Environmental Impact Assessment Report

Proposed Clonberne Wind Farm Development, Co. Galway

Chapter 7 – Biodiversity

DOCUMENT DETAILS

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Planning and Environmental Consultants

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6. BIODIVERSITY

6.1 Introduction

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

The chapter is structured as follows

- The Introduction provides a description of the legislation, guidance and policy context applicable to Biodiversity.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the Baseline Ecological Conditions and Receptor Evaluation is then provided.
- This is followed by an Assessment of Effects which are described with regard to each phase of the development: 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

The following defines terms utilised in this chapter:

- Where the 'Proposed Project' is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR i.e., Wind Farm Site and Grid Connection
- For the purpose of this EIAR chapter, the term 'EIAR Site Boundary'/ 'Site Boundary'/ 'site' refers to the site boundary as shown in Figure 6-1.
- Where the 'Proposed Wind Farm Site' is referred to, this refers to turbines and associated foundations and hard-standing areas, borrow pit, access roads, temporary construction compound, turbine delivery accommodation works, peatland enhancement area, underground cabling, peat, spoil and overburden management, site drainage, tree felling and all ancillary works and apparatus.
- Where 'Proposed Grid Connection' is referred to, this refers to the onsite substation, and associated underground 220kV cabling connecting into the existing Cashla – Flagford 220kV overhead line at Laughil, subject to a planning application under Section 182A of the Planning and Development Act, 2000, as amended.
- "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.

- Where 'Annex I habitats' is referred to this relates to habitats listed in Annex I of the EU Habitats Directive. They are habitats whose conservation status requires the designation of Special Areas of Conservation (SACs).

6.2 Requirements for Ecological Impact Assessment

National Legislation

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

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife (Amendment) Act 2017. These sites do not form part of the Natura 2000 network of European sites and the AA process, or screening for same, does not apply to NHAs or pNHAs. Proposed Natural Heritage Areas (pNHAs) were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated[1] However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future (NPWS, 2020).

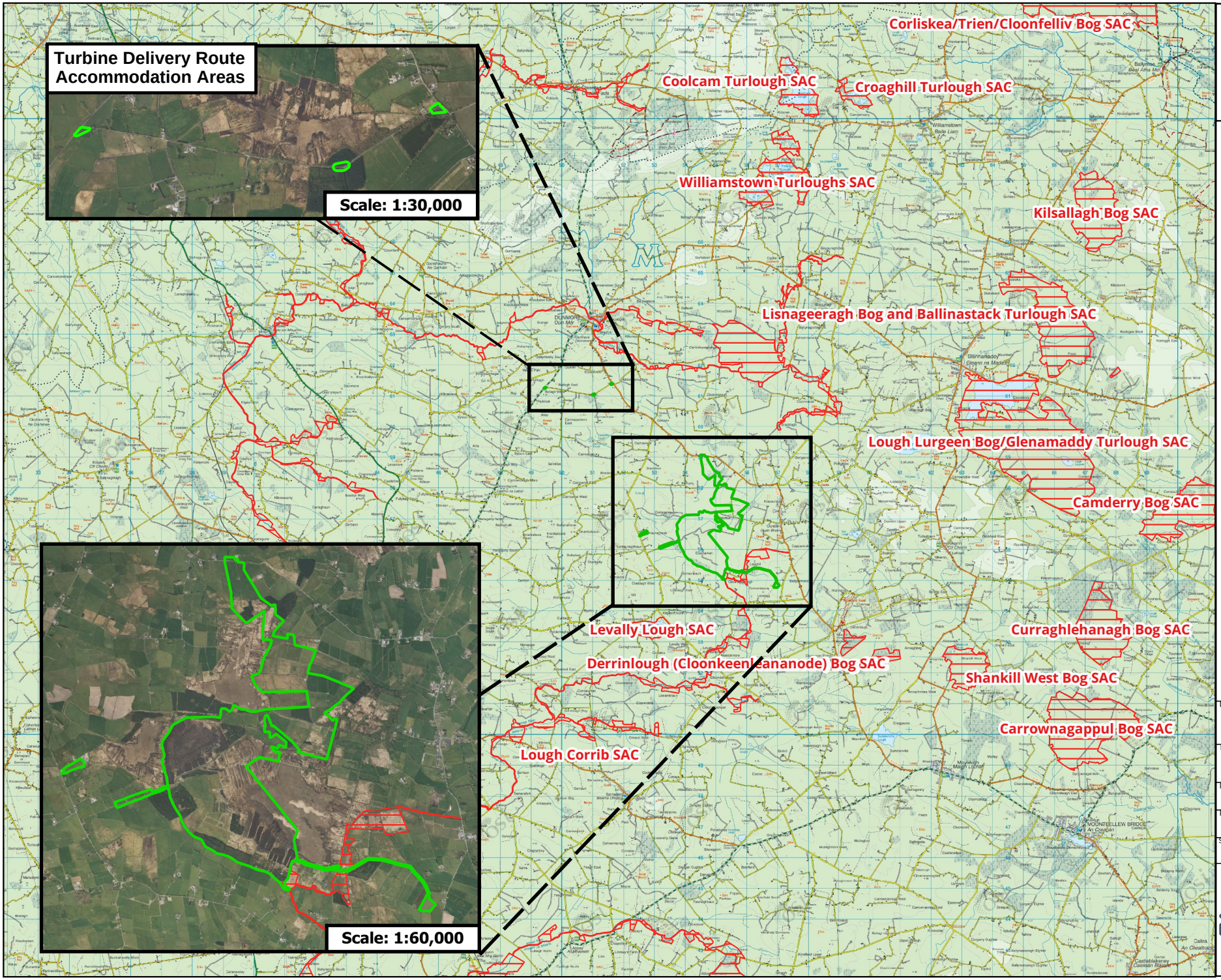
The Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) lists the species, hybrids and/or subspecies of flora protected under Section 21 of the Wildlife Acts. It provides protection to a wide variety of protected plant species in Ireland including vascular plants, mosses, liverworts, lichens and stoneworts.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

