Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Proposed Gannow Renewable Energy Development, Co. Galway

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, Flora and Fauna, and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified. Mitigation by design was applied to the finalised Proposed Project layout wherever possible to avoid impacts on Biodiversity. 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 Act, 1976 (as amended) and the EU Habitats Directive 92/43/EEC. Impacts on avian receptors are considered in Chapter 7: Birds 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, Flora and Fauna.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the Baseline Ecological Conditions and Receptor Evaluation 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, Flora and Fauna.

6.1.1 Project Referencing

The Proposed Project will be known as the 'Gannow Renewable Energy Development'.

For the purposes of this EIAR:

- The 'Proposed Project' refers to the entirety of the project ('Proposed Wind Farm' and 'Proposed Grid Connection' as described below) 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.
- The 'Proposed Wind Farm' refers to the 8 no. turbines and associated foundations and hardstanding areas, including access roads, underground internal cabling, permanent meteorological mast, temporary construction compounds, peat and spoil management areas, biodiversity enhancement, tree felling and vegetation removal, site drainage, operational stage signage, 38kV onsite substation, and all ancillary works and apparatus.
    - The 'proposed turbines' refers to the 8 no. turbines associated with the Proposed Wind Farm as outlined above.

- The 'Proposed Grid Connection' refers to the 38kV underground cabling connection from the proposed onsite 38kV substation to the existing Cashla 220kV substation, and all ancillary works and apparatus.
- The 'Site' refers to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green as shown on Figure 1-1 of the EIAR and encompasses an area of approximately 884 hectares.
- The 'Proposed Wind Farm site' refers to the portion of the Site containing the proposed turbines and ancillary infrastructure but excluding the portion of the Site surrounding the Proposed Grid Connection.

In addition:

- 'Key Ecological Receptor" (KER) is defined as a species or habitat occurring within the zone of influence of the development upon which likely significant effects are anticipated.
- Zones of Influence" (ZOI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.

6.1.2 Requirements for Ecological Impact Assessment

National Legislation

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

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife Act. NHAs are legally protected from damage from the date that they are formally proposed for designation[1]. A list of pNHAs was 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 Act. 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**") 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 (hereafter referred to as the Wildlife 2023 Act) introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the

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

Wildlife 2023 Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows:

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

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

Such policies have informed the evaluation of ecological receptors recorded within the Site and the ecological assessment process. Pollinator friendly measures have been incorporated into the Proposed Project, and these are detailed within the Biodiversity Management and Enhancement Plan (BMEP) (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 Habitats Directive lists

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

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 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 into Irish Law. 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 Birds 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 (NIS). 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).

6.1.3 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, 2009) (referred to

[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 NPWS databased. The name applies to candidate SPAs.*

hereafter as the NRA Ecological Impact Assessment Guidelines), and the survey methodology is based on the NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009). 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:

- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.3. Chartered Institute of Ecology and Environmental Management, Winchester.

This assessment has been carried out in accordance with the Environmental Impact Assessment guidance as outlined in Section 1.2.1 of Chapter 1: Introduction of the EIAR.

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

- 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).
- Wildlife Acts as amended.

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).

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

- Galway County Development Plan 2022-2028
- Ireland's 4th National Biodiversity Action Plan 2023-2027
- Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032
- National Planning Framework 2040
- National Development Plan 2021-2030

6.1.4 Statement of Authority

This EIAR chapter has been prepared by Rachel Walsh (B.Sc. Env, MCIEEM). Rachel has over 5 years' experience in ecological consultancy and has worked on Appropriate Assessments and Ecological Impact Assessments for a range of project types, including renewable energy infrastructure, water services infrastructure and transport infrastructure. This report has been reviewed by John Hynes (B.Sc., M.Sc., MCIEEM). John is Ecology Director at MKO with over 15 years' experience in ecological management and assessment.

The baseline terrestrial ecological surveys were undertaken by Rachel Walsh and accompanied by Cuan Feely (BSc. Env) and Caití Farren (BSc.) of MKO. Aquatic surveys were undertaken by Triturus Environmental Ltd, details of surveyors are provided in Appendix 6-3. Details of bat surveyors are provided in Appendix 6-2.

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 the National Parks and Wildlife Service (NPWS) Article 17 maps 2019, 2013 and 2007.
- Review of online web-mappers: NPWS[5], EPA web mappers[6], Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI)[7].
- IFI Reports, where available.
- Data on potential occurrence of protected bryophytes – as per NPWS online map viewer; Flora (Protection) Order Map Viewer – Bryophytes[8].
- Review of relevant Plans, including the NBAP, County Galway Biodiversity Plan and the All-Ireland Pollinator Plan 2021-2025.
- Review of the Bat Conservation Ireland (BCI) Private Database.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Records from the NPWS web-mapper and 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: Background to the Proposed Project of this EIAR and Section 6.6 of this Chapter. This was informed by a review of the planning files prepared for other plans and projects occurring in the wider area.

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 2-8 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 below provides a list of the organisations consulted with regard to biodiversity during the scoping process, and notes where scoping responses were received.

[5] *https://www.npws.ie/maps-and-data*
[6] *https://www.catchments.ie/water-map/*
[7] *https://opendata-ifigeo.hub.arcgis.com/search?layout=grid&type=Web%2520Map%2CWeb%2520Experience%2CDashboard*
[8] *NPWS, 2019, Online map viewer; Flora Protection Order Map Viewer – Bryophytes. Online, Available at: http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e, Accessed: 15/04/2021.*

Table 6-1 Organisations consulted with regard to biodiversity.

Consultee	Response	
Department of Agriculture, Food and the Marine (DAFM)	-	No response received to date
An Taisce	-	No response received to date
Bat Conservation Ireland	-	No response received to date
Birdwatch Ireland	-	No response received to date
Department of Communications, Climate Action and the Environment	-	No response received to date
Department of Housing, Local Government and Heritage	Response received on 21st November 2024.	Response received was in relation to archaeology, no information in relation to nature conservation received. A meeting with the NPWS was requested by MKO ecologists on the 14th of April 2025. Please see Section 6.2.2.1 below in relation to the meeting held on the 6th of May 2025.
Galway County Council – Heritage Officer	-	No response received to date
Inland Fisheries Ireland	Response received on 30th October 2024.	*IFI reviewed a Section 14 Licence application made in July 2024 by Triturus Environmental Ltd to undertake an electrofishing survey for this proposed windfarm at Gannow and adjacent townlands, located in County Galway. The application was subsequently authorised by the Department of the Environment, Climate and Communications.* *Triturus proposed to survey n=15 sites located in the Raford_SC_010 and Clarinbridge_SC_010 river sub-catchments. It is noted that Section 6.2.4.6 Biodiversity of the Scoping Document confirms that the results of the electrofishing/fisheries assessment and fisheries habitat assessment will be compiled into a baseline report suitable to inform the biodiversity section of the EIAR.*
Irish Peatland Conservation Council	-	No response received to date
Irish Wildlife Trust (IWT)	Response received on 15th October 2024.	*Thank you for contacting us. We do not have the staff capacity to respond to this consultation at the moment, but we will endeavour to respond if possible.*

6.2.2.1 Consultation with NPWS

Members of the Project Team, including Environmental Scientists, Ecologists and Ornithologists met with the NPWS on the 6th of May 2025 to discuss the Proposed Project. The main topics discussed in the meeting included the following:

- An overview of the Proposed Project.
- Ecological surveys which have been undertaken to date and their findings.
- Ornithology surveys which have been undertaken to date and their findings.
- The Key Ecological Receptors identified at the Site.
- Proposed plans for habitat enhancement and management measures.

The outcome of the meeting included the following recommendation from the NPWS:

- The proposals as part of the Biodiversity Management and Enhancement Plan (BMEP) would be further strengthened if it can be guaranteed that the measures proposed are commenced in advance of construction of the Proposed Project.

This recommendation has been implemented as part of the BMEP as set out in Appendix 6-4.

6.2.3 Field Surveys

A comprehensive survey of the biodiversity of the Site was undertaken on various dates between 2023 and 2025, as outlined in Table 6-2. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies, dates of survey and guidance followed.

Table 6-2 Ecological Survey Dates

Survey Type	Dates Undertaken
Proposed Wind Farm site walkover surveys	25th September 2023 19th and 30th of July 2024 17th and 25th of September 2024 10th September 2025
Botanical surveys	30th of July 2024 5th and 17th of September 2024 25th of September 2024
Bat surveys	Full details of dates of surveys for manual activity surveys and emergence surveys, static detector surveys, and daytime bat habitat appraisal surveys, are presented in Appendix 6-2.
Otter surveys	20th and 21st of August 2024 8th and 10th of October 2024 Two camera traps were also deployed under licence between the 12th of March 2025 and 18th of April 2025.

Badger surveys	30th of July 2024 7th of October 2024 Two camera traps were also deployed under licence between the 30th July 2024 and 5th September 2024
Marsh fritillary surveys	25th September 2023 4th, 5th and 17th September 2024. 10th September 2025
Aquatic surveys of Proposed Wind Farm site and Proposed Grid Connection	20th and 21st of August 2024
Surveys of Proposed Grid Connection and Turbine Delivery Route including terrestrial (habitats and fauna), otter surveys and bat surveys	10th of October 2024 13th of February 2025 17th of September 2025

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

Multidisciplinary walkover surveys were undertaken within the Site. Floral survey timings fall 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 Site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys including bats, marsh fritillary and relevé surveys.

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 badger setts and areas of suitable habitat, 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. In addition, an inventory of other species of local biodiversity interest was compiled including invertebrates (butterflies, dragonflies, damselflies, beetles), plants, etc.

The multi-disciplinary walkover surveys comprehensively covered the entire Site and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. These surveys were carried out in accordance with the NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna* on National Road Schemes (NRA, 2009).

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.

Other targeted survey methodologies undertaken within the Site 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 EIAR chapter have been classified in accordance with Fossitt (2000). Detailed botanical surveys/relevé assessments of the Site were undertaken. 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.

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

- Commission of the European Communities (2013) *Interpretation manual of European Union habitats*. Eur 27. European Commission DG Environment.
- NPWS (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
- Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018), *The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats*. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013), *The Irish semi-natural grasslands survey 2007-2012*. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.
- Smith, G.F. & Crowley, W. (2020) *The habitats of cutover raised bog*. Irish Wildlife Manuals, No. 128. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Plant nomenclature for vascular plants follows '*New Flora of the British Isles*' (Stace, 2019), while mosses and liverworts nomenclature follows '*Mosses and Liverworts of Britain and Ireland - a field guide'* (British Bryological Society, 2010).

6.2.3.2.1 *Vegetation composition assessment*

Detailed habitat classification and assessment was undertaken by MKO at targeted locations within the Proposed Wind Farm site, with relevés undertaken in 2024 on the 30th July, 5th September, 17th September and 25th September, within representative habitats at each turbine base and associated Proposed Project infrastructure including the proposed onsite 38kV substation, see Appendix 6-1 for all relevé data. The extent of each habitat on site was mapped on site using aerial photography, handheld GPS and smartphone technology. 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 Figure 1-1 of Appendix 6-1 Botanical Study.

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

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

The Engine for Relevés to Irish Communities Assignment (ERICA)[9] is a web application for assigning vegetation data to communities defined by the 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, 2019).

The data collected from the botanical assessments was uploaded to ERICA, analysed and the results data downloaded.

The analysis procedure uses a clustering process to assign classification affinity to vegetation plots based on a degree of membership to each of the communities defined by the IVC. Table 6-3 details the categorizing types of plots utilizing the clustering analysis. This categorizing procedure was utilized to determine if the grassland plots within the Site had any affinity to Annex I grassland and whether further assessment was required. Detailed botanical assessments were not required along the Proposed Grid Connection which is restricted to existing roads, forestry tracks and species poor agricultural grassland, which is further detailed in Section 6.4.1.7.

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 92/43/EEC were identified and classified as Key Ecological Receptors (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 ecological surveys required. Dedicated surveys for bats and badger were undertaken at the times set out below with the methodologies followed also provided below. Dedicated surveys for otter were carried out along the Proposed Grid Connection and at watercourses in the vicinity of the Proposed Wind Farm site. Given the known occurrence of the marsh fritillary butterfly in the area, this species was also focused on during the site visits with dedicated surveys undertaken.

6.2.3.3.1 *Badger Survey*

Areas identified as providing potential habitat for badger were subject to specialist targeted survey. Dedicated badger surveys were conducted on the 30th July and 7th of October 2024. Two camera traps were also deployed under licence between the 30th July and 5th September 2024. The badger surveys covered the entire development footprint and surrounding suitable habitats within the EIAR Site Boundary.

[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: 10.10.2020*

The badger surveys were conducted in order to determine the presence or absence of badger signs within the Proposed Wind Farm and in the wider survey area. This involved a search for all potential badger signs as per NRA (2009[10]) (latrines, badger paths and setts). If encountered, setts would be classified as per the convention set out in NRA (2009) (i.e. main, annexe, subsidiary, outlier).

The badger survey was conducted adhering to best practice guidance (NRA, 2009) and following the *'Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes'* (NRA, 2006a) and CIEEM best practice competencies for species surveys (CIEEM, 2013[11]).

6.2.3.3.2 Otter Survey

Targeted otter surveys were undertaken along the Raford River along its extents within both the eastern and western portions of the Site on the 8th and 10th of October 2024. Camera traps were deployed along the Raford tributary within the Proposed Wind Farm site between the 12th of March 2025 and 18th of April 2025.

In addition, dedicated otter surveys were undertaken along other watercourses in the vicinity of the Site during dedicated aquatic surveys undertaken in August 2024 (Aquatic Baseline Report, Appendix 6-3).

The otter surveys were conducted as per NRA (2009[10]) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the rivers/watercourses, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat (NPWS 2009). The dedicated otter survey also followed the guidance as set out in NRA (2008) *'Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes'* and following CIEEM best practice competencies for species surveys (CIEEM, 2013[12]).

6.2.3.3.3 Marsh Fritillary Surveys

Following the identification of suitable habitat for marsh fritillary within the Proposed Wind Farm site during habitat surveys, as well as the results of the desk study, targeted surveys for the species were undertaken for larval webs on the 25th September 2023 and on the 4th, 5th and 17th September 2024. The survey methodology followed that described in the NRA (2009)[10] best practice guidance document. This involved walked surveys to identify suitable areas of marsh fritillary habitat within or adjacent to the Proposed Wind Farm footprint (Zone of Influence (ZOI)). This was achieved by walking transects through areas of potentially suitable habitat within the Proposed Wind Farm site. Where suitable habitat did occur, detailed surveys to locate larval webs were undertaken. Areas of suitable habitat were also mapped as part of the survey effort and informed the layout of the Proposed Wind Farm.

6.2.3.3.4 Bat Surveys

Detailed descriptions of the survey methodologies undertaken at the Proposed Wind Farm site throughout 2024 are provided within the full Bat Report included as Appendix 6-2 of this EIAR, together with full details of the survey times and the surveyors who carried out the bat survey and

[10] *NRA (2009) Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes. Dublin: National Roads Authority.*
[11] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey, Online, Available at: https://cieem.net/resource/competencies-for-species-survey-css/ Accessed: 20.03.2021*
[12] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey, Online, Available at: https://cieem.net/resource/competencies-for-species-survey-css/ Accessed: 20.03.2021*

assessment work. An assessment of the Proposed Grid Connection and turbine delivery route was also undertaken.

Survey design and effort was created in accordance with the best practice guidelines, '*Bat Surveys: Good Practice Guidelines'* prepared by the Bat Conservation Trust (Collins 2023) and 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 industry guidelines.

6.2.3.4 Aquatic surveys

Dedicated aquatic baseline surveys were undertaken in the vicinity of the Proposed Project on the 20th and 21st of August 2024. All freshwater watercourses which could be affected directly or indirectly by the Proposed Project were considered as part of the current assessment. This included sites in vicinity of the Site inclusive of watercourse crossings associated with the Proposed Wind Farm and the Proposed Grid Connection. Thus, a total of n=15 sites were selected for detailed aquatic assessment. Aquatic survey sites were present on the Raford River (EPA code: 29R01), Cappaghinanool Stream (29C60), Attimon Beg River (29A03), Clarinbridge River (20C02), Toorkeel Stream (29T06), Glennagloughaun Stream (29G17), Shoodaun River (29S03) and a small number of unnamed drainage channels (no EPA codes).

Survey effort focused on both instream and riparian habitats at each aquatic sampling location. Surveys at each of these sites included a fisheries assessment (electro-fishing and or fisheries habitat appraisal), white-clawed crayfish survey, macrophyte and aquatic bryophyte survey and (where suitable) biological water quality sampling (Q-sampling) and macro-invertebrate sweep sampling. The presence of otter (*Lutra lutra*) was determined through the recording of otter signs within 150m radius of each survey site. Notes on the age and location of signs (ITM coordinates) were made, in addition to the quantity and visible constituents of spraint (i.e. remains of fish, crustaceans, molluscs etc.).

In addition, to validate site surveys and to detect potentially cryptically-low populations, composite water samples were collected from the Raford River (at Clogharevaun) and analysed for freshwater pearl mussel (*Margaritifera margaritifera*), white-clawed crayfish and crayfish plague (*Aphanomyces astaci*).

Full details of the methodology followed for the aquatic surveys as well as details of the locations of survey sites is provided in the Aquatic Baseline Report, Appendix 6-3.

6.2.3.5 Invasive species survey

During the multi-disciplinary walkover surveys, a search for non-native invasive species was undertaken within the Site. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

6.2.3.6 Limitations

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the Site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic habits) was assessed.

The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. The habitats and species recorded on site were readily identifiable and comprehensive assessments were made during the field visit. No limitations in respect of the surveys undertaken have been identified.

6.2.4 Methodology for Assessment of Impacts and Effects

6.2.4.1 Identification of Target Receptors and Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of KERs. Following a comprehensive desk study, initial site visits and stakeholder consultation; "Target Receptors" likely to occur in the ZOI of the Proposed Project were identified. The Target Receptors included habitats and species that were protected under the following legislation:

- Annexes of the EU Habitats Directive.
- Qualifying Interests (QI) of SACs within the likely ZOI.
- Species protected under the Wildlife Act as amended.
- Flora (Protection) Order 2022 S.I. No. 235.

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 NRA Ecological Impact Assessment Guidelines (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 receptor. These guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

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

The guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors 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 NRA Ecological Impact Assessment Guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of National or International, County or Local importance (Higher Value) following the criteria set out in the NRA Ecological Impact Assessment Guidelines are considered to be KERs for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be KERs. This is not to say that they are of no biodiversity value, but that impacts on these habitat types in their local context are not likely to result in a significant effect on biodiversity. It should be noted that this relates to the impact on the habitat itself as distinct from considering the role these habitat types play in supporting KER fauna species.

6.2.4.3 Characterisation of Impacts and Effects

The ecological effects of impacts arising from the Proposed Project are characterised as per the CIEEM '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (2018, updated 2024) (hereafter

referred to as CIEEM 2018 Guidelines). The CIEEM 2018 Guidelines are the industry standard for the completion of Ecological Impact Assessment (EcIA) in the UK and Ireland. This chapter has also been prepared in accordance with the corresponding EPA Guidelines (EPA 2022) as detailed in Section 1.2.1 of Chapter 1. The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

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

6.2.4.4 Determining the Significance of Effects

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

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

When determining significance, consideration is given to whether:

- Any processes or key characteristics of KERs 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.

Integrity

In the context of EcIA, 'integrity' refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued (NRA, 2009). Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to the CIEEM 2018 Guidelines, the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

- Its natural range, and areas it covers within that range, are stable or increasing.
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable.

The conservation of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

According to the NRA 2009 Guidelines and CIEEM 2018 Guidelines, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

6.2.4.5 Incorporation of Mitigation

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

6.3 Establishing the Ecological Baseline

6.3.1 Desk Study

The following sections describe the results of a survey of published material that was consulted as part of the desk study for the purposes of the ecological assessment. It provides a baseline of the ecology known to occur in the existing environment. Material reviewed includes the Site Synopses for designated sites within the Likely ZOI, as compiled by the NPWS, plant distribution atlases and other research publications.

6.3.1.1 Designated Sites

6.3.1.1.1 *Identification of the Designated Sites within the Likely Zone of Influence of the Proposed Project*

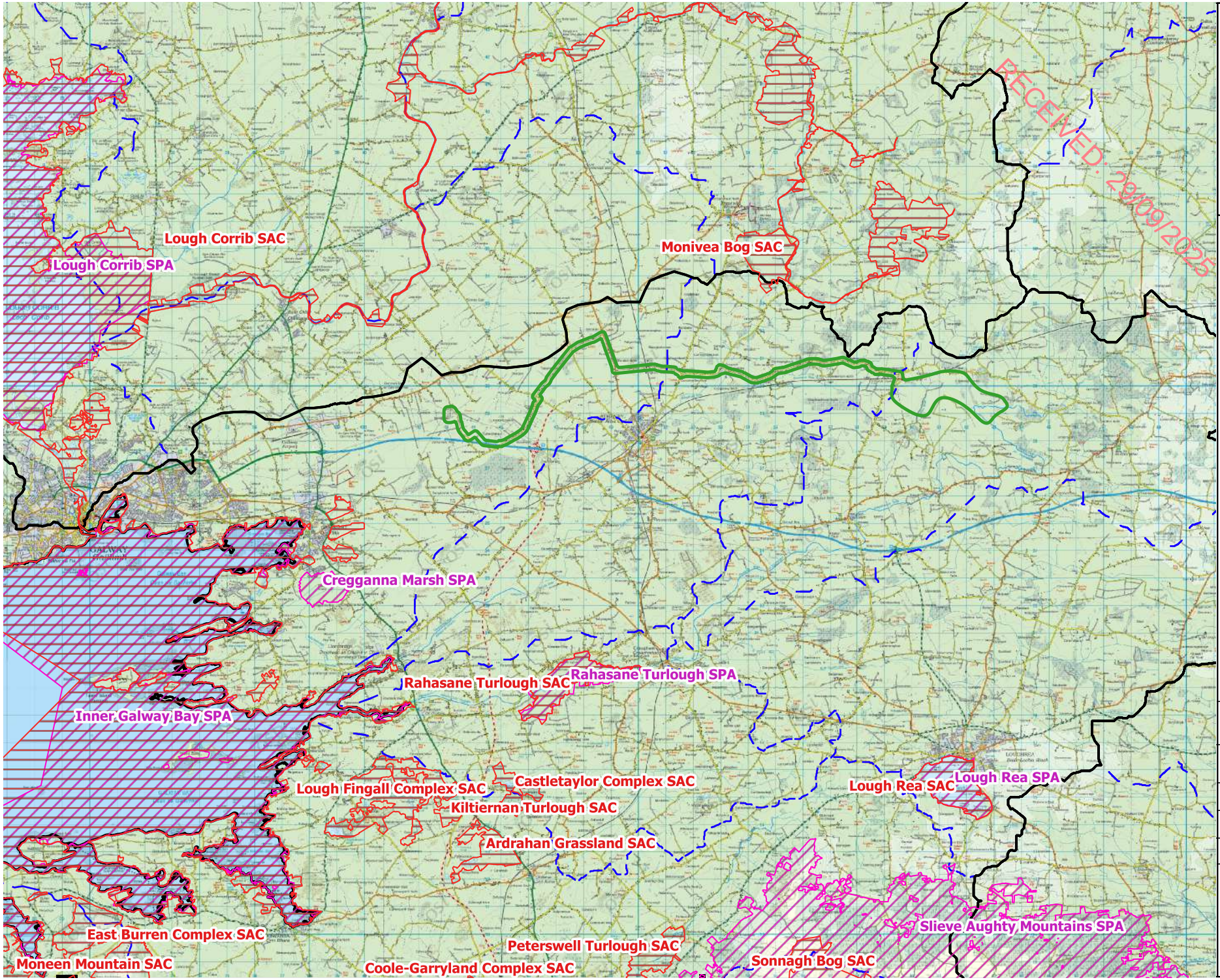
The potential for the Proposed Project to impact on sites that are designated for nature conservation was considered in this Chapter of the EIAR.

SACs and SPAs for Birds are designated under the Habitats Directive and the 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 NIS that accompanies this application. As per EPA 2022 Guidance, *"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 Biodiversity 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 Biodiversity Chapter. NHAs and pNHAs are collectively known as 'Nationally Designated Sites'.

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:

- Initially the most up to date GIS spatial datasets for European and Nationally designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie). The datasets were utilised to identify designated sites which could feasibly be affected by the Proposed Project.
- All European and Nationally designated sites within the vicinity of the Proposed Project 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.
- 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. These figures also display Water Framework Directive hydrological catchments and groundwater bodies.
- Table 6-4 provides details of all relevant Nationally Designated Sites as identified in the preceding steps and assesses which are within the likely ZOI. All European Sites are fully described and assessed in the AA Screening and NIS reports submitted as part of this planning application.
- 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 ZOI and further assessment is required.