National Policy

Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "NBAP"). The NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. It demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations and will implement this through a number of key targets, actions and objectives. The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows:

- **Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity.** Proposed actions include capacity and resource reviews across Government; determining 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.

[1] https://www.npws.ie/protected-sites/nha (accessed 2 February 2024).



Map Legend

- EIAR Site Boundary
- Special Area of Conservation (SAC)

Drawing Title

Site Location

Project Title: Proposed Clonberne Wind Farm, Co. Galway	
Drawn By: KB	Checked By: KOD
Project No.: 180740	Drawing No.: Figure 6-1
Scale: 1:160,000	Date: 21.03.2024

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- **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.

Such policies have informed the evaluation of ecological features recorded within the site and the ecological assessment process.

European Legislation

The EU Habitats Directive (92/43/EEC) (together with the Birds Directive (79/409/EEC), as subsequently codified by Council Directive 2009/147/EC on the conservation of wild birds) forms the cornerstone of Europe's nature conservation within the EU. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. The Habitats Directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. The Habitats Directive and Birds Directive, which were transposed into Irish law through Part XAB of the Planning and Development Acts 2000-2019 (from a land use planning perspective) recognise the significance of protecting rare and endangered species of flora and fauna, and more importantly, their habitats.

Annex I of the Habitats Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. marsh fritillary, Atlantic salmon, and Killarney fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as lesser horseshoe bat and otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish hare, common frog and pine marten. Species can be listed in more than one Annex, as is the case with otter and lesser horseshoe bat which are listed on both Annex II and Annex IV.

The 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.

Council Directive 2009/147/EC on the conservation of wild birds (the "**Birds Directive**") instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). According to Recital 1 of the Birds Directive, Council Directive 79/409/EEC on the conservation of wild birds was substantially amended several times and in the interests of clarity and rationality, the Birds Directive codifies Council Directive 79/409/EEC. Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3). A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their

habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

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

6.3 Relevant Guidance

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 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:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal (CIEEM, 2018).
- SNH (2019) 'Bats and onshore wind turbines: survey, Assessment and mitigation'
- NatureScot (2021). Bats and onshore wind turbines: survey, assessment, and mitigation. Version: August 2021 (updated with minor revisions).
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2022).
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment. Department of the Environment, Community and Local Government DoEHLG (2013).
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2009).
- Environmental Assessment and Construction Guidelines (NRA, 2006).
- Draft Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (Environmental Protection Agency (EPA), 2003).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (Environmental Protection Agency (EPA), 2003).
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002).
- European Commission Guidance on the preparation of the Environmental Impact Assessment Report (2017)
- European Commission Guidance document on wind energy developments and EU nature legislation (2020)

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

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
- National Biodiversity Action Plan 2023-2027

6.3.1 Statement of Authority

This report has been prepared by Sarah Mullen (B.Sc., M.Sc., Ph.D., ACIEEM), Katy Beckett (B.A., M.Sc.) and Kate O'Donnell (B.Sc., ACIEEM) and reviewed by Pat Roberts (B.Sc.Env, MCIEEM). Sarah and Kate have over 7 and 5 years professional ecological consultancy experience respectively. Kate and Sarah are experienced ecologists with skills covering habitat and botanic assessments and specialist mammal surveys. They have undertaken numerous Ecological Impact Assessment and AA assessments for public and private sector clients. Katy has relevant academic qualifications and is competent in undertaking habitat and ecological assessments. This report has been reviewed by Pat Roberts (B.Sc.Env, MCIEEM) who has over 18 years' experience in ecological management and assessment.

The baseline ecological walkover surveys, mammal surveys and marsh fritillary surveys were undertaken by Sarah Mullen, Pat Roberts, Rachel Walsh (B.Sc.), Luke Dodebier (B.Sc.), Katy Beckett, Kate O'Donnell and Ciara Lynn Sheehan (B.Sc.) of MKO.

The dedicated bat surveys were undertaken by Neil Campbell (B.Sc., M.Sc.), Kate Greaney (B.Sc., M.Sc.) and Keith Costello (B.Sc.) of MKO. The bat report appended to this chapter has been prepared by Ryan Connors (B.Sc., M.Sc.) and reviewed by Aoife Joyce (B.Sc., M.Sc.) of MKO.

The baseline aquatic surveys were undertaken by Aran von der Geest Moroney (B.Sc.), Katy Beckett, and Ciara Lynn Sheehan of MKO. All surveyors have relevant academic qualifications and are competent in undertaking habitat and ecological assessments.

6.4 Methodology

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).

The following sections describe the methodologies utilised to establish the baseline ecological condition of the Site.

6.4.1 Desk Study

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

- Review of NPWS Article 17 maps 2019, 2013 and 2007.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA (Envision), Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI).
- Data on potential occurrence of protected bryophytes – as per NPWS online map viewer; Flora Protection Order Map Viewer – Bryophytes2.
- NPWS records (data request)
- Review of the Bat Conservation Ireland (BCI) Private Database
- Review of the publicly available National Biodiversity Data Centre (NBDC) webcha-mapper
- Inland Fisheries Ireland (IFI) Reports.
- 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.

6.4.2 Scoping and Consultation

MKO undertook scoping exercise in 2020 and again in 2023 during preparation of this EIAR, as described in Chapter 2, Section 2.6 of this EIAR.

Copies of all scoping responses are included in Appendix 2-2 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-10 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment. Table 6-1 provides a list of the organisations consulted where a response was received with regard to biodiversity during the scoping process, their comments were fully considered in the preparation of this chapter.

Table 6-1: Organisations consulted with regard to biodiversity

Consultee	Response Yes/No	Response Details
Bat Conservation Ireland	Yes Received 15/12/2023	Bat Conservation Ireland does not have the administrative capacity to comment on planning applications. Please ensure that all bat surveys are undertaken according to best practice.
Birdwatch Ireland	Yes	Birdwatch Ireland provided species of interest that should be addressed in relation to the Proposed Project. White-fronted Geese, Whooper Swan, Crane, Curlew, Merlin and Hen Harrier were highlighted as species of concern in this area. PDFs of recent research papers in relation to disturbance distances and survey techniques were also provided.
Department of Agriculture, Food and the Marine	Yes Received 23/01/2024	If the Proposed Project will involve the felling or removal of any trees, the developer must obtain a Felling License from this Department before trees are felled or removed.

[2] *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:25/06/2024.*

Consultee	Response Yes/No	Response Details
		As this development is within forest lands, particular attention should be paid to deforestation, turbulence felling and the requirement to afforest alternative lands.
Department of Housing, Local Government and Heritage (NPWS)	Yes Received 09/01/2024	Recommendations were made regarding elements to be addressed in the EIAR, including the National Biodiversity Action Plan, mitigation of habitat losses, construction management plans and mitigation, and cumulative and ex-situ effect, as well as guidance on appropriate assessment, post-construction monitoring and the need for licences. Guidance on the surveys and impact assessment of birds, bats, marsh fritillary, watercourses and wetlands, flood plains, hedgerows, scrub, grasslands and alien invasive species were specifically outlined.
Geological Survey of Ireland (GSI)	Yes Received 24/01/2024	Geological Survey Ireland would encourage use of and reference to their datasets. GSI records show that there are County Geological Sites (CGSs, as adopted under the National Heritage Plan) close to the proposed wind farm development area. These include Gortgarrow Spring, Park Esker, Levally Lough and Derrynagran Bog and Esker. With the current plan, there are no envisaged impacts on the integrity of the current CGSs by the Proposed Project. GSI ask that any proposed activities such as construction and modification of access roads and additional traffic due to access road construction and turbine installation in the area associated with the wind farm development do not impact on the CGSs. A karst spring and regionally important aquifer were identified within the zone of impact of the Proposed Project, which is located in an area of variable groundwater vulnerability. There are also groundwater drinking water abstractions for which there are zones of contribution/source protection areas within the area of the proposed wind farm development. Key to groundwater protection in general, and protection of specific drinking water supplies, is preventing ingress of runoff to the aquifer. Design of wind farm drainage will need to be cognisant of the group water scheme and the interactions between surface water and groundwater as well as run-off. Appropriate design should be undertaken by qualified and competent persons to include mitigation measures asnecessary, such as SUDs or other drainage mitigation measures
Inland Fisheries Ireland (IFI)	Yes Received 29/01/2024	IFI require that the EIAR/NIS prepared for the development will measure and identify its potential impacts on the aquatic environment and mitigate against these to ensure that any impact is minimal or non-existent.