Map Legend

- EIAR Site Boundary
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- WFD Hydrological Catchments
- WFD Hydrological Subcatchments

N

Drawing Title: European Designated Sites

Project Title: Gannow Renewable Energy Development

Drawn By	Checked By
RW	JH
Project No.	Drawing No.
240323	Figure 6-1
Scale	Date
1:180,000	06.06.25

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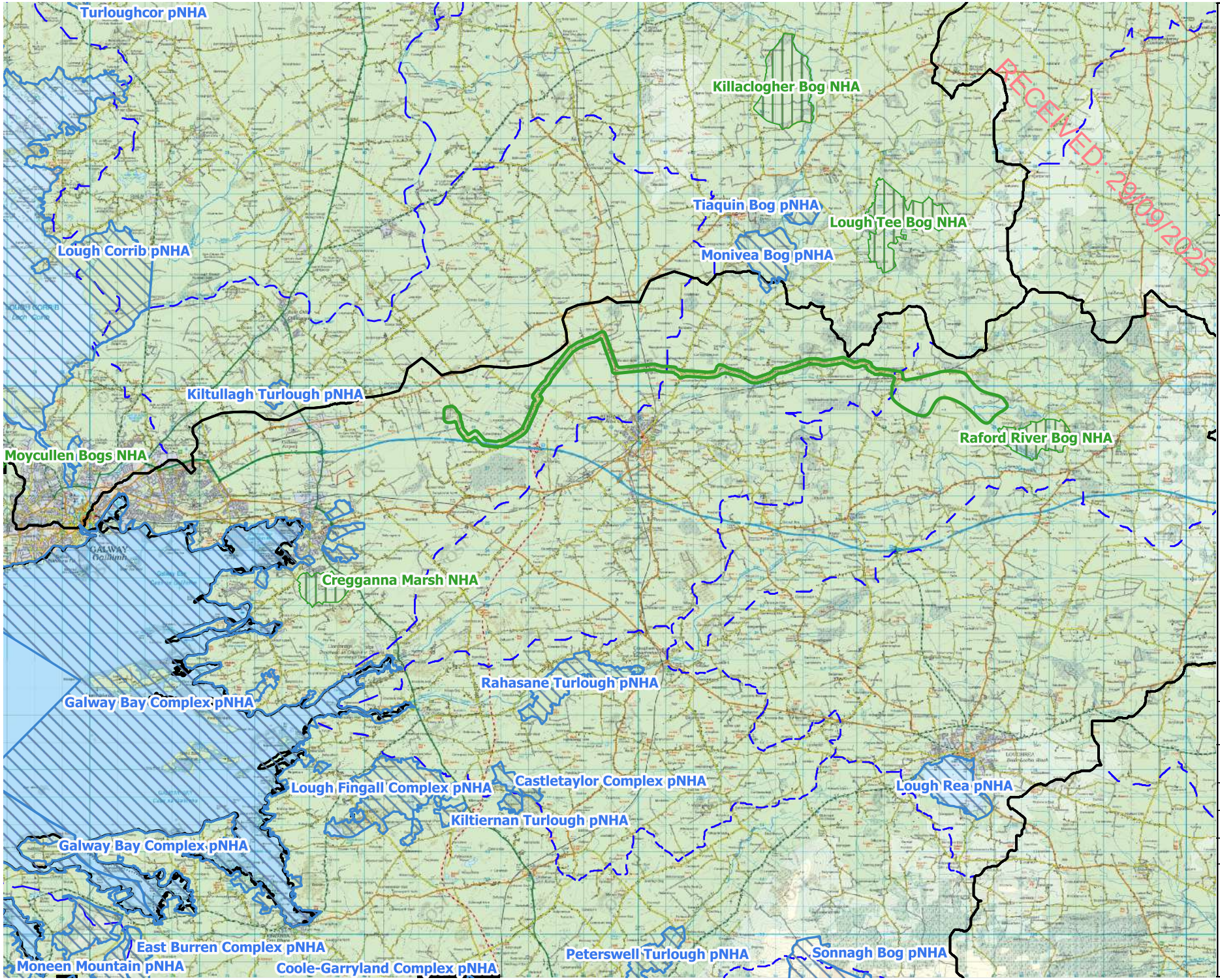

Map Legend

- EIAR Site Boundary
- WFD Hydrological Catchments
- WFD Hydrological Subcatchments
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)

N

Drawing Title
Nationally Designated Sites

Project Title
Gannow Renewable Energy Development

Drawn By	Checked By
RW	JH
Project No.	Drawing No.
240323	Figure 6-2
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Table 6-4: Identification of European and Nationally designated sites within the Likely Zone of Influence

Designated Site	Distance from Proposed Project (km)	Likely Zone of Influence Determination
Special Area of Conservation		
Lough Corrib SAC [00297]	The Proposed Grid Connection is 2km south of the SAC boundary. The Proposed Wind Farm site is located 3.5km southeast of the SAC boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the SAC. **No pathway for significant effects on the European Site has been identified**
Monivea Bog SAC [002352]	The Proposed Grid Connection is 2km south of the SAC boundary. The Proposed Wind Farm site is located 5.3km southeast of the SAC boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the SAC. **No pathway for significant effects on the European Site has been identified**
Galway Bay Complex SAC [000268]	The Proposed Grid Connection is 4.5km northeast of the SAC boundary (over-land). The Proposed Wind Farm site is located 20.1km northeast of the SAC boundary (over-land).	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. The SAC is approx. 28km downstream of the Site via the Raford tributary (which flows in a southerly direction within the western portion of the Proposed Wind Farm site) and it is approx. 32km downstream of the Site via the Raford River (which flows in a southerly direction within the eastern portion of the Proposed Wind Farm site). The Raford River reaches the SAC via the Rahasane Turlough. The SAC is located approx. 17km downstream of the Proposed Grid Connection via the Clarinbridge River. A potential pathway for indirect effect on the SAC was identified via deterioration of water quality as a result of the Proposed Project. **A potential pathway for significant effect on the European Site has been identified and it is considered for further assessment.**
Rahasane Turlough SAC [000322]	The Proposed Grid Connection is 9.7km north of the SAC boundary.	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. The SAC is approx. 28km downstream of the Site via the Raford tributary (which flows in a

Designated Site	Distance from Proposed Project (km)	Likely Zone of Influence Determination
	The Proposed Wind Farm site is located 13.4km northeast of the SAC boundary	southerly direction within the western portion of the Proposed Wind Farm site) and it is approx. 32km downstream of the Site via the Raford River (which flows in a southerly direction within the eastern portion of the Proposed Wind Farm site). There is no hydrological connectivity between the SAC and the Proposed Grid Connection. A potential pathway for indirect effect on the SAC was identified via deterioration of water quality as a result of the Proposed Wind Farm. **A potential pathway for significant effect on the European Site has been identified and it is considered for further assessment.**
Lough Rea SAC [000304]	The Proposed Wind Farm site is 12.2km north of the SAC boundary.	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the SAC, **No pathway for significant effects on the European Site has been identified**
Lough Fingall Complex SAC [000606]	The Proposed Grid Connection is 12.3km north of the SAC boundary. The Proposed Wind Farm site is located 21.2km northeast of the SAC boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the SAC, **No pathway for significant effects on the European Site has been identified**
Castletaylor Complex SAC [000242]	The Proposed Grid Connection is 12.5km north of the SAC boundary. The Proposed Wind Farm site is located 19.1km northeast of the SAC boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. The Proposed Wind Farm is within a separate groundwater body to the SAC, while the Proposed Grid Connection is over 12.5km from the SAC. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the SAC. **No pathway for significant effects on the European Site has been identified**

Designated Site	Distance from Proposed Project (km)	Likely Zone of Influence Determination
Kiltiernan Turlough SAC [001285]	The Proposed Grid Connection is 13.9km north of the SAC boundary. The Proposed Wind Farm site is located 21.5km northeast of the SAC boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. The Proposed Wind Farm is within a separate groundwater body to the SAC, while the Proposed Grid Connection is over 13.9km from the SAC. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the SAC. **No pathway for significant effects on the European Site has been identified**
Special Protection Areas (SPA)		
Inner Galway Bay SPA [004031]	The Proposed Grid Connection is located 6.4km northeast of the SPA boundary The Proposed Wind Farm site is located 22km east of the SPA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. The SAC is approx. 28km downstream of the Site via the Raford tributary (which flows in a southerly direction within the western portion of the Site) and it is approx. 32km downstream of the Site via the Raford River (which flows in a southerly direction within the eastern portion of the site). The Raford River reaches the SPA via the Rahasane Turlough. The SPA is located approx. 17km downstream of the Proposed Grid Connection via the Clarinbridge River. A potential pathway for indirect effect on the SPA was identified via deterioration of water quality and via potential impacts to Special Conservation Interest (SCI) bird species as a result of collision risk or habitat loss from the Proposed Wind Farm. **A potential pathway for significant effect on the European Site has been identified, and it is considered for further assessment.**
Cregganna Marsh SPA [004142]	The Proposed Grid Connection is located 6.8km northeast of the SPA boundary The Proposed Wind Farm site is located 22.6km northeast of the SPA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. There is no potential for indirect effect via hydrological impacts on the SPA, as there is no hydrological connectivity between the SPA and the Proposed Project. The Proposed Wind Farm site is located completely outside of the core foraging range for

Designated Site	Distance from Proposed Project (km)	Likely Zone of Influence Determination
		Greenland White-fronted Goose (5.8km, SNH 2016), therefore there is no potential for indirect or direct ex-situ effects. Given the small scale and nature of the works associated with the Proposed Grid Connection, and the lack of significant supporting habitat for the species in the footprint, there is no potential for indirect or direct ex-situ effects. **No pathway for significant effects on the European Sites has been identified**
Rahasane Turlough SPA [004089]	The Proposed Grid Connection is located 9.7km north of the SPA boundary The Proposed Wind Farm site is located 13.4km northeast of the SPA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. The SAC is approx. 28km downstream of the Site via the Raford tributary (which flows in a southerly direction within the western portion of the Site) and it is approx. 32km downstream of the Site via the Raford River (which flows in a southerly direction within the eastern portion of the site). There is no hydrological connectivity between the SPA and the Proposed Grid Connection. A potential pathway for indirect effect on the SPA was identified via deterioration of water quality as a result of the Proposed Wind Farm. **A potential pathway for significant effect on the European Site has been identified and it is considered for further assessment.**
Lough Corrib SPA [004042]	The Proposed Grid Connection is located 10.7km east of the SPA boundary The Proposed Wind Farm site is located 27.3km east of the SPA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the SPA. **No pathway for significant effects on the European Site has been identified**
Lough Rea SPA [004134]	The Proposed Wind Farm site is located 12.2km north of the SPA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the European Site. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the SPA. **No pathway for significant effects on the European Site has been identified**
Natural Heritage Area (NHA)		

Designated Site	Distance from Proposed Project (km)	Likely Zone of Influence Determination
Raford River Bog NHA [000321]	The Proposed Wind Farm site is located 0.4km west of the NHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the NHA boundary. The NHA is designated for raised bog habitat which includes high bog and cutover bog. The Raford River flows into the NHA boundary 400m downstream of the Proposed Wind Farm site. A potential pathway for impact as a result of deterioration in water quality was identified. **A potential pathway for significant effect on the Nationally Designated Site has been identified and it is considered for further assessment.**
Lough Tee Bog NHA [000307]	The Proposed Wind Farm site and Proposed Grid Connection are located over 3km south of the NHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the NHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Killaclogher Bog NHA [001280]	The Proposed Grid Connection is located 6.8km northeast of the NHA boundary. The Proposed Wind Farm site is over 10km southeast of the NHA	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the NHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Crit Island West NHA [000254]	The Proposed Wind Farm site is located 12.7km west of the NHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the NHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Proposed Natural Heritage Areas (pNHA)		
Monivea Bog pNHA [000311] *This site is also an SAC*	The Proposed Grid Connection is located 3km south of the pNHA boundary.	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site.

Designated Site	Distance from Proposed Project (km)	Likely Zone of Influence Determination
	The Proposed Wind Farm site is located 5.3km southeast of the pNHA boundary.	There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the pNHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Galway Bay Complex pNHA [000268] *This site is also an SAC and SPA*	The Proposed Grid Connection is located 4.6km northeast of the pNHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. The SAC is approx. 28km downstream of the Site via the Raford tributary (which flows in a southerly direction within the western portion of the Proposed Wind Farm site) and it is approx. 32km downstream of the Site via the Raford River (which flows in a southerly direction within the eastern portion of the Proposed Wind Farm site). The Raford River reaches the pNHA via the Rahasane Turlough. The pNHA is located approx. 17km downstream of the Proposed Grid Connection via the Clarinbridge River. A potential pathway for indirect effect on the pNHA was identified via deterioration of water quality as a result of the Proposed Project. **A potential pathway for significant effect on the Nationally Designated Site has been identified and it is considered for further assessment.**
Tiaquin Bog pNHA [001709]	The Proposed Grid Connection is located 4.9km south of the pNHA boundary.	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the pNHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Kiltullagh Turlough pNHA [000287]	The Proposed Grid Connection is located 4.9km east of the pNHA boundary. The Proposed Wind Farm site is 23km from the pNHA boundary.	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the pNHA. Given the scale of the works and the distance between the Proposed Project and the pNHA, there is no potential for indirect effect. **No pathway for significant effects on the Nationally Designated Site has been identified**

Designated Site	Distance from Proposed Project (km)	Likely Zone of Influence Determination
Lough Corrib pNHA [000297] *This site is also an SAC and SPA*	The Proposed Grid Connection is located 10.7km east of the pNHA boundary. The Proposed Wind Farm site is located 27.3km east of the pNHA boundary.	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as the Proposed Project is located in a completely separate hydrological catchment to the pNHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Rahasane Turlough pNHA [000322] *This site is also an SAC and SPA*	The Proposed Grid Connection is located 9.6km north of the pNHA boundary. The Proposed Wind Farm site is located 13.4km northeast of the pNHA boundary.	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. The SAC is approx. 28km downstream of the Site via the Raford tributary (which flows in a southerly direction within the western portion of the Proposed Wind Farm site) and it is approx. 32km downstream of the Site via the Raford River (which flows in a southerly direction within the eastern portion of the Proposed Wind Farm site). There is no hydrological connectivity between the pNHA and the Proposed Grid Connection. A potential pathway for indirect effect on the pNHA was identified via deterioration of water quality as a result of the Proposed Wind Farm. **A potential pathway for significant effect on the Nationally Designated Site has been identified and it is considered for further assessment.**
Callow Lough pNHA [001239]	The Proposed Wind Farm site is located 9.7km southwest of the pNHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the pNHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Lough Rea pNHA [000304] *This site is also an SAC and SPA*	The Proposed Wind Farm site is located 12.2km north of the pNHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the pNHA. **No pathway for significant effects on the Nationally Designated Site has been identified**

Designated Site	Distance from Proposed Project (km)	Likely Zone of Influence Determination
Lough Fingall Complex pNHA [000606] *This site is also an SAC*	The Proposed Grid Connection is located 12.4km north of the pNHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the pNHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Castletaylor Complex pNHA [000242] *This site is also a SAC*	The Proposed Grid Connection is located 12.5km north of the pNHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. The Proposed Wind Farm is within a separate groundwater body to the pNHA, while the Proposed Grid Connection is over 12.5km from the pNHA. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the pNHA. **No pathway for significant effects on the Nationally Designated Site has been identified**
Kiltiernan Turlough pNHA [001285] *This site is also a SAC*	The Proposed Grid Connection is located 13.9km north of the pNHA boundary	There is no potential for direct effect as the Proposed Project is located completely outside of the Nationally Designated Site. The Proposed Wind Farm is within a separate groundwater body to the pNHA, while the Proposed Grid Connection is over 13.9km from the pNHA. There is no potential for indirect effects as there is no hydrological connectivity between the Proposed Project and the pNHA. **No pathway for significant effects on the Nationally Designated Site has been identified**

Designated Sites identified as being within the Likely Zone of Influence

The following designated sites are identified as being within the Likely Zone of Influence and are assessed further in the accompanying NIS:

- Galway Bay Complex SAC [000268]
- Rahasane Turlough SAC [000322]
- Inner Galway Bay SPA [004031]
- Rahasane Turlough SPA [004089]

The following nationally designated sites have been identified as being within the Likely Zone of Influence of the Proposed Project:

- Raford River Bog NHA [000321]
- Galway Bay Complex pNHA [000268]
- Rahasane Turlough pNHA [000322]

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 was carried out as part of this assessment.

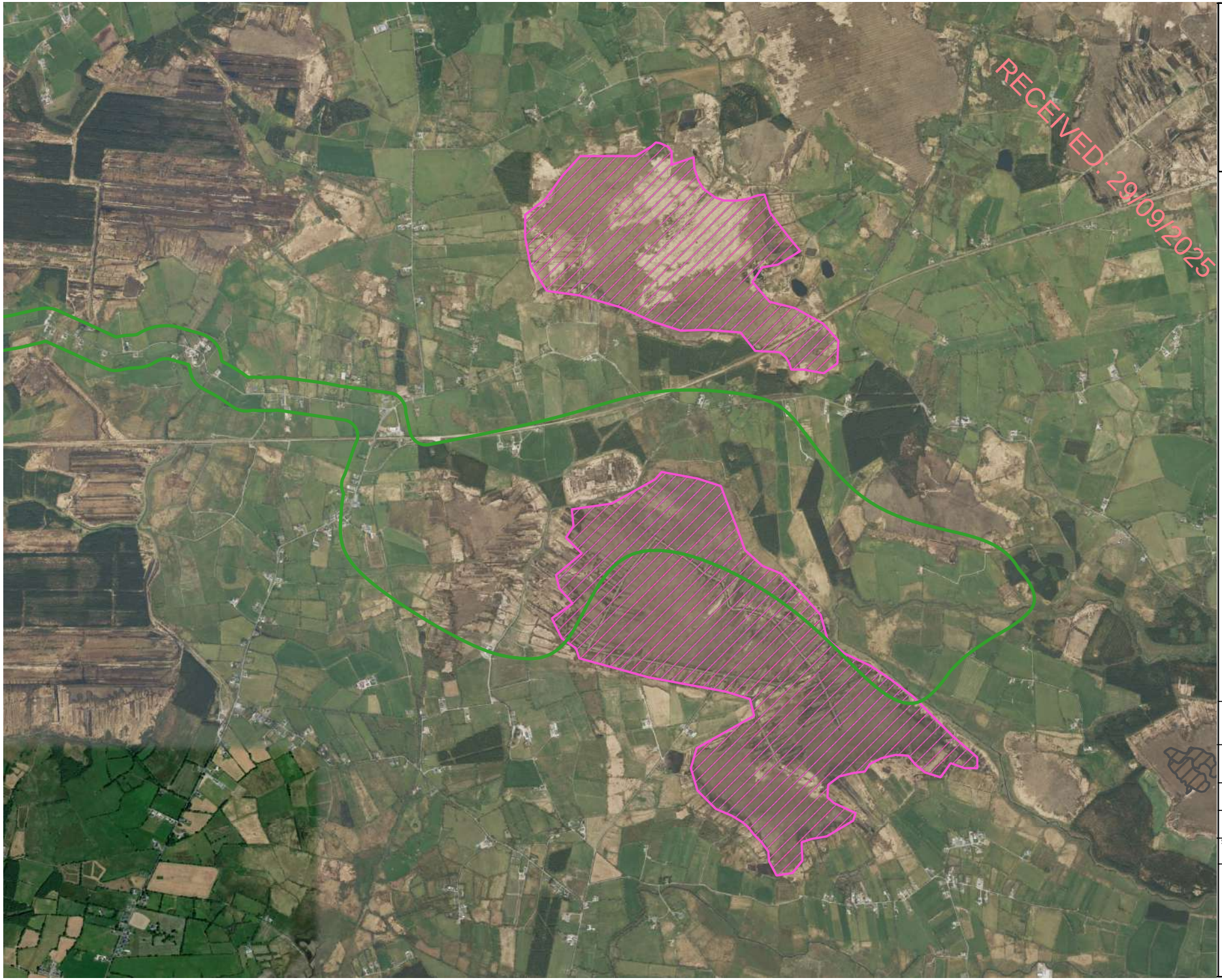
The desk study involved a search of information pertinent to the Site. Initially the NPWS designated site datasets were consulted. Areas of Habitats Directive Annex I habitat 'Active raised bog [7110]' are located within the Proposed Wind Farm site and surrounding areas. These areas are shown on Figure 6-3.

Areas of 'Limestone pavement [8240], 'Orchid rich calcareous grassland [6210]' and 'Dry heath' are present approx. 1.5km to 2km north of the Proposed Grid Connection.

Areas of 'Orchid rich calcareous grassland [6210]' are also mapped 1.7km southwest from the Proposed Grid Connection.

Areas of 'Cladium fens [7210]' are mapped approx. 600m southeast of the Proposed Grid Connection.

Areas of 'Turlough [3180]' are mapped approx. 2.9km southwest of the Proposed Grid Connection underground cabling terminus at the Cashla 220kV substation.



Map Legend

- EIAR Site Boundary
- Active Raised Bog 1
- Active Raised Bog 2

Drawing Title

Article 17 Habitats

Project Title: Gannow Renewable Energy Development	
Drawn By: RW	Checked By: JH
Project No.: 240323	Drawing No.: Figure 6-3
Scale: 1:30,000	Date: 06.06.25

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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 II of the EU Habitats Directive, The Irish Red Data Book – 1 Vascular Plants (Curtis, 1988) or the Flora (Protection) Order 2022 S.I. No. 235 had been recorded in the relevant 10km square in which the Site is situated. Species of conservation concern are given in Table 6-5. No species listed in Annex II of the Habitats Directive are shown in the atlas for squares M43, M42, M52, M62, M53, M63,

The NPWS Flora (Protection) Order 2022 online map viewer[13] was also consulted for records of Flora (Protection) Order species within or adjacent to the Proposed Project.

Table 6-5: Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad M43, M53, M63, M42, M52, M62

Common Name	Scientific Name	Status	Hectad
Northern Yellow-cress	*Rorippa islandica*	LC	M42
Wood Bitter-vetch	*Vicia orobus*	FPO, NT	M42, M43
Small-white Orchid	*Pseudorchis albida*	FPO, VU	M42, M43
Spring Gentian	*Gentiana verna*	NT	M42, M52
Greater Knapweed	*Centaurea scabiosa*	NT	M42, M52, M62
Autumn Lady's-tresses	*Spiranthes spiralis*	NT	M42
Irish Whitebeam	*Sorbus hibernica*	VU	M42
Dense-flowered Orchid	*Neotinea maculata*	NT	M52
Least Bur-reed	*Sparganium natans*	NT	M63

FPO = Floral Protection Order; Red List of Vascular Plants = Near Threatened (NT), Vulnerable (VU), Least Concern (LC)

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 on the 26th of September 2024.

Ribbonwort (*Pallavicinia lyellii*) was recorded in the hectad M53 within Monivea Bog SAC. This species of liverwort is a Protected Species: under the Flora (Protection) Order (FPO, 2022) and is classified as Endangered.

Fir Clubmoss (*Huperzia salago*) was recorded within the hectad M62, this species is protected under Annex V of the Habitats Directive.

Large White-moss (*Leucobryum glaucum*) recorded within the hectad M52, this species is protected under Annex IV of the Habitats Directive.

[13] https://heritagedata.maps.arcgis.com/apps/webappviewer/index.html?id=a41ef4e10227499d8de17a8abe42bd1e

6.3.1.5 National Biodiversity Data Centre (NBDC) Records

A search of the NBDC website was conducted in advance of undertaking field surveys in 2023/2024, and an updated search was carried out on the 17th June 2025. This helped to inform survey effort and provide a baseline of likely species composition in the area. Records of protected fauna recorded from the relevant hectads are provided in Table 6-6.

NBDC and Bird Atlas records for birds are provided in Chapter 7 and are not repeated here.

Table 6-6: NBDC records for protected species and species of conservation interest (excl. birds) in hectads M42, M43, M52, M62, M53, M63,

Common Name (Scientific Name)	Designation	Hectad
Reptiles and Amphibians		
Common Frog (*Rana temporaria)*	HD Annex V; WA	M42, M52, M62, M43, M53, M63
Smooth Newt *(Lissotriton vulgaris)*	WA	M42, M52, M62, M43, M53, M63
Common lizard (*Zootoca vivipara)*	WA	M52
Terrestrial Mammal		
Hedgehog (*Erinaceus europaeus)*	WA	M42, M52, M62, M43, M53, M63
Otter (*Lutra lutra)*	HD Annex II, IV; WA	M42, M52, M62, M43, M53, M63
Pine Marten (*Martes martes)*	HD Annex V; WA	M42
Badger (*Meles meles)*	WA	M42, M52, M62, M43, M53, M63
Red Squirrel (*Sciurus vulgaris)*	WA	M42, M52, M62, M43, M53, M63
Pygmy Shrew (*Sorex minutus)*	WA	M52, M62
Irish Hare (*Lepus timidus subsp. hibernicus*)	WA	M52, M62, M43, M53, M63
Irish Stoat (*Mustela erminea subsp. hibernica*)	WA	M52, M43, M53, M63
Fallow deer (*Dama dama)*	WA	M52, M53
Invertebrates		
Marsh Fritillary (*Euphydryas aurinia)*	HD Annex II, WA	M42, M52, M62, M43, M53, M63
Freshwater White-clawed Crayfish (*Austropotamobius pallipes)*	HD Annex II; V, WA	M52, M62, M43, M53

HD Annex I, Annex II, Annex IV, Annex V = EU Habitats Directive; WA = Wildlife Acts (Ireland)

6.3.1.5.1 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectads. Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) include legislative measures to deal with the introduction, dispersal, dealing in and keeping of non-native species. Records of invasive species subject to restrictions under Regulations 49 and 50 and included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) are present within some of the hectads.

Table 6-7: NBDC records for invasive species (hectads M42, M43, M52, M53, M62, M63)

Common Name	Scientific Name	Threat	Hectad
Japanese Knotweed	*Fallopia japonica*	Third Schedule, High Impact	M42, M52, M53, M63
Sycamore	*Acer pseudoplatanus*	Medium Impact	M42, M52, M62, M43, M53, M63
Budapest Slug	*Tandonia budapestensis*	Medium Impact	M42, M43, M63
Common Garden Snail	*Cornu aspersum*	Medium Impact	M42, M52, M62, M43, M53, M63
Jenkins' Spire Snail	*Potamopyrgus antipodarum*	Medium Impact	M42, M52, M62, M43, M53, M63
American Mink	*Mustela vison*	Third Schedule, High Impact	M42, M62, M43, M63
Bank Vole	*Myodes glareolus*	Medium Impact	M42, M52, M62, M43, M53, M63
European Rabbit	*Oryctolagus cuniculus*	Medium Impact	M42, M52, M62, M43, M53, M63
New Zealand Flatworm	*Arthurdendyus triangulatus*	High Impact	M42, M52, M43, M53
Cherry Laurel	*Prunus laurocerasus*	High Impact	M42, M52, M53
Himalayan Honeysuckle	*Leycesteria formosa*	Medium Impact	M42, M52
Indian Balsam	*Impatiens glandulifera*	Third Schedule, High Impact	M52, M63
Rhododendron	*Rhododendron ponticum*	Third Schedule, High Impact	M52, M53, M63
Traveller's-joy	*Clematis vitalba*	Medium Impact	M52
Keeled Slug	*Tandonia sowerbyi*	Medium Impact	M52, M43
Brazilian Giant-rhubarb	*Gunnera manicata*	Third Schedule	M43
Butterfly-bush	*Buddleja davidii*	Medium Impact	M43, M53

6.3.1.6 Bat Records

Bat Conservation Ireland

A data request was sent to Bat Conservation Ireland for records of bat activity within 10km and roosts within a 1km radius of an approximate central point within the Proposed Wind Farm site (Grid Ref: M 61163 30196). Available bat records were provided by BCI on 16th June 2025. The search included roosts, transects and ad-hoc observations. A number of ad-hoc observations (n=23) have been recorded. At least eight of Ireland's nine resident bat species were recorded within 10km of the Proposed Wind Farm site. The results of the database search are provided in Table 6-8 below.

Table 6-8 National Bat Database of Ireland Records within 10km of the Proposed Wind Farm site

Record	Species	Grid Reference	Date	Location
Roost	*Plecotus auritus*	M5845130739	N/A	Ballynanulty Bridge, Attymon, County Galway
	Myotis daubentonii	M5180020400	N/A	Caherdangan bridge, Co. Galway
	Unidentified bat	M5180020400	N/A	Caherdangan bridge Co. Galway
	Plecotus auritus	M5838	N/A	Colmanstown Co Galway
	M*yotis Daubentonii*	M5821633744	N/A	Clogh, Co Galway
	Nyctalus leisleri, Pipistrellus pygmaeus, Pipistrellus pipistrellus	M5221	N/A	Garracloone South, Craughwell, Co. Galway
	Nyctalus leisleri,Plecotus auritus,Pipistrellus pygmaeus,Pipistrellus pipistrellus	M6731	N/A	Ballinasloe, County Galway
	Unidentified bat	M6731	N/A	Ballinasloe, Co. Galway
Transect	*Myotis natterreri,Myotis spp., Pipistrellus spp., Pipistrellus pygmaeus,Pipistrellus pipistrellus*	M583244	N/A	Clougharevaun Bridge Transect
	Myotis daubentonii	M644204	N/A	Lisduff Townland Transect
	Myotis daubentonii, Unidentified bat	M6080026100	N/A	Rafford House Transect
	Myotis daubentonii, Unidentified bat	M6080026100	N/A	Rafford House Transect spot 1
	Myotis daubentoniid	M5996025720	N/A	Rafford House Transect spot 10
	Myotis daubentoniid	M6074026000	N/A	Rafford House Transect spot 2
	Myotis daubentonii, Unidentified bat	M6059025900	N/A	Rafford House Transect spot 3
	Unidentified bat, *Myotis daubentonii*	M6051025920	N/A	Rafford House Transect spot 4

Record	Species	Grid Reference	Date	Location
	Unidentified bat, *Myotis daubentonii*	M6045025920	N/A	Rafford House Transect spot 5
	Unidentified bat, *Myotis daubentonii*	M6083726048	N/A	Rafford House Transect spot 6
	Myotis daubentonii, Unidentified bat	M6030025870	N/A	Rafford House Transect spot 7
	Myotis daubentonii	M6019025810	N/A	Rafford House Transect spot 8
	Myotis daubentoniid	M6009025770	N/A	Rafford House Transect spot 9
	Unidentified bat, *Myotis daubentonii*	M5473423259	N/A	Rattys Bridge Transect
Ad-Hoc	*Myotis natterreri, Myotis spp., Pipistrellus spp., Pipistrellus pygmaeus, Pipistrellus pipistrellus*	M5223	26/05/2008	Bat Conservation Ireland Bat Walks
	Pipistrellus pygmaeus, Pipistrellus pipistrellus	M5565235458	05/10/2009	BATLAS 2010
	Myotis daubentonii, Myotis spp., Pipistrellus pygmaeus	M5593237912	05/10/2009	BATLAS 2010
	Pipistrellus pygmaeus	M5681935217	05/10/2009	BATLAS 2010
	Pipistrellus pygmaeus	M5425635995	05/10/2009	BATLAS 2010
	Pipistrellus pipistrellus, Pipistrellus pygmaeus	M5594237905	04/09/2019	BATLAS 2020
	Myotis spp., Plecotus auritus, Pipistrellus pygmaeus, Pipistrellus pipistrellus	M5427635995	04/09/2019	BATLAS 2020
	Myotis spp., Plecotus auritus, Myotis daubentonii, Nyctalus leisleri, Pipistrellus pygmaeus, Pipistrellus pipistrellus	M6817630745	04/09/2019	BATLAS 2020
	Unidentified bat, *Pipistrellus pipistrellus, Pipistrellus pygmaeus*	M5793024995	13/08/2019	BATLAS 2020
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Unidentified bat	M6267522360	13/08/2019	BATLAS 2020
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Plecotus auritus	M6578028344	13/08/2019	BATLAS 2020
	Pipistrellus pipistrellus, Pipistrellus pygmaeus	M6795937805	04/09/2019	BATLAS 2020
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Plecotus auritus, Myotis mystacinus	M5282323524	13/08/2019	BATLAS 2020
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri, Myotis natterreri	M6747539160	08/08/2016	Consultancy Surveys
	Pipistrellus pipistrellus, Pipistrellus pygmaeus	M5704025400	14/08/2012	Consultancy Surveys
	Pipistrellus pygmaeus, Pipistrellus pipistrellus, Nyctalus leisleri, Myotis mystacinus/brandtii	M7000028000	30/06/2003	Consultancy Surveys
	Pipistrellus pipistrellus, Pipistrellus pygmaeus	M6300025000	21/08/2006	Consultancy Surveys

Record	Species	Grid Reference	Date	Location
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri, Myotis mystacinus/brandtii	M7000029000	30/06/2003	Consultancy Surveys
	Pipistrellus pygmaeus, Myotis natterreri	M5300036000	29/09/2006	Consultancy Surveys
	Pipistrellus pipistrellus	M5800024000	15/08/2006	Consultancy Surveys
	Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri	M638401	03/09/2020	National Biodiversity Data Centre Bat Records
	Pipistrellus pygmaeus, Nyctalus leisleri	M531276	13/06/2022	National Biodiversity Data Centre Bat Records
	Myotis daubentonii	M608261	05/08/2022	National Biodiversity Data Centre Bat Records

National Biodiversity Data Centre

The National Bat Database of Ireland and National Lesser Horseshoe Bat Database was searched for records of bat activity and roosts within a 10km radius of a central point within the Proposed Wind Farm site (last search 3rd June 2025). Eight of Ireland's nine bat species were recorded in the hectads located within 10km of the Proposed Wind Farm site. The only species not recorded was the lesser horseshoe bat. The results of the database search are provided in Table 6-9 below.

Table 6-9 NBDC Bat Records within 10km of the Proposed Wind Farm site

Hectad	Species	Database	Designation
M42, M52, M62, M43, M53, M63	Brown Long-eared Bat (*Plecotus auritus*)	National Bat Database of Ireland	HD Annex IV, WA
M42	Lesser Horseshoe Bat (*Rhinolophus hipposideros*)	National Lesser Horseshoe Bat Database	HD Annex II & IV, WA
M42, M52, M43, M63	Lesser Noctule (*Nyctalus leisleri*)	National Bat Database of Ireland	HD Annex IV, WA
M42, M52, M43, M53, M63	Natterer's Bat *(Myotis nattereri)*	National Bat Database of Ireland	HD Annex IV, WA
M42, M52, M62, M43, M53, M63	Common Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	National Bat Database of Ireland	HD Annex IV, WA
M42, M52, M62, M43, M53, M63	Soprano Pipistrelle (*Pipistrellus pygmaeus*)	National Bat Database of Ireland	HD Annex IV, WA
M42, M52, M62, M43, M53, M63	Daubenton's Bat *(Myotis daubentonii)*	National Bat Database of Ireland	HD Annex IV, WA

Hectad	Species	Database	Designation
M52	Whiskered Bat (*Myotis mystacinus*)	National Bat Database of Ireland	HD Annex IV, WA

6.3.1.1 NPWS Protected Species Records

NPWS online records were searched to see if any rare or protected species of flora or fauna have been recorded within the relevant hectads. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database. A response was received on the 25th April 2025. Table 6-10 below lists rare and protected species records obtained from NPWS. Records for birds are set out in Chapter 7 of this EIAR.

Table 6-10: NPWS records for rare and protected species

Common name (Scientific Name)	Designation	Hectad(s)
Mammals		
Fallow Deer (*Dama dama)*	WA	M63, M62
Hedgehog (*Erinaceus europaeus)*	WA	M42, M52, M53
Otter (*Lutra lutra)*	HD Annex II, IV; WA	M53, M63, M43, M42, M62, M52
Pine Marten (*Martes martes)*	HD Annex V; WA	M52, M53
Badger (*Meles meles)*	WA	M63, M43, M52, M42,
Irish Hare (*Lepus timidus subsp. Hibernicus*)	WA	M42, M43, M52, M53, M62, M63
Irish Stoat	WA	M52
Red Squirrel	WA	M52
Red Deer (*Cervus elaphus*)	WA	M62
Reptiles and Amphibians		
Common Frog (*Rana temporaria*)	HD Annex V: WA	M42, M43, M52, M53, M63
Smooth Newt (*Lissotriton vulgaris*)	WA	M43
Invertebrates		
White Clawed Crayfish *(Austropotamobius pallipes)*	HD Annex II, V; WA	M43, M52, M53, M62, M63
Fish		
Atlantic Salmon (*Salmo salar*)	HD Annex II, V	M62
European Eel (*Anguilla anguilla*)	OSPAR	M62
Vascular Plants		

Common name (Scientific Name)	Designation	Hectad(s)
Fly Orchid *(Ophrys insectifera)*	RL (Near Threatened)	M43
Fen Violet (*Viola persicifolia*)	RL (Near Threatened)	M52
Small White Orchid *(Pseudorchis albida)*	FPO; RL (Vulnerable)	M42, M43
Wood Bitter-vetch (*Vicia orobus*)	FPO; RL (Vulnerable)	M42, M43
Bryophytes		
Cladonia ciliata	HD Annex V	M53, M63
Cladonia ciliata var. tenuis	HD Annex V	M62
Cladonia portentosa	HD Annex V	M43, M53, M62, M63

HD = EU Habitats Directive; WA = Wildlife Act (Ireland); BD = Birds Directive; BoCC = Birds of Conservation Concern; FPO = Flora Protection Order; RL = Red List

6.3.1.1.1 Marsh Fritillary

The NPWS point dataset for Marsh Fritillary (*Euphydryas aurinia)* was reviewed on GIS to ascertain whether records for the species are present in the vicinity of the Site. Records for Marsh Fritillary are present on bog complexes to the north of the Proposed Wind Farm site, with the closest record approximately 1.6km north of the Proposed Wind Farm site. There is also a record on grassland approx. 4km southeast of the Proposed Wind Farm site.

6.3.1.2 Aquatic Fauna and Fisheries Data

The following desk study data review has been summarised with full details provided in the Aquatic Baseline Report (Appendix 6-3).

6.3.1.2.1 Inland Fisheries Ireland Data

A search of the Inland Fisheries Ireland (IFI) online database was carried out to determine the species richness of the adjacent watercourses. As summarised in the Aquatic Baseline Report:

'The Clarinbridge (or Clarin) River is known to support Atlantic salmon (Salmo salar), brown trout (Salmo trutta), European eel (Anguilla anguilla) and lamprey (Lampetra sp.) with sea trout in the lower reaches (IFI data).

Approximately 1km east of Craughwell, the Raford River forms a confluence with the Dunkellin River (south of the Clarinbridge catchment). According to the fish counter data from 2024 (IFI, 2024), the Dunkellin River supports small runs of spring salmon (n=15), larger numbers of summer grilse (n=151) and small numbers of late summer salmon (n=12). The Dunkellin River also supports low densities of seatrout (n=46) based on the fish counter data. However, the Dunkellin River is not currently meeting the catchment wide electro-fishing (CWEF) mean minimum threshold of ≥17 salmon fry/5 min electro-fishing effort (mean 7.23 of salmon parr; TEGOS, 2023) indicating the numbers of salmon are below recommended conservation thresholds for open rivers for salmon angling. No other fisheries data was available for the remaining rivers in the study area.'

6.3.1.2.2 *Other Protected Aquatic Species*

As summarised in the Aquatic Baseline Report:

'A comprehensive desktop review of available data from the National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Inland Fisheries Ireland (IFI), Botanical Society of Britain and Ireland (BSBI), National Crayfish Plague Surveillance Programme (NCPSP), EPA and Triturus databases for the 10km grid squares containing and adjoining the Proposed Project site (i.e. squares M52, M53, M62 & M63) identified records for a low number of rare and or protected aquatic species within the vicinity of the Proposed Project.

The Raford River, a tributary of the Dunkellin River, is known to support white-clawed crayfish (Austropotamobius pallipes) (EPA/NPWS/NBDC data & pers. obs.) with records overlapping the survey area (e.g. site A3). White-clawed crayfish are also known from the Clarinbridge catchment to the north both upstream and downstream of the study area in 10km grid squares M52 and M63.

Records for otter (Lutra lutra) were widespread in the Raford River catchment south of the M6 motorway with a paucity of records higher up in the catchment in the vicinity of the study area (NPWS, NBDC & EPA data). A single record for otter was present in the Clarinbridge catchment south of the Proposed Grid Connection.'

A review of the distribution of the NPWS Flora (Protection) Order Bryophytes database did not uncover any known records of protected bryophyte species in the study area. No Flora (Protection) Order macrophyte species were present within the study area on review of the BSBI Online Plant Atlas 2020.

6.3.1.3 Regional and Local Hydrology

The following sections have been summarised from Chapter 9: Water in this chapter to provide a context for the assessment on biodiversity.

6.3.1.3.1 *Proposed Wind Farm*

Regionally the Proposed Wind Farm site is located in the Galway Bay Southeast Water Framework Directive (WFD) surface water catchment within Hydrometric Area 29 of the Western River Basin District. The Galway Bay Southeast surface water catchment includes the area drained by all streams entering tidal water in Galway Bay between Black Head and Renmore Point, Galway, draining a total area of 1,270km^2. This catchment is predominantly underlain by karstified limestone, including the northern part of the Burren in County Clare, and the groundwater and surface water systems in the area are closely interlinked in this catchment.

On a more local scale, the vast majority of the Proposed Wind Farm site is mapped within the Raford River sub-catchment (Raford_SC_010). A very small area in the west of the Proposed Wind Farm site is located in the Clarinbridge River sub-catchment (Clarinbridge_SC_010).

Within the Raford River sub-catchment, the Proposed Wind Farm site is mapped in 2 no. WFD river sub-basins: the Raford_020 WFD river sub-basin in the west and the Raford_030 WFD river sub-basin in the east. Within the Raford_020 WFD river sub-basin the Proposed Wind Farm site is dissected by the Raford River (EPA Code: 29_161). The Raford River flows to the west ~250m south of T7 and to the southeast ~90m south of T8. The Raford River then continued to the southeast before it veers to the west to the north of the R348. Meanwhile, within the Raford_030 WFD river sub-basin, the Proposed Wind Farm site is dissected by the Killimor River (referred to by the EPA as the Attimonbeg Stream, EPA Code: 29-368). The Killimor River flows to the south ~230m west of T3 and ~40m east of T2. The Killimor River continues to flow to the south and discharges into the Raford River near Kiltullagh (note that this section of the Raford River is also known as the Clogheravaun River on the Discovery Series

basemaps). The Raford River then continues to flow to the southwest and discharges into the Kilcolgan (EPA Code: 29_263) River near Craughwell. The Kilcolgan River is also known locally as the Dunkellin River. The Kilcolgan River continues to the west, passing through Rahasane Turlough and discharges into Dunbulcan Bay.

Within the Clarinbridge River sub-catchment, the Proposed Wind Farm site is located in the Clarinbridge_010 WFD river sub-basin. The Clarinbridge River flows to the south ~1km to the west of the Proposed Wind Farm site. This section of the Clarinbridge River is referred to as the Cloonkeen River in the OSI Discovery series maps. This river flows to the south-east of Athenry Town and continues to the southwest before discharging into Dunbulcan Bay.

6.3.1.3.2 *Proposed Grid Connection*

On a regional scale, the Proposed Grid Connection is located in the Galway Bay Southeast WFD surface water catchment within Hydrometric Area 29 within the Western River Basin District.

On a more local scale, the Proposed Grid Connection is mapped within 3 no. WFD river sub-catchments. Within the Proposed Wind Farm site, ~100m of the Proposed Grid Connection underground cabling route from the onsite 38kV substation towards the L3115 local road is mapped in the Raford River sub-catchment (Raford_SC_010). Meanwhile, the vast majority of the eastern section of the Proposed Grid Connection is mapped in the Clarinbridge River sub-catchment (Clarinbridge_SC_010) whilst the western section is mapped in the Carrowmoneash River sub-catchment (Carrowmoneash [Oranmore]_SC_010).

Within the Clarinbridge River sub-catchment, the Proposed Grid Connection is mapped within the Clarinbridge_010 and the Clarinbridge_020 WFD river sub-basins. Within the Clarinbridge_010 WFD river sub-basin, the Proposed Grid Connection (~6km in length) is mapped to cross 3 no. watercourses: the Clarinbridge River (EPA Code: 29C02), the Toorkeel Stream (EPA Code: 29T06) and the Glennagloghaun Stream (EPA Code: 29G17). Within the Clarinbridge_020 WFD river sub-basin, the Proposed Grid Connection (~3.9km in length) is mapped to cross 1 no. watercourse: the Shoodaun River (EPA Code: 29S03) at Graigabbey Bridge. All watercourse crossings are at existing bridge and culvert locations.

Note that the Clarinbridge River may also be referred to as the Lavally River downstream of Athenry or the Graigabbey River upstream of Athenry.

Further to the west, within the Carrowmoneash River sub-catchment, ~11.8km of the Proposed Grid Connection is mapped within Carrowmoneash (Oranmore)_010 WFD river sub-basin. This area is devoid of rivers and streams and there are no surface water features in the vicinity of the Proposed Grid Connection. The nearest mapped watercourse is the Innplot Stream located ~4.9km to the southwest.

6.3.1.3.3 *Flood Risk Assessment*

Proposed Wind Farm

To identify those areas as being at risk of flooding, OPW's River Flood Extents Map, the National Indicative Fluvial Mapping, Past Flood Event Mapping (www.floodinfo.ie) and historical mapping (i.e. 6" and 25" base maps) were consulted.

Identifiable map text on local available historical 6" or 25" mapping for the Proposed Wind Farm site identifies land which is 'liable to flood' along the Raford River. There is no text along the Killimor River within the Proposed Wind Farm site which indicated lands prone to flooding. However, there is text indicating flooding on this watercourse ~1.5km downstream of the Proposed Wind Farm site.

The OPW National Flood Hazard Maps have no records of any recurring or historic flood incidences within the Proposed Wind Farm site (www.floodinfo.ie). The closest mapped historic flood event is found ~2.3km south of the Proposed Wind Farm site at Turlough - Knockatogher, Galway (Flood ID: 976). This flood event is associated with a turlough and is recurring. Another recurring flood event is recorded ~2.34km to the south of the Proposed Wind Farm site at Killtullagh to Carnakelly (Flood ID: 1910) and is described in the local area engineers report as follows: "Stream overflows its banks every year after heavy rain. Road is liable to flood".

The GSI's Winter 2015/2016 surface water flood map shows areas of fluvial and pluvial flooding during the Winter 2015/2016 flood event, which was the largest recorded flood event in many areas. This flood map does not record any mapped flood areas within the majority of the Proposed Wind Farm site. A small area of surface water flooding is recorded in the east of the Proposed Wind Farm site along the Raford River.

CFRAM mapping has not been completed for the area of the Proposed Wind Farm site. NIFM fluvial flood maps record low (1,000-year flood event) and medium (100-year flood event) probability fluvial flood zones along the Raford River in the eastern portion of the Proposed Wind Farm site. T08 is mapped within these flood zones. NIFM fluvial flood zones are also mapped along the Killimor River downstream of the western section of the Proposed Wind Farm site. These fluvial flood zones do not encroach upon the Proposed Wind Farm site.

The GSI Historical 2015/2016 groundwater flood map does not record any groundwater flooding within the area of the Proposed Wind Farm. The nearest area of historic groundwater flooding is mapped at ~1.6km in the south of the Proposed Wind Farm site and is associated with the location of a known turlough. In addition, the GSI predictive groundwater flood maps do not record any zones of groundwater flooding within the Proposed Wind Farm site.

The proposed onsite 38kV substation is mapped in Flood Zone C and is at low risk of flooding.

The main risk of flooding at the Proposed Wind Farm site is fluvial flooding adjacent to the Raford River.

Proposed Grid Connection

The vast majority of the Proposed Grid Connection is at low risk of flooding. However, there are areas which may be prone to flooding, principally at existing watercourse crossings. Due to the depth of the Proposed Grid Connection underground cabling, this will have no impact during the operational phase of the Proposed Project.

6.3.1.3.4 *Hydrogeology*

Proposed Wind Farm site

The Proposed Wind Farm site is mapped to be underlain by the Dinantian Upper Impure Limestones of the Lucan Formation (www.gsi.ie). The bedrock underlying the Proposed Wind Farm site is classified by the GSI as being a Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones.

In terms of Groundwater Bodies (GWBs), the vast majority of the Proposed Wind Farm site is underlain by the Groundwater Dependant Terrestrial Ecosystem – Rahasane Turlough (SAC 000322).

Meanwhile, a very small area in the west of the Proposed Wind Farm site is underlain by the Loughrea GWB. The Loughrea GWB is characterised by poorly productive bedrock. According to the GSI's Characterisation Report for the Loughrea GWB (GSI, 2004), this GWB occupies the area between Loughrea and Attymon. The GWB is composed primarily of low transmissivity rocks. Most of the

groundwater flux is likely to be in the uppermost part of the aquifer: comprising a broken and weathered zone typically less than 3m thick; a zone of interconnected fissuring typically less than 10m; and a zone of isolated fissuring typically less than 150m. Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones and karstification is expected to be limited. Recharge occurs diffusely through the subsoils and rock outcrops. Recharge is limited by the low permeability bedrock and in places by low permeability till, thus most of the available recharge discharges rapidly to nearby streams. A small proportion of point recharge occurs via the limited number of swallow holes present. Groundwater flowpaths are short (300m) with groundwater discharging rapidly to nearby streams. The overall groundwater flow direction is to the west.

Groundwater vulnerability

The vulnerability rating of the majority of bedrock aquifer underlying the Proposed Wind Farm site is mapped by the GSI to range from Low to Extreme. The vast majority of the Proposed Wind Farm site is mapped in areas of Low to Moderate vulnerability. Meanwhile, both T5 and T8 are mapped in areas with High to Extreme vulnerability. The proposed onsite 38kV substation is mapped in an area of Moderate to Low groundwater vulnerability. Across the Proposed Wind Farm site, the subsoils comprise of soils and subsoils of low permeability. Furthermore, due to the low permeability nature of the underlying bedrock aquifers, groundwater flowpaths are likely to be short (30 – 300m), with recharge emerging close by and discharging into local surface water streams. This means there is a low potential for groundwater dispersion and movement within the bedrock aquifer, therefore surface water bodies such as drains and streams/rivers are more vulnerable (to contamination from human activities) than groundwater across much of the Proposed Wind Farm site.

Proposed Grid Connection

The eastern section of the Proposed Grid Connection is mapped to be underlain by Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones. Meanwhile, ~9.6km of the Proposed Grid Connection is underlain by a Regionally Important Aquifer – Karstified (conduit).

In terms of GWBs, much of the eastern section (~7.4km) is underlain by the Loughrea GWB. A small section in the vicinity of the Proposed Wind Farm is also underlain by the GWDTE – Rahasane Turlough GWB.

Much of the western section of the Proposed Grid Connection is underlain by the Clarinbridge GWB. According to the GSI's Characterisation Report for the Clarinbridge GWB (GSI, 2004), this GWB is composed primarily of high transmissivity karstified limestone. A large number of karst features occur, including turloughs, caves, dolines, swallow holes and springs. Recharge occurs via point and diffuse mechanisms. Point recharge occurs via swallow holes and via discrete sinks located in the beds of the main rivers. In general, the degree of interconnection in karstic systems is high and they support regional scale flow systems. Surface water catchments are often bypassed by groundwater flowing beneath surface water channels and across surface water catchment divides. Most of the groundwater flow occurs in the upper epikarstic layer and in a zone of interconnected solutionally enlarge bedding planes and fissures, generally extending to a depth of 30m. Groundwater storage in karstified bedrock is low and the potential for contaminant attenuation in such aquifers is limited.

In addition, ~2.2km of the Proposed Grid Connection in the vicinity of the M6 is underlain by the GWDTE-Galway Bay Complex Fens (SAC 000268).

Groundwater vulnerability

Groundwater vulnerability along the Proposed Grid Connection ranges from Low to Extreme. ~10.64km of the Proposed Grid Connection is mapped in areas of Extreme groundwater vulnerability, with an additional ~7.6km mapped in areas of high vulnerability.

The areas of high and extreme vulnerability are located predominantly in the western section of the Proposed Grid Connection. Groundwater vulnerability is extremely high in karst areas due to the high degree of interconnection between surface and groundwaters in these areas. There are several mapped karst landforms along the western section of the Proposed Grid Connection. Groundwater will be most vulnerable to potential effects in areas of High and Extreme vulnerability which are located in the Regionally Important Karst Aquifer.

6.3.1.4 Conclusions of the Desktop Study

The desktop study has provided information about the existing environment of the hectads within which the Proposed Project is located. Two mapped surface watercourses flow within the Proposed Wind Farm site. There is potential for hydrological connectivity with downstream European Sites including Rahasane Turlough SAC and SPA, Galway Bay Complex SAC and Inner Galway Bay SPA. The Raford River Bog NHA is located downstream of the Proposed Wind Farm site.

The desk study identified that a variety of protected faunal species are known to occur within the wider study area, including bats, marsh fritillary, otter and badger. Given the records of marsh fritillary near the Site as well as the presence of peatland habitats, there is potential for this species to occur within the Site. 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[14]).

The desk study revealed that Annex I Article 17 habitats are present within the Site, namely, Active Raised Bog. In addition, the desk study revealed a number of Red Listed and FPO plant species within the hectad.

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 receptors.

[14] *Marnell, F., Kingston, N. & Looney, D. (2009) Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.*

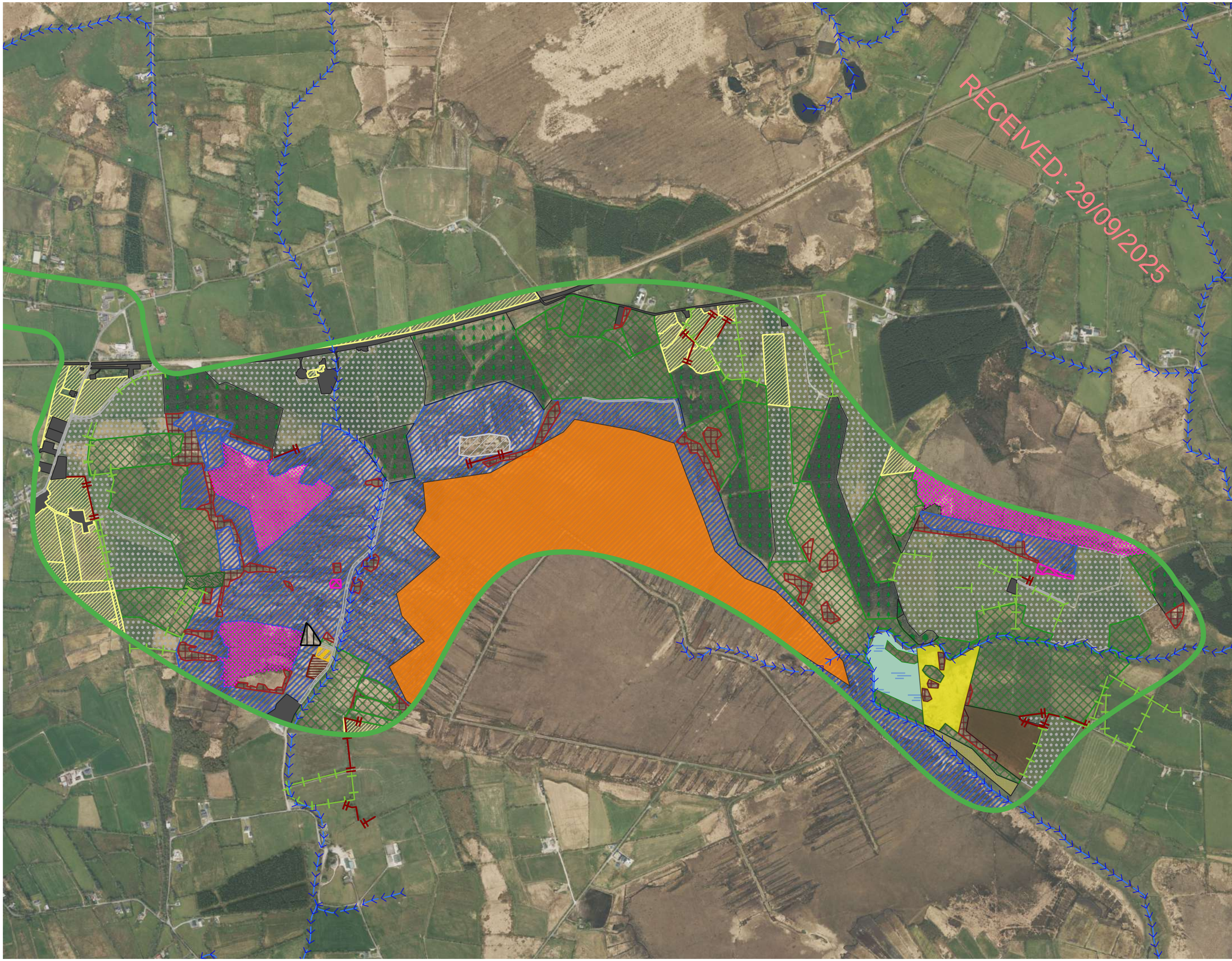
6.4 Baseline Ecological Survey Results

6.4.1 Description of Habitats and Flora within the Site

A total of 20 habitats were recorded within the Site, including;

- Raised Bog (PB1)
- Cutover bog (PB4)
- Bog woodland (WN6)
- Wet grassland (GS4)
- Wet grassland/wet heath mosaic (GS4/HH3)
- Transitional Wet grassland – Marsh (GS4-GM1)
- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Immature woodland (WS2)
- Oak-ash-hazel woodland (WN2)
- Hedgerows (WL1)
- Treelines (WL2)
- Scrub (WS1)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Buildings and Artificial Surfaces (BL3)
- Conifer forestry (WD4)
- Reed and large sedge swamps (FS1)
- Drainage ditches (FW4)
- Lowland/depositing river (FW2)

Cutover raised bog and grassland communities have been categorised to plant communities following the Irish Vegetation Classification (IVC). Detailed botanical data from relevés recorded within the Proposed Wind Farm footprint are provided in Appendix 6-1 of this EIAR. A habitat map of the Site is provided in Figure 6-4. The Proposed Wind Farm is shown overlaying the habitat map in Figures 6-5a to 6-5e.