Consultee	Response Yes/No	Response Details
		A number of survey recommendations were made. These included assessment of the aquatic diversity of all watercourses that will receive drainage from the construction site, the aquatic habitat and physical nature of any watercourse affected by the development, electrofishing surveys of all waters, and surveys of the soil types, strengths, structures and stabilities around all turbines, associated access roads and the site development. It was also noted that attention should be paid to drainage during both the construction phase and the operational phase, including waters being pumped from foundations or other excavations. Considerable attention to detail must be provided in relation to the interception of surface water flows, particularly during the construction of site roads. Serious consideration must also be given to the disposal of all waste materials such that they will not give rise to any risk. The EIS should indicate proposals to monitor the impact on all watercourses within the "development". In the event that environmental damage to the aquatic habitat and associated riparian zone is caused, the EIS should indicate the steps that may be taken to rectify any damage to the aquatic habitat including liaison with the appropriate authorities. In relation to wind farm structures and infrastructure it is important that a sufficient bank side riparian zone is maintained to absorb and attenuate overland flows.
Irish Red Grouse Association – Conservation Trust	Yes	Response received on 17th December 2023 asking for further details which were provided. No response received to date.
Uisce Éireann	Yes Received 18/12/2023	At present, Uisce Éireann does not have the capacity to advise on the scoping of individual projects. However, general aspects of Water Services that should be considered in the scope of an EIA where relevant were outlined. This included mitigations for any potential negative impacts on any water source(s) which may be in proximity and included in the environmental management plan and incident response, any and all potential impacts on the nearby reservoir as public water supply water source(s) are assessed, including any impact on hydrogeology and any groundwater/surface water interactions and mitigation measures in relation to any of the above ensuring a zero risk to any Uisce Éireann drinking water sources (Surface and Ground water).
Waterways Ireland	Yes Received 21/12/2024	This is not within any Zone of Influence of their waterways so Waterways Ireland will not be commenting.

6.4.3 Field Surveys

Comprehensive surveys of the biodiversity of the entire site including the entire site boundary, grid connection route and access route were undertaken on various dates throughout 2019, 2021, 2022, 2023 and 2024. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies, dates of survey and guidance followed.

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

Multidisciplinary walkover surveys were undertaken on the 28th June 2019, 15th July 2019, 19th August 2019, 5th August 2021, 24th August 2021, 25th August 2021, 24th January 2022, 30th September 2022, 1st October 2022, 26th June 2023, 1st September 2023, 23rd November 2023 and the 18th January 2024. All areas were surveyed within the optimal survey period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). A comprehensive walkover of the entire site was completed including turbine bases, hard standing areas, proposed substations, site compound, new internal roads and borrow pit. The multi-disciplinary ecological walkover survey also included the proposed grid connection route, access route and turbine delivery route land take areas. Incidental records were also incorporated from other dedicated species/habitat specific surveys.

Multi-disciplinary ecological walkover surveys were undertaken in accordance with NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009). These surveys provided baseline data on the ecology of the Site and assessed whether further, more detailed habitat or species specific ecological surveys were required.

Habitats were classified in accordance with the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in 'Best Practice Guidance for Habitat Survey and Mapping' (Smith *et al.*, 2011).

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

The walkover surveys were designed to detect the presence of a range of protected habitats and faunal species and habitat that may support protected faunal species that may occur in the vicinity of the Proposed Project.

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS), with a focus on those listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2011), was also conducted.