Map Legend

- EIAR Site Boundary
- Buildings and artificial surfaces
- Spoil and bare ground
- Recolonising bare ground
- Reed and large sedge swamps
- Improved agricultural grassland
- Dry meadows and grassy verges
- Wet grassland
- Wet grassland/Scrub
- Raised bog
- Cutover bog
- Conifer plantation
- Oak-ash-hazel woodland
- Bog woodland
- Scrub
- Immature woodland
- Wet grassland - marsh
- Wet grassland/Wet heath
- Cutover Bog/Scrub
- Article 17 Raised Bog
- Hedgerows
- Treelines
- Bare ground/Recolonising bare ground
- WFD River Waterbodies

Drawing Title

Habitat Map

Project Title: Gannow Renewable Energy Development	
Drawn By: RW	Checked By: JH
Project No.: 240323	Drawing No.: Figure 6-4
Scale: 1:12,000	Date: 2025-09-24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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562,000

730,000

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N

Figure 6-5b

Figure 6-5c

Figure 6-5d

Figure 6-5e

RECEIVED: 29/09/2025

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Map Legend

- Proposed Turbine Layout
- Proposed Met Mast
- Proposed Grid Connection
- Proposed Turbine Delivery Route
- Rivers Waterbodies
- EIAR Site Boundary
- Proposed Peat and Spoil Management Areas
- Proposed Upgrades to Existing Roads
- Proposed New Roads
- Proposed Substation
- Proposed Hardstands
- Proposed Temporary Construction Compounds

Habitats

- Hedgerows (WL1)
- Treelines (WL2)
- Article 17 Habitat
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- ED2/ED3
- Recolonising bare ground (ED3)
- Reed and large sedge swamps (FS1)
- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- GS4- GM1
- GS4/HH3
- Wet grassland/Scrub (GS4/WS1)
- Raised bog (PB1)
- Cutover bog (PB4)
- Oak-ash-hazel woodland (WN2)
- Scrub (WS1)
- Immature woodland (WS2)
- PB4/WS1
- Conifer plantation (WD4)
- Bog woodland (WN7)

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

N

SITE LOCATION - NOT TO SCALE

Drawing Title

Habitat Map with Development Overlay

Project Title

Gannow Renewable Energy Development

Project No	Drawing No	Scale
240323	Figure 6-5a	1:13,000
Drawn By	Checked By	Date
TS	RW	22/09/2025

MKO

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Map Legend

- Proposed Turbine Layout
- Proposed Grid Connection
- Proposed Turbine Delivery Route
- Rivers Waterbodies
- EIAR Site Boundary
- Proposed Peat and Spoil Management Areas
- Proposed Upgrades to Existing Roads
- Proposed New Roads
- Proposed Substation
- Proposed Hardstands
- Proposed Temporary Construction Compounds

Habitats

- Hedgerows (WL1)
- Treelines (WL2)
- Article 17 Habitat
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- ED2/ED3
- Recolonising bare ground (ED3)
- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- Wet grassland/Scrub (GS4/WS1)
- Raised bog (PB1)
- Cutover bog (PB4)
- Scrub (WS1)
- Immature woodland (WS2)
- PB4/WS1
- Conifer plantation (WD4)
- Bog woodland (WN7)

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

N

SITE LOCATION - NOT TO SCALE

Drawing Title

Habitat Map with Development Overlay

Project Title

Gannow Renewable Energy Development

Project No.	Drawing No.	Scale
240323	Figure 6-5b	1:5,000
Drawn By	Checked By	Date
TS	RW	22/09/2025

MKO
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Map Legend

- Proposed Turbine Layout
- Proposed Met Mast
- Rivers Waterbodies
- EIAR Site Boundary
- Proposed Peat and Spoil Management Areas
- Proposed Upgrades to Existing Roads
- Proposed New Roads
- Proposed Hardstands
- Proposed Temporary Construction Compounds

Habitats

- Hedgerows (WL1)
- Treelines (WL2)
- Article 17 Habitat
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- GS4- GM1
- Cutover bog (PB4)
- Oak-ash-hazel woodland (WN2)
- Scrub (WS1)
- PB4/WS1
- Conifer plantation (WD4)
- Bog woodland (WN7)

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

N

SITE LOCATION - NOT TO SCALE

Drawing Title
Habitat Map with Development Overlay

Project Title
Gannow Renewable Energy Development

Project No.	Drawing No.	Scale
240323	Figure 6-5c	1:6,000
Drawn By	Checked By	Date
TS	RW	22/09/2025

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561,500 562,000 562,500 563,000

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Map Legend

- Proposed Turbine Layout
- Proposed Met Mast
- Rivers Waterbodies
- EIAR Site Boundary
- Proposed Peat and Spoil Management Areas
- Proposed Upgrades to Existing Roads
- Proposed New Roads
- Proposed Hardstands
- Proposed Temporary Construction Compounds

Habitats

- Hedgerows (WL1)
- Treelines (WL2)
- Article 17 Habitat
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- GS4- GM1
- GS4/HH3
- Raised bog (PB1)
- Cutover bog (PB4)
- Oak-ash-hazel woodland (WN2)
- Scrub (WS1)
- Conifer plantation (WD4)
- Bog woodland (WN7)

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

Drawing Title
Habitat Map with Development Overlay

Project Title
Gannow Renewable Energy Development

Project No.	Drawing No.	Scale
240323	Figure 6-5d	1:5,000
Drawn By	Checked By	Date
TS	RW	22/09/2025

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Map Legend

- Proposed Turbine Layout
- Rivers Waterbodies
- EIAR Site Boundary
- Proposed Peat and Spoil Management Areas
- Proposed Upgrades to Existing Roads
- Proposed New Roads
- Proposed Hardstands

Habitats

- Hedgerows (WL1)
- Treelines (WL2)
- Article 17 Habitat
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Reed and large sedge swamps (FS1)
- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- GS4- GM1
- GS4/HH3
- Raised bog (PB1)
- Cutover bog (PB4)
- Oak-ash-hazel woodland (WN2)
- Scrub (WS1)
- Conifer plantation (WD4)
- Bog woodland (WN7)

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

N

Drawing Title

Habitat Map with Development Overlay

Project Title

Gannow Renewable Energy Development

Project No.	Drawing No.	Scale
240323	Figure 6-5e	1:5,000
Drawn By	Checked By	Date
TS	RW	22/09/2025

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6.4.1.1 Grassland habitats

The Site comprises large areas of improved agricultural grassland (GA1) and both improved and semi-natural wet grasslands (GS4). Detailed botanical quadrat data was recorded on site in the form of relevés taken at specific locations within the Site, see Appendix 6-1. The botanical data from grassland relevés was uploaded to the National Biodiversity Data Centre (NBDC) online habitat classification system ERICA[15].

6.4.1.1.1 *Improved agricultural grassland (GA1)*

The areas of improved agricultural grassland (GA1) have primarily been intensively managed for sheep and cattle grazing, and many of the fields surveyed have been reseeded with perennial ryegrass (*Lolium perenne*). Turbines T06 and T07 and access roads are located within this habitat. The NBDC online habitat classification system ERICA classified the areas of improved agricultural grassland as conforming to the Yorkshire-fog – Perennial Rye-grass community (GL2C). These are fairly species-poor grassland communities with relatively little recognised conservation value.

Plate 6-1 Improved agricultural grassland within the east Proposed Wind Farm site near T06/T07.

[15] *Engine for Relevés to Irish Communities Assignment*

6.4.1.1.2 Wet grassland (GS4)

Wet grassland dominated by soft rush (*Juncus effusus)* is found throughout the Proposed Wind Farm site. This habitat is present in the footprint of both of the proposed temporary construction compounds and onsite 38kV substation. This grassland type conforms to soft rush – common sorrel community (GL2D).

Plate 6-2 Soft rush dominated wet grassland located within the Proposed Wind Farm site near the temporary construction compound located north of T04.

6.4.1.1.3 Wet grassland/wet heath mosaic (GS4/HH3)

Within the southeast of the Proposed Wind Farm site is a mosaic of wet grassland and wet heath (GS4/HH3) (Plate 6-3). This habitat is found within a field located adjacent to T08, which is subject to less intensive management within the southeast of the Proposed Wind Farm site and has a southern aspect with a sloped area in the central/northern area. It is encroached by gorse (*Ulex europaeus)* scrub in places and is bordered by the Raford River to the south and north. The field is dominated by purple moor grass (*Molinia caerulea).* Parts of the Proposed Wind Farm site show examples of species rich wet grassland (GS4) with species including sweet vernal grass (*Anthoxanthum odoratum),* Yorkshire fog (*Holcus lanatus),* creeping bent (*Agrostis stolonifera),* common sedge (*Carex nigra),* carnation sedge (*Carex panicea),* glaucous sedge (*Carex flacca),* compact rush (*Juncus conglomeratus),* marsh horsetail (*Equisetum palustre),* meadow thistle (*Cirsium dissectum),* and *Rhytidiadelphus squarrosus.* Areas of the field with stronger characteristics of wet heath (HH3) comprise ling heather (*Calluna vulgaris),* hares tail Cottongrass (*Eriophorum vaginatum),* common cottongrass (*Eriophorum angustifolium),* heath rush (*Juncus squarrosus),* tormentil (*Potentilla erecta),* heath woodrush (*Luzula multiflora),* bilberry (*Vaccinium myrtilis),* sheep's fescue (*Festuca ovina),* lousewort (*Pedicularis sp.),* star sedge (*Carex echinata), Sphagnum capillifolium, Aulacomnium palustre, Pleurozium schreberi, Sphagnum fallax, Sphagnum palustre, Rhytidiadelphus loreus and Hylocomium splendens.*

The following orchids were recorded within the southern and northern sections of the field; common spotted orchid (*Dactylorhiza fuchsii)*, heath spotted orchid (*Dactylorhiza maculata)* and lesser butterfly orchid (*Platanthera bifolia*).

Although the field is under grazed with dense, tufted purple moor grass in places, it has affinities with both Annex I Wet Heath and Molinia Meadows.

No infrastructure is proposed within this area with the design layout having been revised, i.e., changing of location of proposed turbine T08, in order to avoid loss of this habitat; please see Section 3.2.5.2.2 of Chapter 3: Site Selection and Reasonable Alternatives for further information on the Proposed Wind Farm design evolution.

Plate 6-3 Wet heath/wet grassland mosaic (HH3/WS4)

6.4.1.1.4 Transitional wet grassland to marsh (GS4-GM1)

This habitat is present in a low lying, flat field to the west of the habitat described in the section above, within the southeast of the Proposed Wind Farm site. The field is bordered to the north, west and south by the Raford River. This habitat is dominated by creeping bent (*Agrostis stolonifera)* and bladder sedge (*Carex vesicaria)* with occasional patches of reed canary grass (*Phalaris arundinaceae).* Also frequent are bogbean (*Menyanthes trifoliata)* and horsetail (*Equisetum sp.).* Occasional broadleaved herbs are present including marsh pennywort (*Hydrocotyle vulgaris),* purple loosestrife (*Lythrum salicaria),* water forget me not (*Myosotis scorpidioides),* marsh bedstraw (*Galium palustre)* and silverweed (*Potentilla anserina).* There was a noticeable absence of bryophytes during surveys of the field. Proposed turbine T08 is located within this field but is located in the east of the field where it is set back from the Raford River.

Plate 6-4 Wet grassland-marsh (GS4-GM1) transitional habitat within the footprint of T08

6.4.1.1.5 *Dry meadows and grassy verges (GS2)*

Within the southeast of the Proposed Wind Farm site is a silage field which is categorised as dry meadows and grassy verges (GS2). This is outside of the Proposed Project development footprint.

6.4.1.2 Peatland habitats

The southern sections of the Proposed Wind Farm site comprise the Killimor Bog. This is mapped under Article 17 habitat mapping as Annex I Active Raised Bog (see Section 6.3.1.2 above). The Proposed Project footprint is located completely outside of any mapped Annex I areas. The margins and central areas of the bog have been cut since at least the mid-1990s as evidenced from historic aerial imagery, with turbary cutting ongoing. This has resulted in most of the peatland habitat within the Proposed Wind Farm site falling under the cutover bog (PB4) category, with small areas of relatively uncut but drained bog categorised as raised bog (PB1). The Proposed Project is located completely outside of any uncut bog areas.

6.4.1.2.1 *Cutover bog (PB4)*

Drained cutover raised bog (PB4) occurs within the Proposed Wind Farm footprint, i.e., in areas where proposed turbine T01 (Plate 6-4 below), Turbine T03 (Plate 6-5 below), and internal access roads are located. These areas of bog have evidently been drained and cut since at least the 1990s based on historic aerial imagery but have since revegetated. Bare peat occurs in patches with *Campylopus introflexus.* The dry high bog areas are dominated by ling heather (*Calluna vulgaris)* and common Cottongrass (*Eriophorum angustifolium).* Proposed turbine T03 is located on a small section of cutover bog measuring 9ha in total which is separated from the main bog by forestry and a bog road. The high sections of the bog are within the centre, with the margins of the bog being lower and slightly wetter in places. The lower margins in this area are dominated by tufted purple moor grass with areas of willow,

gorse and birch scrub (WS1). The bog communities are categorised as per Irish Wildlife Manual (IWM) no. 128 as *Calluna vulgaris-Sphagnum subnitens* cutover bog (MS1) on high bog areas and as *Molinia caerulea* cutover bog (LS3) on low bog areas/margins. The NPWS Article 17 Reporting for 2019 has been published and states:

> *'In an Irish context, ARB (which is currently defined as occurring only on the high bog) encompasses active peat --forming ecotopes (central and sub--central) as defined by Kelly (1993) and Kelly & Schouten (2002), and actively peat --forming flushes.'*

In addition, the definition of Degraded Raised Bog has also been changed in the 2019 Article 17 Reporting. Whilst previously (from the 2013 Reporting), the habitat previously pertained to all vegetated areas of uncut Raised Bog that did not meet the criteria to be classified as Active Raised Bog, it is now recognised that the extent is much narrower and dependant on specific hydrological conditions. This habitat still does not occur on cutover bog in the Irish context and is more limited in its extent on uncut bogs.

According to Smith et al. (2020), an area of cutover bog must have Sphagnum cover of more than 40%, in addition to other criteria, to qualify as Active Raised Bog. As this is the threshold used for the High Sphagnum habitat group, it follows that an area of cutover should fall into the HS1, HS2 or HS3 habitat types to qualify as active raised bog.

Further, in relation to wet heath (HH3) habitat, the IWM no. 128 states the following,

> *'Cutover bog habitats should only rarely be considered examples of dry siliceous heath (HH1) or wet heath (HH3). These habitats are defined by peat depths of less than 0.5 m (Fossitt, 2000), which seldom occur on cutover bog. Only where a habitat is underlain by shallow peat and good indicators of heath are present, such as Carex binervis, Galium saxatile and Juncus squarrosus, should heath habitats be considered for cutover bog'*

These habitats do not occur on the cutover habitats upon which the Proposed Wind Farm footprint is located. However, the cutover habitats within the Proposed Wind Farm site do hold biodiversity value in a local context.

Plate 6-5 Cutover raised bog (PB4) within the footprint of the Proposed Wind Farm site at T01

Plate 6-6 Revegetated cutover bog (PB4) in the footprint of the Proposed Wind Farm site at T03

6.4.1.3 Woodland Habitats

6.4.1.3.1 *Conifer forestry (WD4)*

Plots of private conifer forestry (WD4) are present within the Proposed Wind Farm site. These are predominantly of mature sitka spruce (*Picea sitchensis).* Ground flora and general species diversity is low in these areas. This habitat is present within the footprint of Turbines T04 and T05.

Plate 6-7 Mature conifer forestry (WD4) within the footprint of the Proposed Wind Farm

6.4.1.3.2 *Oak-ash-hazel woodland (WN2)*

Small areas of semi-natural woodland are present within the Proposed Wind Farm site. These occur as two small isolated patches at the margins of pastures in the east of the Proposed Wind Farm site. The proposed new road to Turbine T08 is proposed to run through a small linear area of this woodland type.

Plate 6-8 Small area of oak ash hazel woodland through which a proposed access road to T08 is located.

6.4.1.3.3 Bog woodland (WN7)

Bog woodland occurs within the Proposed Wind Farm site on cutover bog and is dominated by downy birch (*Betula pubescens)* and is the successive habitat from pioneering scrub on the bog. Where it occurs within the Proposed Wind Farm site it does not conform to the Annex I type given the drained and degraded condition of the bog. A small patch of this habitat is located adjacent to the proposed new road to proposed turbine T02.

Plate 6-9 Small area of Bog woodland adjacent to proposed new road to proposed turbine T02 (left of image)

6.4.1.3.4 *Immature woodland (WS2) and scrub (WS1)*

There are areas of cutover bog within the Proposed Wind Farm site that have been colonised by scrub (WS1) or immature woodland (WS2) dominated by downy birch (*Betula pubescens)*, grey willow (*Salix cinerea)* and gorse (*Ulex europaeus)*.

Plate 6-10 Willow and birch scrub within the Proposed Wind Farm site

6.4.1.4 Hedgerows (WL1) and Treelines (WL2)

Agricultural fields within the Proposed Wind Farm site are typically bordered by hedgerow (WL1) and treeline (WL2) habitat, which is dominated by hawthorn (*Crataegus monogyna),* hazel (*Corylus avellana),* bramble (*Rubus fruticosus agg.)* and ash (*Fraxinus excelsior).* These habitats are predominantly found within the east of the Proposed Wind Farm site around agricultural fields.

Plate 6-11 Ash treeline within the east of the Proposed Wind Farm site

6.4.1.5 Watercourses

6.4.1.5.1 *Lowland/depositing River (FW2)*

The main EPA mapped watercourse which flows through the Proposed Wind Farm is the Raford River which flows within the southeast section of the Proposed Wind Farm site. In addition, a tributary of the Raford River flows through the western portion of the Proposed Wind Farm across proposed new roads near proposed turbine T03). The Raford River, particularly where it flows within the southeast of the Proposed Wind Farm site, is a slow moving, depositing river (FW2) with highly vegetated banks of willow herb scrub and reed swamp (FS1).

Two proposed new water crossings are proposed:

- Along the proposed new access road to propose turbine T08, over the main Raford River.
- Along the proposed new access road to the west of proposed turbine T03, over the smaller Raford tributary.

Plate 6-12 The Raford River in the southeast of the Proposed Wind Farm site

Plate 6-13 Location on the Raford River of the proposed water crossing structure near T08, with highly vegetated banks and some instream vegetation.

Plate 6-14 Location of proposed new water crossing structure west of T03 over the Raford tributary, which is densely vegetated by bramble at the crossing location.

6.4.1.5.2 Drainage ditches (FW4)

Drainage ditches (FW2) are present throughout the Proposed Wind Farm site both along the margins of agricultural fields and throughout drained cutover bog areas. These drains are often heavily vegetated and many were dry at time of survey as shown in the Plate below. Several of these man-made drainage ditches will be crossed or redirected to accommodate the infrastructure footprint, however the existing flows will not be impeded.

Plate 6-15 Drainage ditch present along an agricultural field in the east of the Proposed Wind Farm site.

6.4.1.6 Artificial Habitats

6.4.1.6.1 *Spoil and bare ground (ED2), Recolonising bare ground (ED3), Buildings and artificial surfaces (BL1)*

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). These areas 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).

Plate 6-16 Example of spoil tracks within the Proposed Wind Farm site

6.4.1.7 Habitats along the Proposed Grid Connection

The Proposed Grid Connection underground cabling works will consist of the installation of ducting in an excavated trench to accommodate electrical and fibre communications cabling to facilitate a connection between the proposed onsite 38kV substation and the existing Cashla 220kV substation. The underground electrical cabling route is approximately 21.8km in length and is located primarily within the public road corridor, with three subsections (approximately 0.2km, 0.6km and 1.5km respectively) located in private land. Full details of the route of the Proposed Grid Connection are provided in Section 4.3.2 of this EIAR.

As mentioned above the majority of the cabling will be located within the existing road classified as buildings and artificial surfaces (BL3). Habitats found in the wider areas adjacent to the road include dry meadows and grassy verges (GS2), agricultural grasslands (GA1), wet grasslands (GS4), cutover bog (PB4) and conifer forestry (WD4). Hedgerows (WL1) and treelines (WL2) also border the road. Where the Proposed Grid Connection leaves the public road and enters private land, the habitats are described in Section 6.4.1.7.1 below.

There are 10 no. water crossings, 4 no. of which are EPA mapped watercourses along the Proposed Grid Connection underground cabling route. Instream works are not required at any watercourse crossing location. The riparian habitats found along the Proposed Grid Connection is described in detail in Appendix 6-3 and summarised below. Watercourses referenced in Table 4-5 of Chapter 4 as 'WC 1', 'WC 3', 'WC 4', and 'WC 7' consist primarily of field drains and are not described in detail below.

Water Crossing 2 (WC 2) consists of a masonry bridge over the Clarinbridge River, a depositing/lowland river (FW2). The channel supported occasional macrophytes comprising of fool's watercress, brooklime (*Veronica beccabunga*), watercress and water-starwort (*Callitriche* sp.). The channel margins were lined with scrub and/or open and graded into bordering heavily improved pasture (GA1).

Water Crossing 5 (WC 5) consists of a masonry bridge over two concrete pipes over an unnamed depositing/lowland river (FW2) with a moderate flow. The banks are open and directly bordered by improved agricultural grassland (GA1).

Water Crossing 6 (WC 6) over the Toorkeel Stream comprises a modified lowland depositing stream (FW2) channel that was historically realigned and locally deepened. The stream was 1-1.5m wide and between 0.05-0.1m deep with 1m high banks. The riparian areas were open apart from scattered mature ash. They graded into the adjoining wet pasture (GA1).

Water Crossing 8 (WC 8) comprises the Glennagloughan Stream, a heavily modified lowland depositing stream (FW2) along improved pastures. The channel supported occasional emergent lesser water parsnip, water mint and water figwort on exposed cobble margins. The riparian areas supported scattered mature blackthorn, hawthorn and ash with bramble in the understories. The heavily modified stream was bordered by wet pasture (GA1).

Water Crossing 9 (WC 9) consists of the Graigabbey Bridge over the Clarinbridge river/Shoodaun River. The river was characteristic of a depositing river (FW2) channel that was historically straightened and deepened. The river was 4m wide and between 0.2-0.8m deep with 1.5m high banks. The channel margins supported occasional water-forget-me-not, water mint, water figwort (*Scrophularia auriculata*) and fool's watercress. Instream small boulder supported occasional *Rhynchostegium riparioides* and *Leptodictyum riparium*. The liverwort *Pellia endiviifolia* was also occasional. The channel was too shaded and peat stained to support filamentous green algae. The riparian areas supported mature grey willow, sycamore and alder. The understories supported dense scrub comprising of scattered bramble, gorse, meadowsweet, purple loosestrife, wild angelica and yellow flag. The river was bordered by wet pasture (GA1).

Water Crossing 10 (WC 10) consists of a heavily choked drainage channel (FW4) and masonry culvert. The channel is dominated by fool's water cress, nettles and willowherb. No flow was perceptible.

6.4.1.7.1 Proposed Grid Connection - Western Section and Off-road Sections

Habitat maps of the off-road sections of the Proposed Grid Connection are provided in Figure 6-6a and 6-6b.

Beginning from Cashla 220kV Substation to the west, the Proposed Grid Connection follows the L-7109 local road for approx. 1.2km. This stretch of road is classified as **Buildings and artificial surfaces (BL3)**. The Proposed Grid Connection then runs across a small area of agricultural land before following the boundary between two agricultural fields for approx. 0.5km. The small stretch of agricultural land is classified as **Recolonising bare ground (ED3)** due the extensive poaching from cattle to the land in this area (Plate 6-17). The field boundary can be classified as both **Hedgerow (WL1)** and **Stone walls and other stonework (BL1)**. Species found here include Bramble (*Rubus fruticosus agg.*) and Hawthorn (*Crataegus monogyna*). The fields either side of the field boundary are classified as **Improved Agricultural Grassland (GA1)**. Species found in this habitat include Perennial Ryegrass (*Lolium perenne*), White Clover (*Trifolium repens*), Creeping Buttercup (*Ranunculus repens*) and Daisy (*Bellis perennis*) (Plate 6-18).

The Proposed Grid Connection then proceeds along a private road and the L-7108, L-3103 and L-31030 local roads for approx. 4.9km. Along the L-31030 the Proposed Grid Connection passes under the M17 along the L31030 local road. The Proposed Grid Connection then enters into the second section of private land, utilising an existing track through coniferous forestry. This habitat is classified as **(Mixed) conifer woodland (WD3)** with the forestry track categorised as **recolonising bare ground (ED3)**. Species found within this habitat include Lodgepole Pine (*Pinus contorta*), Scots Pine (*Pinus sylvestris*), Hazel (*Corylus avellana*), Beech (*Fagus sylvatica*), Ivy (*Hedera hibernica*), Bramble (*Rubus fruticosus agg.*) and Holly (*Ilex aquifolium*) (Plate 6-19). On the other side of the forestry the Proposed Grid Connection continues along the private road before re-entering the public road network and continuing east towards the Proposed Wind Farm site.

Plate 6-17 Recolonising bare ground (ED3) in an agricultural field due to cattle poaching

Plate 6-18 Hedgerow (WL1) and Stone walls and other stonework (BL1) acting as field boundaries. Fields classified as Improved Agricultural Grassland (GA1).

Plate 6-19 Existing forestry track through forestry area classified as (Mixed) conifer woodland (WD3)

544,000
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200 m

Map Legend

- Proposed Grid Connection
- EIAR Site Boundary
- Proposed Upgrades to Existing Roads
- Proposed New Roads

Habitats

- Hedgerows (WL1)
- Buildings and artificial surfaces (BL3)
- Improved agricultural grassland (GA1)

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

Drawing Title
Proposed Grid Connection Route: Off-road Sections

Project Title
Gannow Renewable Energy Development

Project No.	Drawing No.	Scale
240323	Figure 6-6a	1:4,000
Drawn By	Checked By	Date
TS	RW	23/09/2025

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

547,000
547,250
547,500
731,250
731,000
730,750
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RECEIVED: 29/09/2025

Map Legend
Proposed Grid Connection
EIAR Site Boundary
Proposed Upgrades to Existing Roads
Habitats
Treelines (WL2)
Spoil and bare ground (ED2)
Improved agricultural grassland (GA1)
Scrub (WS1)
(Mixed) conifer woodland (WD3)

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

Drawing Title
Proposed Grid Connection Route: Off-road Sections

Project Title
Gannow Renewable Energy Development

Project No.	Drawing No.	Scale
240323	Figure 6-6b	1:2,500
Drawn By	Checked By	Date
TS	RW	23/09/2025

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6.4.1.8 Habitats along the Turbine Delivery Route

The Turbine Delivery Route (TDR) runs from the Galway Docks to the Proposed Wind Farm site. Within Galway City the TDR runs along the following roads: Dock Road, Lough Atalia Road, College Road, Wellpark Road, Connolly Avenue, Tuam Road, Bothar na dTreabh and the N6. Once outside of Galway City, the TDR runs along the M6 before taking the exit at Athenry along the R347. From Athenry the TDR runs along the R348 until it enters the L-3115 outside of Kiltullagh, the TDR follows the L-3115 until it is outside Attymon where it enters the Proposed Wind Farm site. The TDR is located entirely on existing roadways which are classified as **Buildings and artificial surfaces (BL3)**.

6.4.1.9 Protected Habitats

In summary, as described in the preceding sections, the following Annex I habitats are present within the EIAR Site Boundary but are located completely outside of the footprint of the Proposed Project:

- Active Raised Bog
- Wet heath/Molinia meadow mosaic

Peatlands present within the Proposed Wind Farm footprint include cutover raised bog (PB4). Potential for degraded areas to correspond with Annex I Degraded Raised Bog was considered. According to the EU Commission[16]:

> *'These are raised bogs where there has been disruption (usually anthropogenic) to the natural hydrology of the peat body, leading to surface desiccation and/or species change or loss. Vegetation on these sites usually contains species typical of active raised bog as the main component, but the relative abundance of individual species is different. Sites judged to be still capable of natural regeneration will include those areas where the hydrology can be repaired and where, with appropriate rehabilitation management, there is a reasonable expectation of re-establishing vegetation with peat-forming capability within 30 years.'*

The peatland habitat within the footprint of the Proposed Wind Farm has been subject to turbary activities and as a result peat depths are exhausted in much of the areas. The Proposed Project footprint is not located within any areas of Annex I peatland habitat.