6.4.3.2 Dedicated Habitat and Vegetation Composition Surveys

Detailed botanical surveys/ relevé assessments of the Proposed Project infrastructure were undertaken by MKO at targeted locations within the Site Boundary, with relevés undertaken in 2023 and 2024 at the location of all turbine bases as well as in habitats within the development infrastructure footprint which had the potential to correspond to Annex I habitat types. 2m x 2m relevés were undertaken in grassland habitats, 4m x 4m relevés were undertaken in peatland habitats and 20m x 20m relevés were undertaken in woodland habitats. All plant species within each relevé were recorded and cover/abundance values for each species were recorded. The extent of each habitat on site was mapped 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 6-2.

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:

- 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. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service.
- Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey 2013. Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
- Foss, P.J. & Crushell, P. 2008, *Guidelines for a National Fen Survey of Ireland, Survey Manual.* Report for the National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.
- NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 1. Version 1.1. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- 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.
- Commission of the European Communities (2013) *Interpretation manual of European Union habitats*. Eur 27. European Commission DG Environment.
- 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.
- Perrin, P., Martin, J., Barron, S., O'Neill, F., McNutt, K. & Delaney, A. (2008) National Survey of Native Woodlands 2003-2008. Unpublished report submitted to National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin

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).

6.4.3.2.1 Vegetation Composition Assessment

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

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

The Engine for Relevés to Irish Communities Assignment (ERICA)[3] is a web application for assigning vegetation data to communities defined by the Irish Vegetation Classification (IVC). Data can be uploaded, checked for errors, and analysed and the results can then be downloaded. ERICA works

with both quantitative vegetation cover data (such as are recorded in relevés and other types of botanical recording plots) and presence/absence data, such as species lists. ERICA covers grasslands, woodland, duneland, heaths, bogs, fens, mires, freshwater, saline waters, rocky habitats, scrub, strandline, saltmarsh and weed communities (Perrin, 2019).

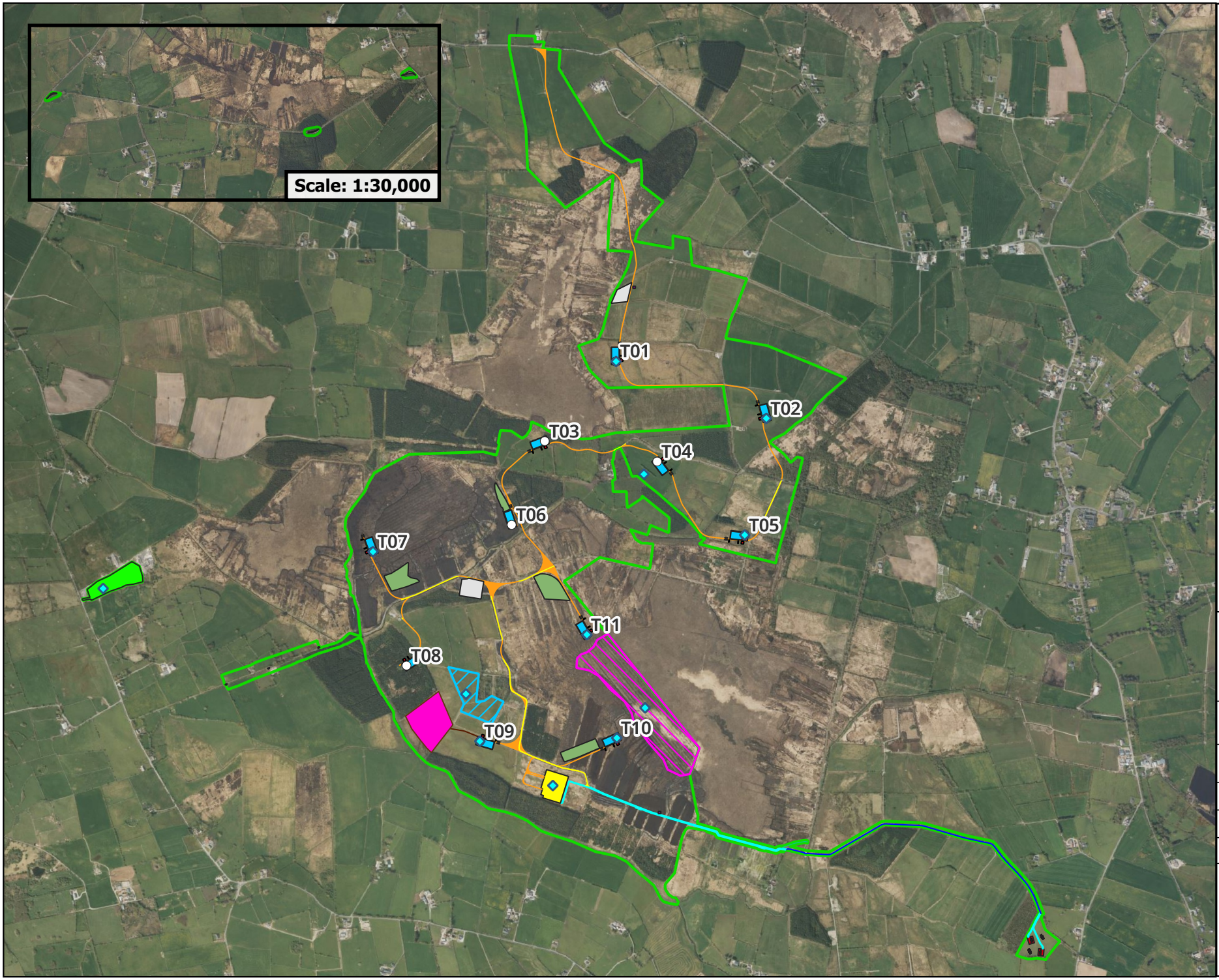
The data collected from the botanical assessments was uploaded to ERICA, analysed and the results data downloaded.