As identified during aquatic surveys (Appendix 6-3), survey site A4 was located on the Raford River at Raford Bridge. This survey site is located 8.2km downstream of the Proposed Wind Farm site. The Annex I habitat 'Water courses of plain to montane levels, with submerged or floating vegetation of the *Ranunculion fluitantis* and *Callitricho-Batrachion* (low water level during summer) or aquatic mosses [3260]' (commonly referred to as floating river vegetation) was recorded at site A4. The aquatic vegetation community at this site supported several indicator species (EC, 2013) including *Potamogeton crispus*, *Potamogeton gramineus*, *Potamogeton pusillus* and *Myriophyllum spicatum*.

6.4.1.10 Invasive plant species

During field 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. One record of *Rhododendron ponticum* was found within wet grassland within the east of the Site at ITM X562076, Y729531. This is located adjacent to the bat buffer vegetation clearance area associated with proposed turbine T05. No aquatic invasive macrophyte species were identified during aquatic surveys (Appendix 6-3).

[16] *https://eunis.eea.europa.eu/habitats/10143*

6.4.2 Fauna in the Existing Environment

Faunal walkover surveys were designed to detect the presence, or likely presence, of a range of protected species. Potential suitable habitats were investigated for signs of animal presence. The following subsections provide a breakdown of the species recorded within the Site during the site visits and assessments.

6.4.2.1 Badger

Badger surveys were undertaken on the 30th July and 7th of October 2024. Two camera traps were also deployed under licence between the 30th July and 5th September 2024. Two badger setts were recorded within the Proposed Wind Farm site. One active main sett comprising 7 entrances was found within woodland in the east of the Site, and a sett with 2 entrances was found within a bog in the north of the Site. The locations of the badger setts are provided in Confidential Appendix 6-5[17].

The Proposed Wind Farm layout was altered in order to avoid disturbance of the main sett in the east of the site. As a result, proposed infrastructure is located more than 50m from this badger sett. The smaller 2 entrance sett is located over 30m from a proposed new access road.

Plate 6-20 Badger sett entrance present within the Proposed Wind Farm site

[17] *Following standard best practice, the location of breeding or resting places of protected species should be provided as a confidential appendix for review by the competent authority and not made available to the public in order to avoid potential for persecution.*

6.4.2.2 Otter

Dedicated otter surveys were undertaken on the 8th and 10th October 2024 within the Site. Camera traps were deployed along the Raford tributary between the 12th of March 2025 and 18th of April 2025. No otter holts were found. No evidence of otter activity was recorded on the cameras. Potential evidence of otter activity was found in the form of trails within wet grassland along the banks of the Raford River and entering the water in the east of the site. However, these trails may be associated with other mammal species (Plate 6-21).

A potential otter spraint containing small mammal or bird bones was found near the Graigabbey Bridge over the Clarinbridge river/Shoodaun River along the Proposed Grid Connection (Plate 6-22).

No breeding (holts) or resting (couch) areas were identified in the vicinity of the aquatic survey sites in August 2024. Otter spraint was recorded at site A4 during aquatic surveys in August 2024. The sample site is located near Raford Bridge on the Raford River, approx. 8km downstream of the Proposed Wind Farm site. A regular spraint site was recorded under the bridge apron on boulders within the Raford River at aquatic survey site A5, approx. 12.2km downstream of the Proposed Wind Farm site.

Plate 6-21 Mammal trails/potential otter trails entering/exiting the Raford River in the east of the Proposed Wind Farm site.

Plate 6-22 Likely otter spraint near the Graigabbey Bridge

6.4.2.3 Bats

Bat surveys undertaken in 2024, in accordance with NatureScot guidance, form the core dataset for the assessment of effects on bats. Bat surveys included roost surveys, manual transect surveys and ground-level static surveys. Full details of results are provided in the Bat Report in Appendix 6-2 and are summarised in the sections below.

6.4.2.3.1 *Roost Surveys*

Structures

Following a search for roosts in 2024, five structures containing potential suitable bat roost features were identified, four of which were inspected within the Site and one outside the Site (inspected externally). These include a derelict building, Farm shed (no.1), Storage shed and offices, Unoccupied dwelling, and Farm sheds (no.2) and ruined house. All identified structures will be retained and avoided as part of the Proposed Project. Three of these structures were assessed as being of *Negligible* roost suitability. The derelict building was assessed as being of *High* roost suitability and the farm shed (no.2) was of *Low* roost suitability. The latter 2 no. structures were subject to roost emergence surveys as summarised below.

Derelict building (*High* roost suitability), located approximately 445m east of proposed turbine T08 (IG Ref: M 62888 28973), was subject to a roost emergence survey. A total of 17 bats were recorded emerging from the structure by surveyors and via night vision aid. Of these, five were identified as soprano pipistrelle, two as brown long-eared bat, and one as common pipistrelle. The remaining individuals were unidentified. This structure's location is outside the footprint of all proposed infrastructure, ensuring it will be retained and avoided.

The farm shed no. 2 (*Low* roost suitability), located at IG Ref: M 61693 30458, was also subject to a roost emergence survey. One common pipistrelle was observed emerging from vegetation attached to the structure. This structure will also be retained as part of the Proposed Project.

Two farm sheds located in the vicinity of the western section of the Proposed Grid Connection (IG Ref: M 43823 28092; M 44139 28146) were assessed and classified as having *Negligible* potential for roosting bats.

Trees

The majority of trees within the Site will be retained as part of the Proposed Project; however, there will be some requirement to remove vegetation to facilitate the required bat buffers. A detailed description of trees/tree groups of note within the bat felling buffer (requiring removal) of the proposed turbine locations, and along the Proposed Grid Connection and Turbine Delivery Route, is provided in Appendix 6-2. No trees with significant suitable Potential Roost Features (PRFs) were identified within the bat felling buffers (refer to Section 6.2.3) or within the footprint of the Proposed Wind Farm site.

There is no requirement for removal or trimming of trees identified as having bat roost potential associated with the Turbine Delivery Route or Proposed Grid Connection.

6.4.2.3.2 Manual Transects

Manual bat activity surveys took place in the Spring, Summer, and Autumn of 2024. Bat activity was recorded on all surveys, with a total of 241 bat passes. Soprano pipistrelle (n=139) was the species recorded most frequently, followed by Common pipistrelle (n=98). Brown long-eared bat (n=3), and Leisler's bat (n=1) were recorded in low numbers.

Manual activity surveys included both walked and driven transects conducted at dusk. In spring and summer, transect surveys were carried out following dusk emergence surveys at identified PRFs, with the aim of assessing bat use of linear features and surrounding habitats. The autumn transect commenced at dusk and included both walked and driven components.

Species composition and activity levels varied across the survey periods. Bat activity was concentrated along treelines, hedgerows, and linear (road/track) habitats. Common and soprano pipistrelle were the most frequently recorded species during the spring and autumn 2024 surveys. In contrast, the summer survey recorded limited activity, primarily restricted to the area surrounding the derelict building that was surveyed immediately prior to the manual transect.

6.4.2.3.3 Ground-level Static Surveys

A summary of the results of ground level surveys conducted at the Proposed Project are provided below. The location of all static detectors is provided in Appendix 6-2 of this EIAR.

In total, 57,965 bat passes were recorded across all deployments. In general, Common pipistrelle (n=27,794) and Soprano pipistrelle (n=25,185) occurred most frequently. Leisler's bat (n=3,439) was significantly less. Instances of brown long-eared bat (n=613), *Myotis* spp. (n=581), and Nathusius' pipistrelle (n=353) were recorded in much lower numbers.

Bat activity was calculated as total bat passes per hour (bpph) per season to account for any bias in survey effort, resulting from varying night lengths between seasons. In 2024, bat activity was highest for common pipistrelle during the spring, while activity in summer and autumn showed a more balanced distribution between common and soprano pipistrelles. However, a significant drop in activity was recorded for both species during the autumn period. Leisler's bat activity remained relatively consistent across all seasons. In contrast, Myotis species and brown long-eared bats exhibited an increase in activity during the autumn. Nathusius' pipistrelle was infrequently recorded overall, though it was slightly more prevalent in the spring.

Assessment of bat activity levels-Adapted site-specific ranges

Low, *Medium* and *High* activity levels were assigned to median and maximum pass rates (bpph) identified during spring, summer and autumn at the detectors deployed across the Proposed Wind Farm site, as adapted from Mathews *et al.* (2016).

Leisler's bat generally exhibited *Medium* median activity in spring, declining to *Low* during summer and autumn. *High* median activity was observed at detectors D05A (2.5 bpph) and D08 (2.3 bpph) in spring. No other instances of *High* median activity were recorded for the species across 2024. *Medium* activity was also recorded in summer at D01 (1.0 bpph) and D08 (0.8 bpph), with the *High*est maximum activity observed at D01 (8.4 bpph). Median activity at all locations dropped to *Low* in autumn.

Common pipistrelle activity was predominantly *Low* to *Medium* during spring and summer. A single instance of *High* median activity was recorded at D01 in spring (75.2 bpph), which also exhibited the *High*est maximum activity (125.1 bpph). *Medium* activity was observed at D02, D03, and D05A in spring, and at D01, D03, D04, and D05A in summer. All other detectors recorded *Low* median activity.

Soprano pipistrelle activity patterns were similar to those of common pipistrelle. *High* median activity was recorded at D01 in both spring (34.4 bpph) and summer (21.6 bpph), with corresponding *High* maximum values in spring (85.5 bpph) and autumn (76.6 bpph). *Medium* median activity was observed at D05 in both spring and summer, and at D02B, D03, D04, and D05A in summer. All remaining locations recorded *Low* median activity.

Myotis species consistently showed *Low* median activity across all detectors and seasons. However, isolated *High* maximum activity levels were recorded at D01 and D04 in summer and autumn, and at D08 in summer, ranging from 1.0 to 1.3 bpph.

Brown Long-eared Bat exhibited *Low* median activity throughout the year at all detectors. Notably, *High* maximum activity was observed at D04 in summer (3.4 bpph) and at D07 in autumn (2.0 bpph).

Median activity levels for Nathusius' pipistrelle were *Low* across all sites, except for D01 in spring, which recorded a *Medium* median activity of 0.7 bpph. *High* maximum activity was recorded at D01 in both spring and autumn, with the *High*est peak at D02 in spring (6.8 bpph).

Overall, bat activity across the Proposed Wind Farm site was generally *Low* to *Medium*, with occasional *High* activity levels recorded at specific detectors, primarily during spring. Common and soprano pipistrelles were the most active species, particularly at detector D01, while *Myotis spp.*, brown long-eared bat, and Nathusius' pipistrelle exhibited consistently *Low* activity.

6.4.2.3.4 Proposed Grid Connection Crossing Structures

On the 10th of October 2024 and the 13th of February 2025, the structures of the existing water crossings along the Proposed Grid Connection underground cabling route were inspected for signs of bat roosts. These, as well as the motorway crossing along the L-31030 under the M17 and the railway bridge, were also assessed for bat roost potential. The crossing structures were visually assessed for potential use as bat roosting habitat using a protocol set out in the Bat Conservation Trust (BCT) guidance document, *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition)* Collins (2023). Table 4.1 of the BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into five Suitability Categories: *High, Moderate, Low, Negligible,* and *None*. No signs of bat roosts were found at any of the structures. The findings of the suitability assessments are summarized in Appendix 6-2. All works will be confined to the existing road structure or completed using temporary construction methods such as flatbed formation within the existing road or horizontal directional drilling offset from the crossing structures, with no requirement to remove or alter structures that could support bats.

The rivers in the vicinity of the Proposed Grid Connection provide *Moderate suitability* for commuting and foraging bats. The treelines and hedgerows identified along the Proposed Grid Connection also provide *Moderate* suitability for commuting and foraging bats.

6.4.2.4 Reptiles and Amphibians

Live adult common frogs (*Rana temporaria*) were recorded within the Proposed Wind Farm site and within wetland habitats and agricultural grassland within the southeast of the Proposed Wind Farm site as well as in the vicinity of proposed turbine T01. There will be no loss of breeding habitat for the species as a result of the Proposed Wind Farm.

Smooth newts (*Lissotriton vulgaris*) were not recorded within the Site or aquatic survey sites, but have potential to occur in the wider area.

Although no Common lizard (*Zootoca vivipara*) was found, suitable habitat for this species exists within the Site. The Proposed Project will not result in a significant loss of suitable habitat for reptiles and amphibians. It is considered that suitable habitat is widespread in the Site and beyond.

6.4.2.5 Fisheries and Aquatic Fauna

Full details of results of aquatic surveys undertaken in August 2024 are provided in the Aquatic Baseline Report (Appendix 6-3) and are summarised in this section.

'The watercourses in the vicinity of the Proposed Project were typically lowland depositing channels and tributaries that had been historically modified. The hydromorphology of the Raford River, despite historical drainage, exhibited good flow heterogeneity and mixed rocky substrata. The moderate to good quality hydromorphology of the river overall (despite historical drainage, enrichment and siltation pressures) helped support moderate to good quality salmonid habitat, crayfish populations and localised Annex I, floating river vegetation. This was the highest quality aquatic habitat in the study area.

The upper Attimon Beg catchment (sites B1, B2 & B3) was heavily impacted by drainage works, including peat erosion (siltation) and enrichment pressures and was consequently of low ecological value. While site B4 on the Attimon Beg River supported a low density population of brown trout and European eel it was also evidently impacted by historical drainage, siltation and enrichment pressures. The Clarinbridge catchment also exhibited poor hydromorphology with the majority of the channels being of local importance (lower value) given the absence of any aquatic habitats or species of high conservation value, with exception of the Clarinbridge River (C1) and Shoodaun River (C5) that supported brown trout populations. The main aquatic habitats and species of ecological interest are described individually below, inclusive of the fisheries asset.'

The following paragraphs summarise the fish species that were found during the electrofishing surveys:

'The Raford River was the best fisheries habitat in the study area supporting Atlantic salmon, European eel and brown trout populations. The lower sites on the Raford River (i.e. sites A4 & A5) were the only sites in the study area to support Atlantic salmon. Site A5 supported the highest density of salmon (n=16). Apart from the Rafford River at sites A3, A4 and A5 that supported European eel, site B4 on the Attimon Beg River also supported the species. The highest density eel population was recorded at site A3 on the Raford River (n=5).

Brown trout populations were recorded at all sites on the Raford River (sites A1, A3, A4 & A5) but not on the Cappaghnanool Stream tributary (A2). Brown trout populations were also recorded on the Attimon Beg River (B4), Clarinbridge River (C1) and Shoodaun River (C5). The highest density brown trout population was recorded on the Shoodaun River (n=22).

Lamprey species were not recorded in the study area given sub-optimal habitat (limited spawning and suitable ammocoete burial habitat) due to historical drainage pressures and or watercourses of too high an energy. However, lamprey are known from the lower reaches of the Raford River and Clarinbridge River outside of the study area (pers. obs.).

White-clawed crayfish were recorded at all sites on the Raford River (i.e. sites A1, A3, A4 & A5). This was supported by the eDNA results that detected 12 positive replicates out of 12 for the species in the river. Furthermore, the river tested negative for crayfish plague indicating the importance of the river for the species. Crayfish plague is listed at one of the world's 100 worst invasive species (GISD, 2022; Lowe et al., 2000) and is becoming highly prevalent across Ireland. In modern times catchments free of plague are becoming increasingly rare and thus their importance cannot be underestimated.

Crayfish were not detected in the Cappaghinanool Stream (site A2), the Attimon Beg River catchment (sites B1-B5) and the Clarinbridge River catchment (sites C1-C5). While alkalinities were suitable to support the species (i.e. limestone) extensive historical drainage including of enrichment, siltation and other pressures may account for the species absence during the surveys.'

No freshwater pearl mussel eDNA was recorded at site A5 the lowermost aquatic survey site on the Raford River, in keeping with the known absence of the species in the catchment. However, 12 positive qPCR replicates out of 12 were recorded for white-clawed crayfish on the Raford River supporting the presence of the species. This was validated in the results of the physical site surveys for crayfish. The invasive pathogen crayfish plague (*Aphanomyces astaci*) was not detected in the Raford River.

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 samples taken from 14 no. riverine sites (1 no. site; B5 on the Attimon Beg River was dry). With the exception of sites B4 (Attimon Beg River) and C5 (Shoodaun River) which achieved ***Q4 (good status)****, all sites failed to meet 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). The remaining 12 no. sites achieved* ***Q3-4 (moderate status)*** *or* ***Q3/Q2-3 (poor status)*** *water quality. Significant siltation of the watercourses (primarily from peat drainage and agriculture) was noted during the surveys and, along with eutrophication and hydromorphological alterations (channelisation). These are known to be significant threats to water quality in the wider survey area (EPA, 2021).'*

6.4.2.6 Marsh Fritillary

Suitable marsh fritillary habitat within the Proposed Wind Farm site was identified and mapped during feasibility studies and walkover surveys. Dedicated Marsh Fritillary larval web surveys were undertaken within suitable habitat within the Proposed Wind Farm site on the 25th September 2023, on the 4th, 5th and the 17th September 2024, and on the 10th of September 2025. Incidental records were also gathered on 13th March 2025.

Areas of active larval webs were recorded within fields to the southeast of the Proposed Wind Farm site, close to proposed turbines T05 and T08. These habitats consisted of wet grassland and wet grassland/wet heath mosaic and were dominated by purple moor grass. These were the main breeding areas identified within the Proposed Wind Farm site, and the Proposed Wind Farm layout was designed through an iterative process to avoid impact on these breeding habitats.

Active larval webs were also found on cutover bog habitat near T01 and T03 in the west and north of the Proposed Wind Farm site respectively. These areas hosted much smaller populations within very fragmented devils bit scabious habitat. These were identified as meta-populations of the species within the Site. As a result, the Proposed Project layout was changed in order to avoid direct impact on these breeding areas also.

In 2025, three no. active larval webs were recorded in the west of the site in the vicinity of proposed turbine T02. Two webs are located within the footprint of the proposed access road to proposed turbine T02.

A map showing larval web records, as well as areas of suitable marsh fritillary habitat (i.e Devils-bit scabious), is shown in Confidential Appendix 6-5[17].

Plate 6-23 Fourth instar marsh fritillary larvae recorded in March 2025

6.4.2.7 Other species

Irish hare (*Lepus timidus ssp. hibernicus*) were observed on occasion travelling across peatland habitats within the Proposed Wind Farm site. Both fox (*Vulpes vulpes*) and pine marten (*Martes martes)* were recorded on trail camera footage within the Proposed Wind Farm site in the vicinity of a badger sett. Foxes were observed on numerous other occasions during ornithological surveys of the Proposed Wind Farm site. No evidence of other species of conservation concern were identified within the boundaries of the Proposed Wind Farm site.

6.4.2.7.1 *Invasive faunal species*

Two non-native invertebrate species were recorded during aquatic surveys (Appendix 6-3). These were the New Zealand mud snail (*Potamopyrgus antipodarum*) and the North American amphipod *Crangonyx* sp. The latter species was only present at site A4 on the Raford River at Raford Bridge. The second non-native species, the New Zealand mud snail (*Potamopyrgus antipodarum*), was widespread in the Raford River, Clarinbridge and Attimon Beg sub-catchments. There will be no instream works as part of the Proposed Project.

Mink and a dead greater white toothed shrew were also observed within the Site.

6.4.3 Identification of Key Ecological Receptors

Table 6-11 lists all identified receptors and assigns them an ecological importance in accordance with the NRA Ecological Impact Assessment Guidelines. This table also provides the rationale for this determination and identifies the habitats that are KERs. These ecological receptors are considered in Section 6.5 of this report and mitigation/ measures will be incorporated into the Proposed Project where required, to avoid potential significant impacts on the features.

Table 6-11 Key Ecological Receptors identified during the assessment

Ecological feature or species	Reason for inclusion as a KER	KER
Designated sites	**Nationally Designated Sites** The following Nationally Designated Sites are located downstream of the Proposed Project. A pathway for impact via water quality deterioration as a result of the Proposed Project was identified: › Raford River Bog NHA [000321] › Galway Bay Complex pNHA [000268] › Rahasane Turlough pNHA [000322] Galway Bay Complex pNHA and Rahasane Turlough pNHA have been assessed as of **International Importance** due to their also having a European designation. Raford River Bog NHA is of **National Importance.**	Yes
	European Sites The following Special Areas of Conservation are identified in the AA Screening as being within the Likely ZOI and are assessed fully in the NIS that accompanies this application: › Galway Bay Complex SAC [000268] › Rahasane Turlough SAC [000322] › Inner Galway Bay SPA [004031] › Rahasane Turlough SPA [004089] These sites are assigned **International Importance** and included as a KER as there is potential for indirect effects on them via water pollution. **Note: SPAs within the Likely ZOI are considered in Chapter 7, Birds and in the NIS.**	Yes
Habitats		
Surface watercourses with associated fisheries and aquatic fauna.	The Raford River, a depositing/lowland river (FW2), traverses through the eastern section of the Proposed Wind Farm site (adjacent to T08). A tributary of this river also traverses through the western section of the Proposed Wind Farm site (along proposed new road southwest of T03). There are two new water course crossings proposed within the Proposed Wind Farm site. A total of 10 no. existing watercourse crossings are present along the Proposed Grid Connection. In the absence of appropriate mitigation and design, taking a precautionary approach; potential for indirect effect on these watercourses during construction of the Proposed Project has been	Yes

	identified. Depositing/lowland rivers (FW2) and associated aquatic habitats and related species have therefore been identified as a KER for further assessment. The aquatic species that are associated with the watercourses occurring within the Proposed Wind Farm site and along the Proposed Grid Connection underground cabling route and downstream have been assigned **Local Importance (Higher Value)** as they have a high biodiversity value in the local context. Fish and other aquatic species are therefore included as a KER for further assessment along with the river habitats described above.	
Active Raised bog	Areas of Annex I raised bog habitat are present within the EIAR Site Boundary. This area is to the south and is mapped under NPWS Article 17 reporting. The mapped area is of **National Importance** given its inclusion in Article 17 Reporting. This area has been completely avoided by the Proposed Project. However, it has been included as a KER given the sensitivity of the habitat and its proximity to works areas. Other areas of raised bog (PB1) within the Proposed Wind Farm site which have not been cut and are not mapped under Article 17, but which have likely been impacted by adjacent drainage works and turbary, have been assigned **County Importance** on a precautionary basis given their potential to support active raised bog. These areas are located completely outside of the Proposed Wind Farm footprint.	Yes
Cutover Bog (PB4) and associated secondary habitats	Cutover bog habitats within the Proposed Wind Farm site are highly degraded due to extensive drainage and turbary activity. In their degraded state they are no longer considered to conform to the peatland habitat types listed under Annex I of the Habitats Directive, however, they do hold biodiversity value in a local context and are of **Local Importance (higher value).** Some of this habitat will be lost to facilitate the Proposed Wind Farm and it is therefore included as a KER.	Yes
Wet Heath/Wet grassland (HH3/GS4) mosaic	This habitat is present within a field to the east of proposed turbine T08. It is a species rich area and has affinity with a mosaic of two Annex 1 listed habitats – Wet Heath and Molinia Meadows. It has been assigned **County Importance.** The Proposed Wind Farm has been designed specifically to avoid loss of this habitat. However, given that construction works are proposed in close proximity to this habitat, it is included as a KER for further assessment.	Yes
Wet Grassland - Marsh (GS4-GM1)	This habitat is present within the footprint of proposed turbine T08. While not conforming to any of the habitat types listed under Annex I of the Habitats Directive, this habitat is relatively species rich and is of **Local Importance (higher value).** Therefore, it is included as a KER for further assessment.	Yes
Woodland habitats: **Oak-ash-hazel woodland (WN2)** **Bog Woodland (WN7)**	These woodland habitats are semi-natural woodland types of high value for local biodiversity and are of **Local importance (Higher value)**. There will be some loss of WN2 habitat to facilitate the proposed access road to proposed turbine T08, and some construction works are in close proximity to a small area of WN7 habitat. Therefore, these woodland habitats are included as a KER for further assessment.	Yes

Treelines (WL2) and Hedgerows (WL1)	Hedgerows and treelines have been assessed as being of **Local importance (higher value)** as they 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 site and maintain a separation in distance between the proposed turbine blades and hedgerow features (likely to be used by commuting and foraging bat species locally), there will be some loss of hedgerow/treeline habitat within the Proposed Wind Farm site. For this reason, these habitats have been identified for further assessment as a KER.	Yes
Scrub (WS1)	Some areas of scrub (WS1) of **local importance (higher value)** will be removed to facilitate the Proposed Project and bat buffer areas associated with the turbines. While species composition is generally poor and of wide availability in the wider landscape, the loss of scrub, including potential loss of its function as wildlife corridors, is included as a KER for further assessment.	Yes
Conifer forestry (WD4)	There will be loss of commercial conifer forestry to facilitate the Proposed Project. This habitat where it occurs within the Site is very species poor in both canopy and ground layer and is limited in value to local wildlife. It is of **Local Importance (lower value)** and it is not considered as a KER.	No
Improved Agricultural grassland (GA1) and wet grassland (GS4- agricultural)	Improved agricultural grassland (GA1) habitat is located within the footprint of proposed Turbines T06 and T07 and offroad sections of the Proposed Grid Connection. Agricultural species-poor wet grassland (GS4) is also in the footprint of some sections of proposed new road. This habitat is highly modified and in the context of the Site is a very species poor habitat. It is of **Local Importance (lower value)** and is not included as a KER.	No
Spoil and bare ground (ED2), & Buildings and artificial surfaces (BL3)	These habitats are common and widespread in the wider area. The habitats have been assessed as of **Local Importance (lower value)** as they are largely associated with artificial site access tracks and are of low biodiversity value. Similarly, the existing road in which the Proposed Grid Connection underground cabling route is located, which is categorised under buildings and artificial surfaces (BL3) is not of ecological significance. For this reason, they have not been identified for further assessment and are not a KER.	No
Fauna		
Marsh fritillary	During dedicated marsh fritillary surveys undertaken for the Proposed Wind Farm, a significant breeding population and smaller metapopulations were recorded within the Proposed Wind Farm site. This population is considered to be of **County Importance** on a precautionary basis considering that it is an important population of an Annex II species and considering the relative scarcity of suitable habitat for the species in the wider landscape. Therefore, the potential for impact on this species must be considered and they are considered a KER for further assessment.	Yes
Badger	Badger as an ecological receptor has been assigned **Local Importance (Higher value)** on the basis that the habitats within the Proposed Wind Farm site are utilised by a locally occurring badger population of Local Importance. The Proposed Wind Farm site layout has been altered to avoid potential for direct impacts on the species as a result of the development infrastructure. Given that the species is known to inhabit the area with 2 no. setts identified within the Proposed Wind	Yes

	Farm site, potential for direct and indirect impacts on badger therefore considered further in this assessment and the species has been included as a KER for further assessment.	
Otter	No otter holts, couches or slides were identified during dedicated surveys undertaken for the species within the Site. However, a number of mammal trails in the vicinity of the Raford River were recorded and the Raford River provides suitable commuting and foraging habitat for the species. Furthermore, the species is known to be present in the area and evidence of the species in the form of spraint sites was recorded in the vicinity of watercourses along the Proposed Grid Connection. The potential for local otter populations to be associated with Galway Bay Complex SAC is considered on a highly precautionary basis given that the SAC is approx. 17km downstream of the Proposed Project via the Proposed Grid Connection. The population is therefore considered of **International importance.** Otter are considered a KER and the potential for impact on this species is considered further.	Yes
Bats	The habitats within and surrounding the Proposed Project are likely to be utilised by a bat population **of Local Importance (higher value)**. All bat species in Ireland are protected under both national legislation – (Wildlife Act, 1976, as amended) and European legislation – (Habitats Directive (92/43/EEC). Within the Proposed Wind Farm site, two bat roosts were identified: a small common pipistrelle roost comprising a single individual, and a mixed roost hosting 17 bats, including soprano pipistrelles, brown long-eared bats, and common pipistrelles. The structures in which these roosts reside will be retained and avoided as part of Proposed Project. In addition, several trees within the Proposed Wind Farm site provide potential roosting habitat. All trees containing PRFs will also be retained and avoided as part of the Proposed Project. No roosting site of National Importance (i.e. site greater than 100 individuals) was recorded within the Proposed Wind Farm site during the 2024 surveys. The rivers in the vicinity of the Proposed Grid Connection provide Moderate suitability for commuting and foraging bats. The treelines and hedgerows identified along the Proposed Grid Connection also provide Moderate suitability for commuting and foraging bats. The Proposed Project has the potential to result in direct and indirect effects on the receptor. Therefore, bats are included as a KER for further assessment.	Yes
Pine marten and Red squirrel	The recorded evidence suggests that the Site is not utilised by populations of pine marten or red squirrel of higher than **Local Importance (higher value)** and no potential for significant effects have been identified at the population level. Due to the small footprint and nature of the Proposed Project, they are unlikely to be significantly affected by the Proposed Project. However, given the recorded activity of these species within the Site or surrounding area, they are included as a KER for further assessment.	Yes
Reptiles and Amphibians	It is considered that the Proposed Project will not result in a significant loss of suitable habitat for reptiles and amphibians. No evidence of populations of amphibians/reptiles being significant at more than a local level was recorded. No likely significant effects on these species	No

	are anticipated and therefore further survey/ assessment was not deemed necessary.	
Other Protected Fauna	The recorded evidence suggests that the Site is not utilised by populations of other protected fauna of higher than local significance and no potential for significantly effects have been identified at the population level. Due to the small footprint and nature of the Proposed Project, they are unlikely to be significantly affected by the Proposed Project.	No

6.5 Ecological Impact Assessment

6.5.1 Do-Nothing Effect

If the Proposed Project were not to proceed, the existing use of small-scale agriculture and commercial forestry, as well as turbary activity would continue. The other habitats identified within the Site including hedgerow, watercourses and associated habitats, would likely remain in a similar condition. The general biodiversity on the Site, as described in this chapter, would likely remain similar to its current state as activity levels and land use would not change significantly.

The opportunity to harness the wind energy resource of County Galway would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment would also be lost.

Furthermore, as this application includes a Biodiversity Management and Enhancement Plan (Appendix 6-4) to be implemented during the development's operation, the opportunity to enhance the site for biodiversity, at a local scale, would also be lost.

6.5.2 Likely Significant Effects During Construction Phase

Within this section, the assessment of effects will consider the Proposed Project i.e. both the Proposed Wind Farm site and the Proposed Grid Connection as a whole, where possible. Where the Proposed Wind Farm site and the Proposed Grid Connection are required to be considered separately, this is identified within the assessment.

6.5.2.1 Effects on Habitats During Construction

Table 6-12 provides details of the extent of the habitats that will be lost to facilitate the footprint of the Proposed Project including the turbine bat buffer areas.

Figures showing the Proposed Wind Farm footprint overlaying the habitat map are provided in Figure 6-5a to 6-5e. Habitat maps of the off-road sections of the Proposed Grid Connection are also shown in Figures 6-6a and 6-6b.

Table 6-12 Habitats occurring within the Proposed Project Footprint.

Habitat	Area to be lost to Proposed Project footprint (hectares/meters)	KER?
Cutover Bog (PB4)	**4ha**	**Yes**
Woodland habitats (WN2, WN7)	**0.1ha**	**Yes**
Scrub (WS1)	**1.6ha**	**Yes**
Wet grassland-Marsh (GS4-GM1)	**0.65ha**	**Yes**
Hedgerows (WL1) and Treeline (WL2)	**466m**	**Yes**
Conifer forestry (WD4)	7.5ha	No
Agricultural grassland (GA1)	3.1ha	No
Wet grassland (GS4)	2.4ha	No
ED2 and ED3	0.2ha	No

The Proposed Grid Connection underground cabling route will not result in the significant permanent loss of any habitat. The works will be primarily restricted to the existing road categorised as Buildings and Artificial Surfaces (BL3) with short sections in agricultural grassland, including a 0.5km section of proposed new road. Some sections of private track within agricultural grassland and conifer forestry will need to be widened. There will be small loss of sections of scattered, gappy hedgerows (WL1) which are proposed to be replanted. These areas are shown on the Habitat Maps provided and included in the figures presented in the table above.

The effects on habitats that are identified as KERs are described in the below tables. The habitats brought forward for further assessment as described in the table above, include the following:

- Surface watercourses (with associated fisheries and aquatic fauna)
- Annex I Raised Bog Habitat
- Cutover Bog (PB4) and associated secondary habitats
- Wet Heath/Wet grassland (HH3/GS4) mosaic and Wet Grassland -Marsh (GS4-GM1)
- Woodland habitats: Oak-ash-hazel woodland (WN2) and Bog woodland (WN7)
- Treelines (WL2), Hedgerows (WL1) and Scrub (WS1)

6.5.2.1.1 *Assessment of Potential Effects on Surface Watercourses and Sensitive Aquatic Faunal Species*

Table 6-13 Potential for impact on Watercourses and Sensitive Aquatic Species

Description of Effect	This section assesses the potential for likely significant effects on surface watercourses and associated aquatic habitats, including the Annex I habitat 'Water courses of plain to montane levels, with submerged or floating vegetation of the Ranunculion fluitantis and Callitricho-Batrachion (low water level during summer) or aquatic mosses [3260]' which is present 8.2km downstream of the Proposed Wind Farm site within the Raford River. The potential for impacts on associated aquatic fauna is also assessed including white-clawed crayfish, European eel, salmonids, coarse fish, aquatic invertebrates, molluscs and other aquatic species identified during the desk study and dedicated aquatic surveys and likely to occur downstream of the Site. Two clear-span water-

	crossing structures are proposed within the Proposed Wind Farm site however no instream works are required for these. Construction phase activities will require ground excavations, cement, tree felling, excavation dewatering, use of fuel powered of machinery, all of which have potential to result in pollutive materials entering watercourses. Along the Proposed Grid Connection, there are 10 no. surface water crossing points. The Proposed Grid Connection will be emplaced primarily along the road carriageway with some shorter off-road sections; therefore no instream works will occur. However, there is potential for the activities associated with the installation of the Proposed Grid Connection to result in the runoff of silt and other pollutants such as hydrocarbons and cementitious material in the absence of mitigation. Surface water quality effects on local watercourses may occur during drilling and groundworks associated with potential horizontal directional drilling (HDD) at the 3 no. watercourse crossings (WC02 – EPA mapped Clarinbridge River, WC06 – EPA mapped Torkeel Stream, and WC09 – EPA mapped Shoodaun River) along the Proposed Grid Connection. It is proposed that HDD will be undertaken to prevent direct impacts on the watercourse. However, there is a risk of indirect impacts from sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. These effects on water quality are fully described in Chapter 9: Water of this EIAR and are described here in relation specifically to ecology.
Assessment of Significance prior to mitigation	In the absence of mitigation, there is potential for the Proposed Wind Farm to result in significant indirect effects on the identified aquatic habitats and species at a local geographic scale in the form of pollution during the construction phase. There is potential for an indirect, negative, significant, temporary, likely impact to surface waters within the Proposed Wind Farm site. This would result in impacts on a receptor of local importance (higher value), and potentially of National Importance due to downstream connectivity with the Raford River NHA. In the absence of mitigation, there is potential for the Proposed Grid Connection to result in significant indirect effects on the identified aquatic habitats and species at a local geographic scale in the form of pollution during the construction phase. There is potential for an indirect, negative, temporary, likely impact to surface waters along the Proposed Grid Connection, although not considered significant. This would result in impacts on a receptor of local importance (higher value).
Mitigation	A drainage design for the Proposed Project is provided in Section 4.6 of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project, in particular the Proposed Grid Connection. In addition to this, specific mitigation is provided in relation to protection of surface water quality is provided in Chapter 9: Water of this EIAR, see Section 9.5. These mitigations relate to earthworks, tree felling, potential release of hydrocarbons during construction and storage, contamination from wastewater disposal, groundwater impacts, flooding impacts, potential impacts during horizontal directional drilling, and release of cement-based products.
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.

6.5.2.1.2 Assessment of Potential Effects on Annex I Raised Bog Habitats

Table 6-14 Assessment of Potential Effects on Annex I Raised Bog Habitats

Description of Effect	**Direct habitat loss:** There will be no direct loss of Annex I raised bog habitat as a result of the Proposed Project. The Proposed Project has been designed to avoid areas of Article 17 mapped raised bog habitat. As discussed in Section 6.4.1.2, the peatland habitats within the footprint of the Proposed Wind Farm site are highly degraded and are not considered to be of the condition of the Annex I habitat type. However, the impacts of the Proposed Project on non-Annex I peatland habitats are assessed below. **Indirect effects:** Indirect effects due to drainage: The potential for indirect effects to nearby Annex I raised bog as a result of drainage effects from adjacent construction areas requires further assessment. 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. According to the Peatland Code (IUCN 2023)[18], peatland is considered 'drained' if it is within 30m of an artificial drain or a natural drain formed by the presence of a hagg and gully. Proposed turbine T03 is the closest turbine to Article 17 habitat and is 100m from the mapped Annex I extent. The proposed access road to proposed turbine T03 is over 50m from the mapped area. Furthermore, it is separated from the mapped area by a bog road. No drainage effects to Annex I raised bog habitat as a result of the Proposed Wind Farm are likely. The closest proposed works to Annex I raised bog habitat is the peat management area proposed directly adjacent to the Article 17 mapped area. The placement of excavated peat from construction areas will not overlap with mapped Annex I habitat. The peat management area directly adjacent to the mapped Article 17 area has been selected as part of the BMEP, see Appendix 6-4. Peat used within this area will be specifically used to block drains within the delineated enhancement area (see Figure 3-1, 3-2 in Appendix 6-4 and associated drain mapping). It is proposed that the blocking of surface water flows from this area of marginal bog will increase the wetness and habitat value of the delineated peat management area itself. In turn, it is anticipated that reduced water flows from this marginal area will enhance the adjacent Article 17 mapped area by increasing the water level within the habitat, which is currently in a drained state where it has been cut at the margin. Indirect effects due to dust: Given that construction works will take place within 50m of the Article 17 mapped habitat, the potential for impact to the habitat and associated plant communities as a result of dust deposition from construction works must be considered. Dust deposition has the potential to smother sensitive plant communities.
Assessment of Significance prior to mitigation	**Direct habitat loss** As discussed above, there will be no loss of Annex I raised bog habitat as a result of the Proposed Project. There is no potential for significant effect as a result of direct habitat loss.

[18] https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2023-03/Peatland%20Code%20V2%20-%20FINAL%20-%20WEB_2.pdf

	Indirect effects: Given the distance between the majority of proposed infrastructure and Annex I peatland habitats, there is no potential for significant effect to peatland habitats as a result of drainage due to permanent proposed infrastructure. A potential for effect to Article 17 raised bog habitat as a result of dust deposition from construction works has been identified. Given the drained, degraded nature of the marginal cut peatland habitats in closest proximity to areas of construction, and the temporary nature of the effects of dust deposition, this is not considered to have the potential to result in a significant effect on the habitat. However, mitigation is provided below to prevent any such effects.
Mitigation	**Mitigation by Design** The Proposed Wind Farm has been specifically designed to avoid Article 17 mapped and unmapped Annex I 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 Wind Farm layout was thereby altered through the iterative design process to avoid important peatland habitats. **Dust Mitigation** A range of construction phase mitigation measures to prevent dust impacts have been described as set out in Chapter 10: Air Quality. These include the following: › Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored by the Ecological Clerk of Works (ECoW) to avoid, insofar as reasonably possible, increased runoff. › All plant and materials vehicles shall be stored in dedicated areas within the Site. › Areas of excavation will be kept to a minimum, and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in peat and spoil management areas. › Turbines and construction traffic will be transported to the Proposed Wind Farm on specified haul routes only. › The agreed haul route road adjacent to the Proposed Wind Farm will be regularly inspected for cleanliness and cleaned as necessary. › The roads adjacent to the Proposed Wind Farm proposed new entrance will be checked weekly for damage/potholes and repaired as necessary. › The transportation of construction materials from locally sourced quarries for the Proposed Grid Connection infrastructure and for the Proposed Wind Farm will be covered by tarpaulin where necessary. › If necessary, excavated material will be dampened prior to transport to the spoil management areas. › Approximately 5 dust monitoring gauges will be deployed across the Proposed Wind Farm to detect any exceedances of acceptable dust levels. › Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Proposed Project to reduce the amount of emissions associated with vehicle movement.
Residual Effect	With the above mitigation in place, there is no potential for residual significant effect on Annex I Raised Bog habitat.

6.5.2.1.3 Assessment of Potential Effects on Cutover Bog (PB4) and Associated Habitats

Table 6-15 Assessment of Potential Effects on Cutover Bog and Associated Habitats

Description of Effect	The Biodiversity Management and Enhancement Plan (Appendix 6-4) provides for the enhancement of 5.3ha of cutover bog habitat on the margin of mapped Article 17 Active Raised bog. It is anticipated that blocking the existing drains within this area, as well as ceasing further turbary activity will allow subsurface water levels to rise, making the area wetter and allowing for colonisation of wetland plants. This will in turn be of hydrological benefit to the adjacent Article 17 mapped raised bog area and will deliver benefits to biodiversity as part of the Proposed Project. **Direct habitat loss:** There will be a loss of 4ha of cutover bog habitats to facilitate the construction of the Proposed Wind Farm permanent infrastructure. In addition to permanent infrastructure, peat and spoil management areas will be required on cutover bog areas adjacent to the proposed Turbines T02 and T03. There will be no other direct impacts on peatland habitats within the Proposed Wind Farm site. **Indirect effects:** The potential for indirect effects to cutover peatland habitats as a result of drainage effects from adjacent construction areas has been considered. 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. According to the Peatland Code (IUCN 2023)[19], peatland is considered 'drained' if it is within 30m of an artificial drain or a natural drain formed by the presence of a hagg and gully. However, the cutover peatland habitat within and adjacent to the Proposed Wind Farm footprint is already significantly drained and subject to turbary activities, and the addition of drainage associated with site infrastructure is not anticipated to result in additional drainage impacts to any in-tact areas of peatland. The potential for impact to cutover peatland habitats and associated plant communities as a result of dust deposition from construction works has been considered. Given the drained, degraded nature of the marginal cut peatland habitats in closest proximity to areas of construction, and the temporary nature of the effects of dust deposition, this is not considered to have the potential to result in a significant effect on the habitat.
Assessment of Significance prior to mitigation	**Direct habitat loss** As discussed above, there will be a permanent loss of 4ha of cutover bog habitat of **Local importance (higher value).** This is considered to be a permanent significant effect at the local scale. Cutover bog areas adjacent to Turbines T02 and T03 will be used for placement of excavated peat. The habitat in these areas is highly drained, dry and modified but contain typical dry, cutover bog plant communities. These areas will be allowed to naturally revegetate with plant communities common to adjacent areas, and plug planted with devils bit scabious. This is considered to be a temporary, not significant effect at the local scale. **Indirect effects:**

[19] https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2023-03/Peatland%20Code%20V2%20-%20FINAL%20-%20WEB_2.pdf

	No potential for significant effect to adjacent cutover peatland habitats due to drainage impacts or dust impacts is anticipated. However, mitigations are provided below to prevent any effects.
Mitigation	**Specific Mitigation** The loss of 4ha of cutover peatland for the Proposed Project will be offset through the BMEP which includes for the re-wetting of a cutover bog area measuring 5.6ha. This area comprises degraded and drained marginal peatland habitat. It is intended that excavated peat from the construction works will be used to block drains and/or create bunded wetland cells within this area. The mapped drains in this area are shown in Figure 3-2 of the BMEP. It is anticipated that the slowing down of water flows from this area will in turn enhance the adjacent Article 17 mapped raised bog area. A Monitoring Plan to ensure success of the proposed measures are also provided in the BMEP. Excavated material used within the area for this purpose will comprise strictly peat soils. In addition, the area for peat management proposed adjacent to proposed turbine T03 will be used as part of biodiversity proposals within the BMEP. It is proposed that the area is plug-planted with devil's bit-scabious for the benefit of marsh fritillary and will comprise strictly peat soils to encourage re-colonisation with peatland plant communities. The area proposed for peat/spoil management adjacent to proposed turbine T02 will be allowed to naturally revegetate. **Dust Mitigation** The dust mitigations outlined in Section 0 above will be applied.
Residual Effect	With the implementation of the mitigation outlined above, there is no potential for residual significant effect on cutover peatland habitats.

6.5.2.1.4 *Assessment of Potential Effects on Wet Heath/Wet Grassland (HH3/GS4) Mosaic and Transitional Wet Grassland-Marsh (GS4-GM1)*

Table 6-16 Assessment of Potential Effects on Wet heath/Wet grassland (HH3/GS4) Mosaic and Wet Grassland-Marsh (GS4-GM1)

Description of Effect	**Wet Heath/Wet Grassland (HH3/GS4) Mosaic** As described in Section 6.4.1.1.3, there is an area of wet heath/wet grassland mosaic (HH3/GS4) within the field directly east of the proposed turbine T08. This habitat has the potential to conform to Annex I habitats 'northern Atlantic wet heaths with *Erica tetralix* (4010)' as well as 'Molinia meadows (6410)'. This habitat within the Proposed Wind Farm site supports a breeding population of marsh fritillary. The potential for impacts to this habitat as a result of construction works associated with the proposed turbine T08 has been considered. The field in question is naturally separated from the field within which proposed turbine T08 will be constructed, by a field boundary drain and associated scrub. In addition, the topography of the west to northwestern section of the field is higher and slopes down to the proposed turbine T08 construction area which also serves as a natural buffer. The proposed construction site access for proposed turbine T08 will be via the proposed new road from the north. There will be no access to the field east of the proposed turbine T08 or Annex I habitat. However, the potential for impacts to the habitat from dust deposition impacts during construction is considered further. **Transitional Wet grassland-Marsh (GS4-GM1)**

	The construction of proposed turbine T08 will result in the loss of 0.65ha of transitional wet grassland-marsh (GS4-GM1) within the flood plain of the Raford River. This is a semi-natural habitat type with wetland vegetation. This habitat contains broadleaf wetland species and in turn is likely to provide foraging habitat for a range of invertebrates and mammals including those associated with the adjacent Raford River. However, the construction area is restricted to the eastern boundary of the field and the construction footprint comprises approx. 15% of the habitat. The majority of the habitat will be retained, particularly the extent of the habitat that is closest to the river.
Assessment of Significance prior to mitigation	**Wet Heath/Wet Grassland (HH3/GS4) Mosaic** No potential for significant effect to this habitat as a result of direct impacts or dust deposition is anticipated, however, precautionary mitigation measures are outlined below. **Transitional Wet grassland-Marsh (GS4-GM1)** The loss of 0.65ha of wet grassland-marsh is not considered significant at any scale, given that 85% of the habitat will remain. No potential for significant effect to this habitat as a result of direct impacts or dust deposition is anticipated, however, precautionary mitigation measures are outlined below.
Mitigation	**Mitigation by Design** The Proposed Project has been specifically designed to avoid loss of Annex I habitat. 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 loss of any Annex I habitat. **Construction Mitigation** Direct Habitat Impacts: › Construction works associated with the proposed turbine T08, including site set up, will be undertaken with supervision by an appropriately qualified and experienced ECoW. › The construction works area for proposed turbine T08 and associated site access routes will be fully fenced off (with solid hoarding where possible) to ensure there is no access or egress to adjacent areas of sensitive habitat. **Dust Mitigation** The dust mitigations outlined in Section 0 above will be applied.
Residual Effect	With the implementation of the mitigations set out above, there is no potential for residual significant effect on Wet heath/Wet grassland (HH3/GS4) Mosaic and Wet Grassland-Marsh (GS4-GM1).

6.5.2.1.5 Assessment of Potential Effects on Woodland Habitats and Scrub

Table 6-17 Assessment of Potential Effects on Woodland Habitats

Description of Effect	The Biodiversity Management and Enhancement Plan (Appendix 6-4) provides for the replanting of 1.9ha of native woodland within the Proposed Wind Farm site. This will result in a net gain in native woodland habitat within the Site as a result of the Proposed Project. There will be a loss of 0.1ha of semi-native woodland and 1.6ha of scrub to facilitate the Proposed Project. This includes a section of a small linear area of oak-ash-hazel woodland through which the access road for proposed turbine T08 is proposed. Also included is scrub within the proposed bat buffer zones required for each turbine, particularly in the vicinity of proposed turbine T01. A small area of birch/bog woodland edge will be lost to accommodate the proposed access road to proposed turbine T02.
Assessment of Significance prior to mitigation	Taking a precautionary approach, the cumulative loss of 0.1ha of semi-native woodland and 1.6ha of scrub within the site, comprising various smaller sections associated with infrastructure throughout the Site, is considered to be a permanent significant effect on the local scale.
Mitigation	The loss of woodland and scrub for the Proposed Project will be offset through the planting of native woodland as part of the BMEP (Appendix 6-4). In total, it is proposed to plant 1.9ha of native woodland. The proposed native woodland replanting areas are shown in Figure 3-1 of the BMEP. These have been strategically chosen to link up with identified bat commuting corridors within the Proposed Wind Farm site and will provide enhanced habitat forging area relative to the commercial conifer stands. The proposed planting will comprise native tree species of various age structures and will be of greater biodiversity value than the habitats being lost. The BMEP and associated planting proposals will be implemented within planting season during or in advance of phase 1 of construction works in order to minimise the interim time necessary for growth and establishment of new habitat.
Residual Effect	With the implementation of the BMEP, there is no potential for residual significant effect. There will be a positive effect on the extent of native woodland habitat within the Proposed Wind Farm site upon implementation of the BMEP which will provide an overall long-term net gain in terms of area of native woodland.

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

Table 6-18 Assessment of Potential Effects on Treeline (WL2) and Hedgerow (WL1)

Description of Effect	The footprint of the Proposed Project, including internal roads, turbines and associated bat buffer vegetation clearance areas (as per NatureScot 2021 guidance) and the Proposed Grid Connection, will result in the loss of approx. 466 meters of hedgerow and treeline within the Site.
Assessment of Significance prior to mitigation	The loss of treeline and hedgerow is considered a permanent, negative, significant effect at the local scale.
Mitigation	Approximately 3,570m linear metres of new hedgerow planting will be carried out along selected boundaries of fields within the Proposed Wind Farm site. The replanting areas are presented in Figure 3-1 of the BMEP (Appendix 6-4). These have been strategically chosen to link up with identified bat commuting corridors in the Proposed

	Wind Farm site. This will result in more than a 100% net gain in this habitat within the Proposed Wind Farm site. Species planted in these locations will be of a similar composition to those occurring on site and will be of local provenance where possible. Further details with regard to species, planting location, and management is contained within the BMEP. The BMEP and associated planting proposals will be implemented within planting season during or in advance of phase 1 of construction works in order to minimise the interim time necessary for growth and establishment of new habitat.
Residual Effect following Mitigation	Following implementation of mitigation, no potential for significant effect exists at any geographic scale. The planting of additional hedgerow will result in a net gain of this habitat within the Proposed Wind Farm site.

6.5.2.1.7 *Biosecurity*

No Third Schedule invasive species were identified within the permanent infrastructure footprint of the Proposed Project during the surveys undertaken. However, one stand of *Rhododendron ponticum* was identified adjacent to scrub within the proposed bat felling buffer for proposed turbine T05.

Due to the scrub clearance works required for the bat buffer in this area, in the absence of mitigation there is potential for spread of this species to other habitats within the Proposed Wind Farm site and outside of the 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. The following measures will be in place to avoid impacts to biosecurity as a result of construction of the Proposed Project:

Rhododendron regrows 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 additional 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 (EnCoW) or ECoW 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 ECoW or EnCoW.
- In advance of scrub clearance 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.[20]
- 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 Proposed Project and excavation works are not proposed in the vicinity of the identified Rhododendron stand. Should potentially Third Schedule contaminated soil 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.

[20] *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.

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 that were recorded on the Site but were not included as KERs, see Table 6-11 above. Given the extensive area of habitat that will remain undisturbed throughout the Site and in the wider area and the avoidance of the most significant areas of faunal habitat, no significant effects on non-KER faunal biodiversity are anticipated as a result of the Proposed Project. Therefore, these species were excluded from further assessment.

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 6.5.2.1.1 above and is not repeated below.

The following species have been brought forward for further assessment, as identified in Table 6-11:

- Marsh fritillary
- Badger
- Otter
- Bats
- Pine marten and red squirrel

6.5.2.2.1 *Assessment of Potential Effects on Marsh Fritillary*

Table 6-19 Assessment of Potential Impacts on Marsh Fritillary During the Construction Phase

Description of Effect	The Biodiversity Management and Enhancement Plan (Appendix 6-4) provides for the creation of 8ha of additional suitable marsh fritillary breeding habitat within the Proposed Wind Farm site. This will result in a net gain in availability of suitable habitat for the species within the Site as a result of the Proposed Project. **Direct effects/ Mortality** The Proposed Wind Farm has been designed, through an iterative design process, to avoid areas of breeding marsh fritillary and suitable habitat. Given the proximity of the construction works required for some elements of the Proposed Wind Farm to identified marsh fritillary breeding areas, the potential for direct impacts on the species has been considered. Construction works will occur in close proximity to identified marsh fritillary populations at proposed turbines T01, T03 and associated access road, near T05 and T08 and along the proposed access road to proposed turbine T02. In the absence of mitigation, direct effects could occur due to mortality of marsh fritillary larvae. **Indirect effects** In the absence of mitigation, construction works adjacent to existing breeding areas has the potential to indirectly impact marsh fritillary due to dust related impacts. Airborne dust from construction works could settle on marsh fritillary larval webs resulting in suffocation or degradation of breeding habitat. **Loss of suitable breeding habitat**

	The Proposed Wind Farm has been designed, through an iterative design process, to avoid areas of breeding marsh fritillary and high quality, suitable habitat. As a result, there is no potential for direct impacts on the identified main breeding populations. The Proposed Project will result in the loss of approx. 1ha of suitable marsh fritillary breeding habitat (i.e., habitat containing the foodplant devils bit scabious (*Succisa pratensis).* However, these habitats are more fragmented and less structurally developed.
Assessment of Significance prior to mitigation	**Direct effects/ Mortality** Taking a precautionary approach, in the absence of mitigation, the potential for direct impacts to marsh fritillary would be a significant effect to the population at the County Scale. **Indirect effects/dust impacts** Taking a precautionary approach, the potential for indirect effects to marsh fritillary as a result of adjacent construction works has the potential to be a significant effect to the population at the County scale. **Loss of suitable breeding habitat** Given that high quality and existing breeding habitat for marsh fritillary has been avoided, and the Proposed Wind Farm footprint contains only some areas of lower quality, fragmented and less structurally developed areas of devils bit scabious, it is considered that there is no potential for significant effect to marsh fritillary at the County scale. However, given the requirements of marsh fritillary populations on a small landscape scale due their narrow range where they occur, the loss of 1ha of fragmented potential marsh fritillary habitat is considered, on a precautionary basis, to have the potential to be significant at the local scale.
Mitigation	**Mitigation by Design** › The Proposed Wind Farm has been specifically designed to avoid direct impacts on identified marsh fritillary within the Proposed Wind Farm site. This was achieved through an early-stage ecological constraints study informed by field surveys and habitat mapping. The Proposed Wind Farm layout was thereby altered where possible through the iterative design process to avoid loss of marsh fritillary breeding habitat as well as significant areas of potential breeding habitat (i.e., large areas containing devils bit scabious). › Consequently, the Proposed Wind Farm permanent footprint is over 60m from the main populations of marsh fritillary identified within the site. **Mitigation - Direct effects/Mortality** Construction works will occur in close proximity to identified marsh fritillary-populations at T01, T03, T05 and T08 and along the proposed access road to T02. In addition, scrub clearance within the proposed bat buffer for Turbines T05 and T08 will be required in proximity to existing confirmed breeding sites. The following mitigations will be applied at these construction locations: › A pre-commencement survey for marsh fritillary larvae will be undertaken at the suitable time of year in advance of construction throughout footprint areas of the Proposed Wind Farm › If active larval webs are recorded within the construction footprint, these webs will be translocated by a suitably qualified ecologist to adjacent suitable existing foraging habitat outside of the construction footprint. This will be achieved by translocating a sod of earth with entire, intact devils' bit scabious plants upon which the larvae are feeding.