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 6-2 details the categorizing types of plots utilizing the clustering analysis. This categorizing procedure was utilized to determine if the Relevés within the site had any affinity to Annex I habitats and whether further assessment was required.

Table 6-2: 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).



Map Legend

- EIAR Site Boundary
- Botanical Relevé Locations
- Proposed Turbine Layout
- Proposed Crane Platform Hardstanding
- Proposed Turbine Foundations
- Proposed Substation
- Proposed Construction Compounds
- Proposed Borrow Pit
- Proposed Spoil Storage Area
- Proposed Peat Repository Areas
- Proposed New Roads
- Proposed Upgrades to Existing Roads
- Proposed Operational Access Road
- Proposed Spoil Repository Access Road
- Proposed Passing Bays
- Proposed TDR Accommodation Areas
- Proposed Cable in the Public Road
- Proposed Cable Route and Cable Access Track
- Proposed Grid Connection Compounds
- Proposed Grid Connection Masts
- Proposed 38kV Line to Cable Interface End Masts
- Proposed Woodland Replanting Area
- Proposed Peatland Enhancement Area

N

Drawing Title

Botanical Relevé Locations

Project Title	
Proposed Clonberne Wind Farm, Co. Galway	
Drawn By: KB	Checked By: KOD
Project No.: 180740	Drawing No.: Figure 6-1
Scale: 1:23,000	Date: 21.03.2024

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6.4.3.3 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.

Mammal surveys undertaken included dedicated surveys for bats, otter and badger which were undertaken at the times set out below with the methodologies followed also provided below.

During the multidisciplinary walkover surveys, records of invertebrates including butterflies, damselflies, dragonflies, moths, bees etc. were recorded. As the desk study identified records for marsh fritillary (*Euphydryas aurinia*) from the 10km grid square overlapping the development, this species was also focused on during the site visits with dedicated surveys undertaken in August 2019 and September 2022 in areas of suitable habitat identified during the multi-disciplinary walkover survey to determine the occurrence, distribution and likely size of the population within the development site.

Aquatic faunal surveys were also undertaken in watercourses within and downstream of the development site and proposed infrastructure in February 2024 and are described below.

6.4.3.3.1 *Badger Survey*

Dedicated badger surveys were conducted on the 28th June and 15th July 2019, 23rd November 2023 and 18th January 2024 within the site boundary and 26th June 2023 and 23rd November 2023 along the proposed grid connection route. Areas identified as providing potential habitat for badger were subject to specialist targeted survey. The badger survey was not constrained by vegetation given the nature of the habitats within the site and the timing of the surveys (NRA 2006a).

The badger surveys were conducted in order to determine the presence or absence of badger signs within and outside (areas of identified suitable habitat) the development footprint and site. This involved a search for all potential badger signs as per NRA (2009) (latrines, badger paths and setts). If encountered, setts were classified as per the convention set out in NRA (2009) (i.e. main, annexe, subsidiary, outlier) and camera traps were installed at the entrances and left *in situ* for 2-4 weeks.

The badger survey was conducted adhering to best practice guidance (NRA, 2009) and followed 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[3]).

6.4.3.3.2 *Otter Survey*

Areas identified from the desktop study and during the multi-disciplinary walkover survey as providing potential habitat for otter were subject to specialist targeted survey. The otter surveys of watercourses were conducted on 28th June, 15th July and 19th August 2019, 26th June 2023 and 18th January 2024.

The otter survey was conducted as per NRA (2009) 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).