	› Larval webs and associated food plants would only be translocated by the ECoW to existing breeding areas as shown in Appendix 6-5. › Existing breeding areas will be fully fenced off with a minimum exclusion zone distance of 5 metres near T01, T03, T05 and T08. › ECOW supervision will be required for construction of components near existing breeding areas (such as Turbines T01, T03, T05, T08 and along the proposed new road to T02). › Where suitable marsh fritillary habitat occurs in close proximity to Proposed Wind Farm infrastructure, side casting of material will be to the opposite side of the proposed infrastructure to where the suitable habitat occurs. › No clearance of scrub within the proposed bat buffer of Turbines T05 or T08 will be carried out until sufficient exclusion zone fencing to a minimum of 5m is in place, or unless under ECoW supervision. **Dust Mitigation** The following mitigation applies to construction areas within 20m of recorded marsh fritillary larval webs (in line with Table 4 of Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction 2024[21]): › Groundworks (i.e works with potential to create dust) associated with proposed Turbines T01, T03, T05 and T08 will be fully supervised by an ECoW. › The ECoW will regularly monitor adjacent marsh fritillary larval web areas on a daily basis for potential signs of dust deposition or any other habitat degradation. Dust level thresholds and weather will also be monitored in line with the mitigations set out in Section 0 above. › If any signs of habitat degradation are noted, the dust-producing works will be immediately halted and further mitigation to protect larval web areas from dust will be implemented in advance of resuming work. › The ECoW will have power to halt construction works if required as outlined above. › All of the additional dust mitigation measures outlined in Section 0 above will apply. **Mitigation - Loss of suitable breeding habitat** As described above, the Proposed Project will result in the loss of approx. 1ha of potentially suitable marsh fritillary habitat (i.e. areas of devils bit scabious). As part of the BMEP proposed as part of the Project (Appendix 6-4) it is proposed to create 8ha of suitable habitat for marsh fritillary. In addition, it is also proposed to implement monitoring of existing marsh fritillary breeding areas within the Proposed Wind Farm site. These measures will not only offset any potential loss of habitat but will result in a significant net gain in suitable marsh fritillary habitat within the Proposed Wind Farm site. Full details on habitat establishment and monitoring are provided in the BMEP.
Residual Effect following Mitigation	With the above mitigation in place, there is no potential for residual significant effect to marsh fritillary. With the proposed BMEP in place, there will be a significant net gain in suitable marsh fritillary breeding and foraging habitat within the Proposed Wind Farm site.

6.5.2.2.2 *Assessment of Potential Effects on Bats*

As per NatureScot Guidance, wind farms present four potential risks to bats:

[21] https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf

- Collision mortality, barotrauma and other injuries; (Operational Phase Impact)
- Loss or damage to commuting and foraging habitat;
- Loss of, or damage to, roosts;
- and Displacement of individuals or populations.

For each of these four risks, the detailed knowledge of bat distribution and activity within the Site has been utilised to predict the potential effects of the Proposed Project on bats.

Bat surveys undertaken in 2024, in accordance with NatureScot Guidance, form the core dataset for the assessment of effects on bats.

Table 6-20 Assessment of Potential Impacts on Bats During the Construction Phase

Description of Effect	**Loss or damage to commuting and foraging habitat** In the absence of appropriate design, the loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. The Proposed Wind Farm site is predominantly located on improved agricultural/wet grassland, peatlands and areas of conifer forestry. The implementation of the Biodiversity Management and Enhancement Plan (BMEP, Appendix 6-4) will deliver significant positive measures for bats within the Proposed Wind Farm site. In particular, approximately 3,521m of new hedgerow habitat will be planted, strategically located to link existing areas of bat activity and support long-term habitat connectivity. These measures will enhance ecological corridors across the site, providing new foraging and commuting opportunities once established. Approximately 466m of hedgerow and treeline habitat will be lost to accommodate turbines, associated bat buffers, access roads, and ancillary infrastructure. When combined with the removal of additional features such as linear scrub and forestry edge habitat relevant to bat commuting corridors, the total net loss of linear habitat amounts to 1,966m. This figure accounts for the direct removal of hedgerow and treeline habitat (approx. 466m), the loss of additional linear features such as scrub and forestry edge habitat (approx. 2,334m) and also reflects the creation of new linear edge habitat resulting from proposed felling activities (approx. 834m). No accommodation works along the turbine delivery route are proposed. Therefore, no significant effects on commuting and foraging bats associated with the turbine delivery route are anticipated. **Loss of, or damage to, roosts** The Proposed Wind Farm is predominantly located within agricultural and wet grasslands, peatlands, and areas of conifer forestry. Roost surveys carried out for the Proposed Project identified both structures and trees with potential roost features (PRFs). The project design has been informed by these surveys and incorporates avoidance measures to ensure that confirmed roosts and all identified PRFs are retained and safeguarded, thereby protecting roosting habitat throughout construction and operation. Two structures within the Proposed Wind Farm site were confirmed to support small bat roosts during the 2024 surveys: a derelict building supporting soprano pipistrelle, common pipistrelle and brown long-eared bats, and a farm shed supporting a single common pipistrelle. Both structures will be retained in situ and excluded from the development footprint, ensuring the continued availability of these roosting resources. In addition, while several trees containing PRFs were identified within the Proposed Wind Farm site, none occur within the bat felling buffer or areas of proposed infrastructure, and no tree removals affecting PRFs are required.

	The proposed onsite 38kV substation is located within improved agricultural grassland with no trees containing PRFs. Some vegetation removal will be necessary to accommodate access roads and ancillary infrastructure, but no roosting features will be lost. Similarly, the Proposed Grid Connection underground cabling will follow existing roads and verges; although PRFs were identified in trees adjacent to the roadway (outside the footprint), no removal is proposed. The turbine delivery route also requires no accommodation works and will not affect potential roosting habitat. The Proposed Grid Connection will traverse 10 no. watercourse crossings, as well as a motorway underpass and a rail bridge. All works will either be confined to the existing road infrastructure or completed using temporary construction methods such as horizontal directional drilling (launch pads set-back from crossing infrastructure) or flatbed formation within the existing road network. In addition, two farm sheds along the route were assessed as having *Negligible* potential to support roosting bats; both will be retained in situ and unaffected by the Proposed Grid Connection. As such, no significant effects on potential roosting bats associated with the Proposed Grid Connection are anticipated. **Disturbance or Displacement of Individuals or Populations** The Proposed Wind Farm is predominantly located on agricultural/wet grasslands, peatlands and areas of conifer forestry. There will be no net loss of linear landscape features for commuting and foraging bats and there will be no loss of any roosting site. The habitats on the Proposed Wind Farm site will remain suitable for bats and no displacement of individuals or populations is anticipated. Following a number of roost assessments on the Proposed Grid Connection watercourse and rail/motorway crossing infrastructure, no evidence of roosting bats was identified; however, there is potential for opportunistic roosting by individual bats at 4 no. crossing points (Appendix 6-2). All works pertaining to the Proposed Grid Connection crossing points will either be confined to the existing road infrastructure or completed using temporary construction methods such as horizontal directional drilling (launch pads set-back from crossing infrastructure) or flatbed formation within the existing road network. No works are proposed on the underside or abutments of the crossing infrastructure. Potential noise and vibration associated with temporary works at crossing points are not expected to be out of character with existing traffic/rail activity or typical roadworks, to which any potential roosting bats in the area are already to be accustomed. Given the short-term nature of these works, significant disturbance or displacement of bats is not anticipated.
Assessment of Significance prior to mitigation	**Loss or damage to commuting and foraging habitat** Given the extensive area of habitat that will remain undisturbed throughout the Proposed Wind Farm site and the avoidance of the most significant areas of faunal habitat (i.e. mature treelines and hedgerows), no significant effects with regard to loss of commuting and foraging habitat are anticipated. **Loss of, or damage to, roosts** No potential for significant effect regarding the loss or disturbance of roosting habitat within the Proposed Wind Farm site or Proposed Grid Connection is anticipated. **Disturbance or Displacement of Individuals or Populations** No potential for significant effect with regard to disturbance or displacement of bat populations is anticipated as a result of construction of the Proposed Wind Farm or the Proposed Grid Connection.

Mitigation	**Loss or damage to commuting and foraging habitat** Approximately 3,521m of hedgerow will be replanted within the Site, contributing to long-term habitat connectivity and ecological value within the Site. This will result in a net gain of approximately 1,555m in linear landscape features within the Site. In addition to this, it is proposed to plant 1.9ha of native woodland, resulting in a net gain of native woodland within the Proposed Wind Farm site and which will provide further foraging and commuting edge habitat. The proposed replanting area is shown and discussed in Appendix 6-4, BMEP. **Loss of, or damage to, roosts** No potential for significant effect regarding the loss or disturbance of roosting habitat within the Proposed Wind Farm site or Proposed Grid Connection is anticipated and no mitigation is required. **Lighting** With regard to any lighting required for construction of the Proposed Project, the Applicant commits to using lighting during construction only where necessary, in line with the updated Dark Sky Ireland Lighting Principles: › All lighting will be justified and used only when required. › Warm colour temperatures will be used to minimise impacts on wildlife and the night sky. › Glare and brightness will be minimised to protect visual comfort. › Luminaires will be angled downward with appropriate beam control to avoid over-lighting. › Lower mounting heights will be used where possible to better contain light. › Lighting will incorporate timers, dimmers, or PIR sensors to reduce energy use and emissions. › Natural areas such as trees, waterbodies, and nesting habitats will not be illuminated.
Residual Effect following Mitigation	Approximately 3,521m of hedgerow will be planted within the Proposed Wind Farm site, resulting in a net gain in linear landscape features, contributing to long-term habitat connectivity and ecological value within the Site. While these measures will maintain and enhance ecological corridors in the long term, a short-medium term reduction in connectivity may occur until newly planted or enhanced hedgerow becomes fully established. Following the implementation of the replanting plan as outlined in the BMEP, no significant effects in relation to habitat fragmentation or loss of commuting or foraging habitat for bats is anticipated. The Proposed Wind Farm site is predominantly located on agricultural/wet grasslands, peatlands and areas of conifer/broadleaved forestry. There will be no net loss of linear landscape features for commuting and foraging bats and there will be no loss of any roosting site of ecological significance. The habitats on the Proposed Wind Farm site will remain suitable for bats and no significant disturbance or displacement of individuals or populations is anticipated.

6.5.2.2.3 *Assessment of Potential Effects on Badger*

Table 6-21 Assessment of Potential Effects on Badger

Description of Effect	**Habitat Loss/Fragmentation** Given the presence of 2 no. badger setts within the Proposed Wind Farm site, the proposed Wind Farm layout was changed during iterative design stages in order to avoid direct impacts on sett locations. Therefore, there will be no loss of badger sett habitat. Given the nature of the Proposed Wind Farm, there will be some minimal loss of suitable badger

	foraging habitat i.e., agricultural grassland (GA1), 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 with the Proposed Wind Farm site and the wider area.
	Disturbance The Proposed Wind Farm layout has been designed such that proposed infrastructure is located over 50m from the main badger sett in the east of the site near Turbines T06 and T07. This is in line with NRA guidance[22] for avoidance of disturbance of badger during construction works. A proposed new road is located over 30m from a 2-entrance sett. This distance is in line with the NRA Guidelines in relation to works outside of badger breeding season (badger breeding season is between January to June inclusive). There will be no pile driving necessary within 150m of any identified setts[22]. There is a potential for new badger setts to be created during the interim between baseline ecological surveying and commencement of construction. Noise and earth movement during construction works 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[22]) and therefore any excavation by heavy machinery in close proximity to sett entrances risks causing damage to setts and/or direct harm to badgers in the absence of mitigation. In the event that a new badger sett is established within or near the footprint of the Proposed Wind Farm during the interim between baseline ecological surveys and commencement of construction, there is potential for disturbance to badger using the setts as a result of noise during construction works.
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 Any potential for physical damage or significant disturbance of occupied setts has been identified as significant at the local geographic scale in the absence of mitigation.
Mitigation	**Habitat Loss/Fragmentation** No specific mitigation is required for the avoidance of habitat loss.
	Disturbance/Displacement Due to time that can elapse between the original surveys, any future planning consent and construction, a pre-construction badger survey will be carried out in order to assess activity levels at setts and to identify any additional sett entrances that may have been established in the intervening period. All setts within 50m 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. All badger survey work will be undertaken in line with current best practice guidance. Taking a precautionary approach, the following measures will be undertaken for the avoidance of disturbance/displacement and will be implemented during the construction phase of the Proposed Wind Farm: › 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.

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

	› Construction works associated with the proposed new road to proposed turbine T03 will be carried out over 30m away from the sett and the 30m exclusion zone will be fenced off to exclude potential access by construction workers. › Construction works associated with the proposed new road to proposed turbine T03 which is <50m from the sett will be undertaken outside of badger breeding season (January to June inclusive) if possible, unless in consultation with the NPWS with agreed additional mitigation in place. All of the above works will be undertaken or supervised by an appropriately qualified ecologist in advance of construction.
Residual Effect following Mitigation	With the above mitigation in place, there is no potential for significant residual effect to badger.

6.5.2.2.4 Assessment of Potential Effects on Otter

Table 6-22 Assessment of Potential Impacts on otter

Description of Effect	Potential for effects on otter has been considered with regard to NPWS '*Threat Response Plan*'[23] (TRP) which identifies four significant threats facing otter in an Irish context: habitat destruction, water pollution, disturbance (recreational sources) and accidental death/persecution. No otter holts were found within 150m of the Proposed Project during the dedicated surveys undertaken. However, evidence of otter activity was recorded within rivers downstream of the Proposed Grid Connection and as such they are known to be active in the area. Suitable habitat for otter exists within the Proposed Wind Farm site within the Raford River through the east of the Proposed Wind Farm site and the tributary that flows through the west of the Proposed Wind Farm site. Two new clear-span water crossing structures are proposed along proposed new roads on approach to the proposed Turbines T03 and T08. The potential for commuting bankside habitat loss or disturbance as a result of these structures requires further assessment. The installation of the Proposed Grid Connection underground cabling route within the existing public road network crosses over some existing water crossings where evidence of otter activity was recorded. In relation to disturbance, otter are predominantly crepuscular in nature and it is anticipated that construction activity associated with the Proposed Grid Connection underground cabling route will be confined to daytime hours, thus minimizing potential disturbance related impacts to the species. 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 Grid Connection underground cabling route. There is potential for the construction activity to result in the run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream of the Proposed Grid Connection. This represents a potential indirect effect on otter in the form of habitat degradation through water pollution.
Assessment of Significance prior to mitigation	Taking a precautionary approach, the construction of a new watercourse structure over the Raford River to facilitate access to proposed turbine T08 has the potential to be a temporary significant effect to otter in the area as a result of disturbance. It has the potential for a permanent significant effect at the local scale as a result of barrier to movement in the absence of a sensitive design. In the absence of mitigation, the indirect effect of water pollution on otter during construction has the potential be a temporary significant effect.

[23] *NPWS (2009) Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.*

Mitigation	Chapter 4 of this EIAR describes the installation options for the Proposed Grid Connection underground cabling route. A total of 10 no. existing watercourse crossings will be traversed along the Proposed Grid Connection. Instream works are not required at any watercourse crossing along the Proposed Grid Connection. Watercourses will not be directly impacted upon since no instream works or bridge/culvert alterations are proposed. Two new watercourse crossing structures are required within the Proposed Wind Farm site. The following mitigations will be in place with regard to construction works within the Proposed Wind Farm: › A pre-commencement survey for otter will be undertaken along the Raford River and its tributary (the Killimor/ Attymon Beg River) within 150m upstream and downstream of the proposed new crossing structures in advance of commencement of works in order to confirm whether the baseline survey conditions remain the same. › If a holt is found within 150m of construction areas, the works will be undertaken in line with NRA guidelines and if a potential for disturbance is identified, these works will not be undertaken until a derogation licence is obtained. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of the survey will be to assess any changes in baseline conditions since the time of undertaking the baseline surveys. › The proposed 2 no water crossing structures will be pre-cast, clear-span structures and will therefore avoid any loss of riverbed or riverbank habitat. Specific mitigation is provided in relation to water quality in Chapter 9: Water of this EIAR and is summarised in Sections 6.5.2.1.1 above.
Residual Effect following Mitigation	Following the implementation of mitigation, there is no potential for residual significant effect on otter.

6.5.2.2.5 *Assessment of Potential Effects on Red Squirrel and Pine Marten*

Table 6-23 Assessment of Potential Effects on Red Squirrel and Pine Marten

Description of Effect	During the ecological surveys undertaken of the Proposed Project, no pine marten dens or red squirrel dreys were found. However, as described in Section 6.4.2.7, evidence of pine marten and red squirrel activity was found within or in the vicinity of the Site. No direct impacts to these species via habitat loss or mortality are anticipated. However, taking a precautionary approach, there is potential for red squirrel within the Site to build new dreys in the vicinity of proposed infrastructure during the interim between the grant of planning and construction phase. There is potential for pine marten to create dens within the Proposed Project infrastructure footprint. Therefore, it is considered there is a potential for disturbance to these species as a result of construction works. There is no potential for significant loss of pine marten or red squirrel foraging habitat or barriers to movement as a result of the Proposed Project, due to the nature of the habitats being lost for the Proposed Project and lack of structures which could cause a barrier to movement.
Assessment of Significance prior to mitigation	No red squirrel dreys or pine marten dens were found within the Site and no significant effects to these species are predicted. However, taking a precautionary approach, the potential for disturbance to these species during construction works is considered and mitigation is provided below.
Mitigation	Prior to the commencement of construction works, the following measures will be undertaken for the avoidance of disturbance and to ensure no dreys or dens have been established since the original surveys undertaken. The following measures are in line with *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA 2009).

	› From a precautionary basis, a pre-commencement survey will be undertaken by a qualified ecologist in accordance with standard best practice guidance prior to the commencement of site works to ensure that no red squirrel dreys or pine marten dens are present within or in close proximity to Proposed Project infrastructure footprint. › In the event that a red squirrel drey or pine marten den is identified within the Proposed Project footprint during pre-commencement surveys, further surveys will be undertaken to ascertain whether the drey/den is in use. A Species Protection Plan as agreed by the project ecologist will be put in place in advance of felling works.
Residual Effect	Following the implementation of the mitigation proposed above, there will be no significant residual effect on pine marten or red squirrel as a result of the Proposed Project at any geographic scale.

6.5.3 Likely Significant Effects During Operational Phase

Within this section, the assessment of effects will consider the Proposed Project i.e. both the Proposed Wind Farm and the Proposed Grid Connection as a whole, where possible. Where the Proposed Wind Farm and the Proposed Grid Connection are required to be considered separately, this is identified within the assessment.

6.5.3.1 Effects on Habitats during Operation

The BMEP included as Appendix 6-4 includes for creation of 8ha of additional marsh fritillary breeding habitat within the Proposed Wind Farm site, management of existing habitat, creation of native woodlands, enhancement of peatland and planting of over 3km of new hedgerows/wildlife commuting corridors. The measures proposed will achieve a net gain for biodiversity as part of the Proposed Project.

The BMEP will commence during the planting season in advance of or during the first phase of construction of the Proposed Project and will be maintained for the operational lifetime of the Proposed Project.

6.5.3.1.1 *Effects on surface watercourses during operation*

Table 6-24 Assessment of potential effects on groundwater dependant habitats and surface watercourses during operation

Description of Effect	This section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e., watercourses), salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates, molluscs and other aquatic species. The following impact assessment is based on Section 9.5.3, Chapter 9: Water and is summarised here in the context of ecology. <u>Proposed Wind Farm site</u> **Increased hardstanding/run-off impacts:** Progressive replacement of the 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. For the purposes of assessment, it is conservatively assumed that the Proposed Wind Farm roads and hardstands (including the proposed onsite 38kV substation) are impermeable. The assessed Proposed Project footprint (7.6ha) comprises turbine and met mast foundations and hardstandings, access roads, onsite 38kV substation, and temporary construction compounds. 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. The emplacement of the Proposed Project footprint, as described in Chapter 4 of the EIAR, (assuming emplacement of impermeable materials under a precautionary scenario) could result in an average total site increase in surface water runoff of approximately 362m^3/month. This increase is small given the scale of the Proposed Project footprint in comparison to the overall site area. Furthermore, baseline runoff rates are very high due to the presence of low permeability peat soils across much of the Site. Therefore, the replacement of natural surfaces with impermeable surfaces at the Proposed Project footprint will not result in any significant increase in runoff. The runoff during the operational phase, in the absence of drainage controls, represents only a 0.3% increase in runoff in comparison to the baseline runoff rates across the Proposed Wind Farm site. **Contamination from run-off:** During the operational phase, the potential for silt-laden runoff is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete. Some minor maintenance works may be completed, such as maintenance of site entrances, internal roads, hardstand areas and amenity pathways. These works would be of a very minor scale and would be very infrequent. Potential sources of sediment laden water would only arise from surface water runoff from small areas where new material is added during maintenance works. These minor activities could, however, result in the release of suspended solids to surface water and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality of downstream water bodies. During such maintenance works there is a small risk associated with the release of hydrocarbons from site vehicles, although it is not envisaged that any significant refuelling works will be undertaken on site during the operational phase. <u>Proposed Grid Connection</u> **Increased hardstanding/run-off impacts:** There will be no potential increase in runoff along the Proposed Grid Connection. The works are predominantly 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. Only a very small section (0.5km) of access road will be constructed along the Proposed Grid Connection and this will drain over the edge and will not change the existing runoff and recharge rates in this area as all water currently recharges to ground. **Contamination from run-off:** Maintenance works will be contained within the Proposed Wind Farm site and no routine maintenance works will be required along the Proposed Grid Connection, allowing for a rare occurrence of a fault on the cabling.
Assessment of Significance prior to mitigation	Significant effects on water quality are not anticipated at any geographic scale during the operation of the Proposed Project.
Mitigation	Mitigation by design: *Proposed Wind Farm site* 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 4-3): › Interceptor drains will be installed up-gradient of all proposed 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/road side 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/road side 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. *Proposed Grid Connection* The trench associated with the Proposed Grid Connection underground cabling route will be backfilled and reinstated following the laying of the cable. As such, the permeability of the ground will remain unchanged. Mitigation measures for sediment control are the same as those detailed above for the construction phase. With regards to hydrocarbons: › Onsite re-fuelling of normal operational vehicles will not be carried out during the operational phase of the Proposed Project. These vehicles will be refuelled offsite; › Fuels stored on site will be minimised and any hydrocarbons stored on-site will be bunded. The bund capacity will be sufficient to contain 110% of the storage tank's maximum capacity; › The substation will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage of any associated chemicals and to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › Oil in the turbine transformers will be fully bunded within the enclosed turbine and as such, there is no potential pathway to the water environment i.e. the pathway has been blocked; › Any plant used during the operational phase will be regularly inspected for leaks and fitness for purpose; and, › Spill kits will be available to deal with accidental spillages.
Residual Effect following Mitigation	*Proposed Wind Farm Site* No potential for residual significant effect on aquatic habitats or species as a result of operation of the Proposed Wind Farm is predicted. *Proposed Grid Connection* No potential for residual significant effect on aquatic habitats or species as a result of operation of the Proposed Grid Connection is predicted.

6.5.3.2 Effects on Fauna during Operation

The operation of the Proposed Project will not result in any additional habitat loss or deterioration, nor will it result in a significant increase in anthropogenic activity (relative to current agricultural management practices) due to its location and scale.

The BMEP measures described in Appendix 6-4 will result in the establishment of habitats of higher value for local faunal species. As such, the operation of the Proposed Project will not result in a significant effect at any geographic scale. Such measures will have positive effects for fauna at the Site. A net gain in marsh fritillary breeding habitat will provide greater opportunity for the species to expand its range within the Proposed Wind Farm site. There will be a net gain in hedgerow habitat with the replanting plan for the Site, which will also provide more foraging opportunities for fauna, as well as additional shelter for birds and mammals, and commuting links for bats. There is no potential for significant negative effects on non-volant terrestrial fauna including otter or badger that were identified as KERs during the operational phase of the development.

Potential for significant effects on bat species resulting from the operation of the Proposed Project were identified and therefore, these are identified as KERs during the operational phase.

6.5.3.2.1 *Assessment of Potential Effects on Bats during operation*

Table 6-25 Assessment of Potential Effects on Bats

Assessment of Significance prior to mitigation	Following the precautionary principle, there is potential for the operation of the Proposed Wind Farm to result in significant effects on the local bat population.
Mitigation	While High median activity was recorded at three locations, it is noted that habitats at these locations will change during the construction phase of the Proposed Project with the required implementation of the bat felling buffers. A monitoring and mitigation strategy has been devised for the Proposed Project, in line with the case study example provided in Appendix 5 of the NatureScot 2021 Guidance and based on the site-specific data. After year 1 monitoring, if a curtailment requirement is identified, a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers if deemed necessary. **Bat Vegetation buffer** In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) should be applied to the siting of all wind turbines. However, Eurobats No. 6 guidance and NIEA recommends increased buffers of 100m and 200m around woodland/forestry areas, however, there is no scientific evidence to support these increased buffer distances in the UK. NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post-construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring and updated where necessary. The formula provided in Section 6.1.3 of the Bat Report (Appendix 6-2) is presented to provide appropriate mitigation in relation to bats, and the relevant input required from turbine parameters, is the combination of the blade length and hub height. The proposed turbines to be installed on the Proposed Wind Farm site will have a maximum ground-to-blade tip height of 185m, rotor diameter of 163m, and hub height of 104m. There will be a requirement to remove linear vegetation i.e. treelines/hedgerows, to facilitate the required bat buffers at the Proposed Wind Farm site. These vegetation-free areas will be maintained during the operational life of the Proposed Project.

	Blade feathering NIEA Guidelines also recommend that, in addition to buffers applied to habitat features, all wind turbines are subject to 'feathering' of turbine blades when wind speeds are below the cut-in speed of the proposed turbine. This means that the turbine blades are pitched at 90 degrees or parallel to the wind to reduce their rotation speed to below two revolutions per minute while idling. This measure has been shown to significantly reduce bat fatalities (by up to 50%) in some studies (NIEA, 2021). In accordance with NIEA Guidelines, blade feathering will be implemented as a standard across all proposed turbines when wind speeds are below the cut-in speed of the turbine. **Operational monitoring** To assess the effects of the Proposed Wind Farm site on bat activity, at least 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision. The results of post-construction monitoring shall be utilised to assess any potential changes in bat activity patterns and to monitor the implementation of the mitigation strategy. At the end of Year 1, and if a curtailment requirement is identified (i.e. significant bat fatalities encountered), a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers. At the end of each year, the efficacy of the mitigation and monitoring plan will be reviewed, and any identified efficiencies incorporated into the programme. This approach allows for an evidence-based review of the potential for bat fatalities at the Site, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally. The effectiveness of any mitigation/curtailment needs to be monitored in order to determine (a) whether it is working effectively (i.e. the level of bat mortality is incidental), and (b) whether the curtailment regime can be refined such that turbine down-time can be minimised whilst ensuring that it remains effective at preventing casualties. Section 6.2.1 of the Bat Report (Appendix 6-2) provides detail with regard to the monitoring to be carried out in years 1, 2 and 3 and includes bat activity surveys and carcass searches. **Lighting** With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post construction monitoring will be carried out (as outlined below) to assess any potential changes in bat activity patterns and collision risk. Significant effects as a result of lighting are not anticipated; however, if in the course of this monitoring, any potential for significant effects on bats is identified, the site-specific mitigation measures will be reviewed and any changes necessary will be implemented to avoid any such impacts.
Residual Effect following Mitigation	Following the implementation of the monitoring and mitigation described above, there is no potential for significant residual effects on bat species.

6.5.4 Likely Significant Effects During Decommissioning phase

Decommissioning is fully described in Section 4.11 of Chapter 4 and in Appendix 4-6 Decommissioning Plan. 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 Wind Farm may be decommissioned fully.

Upon decommissioning of the Proposed Wind Farm, the wind turbines and the meteorological mast will be disassembled in reverse order to how they were erected. All above ground turbine and mast components would be separated and removed off-site for recycling. Turbine and mast foundations would remain underground and would be covered with earth and allowed to revegetate. Leaving the foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant temporary environment nuisances such as noise, dust and/or vibration. Internal site roads will be used during the operational phase by farm machinery and will provide a useful means of extracting the commercial forestry crop which exists on at the Proposed Wind Farm site and therefore will be retained post decommissioning to facilitate these activities.

The underground electrical cabling connecting the proposed 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.

The Proposed Grid Connection and proposed onsite 38kV electricity substation, will remain in place as it will be part of the Electricity Grid under the ownership and control of the ESB Networks.

A Decommissioning Plan has been prepared (Appendix 4-6). 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 agree with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Wind Farm 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 Wind Farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

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

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

6.5.5 Likely Significant Effects on Designated Sites

6.5.5.1 European Designated Sites

The Proposed Wind Farm site is located completely outside of the boundary of any European Site. A potential for indirect likely significant effect was identified on the following European Sites via surface water pathways:

- Galway Bay Complex SAC [000268]
- Rahasane Turlough SAC [000322]
- Inner Galway Bay SPA [004031]
- Rahasane Turlough SPA [004089]

In relation to European sites, an AA Screening Report and NIS have been prepared to provide the competent authorities with the information necessary to complete an AA Screening 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 SACs and SPAs.

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 would be likely to have a significant effect on the following European Sites:

- *Rahasane Turlough SAC [000322]*
- *Rahasane Turlough SPA [004089]*
- *Galway Bay Complex SAC [000268]*
- *Inner Galway Bay SPA [004031]*

As a result, an Appropriate Assessment is required and a Natura Impact Statement has been 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 6.3.1.1, the below listed Nationally Designated Sites have been identified as being within the Likely ZOI of the Proposed Project. A potential for impact as a result of deterioration in water quality as a result of construction of the Proposed Wind Farm was identified, as well as via surface water connectivity due to the Proposed Grid Connection underground cabling route:

- Raford River Bog NHA [000321]
- Galway Bay Complex pNHA [000268]
- Rahasane Turlough pNHA [000322]

There is no potential for significant effects on the Raford River Bog NHA for the following reasons:

- No works associated with the Proposed Project are proposed within this NHA;
- Strict, tried and tested-best practice mitigation measures have been prescribed in this EIAR for the protection of surface and groundwater quality at the Proposed Wind Farm site as set out in Chapter 9 and Section 6.5.2.1 and 6.5.3.
- A 50m buffer has been applied to the Raford River and the only works which directly overlap with the delineated 50m hydrological buffer zone is the proposed crossing over the Raford River to the north of T08. No instream works are proposed at this location and the crossing will be completed using a clear span bridge crossing. Specific mitigation measures regarding the proposed watercourse crossing works are prescribed in Section 9.5.2.9 of this EIAR.
- The proposed drainage regime will ensure that there will be no change to surface water runoff rates of groundwater recharge rates at the Proposed Wind Farm site;
- The mitigation measures described in Section 9.5.2.1 (tree felling), Section 9.5.2.2 (suspended solids), Section 9.5.2.6 (hydrocarbons), Section 9.5.2.7 (cement-based products), Section 9.5.2.8 (wastewater) and Section 9.5.2.9 (morphological changes) will ensure the protection of water quality during the construction phase
- Mitigation measures are also proposed for the protection of water quality in the event of a fluvial flood event at the Proposed Wind Farm site (Section 9.5.2.13)
- The proposed drainage design will ensure that all construction phase water is attenuated and treated prior to discharge at greenfield runoff rates.

Galway Bay Complex pNHA and Rahasane Turlough pNHA are also assessed under their SAC and SPA designation within the NIS which accompanies this application. As discussed in Section 6.5.2 and 6.5.3, a range of mitigation measures are in place to protect surface water receptors and groundwater receptors during construction of the Proposed Project. Further detail with regard to these measures are provided in Chapter 9 of this EIAR. With the prescribed mitigations in place, there is no potential for impact on the designated sites via the identified pathways.

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 0 of this report. 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 Section 2.9 of Chapter 2. The full list of projects has been considered and relevant ones from this list are discussed in this section.

6.6.1 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 Site, within the ZOI 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 6.6.2 concludes on their potential for impact on biodiversity.

Table 6-26 below provides the cumulative study areas for individual EIAR topics that are also relevant in relation to ecological receptors i.e., hydrological connectivity is important for assessing potential for effects on designated sites.

Potential for cumulative effects in relation to birds is assessed separately within Chapter 7 of this EIAR.

Table 6-26 Cumulative Study Areas in relation to ecological receptors (birds are assessed separately within Chapter 7 of this EIAR)

Individual Topic	Maximum Extent	Justification
Biodiversity (excluding birds)	**Proposed Wind Farm** 10km from the Proposed Wind Farm **Proposed Grid Connection** 250m from the Proposed Grid Connection underground electrical cabling route	A 10km buffer of the Site is used as is recommended for the desktop study and cumulative assessment by NatureScot Guidelines 2021 in relation to bats (Section 4). For the purposes of this cumulative assessment, wind farms within a 25-kilometre radius of the Proposed Wind Farm area were also considered on a precautionary basis. This extent is considered more than adequate to assess potential for cumulative effects on other terrestrial ecological receptors. Using the precautionary approach and given the nature and scale of the Proposed Project, the geographical boundary for terrestrial ecological aspects, i.e. habitats and fauna (excluding bats and birds), is 2km for cumulative assessment of other non-wind farm projects for the Proposed Wind Farm and 250m from the Proposed Grid Connection underground electrical cabling route. In addition, in relation to aquatic habitats and species, the cumulative assessment boundary for hydrological impacts has also been considered, as described below.
Water	**Proposed Wind Farm** WFD Catchment for large infrastructural developments such as wind farms, energy and public transport developments. River Sub Basins for all smaller proposed, permitted or existing plans or projects (i.e. private and commercial type developments). **Proposed Grid Connection Route:** Within a 250m buffer zone of the Proposed Grid Connection Route.	Regional surface water catchments are used for cumulative impact assessment with regard large infrastructural developments such as wind farms, energy and public transport developments. The potential for cumulative effects for these developments likely exists on a regional catchment scale (i.e. significant works likely existing in several sub-basins). Regionally the Proposed Wind Farm site is located in the Galway Bay Southeast WFD surface water catchment within Hydrometric Area 29 of the Western River Basin District. Therefore, other wind-farm developments are considered within the Galway Bay South East Catchment for cumulative effects. River Sub Basins are used for smaller developments (i.e. private & commercial type developments). These developments are not likely to present a significant cumulative impact risk on a regional catchment scale as any effects would likely be imperceptible as a result of the setback distances and localised nature of the associated works. Given the nature and scale of the proposed works and the lack of hydrological cumulative impact potential beyond the river sub basin scale,

		the Water cumulative study area is defined by river sub basins in which the Proposed Wind Farm is located. The vast majority of the Proposed Wind Farm site is mapped within the Raford River sub-catchment (Raford_SC_010). A very small area in the west of the Proposed Wind Farm site is located in the Clarinbridge River sub-catchment (Clarinbridge_SC_010). Within the Raford River sub-catchment, the Proposed Wind Farm site is mapped in 2 no. WFD river sub-basins: the Raford_020 WFD river sub-basin in the west and the Raford_030 WFD river sub-basin in the east. Within the Clarinbridge River sub-catchment, the Proposed Wind Farm site is located in the Clarinbridge_010 WFD river sub-basin On a regional scale, the Proposed Grid Connection is located in the Galway Bay Southeast WFD surface water catchment within Hydrometric Area 29 within the Western River Basin District. On a more local scale, the Proposed Grid Connection is mapped within 3 no. WFD river sub-catchments: Raford River sub-catchment (Raford_SC_010), Clarinbridge River sub-catchment (Clarinbridge_SC_010), and the Carrowmoneash River sub-catchment (Carrowmoneash [Oranmore]_SC_010). Due to the narrow nature of the Proposed Grid Connection trench (~0.6m wide), a 250m buffer zone is an appropriate scale when considering potential cumulative effects on the water environment.

6.6.1.1 Other Wind Farm Projects

For the purposes of this cumulative assessment, wind farms within a 25-kilometre radius of the Proposed Project area are listed below in Table 6-27. In total, 7 no. applications relating to wind energy were identified within 25km of the Proposed Wind Farm site. However, none of these wind farms are located within the delineated hydrological cumulative study area. Furthermore, in order to be ultra conservative an assessment was completed to identify any wind farm underlain by the Rahasane Turlough groundwater body. Similarly, no existing or proposed wind farm are located in this study area. Additionally, none of the below listed wind farms are located within the 10km cumulative study buffer for bats. However, each project is considered in further detail in the sections below on a precautionary basis. Given the small scale and limited impact of single / domestic turbines, no potential for significant cumulative effect is predicted in relation to such developments.

Table 6-27 Wind farm projects within 25km of the Proposed Project

Pl. Ref.	Wind Farm	Decision	Status	Turbine No.	Distance to proposed turbine
An Coimisiún PleanálaRef. PC07.314212	Killure More Wind Farm	N/A	Proposed	14	14 km
An Coimisiún Pleanála Ref. 07.316466	Cooloo Wind Farm	N/A	Proposed	9	19 km
Galway CoCo. Ref. 003234	Sonnagh Old Wind Farm	Granted by GCC	Existing	9	19km
Galway CoCo. Ref. 082407 An Coimisiún Pleanála Ref. 07.232902	Cloonlusk Wind Farm	Granted by GCC	Existing	2	20km
Galway CoCo, Refs. 97/3470, 97/2652, 00/4581 An Coimisiún Pleanála Ref. 07.308019	Derrybrien Wind Farm	N/A	Existing (not in operation)	70	23km
Galway CoCo. Ref. 221175	Cloonascragh Wind Turbine	Granted by GCC	Permitted	1	23km
N/A	Derryfadda Wind Farm	N/A	Proposed	N/A	20km

6.6.1.1.1 Killuremore Wind Farm

This project is at pre-application consultation stage and is located 14km east of the Proposed Wind Farm near Ballinasloe. The project comprises 14 turbines and the area is located on agricultural grasslands and cutover bog habitats. The proposed Killuremore Wind Farm is located within a separate hydrological catchment to the Proposed Project. Given the lack of significant residual effects predicted as a result of the Proposed Project as well as the proposed BMEP, which includes the creation of significant new areas of marsh fritillary breeding habitat, and the enhancement of peatland areas within the site, there is no potential for likely significant cumulative effect when considered in-combination with this project.

6.6.1.1.2 Cooloo Wind Farm

This project is at pre-application consultation stage and is located 19km from the Proposed Wind Farm. It is located within a separate hydrological catchment. Given the lack of significant residual effects predicted as a result of the Proposed Project as well as the proposed BMEP, which includes the creation of significant new areas of marsh fritillary breeding habitat, and the enhancement of peatland areas within the site, there is no potential for likely significant cumulative effect when considered in-combination with this project.

6.6.1.1.3 Sonnagh Old Wind Farm

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside the existing Sonnagh Old Wind Farm was considered. The planning file was reviewed on the Galway County Council Planning Register. The wind farm is located within commercial forestry habitat 19km south of the Proposed Wind Farm, within a separate hydrological sub catchment. Given the distance from the Proposed Project (19km), as well as the lack of significant residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effect.

6.6.1.1.4 Cloonlusk Wind Farm

The potential for the Proposed Project to result in significant cumulative effects when assessed alongside the 2 no. existing turbines at Cloonlusk Wind Farm was considered. The planning file was reviewed on the Galway County Council Planning Register[24]. The wind farm consists of 2 no. turbines on agricultural lands. The wind farm is located in a separate hydrological catchment to the Proposed Project. Given the small scale of the Cloonlusk development and distance from the Proposed Wind Farm (20km), as well as the lack of significant residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effect.

6.6.1.1.5 Derrybrien Wind Farm

The potential for the Proposed Project to result in significant cumulative effects when assessed alongside the existing but non-operational Derrybrien Wind Farm has been considered. The planning file was reviewed on the An Coimisiún Pleanála Register and the rEIAR (non-technical summary[25]) associated with the substitute consent application for this project was reviewed. A destructive peat slide occurred in 2003 as a result of construction of the Derrybrien Wind Farm. It is reported that pre-peat slide water quality and fish stocks are believed to have recovered in the affected waterbodies. Derrybrien Wind Farm is 23km away from the Proposed Wind Farm and is within a separate subcatchment. Given the significant passage of time between the construction phases of both projects, the distance between the

[24] https://www.eplanning.ie/GalwayCC/AppFileRefDetails/082407/0
[25] https://www.pleanala.ie/publicaccess/EIAR-NIS/308019/Vol%202%20Section%208%20rEIAR%20Non%20Technical%20Summary/Vol%202%20Section%208%20rEAIR%20Non%20Technical%20Summary.pdf?r=790645923514

projects and the lack of significant residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effects. In addition, the potential for cumulative effects to occur as a result of the proposed decommissioning works required for the Derrybrien Wind Farm, in-combination with the Proposed Development, has been considered. However, given the separation in distance between the two sites, there is no potential for significant cumulative effect.

6.6.1.1.6 *Cloonascragh Wind Turbine*

This project consists of a single turbine on cutover bog. The planning file was reviewed on the Galway County Council Planning Register[26]. This wind farm is located within a separate hydrological catchment to the Proposed Project. Given the large distance between the two projects (23km), the small scale of the single turbine, and the lack of significant residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effects.

6.6.1.1.7 *Derryfadda Wind Farm*

This project is at an early stage and has not yet undergone pre-planning consultation. However, the location and aerial imagery of the proposed site was reviewed[27]. The proposed development will be located on Derryfadda, Boughill and Gowla Bogs located in County Galway, along the border with County Roscommon. This project is located in a separate hydrological catchment to the Proposed Project. Given the nature of the habitats that will likely be lost as part of the development (bare milled peat/cutover bog) and the distance from the Proposed Project (20km), no potential for likely significant cumulative effect was identified.

6.6.1.2 Other EIA or Large-scale Projects

A number of other large-scale projects (excluding wind farms) were identified within 10km of the Proposed Project. These included the following:

- Continued use of existing quarry (Coshla Quarries Ltd.-ACP 322624),
- The N6 Galway City Ring Road,
- Alterations to an existing materials recovery facility (ABP-301195-18),
- Strategic Housing Development at Moneyduff/Oranhill (ABP-304203-19),
- Dexcom medical device manufacturing facility (GCC ref 2361035),
- A new overhead line to Athenry substation (GCC 2560807)
- The construction of a new service station at Castlegar (GCC 2560997)
- The construction of 39 no. residential units on an infill development site in the townland of Treanrevagh, Mountbellew, Co. Galway (GCC 2560911).
- The development of a foul sewer pumping station at Newford, Athenry (GCC 2560481).

Given the lack of significant residual effects predicted as a result of the Proposed Project, and given the nature and locations of the above listed projects relative to the Proposed Project, no potential for significant cumulative effect in combination with these projects is predicted.

6.6.1.3 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. Land use in the wider area is dominated by agricultural pasture, commercial forestry and peatland turbary, as well as uncut raised bog habitats. Land use in the wider area will not contribute to significant cumulative effects to biodiversity in-combination with the Proposed Project. Furthermore, it is

[26] https://www.eplanning.ie/GalwayCC/searchresults
[27] https://www.derryfaddawindfarm.ie/

unlikely that the construction phase of the Proposed Project, which will last 18-24 months, would overlap with felling operations (forestry rotations typically last 30-50 years).

The Proposed Project is located primarily on improved agricultural grassland (GA1) habitats and degraded cutover peatland (PB4). Annex I peatlands, heath and grasslands within the Site will be avoided by the Proposed Project. Any other loss of high value habitat will be offset through the measures described in the BMEP in Appendix 6-4. The Proposed Project will not contribute to a net overall loss of high value habitat.

6.6.1.4 Other Projects Within 2km of Proposed Wind Farm

A desk-based planning search was undertaken to identify permitted developments within 2km vicinity of the Proposed Wind Farm site using the Galway County Council planning portal. The projects within this boundary are described in Chapter 2 and are not repeated in detail here. Sixty-three projects were identified within this area and consisted predominantly of the construction of individual private dwellings, extensions to existing dwellings, agricultural shed and infrastructure projects.

Given the small scale of the projects identified within 2km of the Proposed Wind Farm, and given the lack of significant residual effects predicted as a result of the Proposed Project as well as the proposed BMEP, which includes the creation of significant new areas of marsh fritillary breeding habitat, and the enhancement of peatland areas within the site, there is no potential for likely significant cumulative effect when considered in-combination with these projects.

6.6.1.5 Other Projects Within 250m of Proposed Grid Connection

A desk-based planning search was undertaken to identify permitted developments within 250m vicinity of the Proposed Grid Connection route using the Galway County Council planning portal. The projects within this boundary are described in Chapter 2 and are not repeated in detail here. Seventy-two projects were identified within this area and consisted predominantly of the construction of individual private dwellings, extensions to existing dwellings, agricultural shed and infrastructure projects. The following additional projects were reviewed:

- To upgrade the existing 220k overhead line between the existing Cashla 220kV Substation in the townland of Barrettspark, Co. Galway, & Tower 138 in the townland of Oughtagh, Co. Galway (ref: 23355)
- For the amendments to the 110kV electricity substation within the solar photovoltaic ("PV") energy development approved under ref: 20/961
- For the development and operation of a 150 to 500 MVA (electrical rating) synchronous condenser. (ref: 221006)
- To refill an existing disused quarry with inert material (ref: 19325)
- For a ten-year planning permission for the development of an up to 100MW Battery Energy Storage Facility that will provide energy services to the national grid and will be delivered in 4 no. phases. (ref: 181883)
- To construct a 300MW open cycle gas turbine plant, primarily fueled by natural gas and ancillary development, including a 220kV Substation and 220kV connection from the substation to the existing Cashla 220kV Substation.

Given the small scale of the projects identified within 250m of the Proposed Grid Connection, and given the lack of significant residual effects predicted as a result of the Proposed Project as well as the proposed BMEP, which includes the creation of significant new areas of marsh fritillary breeding habitat, and the enhancement of peatland areas within the site, there is no potential for likely significant cumulative effect when considered in-combination with these projects. The works along the Proposed Grid Connection are minor and transient, similar to roadworks being completed across the country and have no potential for significant cumulative effects on ecology.

6.6.2 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 within the following section. 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 impacts on water quality, fauna and habitats.

Following the detailed surveys undertaken and impact assessment provided in Section 6.5, it is concluded that there will be no significant residual effects on biodiversity. The other permitted, proposed, and/or existing wind farms in the area were considered (among other projects) but the Proposed Project has been deliberately designed to minimise the effects on biodiversity by avoiding annex I habitat and areas of high value for fauna. The Proposed Project also includes a BMEP, which proposes enhancement measures for habitats and fauna within the Site and will result in a biodiversity net gain.

The Proposed Project will not result in any significant residual effects on biodiversity and will not contribute to any cumulative effect when considered in combination with other plans and projects.

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 Cumulative Impacts and Compliance with Development Plans

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

- Galway County Development Plan 2022-2028
- 4th National Biodiversity Action Plan 2023-2027
- Northern and Western Regional Assembly Regional Spatial and Economic Strategy 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 the table below. The potential for cumulative impact of the Proposed Project in-combination with the Plans is also considered in Table 6-28 below.

Table 6-28 Development Plan Review

Plans	Key Policies/Issues/Objectives Directly Related To Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy, and potential to result in cumulative effects
Galway County Development Plan 2022-2028	**NHB 1 Natural Heritage and Biodiversity of Designated Sites, Habitats and Species** Protect and where possible enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts) and extend to any additions or alterations to sites that may occur during the lifetime of this plan. Protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora (Protection) Order (SI 94 of 1999). Support the protection, conservation and enhancement of natural heritage and biodiversity, including the protection of the integrity of European sites, that form part of the Natura 2000 network, the protection of Natural Heritage Areas, proposed Natural Heritage Areas, Ramsar Sites, Nature Reserves, Wild Fowl Sanctuaries (and other designated sites including any future designations) and the promotion of the development of a green/ ecological network.	The Galway County Development Plan (GCDP) was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. A comprehensive AA Screening and NIS has been submitted along with this application in which impacts with regard to European Sites is assessed. In line with the GCDP the BMEP associated with the Proposed Project sets out measures to enhance biodiversity within the Proposed Wind Farm site. As a result, a significant biodiversity net gain in terms of suitable habitat for the population of marsh fritillary within the Proposed Wind Farm site is proposed, in addition to a net gain in native woodland and linear habitats. Detailed mitigations and

		enhancement proposals are in place to protect bats, their roosts and commuting corridors in line with the GCDP. On review of the GCDP, no potential for cumulative effect when considered in-combination with the Proposed Project was identified.
	NHB 2 European Sites and Appropriate Assessment To implement Article 6 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). All assessments must be in compliance with the European Communities (Birds and Natural Habitats) Regulations 2011. All such projects and plans will also be required to comply with statutory Environmental Impact Assessment requirements where relevant.	
	NHB 3 Protection of European Sites No plans, programmes, or projects etc. giving rise to significant cumulative, direct, indirect or secondary impacts on European sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall be permitted on the basis of the GCDP (either individually or in combination with other plans, programmes, etc. or projects.*	
	NHB 4 Ecological Appraisal of Biodiversity Ensure, where appropriate, the protection and conservation of areas, sites, species and ecological/networks of biodiversity value outside designated sites. Where appropriate require an ecological appraisal, for development not directly connected with or necessary to the management of European Sites, or a proposed European Site and which are likely to have significant effects on that site either individually or cumulatively	
	NHB 5 Ecological Connectivity and Corridors Support the protection and enhancement of biodiversity and ecological connectivity in non designated sites, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, stonewalls, geological and geo-morphological systems, other landscape features and associated wildlife areas where these form part of the ecological network and/or may be considered as ecological corridors in the context of Article 10 of the Habitats Directive.	

	NHB 6 Implementation of Plans and Strategies Support the implementation of any relevant recommendations contained in the National Heritage Plan 2030, the National Biodiversity Plan, the All Ireland Pollinator Plan and the National Peatlands Strategy and any such plans and strategies during the lifetime of this plan	
	NHB 7 Mitigation Measures Require mitigating measures in certain cases where it is evident that biodiversity is likely to be affected. These measures may, in association with other specified requirements, include establishment of wildlife areas/corridors/parks, hedgerow, tree planting, wildflower meadows/marshes and other areas. With regard to residential development, in certain cases, these measures may be carried out in conjunction with the provision of open space and/or play areas.	
	NHB 9 Protection of Bats and Bats Habitats Seek to protect bats and their roosts, their feeding areas, flight paths and commuting routes. Ensure that development proposals in areas which are potentially important for bats, including areas of woodland, linear features such as hedgerows, stonewalls, watercourses and associated riparian vegetation which may provide migratory/foraging uses shall be subject to suitable assessment for potential impacts on bats. This will include an assessment of the cumulative loss of habitat or the impact on bat populations and activity in the area and may include a specific bat survey. Assessments shall be carried out by a suitably qualified professional and where development is likely to result in significant adverse effects on bat populations or activity in the area, development will be prohibited or require mitigation and/or compensatory measures, as appropriate. The impact of lighting on bats and their roosts and the lighting up of objects of cultural heritage must be adequately assessed in relation to new developments and the upgrading of existing lighting systems.	As described in this EIAR chapter, detailed bat surveys have been carried out at the Site in line with the most up to date bat survey guidelines. The potential for impacts on bats as a result of the Proposed Project has been assessed in Sections 6.5.2.2.2 and 6.5.3.2.1 and a range of mitigation measures are in place to protect bats and their habitats.
	WR 1 Water Resources Protect the water resources in the plan area, including rivers, streams, lakes, wetlands, springs, turloughs, surface water and groundwater quality, as well as surface waters, aquatic and wetland habitats and freshwater and water dependent species in accordance with the requirements and guidance in the EU Water Framework Directive 2000 (2000/60/EC), the European Union (Water Policy) Regulations 2003 (as amended), the River Basin District Management Plan 2018 – 2021 and other relevant EU Directives, including associated national legislation and policy guidance (including any superseding versions of same) and also have regard to the Freshwater Pearl Mussel Sub-Basin Management Plans	As discussed in this EIAR chapter, potential for impacts on local groundwater and surface water has been identified. Appropriate mitigation measures have been applied to prevent impacts via groundwater and surface water pathways, as described in Section 6.5 of this report and in Chapter 9: Water of this EIAR.

	WTWF 1 Wetland Sites Protect and conserve the ecological and biodiversity heritage of the wetland sites in the County. Ensure that an appropriate level of assessment is completed in relation to wetland habitats that are subject to proposals which would involve drainage or reclamation that might destroy, fragment or degrade any wetland in the county. This includes lakes and ponds, turloughs, watercourses, springs and swamps, marshes, fens, heath, peatlands, some woodlands as well as some coastal and marine habitats. Protect Ramsar sites under The Convention on Wetlands of International Importance (especially as Waterfowl Habitat).	A detailed assessment has been carried out in relation to wetland habitats within the Site.
	TWHS 1 Trees, Hedgerows, Natural Boundaries and Stone Walls Protect and seek to retain important trees, tree clusters and tree boundaries, ancient woodland, natural boundaries including stonewalls, existing hedgerows particularly species rich roadside and townland boundary hedgerows, where possible and replace with a boundary type similar to the existing boundary. Ensure that new development proposals take cognisance of significant trees/tree stands and that all planting schemes developed are suitable for the specific site and use suitable native variety of trees of Irish provenance and hedgerows of native species. Seek Tree Management Plans to ensure that trees are adequately protected during development and incorporated into the design of new developments. **TWHS 2 Planting of Trees and Woodlands** Encourage and promote in co-operation with Coillte and the Department of Agriculture, Food and the Marine and other organisations, the planting of trees and woodlands, as an important means of contributing to its objective of sustaining, protecting and enhancing the County's biodiversity, natural resources, amenity, landscape and developing tourism product. Encourage community woodlands in urban/urban fringe areas utilising funding available through schemes such as the Neighbour Wood and Native Woodland Schemes. **TWHS 3 Protection of Forestry** Protect all substantial areas of deciduous forest, other than areas of commercial forestry. Proposals for development in these areas should seek to interact with the landscape character of the forested areas and its limits while also enhancing the forested areas so as to increase biodiversity value.	As part of the BMEP, any hedgerows and native woodland to be lost for the Proposed Project will be replanted within the Proposed Wind Farm site such that there will be a net gain in hedgerow and native woodland habitat within the Proposed Wind Farm site.
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. The Proposed Project is in compliance with the objectives of the Strategy and there will be no net loss to biodiversity as a result of the Proposed Project. There will be a net gain.

		On review of the Strategy, no potential for cumulative effect when considered in-combination with the Proposed Project was identified.
4th National Biodiversity Action Plan 2023-2030	**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.	The Proposed Project will not contravene the proposed objectives of the NBAP. On review of the NBAP, no potential for cumulative effect when considered in-combination with the Proposed Project was identified.
	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.	

6.8 Conclusion

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

The potential for effects on the European Sites is fully described in the NIS 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.