[3] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey, Online, Available at: https://cieem.net/resource/competencies-for-species-survey-css/ Accessed: 02.02.2024*

6.4.3.3.3 Bat Surveys

Bat surveys carried out in 2022 in accordance with NatureScot, 2021[4], form the core dataset for the assessment of effects on bats. Bat walkover surveys were carried out throughout 2022. During these surveys, habitats within the Wind Farm Site were assessed for their suitability to support roosting, foraging and commuting bats. Bat surveys employed a combination of methods, including desktop study, habitat and landscape assessments, roost inspections, manual activity surveys and ground-level static detector surveys. Habitat suitability for bats was assessed according to Collins (2016), which provides a grading protocol for roosting habitats and for commuting and foraging areas. The survey scope, assessment and mitigation provided in this report is accordance with NatureScot 2021 Guidance. This guidance has set the industry standard for best practice bat surveys at wind farms since its initial publication in 2019. Details of the bat surveys undertaken are described in full in a separate Bat Report which was prepared for the Proposed Project and is included as Appendix 6-2 of this EIAR.

6.4.3.3.4 Marsh Fritillary Surveys

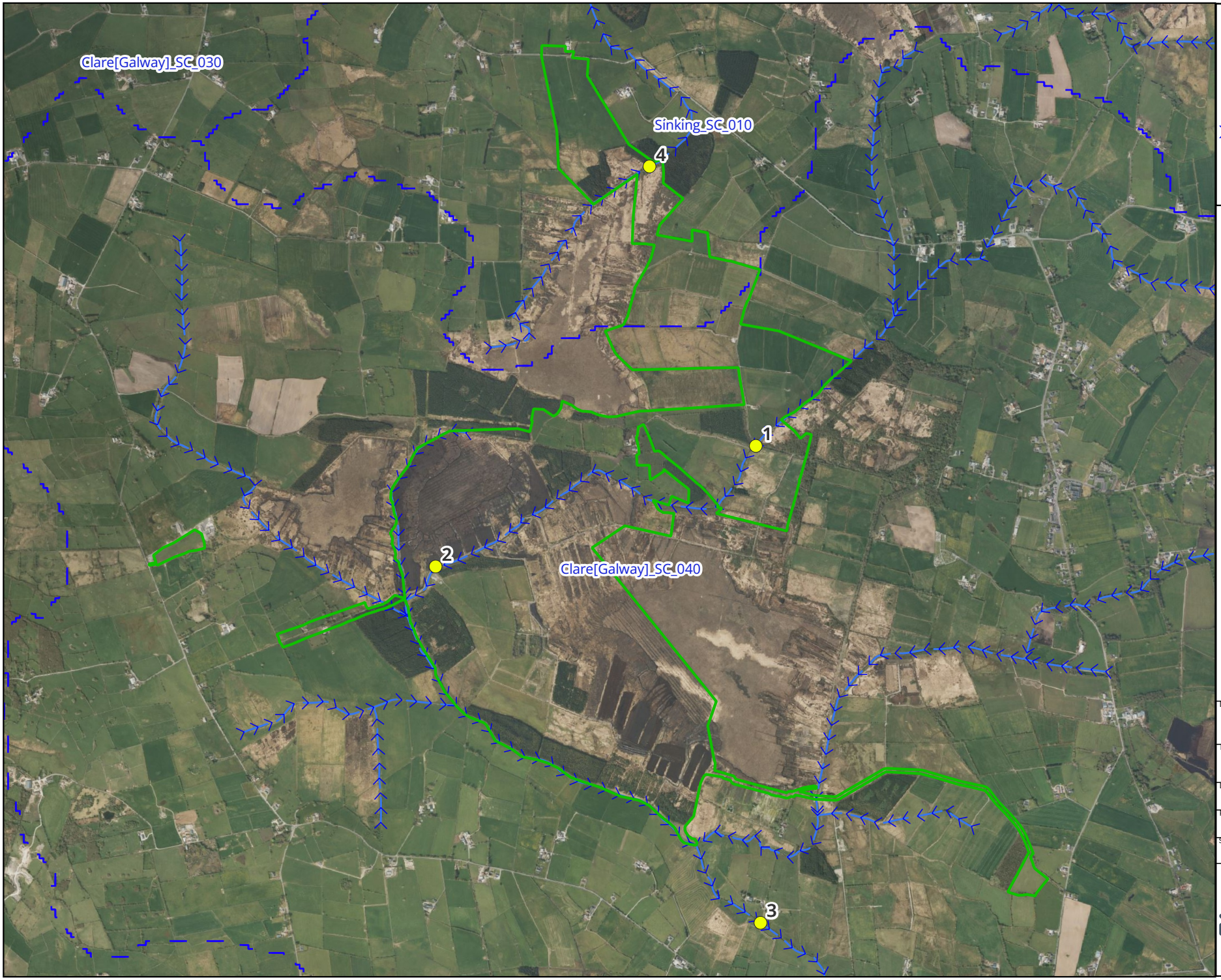
Following the identification of suitable habitat for marsh fritillary (i.e. devil's bit scabious) within the site during the mutli-disciplinary walkover and dedicated botanical surveys, targeted larval web surveys for the species were undertaken by MKO on the 19th August 2019 and on the 31st September 2022 within the optimal period for these surveys. The survey methodology followed that described in the NRA (2009) best practice guidance document.

6.4.3.3.5 Aquatic/Freshwater Invertebrate Surveys

Dedicated aquatic baseline surveys of the watercourses within and downstream of the site were undertaken by Triturus Environmental in 2021. The baseline assessment focused on aquatic ecology including fisheries and biological water quality, as well as protected aquatic species and habitats in the vicinity of the Proposed Project. Undertaken on a catchment-wide scale, the baseline surveys focused on the detection of freshwater habitats and species of high conservation value. These included surveys for white-clawed crayfish (*Austropotamobius pallipes*), freshwater pearl mussel (*Margaritifera margaritifera*) (eDNA only), macro-invertebrates (biological water quality) and fish species, inclusive of supporting nursery and spawning habitat. The surveys also documented macrophyte and aquatic bryophyte communities including Annex I habitat associations in the vicinity of the project. This holistic approach informed the overall aquatic ecological evaluation of each site in context of the Proposed Project and ensured that any habitats and species of high conservation value would be detected. Full details of the methodology followed for the aquatic surveys as well as details of the locations of survey sites is provided in the Aquatic Baseline Report, Appendix 6-3.

In addition to the above, invertebrate kick sampling surveys of watercourses within and downstream of the Proposed Project were undertaken by MKO on the 7th February 2024 in order to provide a baseline against which water quality in the watercourses downstream of the site can be monitored throughout construction and operation. Kick sampling was carried out within and downstream of the site at the locations provided on Figure 6-3.

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



Map Legend

- Site Boundary
- WFD Hydrological Subcatchments
- WFD River Waterbodies
- Kick Sampling Sites

N

Drawing Title

Kick Sampling Locations

Project Title: Proposed Clonberne Wind Farm, Co. Galway	
Drawn By: KB	Checked By: KOD
Project No.: 180740	Drawing No.: Figure 6-3
Scale: 1:25,000	Date: 21.03.2024

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6.4.4 Methodology for Assessment of Impacts and Effects

6.4.4.1 Identification of Target Receptors and Key Ecological Receptors

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

6.4.4.2 Valuing Ecological Receptors

The importance of the ecological features identified within the site was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

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

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. 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 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 NRA (2009) are considered to be Key Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

6.4.4.3 Characterisation of Impacts and Effects

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

- **Positive or Negative**. Assessment of whether the Proposed Project results in a positive or negative effect on the ecological receptor.
- **Extent**. Description of the spatial area over which the effect has the potential to occur.

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

6.4.4.4 Determining the Significance of Effects

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

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

When determining significance, consideration is given to whether:

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

6.4.4.5 Incorporation of Mitigation

Section 6.7 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 sensitive ecological receptors are predicted, mitigation is incorporated into the project design or layout to address such impacts. The implemented mitigation measures avoid or reduce potential significant residual effects, post mitigation.

6.4.4.6 Limitations

The information provided in this assessment accurately and comprehensively describes the baseline ecological environment following surveys on numerous dates during all seasons and over 5 years; provides an accurate prediction of the likely ecological effects of the Proposed Project; prescribes best practice and mitigation as necessary; and describes the residual ecological impacts.

The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

The habitats and species on the site were readily identifiable and comprehensive assessments were made during the field visits. No significant limitations in the scope, scale or context of the assessment have been identified.

6.5 Establishing the Ecological Baseline

6.5.1 Desk Study

The following sections describe the findings of the desk study. It provides a baseline of the ecology known to occur in the existing environment based on data sources reviewed to inform the ecological impact assessment as outlined in Section 6.4.1.

6.5.1.1 Designated Sites

6.5.1.1.1 *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 Ecological Impact Assessment.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European Sites'. The potential for significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the AA Screening Report and Natura Impact Statement that accompanies this application. As per EPA Guidance 2022, *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and appropriate"*. Section 6.7.5 of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites.

The potential for likely significant effects on the following European Sites was identified:
- Lough Corrib SAC [000297]
- Williamstown Turloughs SAC [002296] and
- Levally Lough SAC [000295].

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.

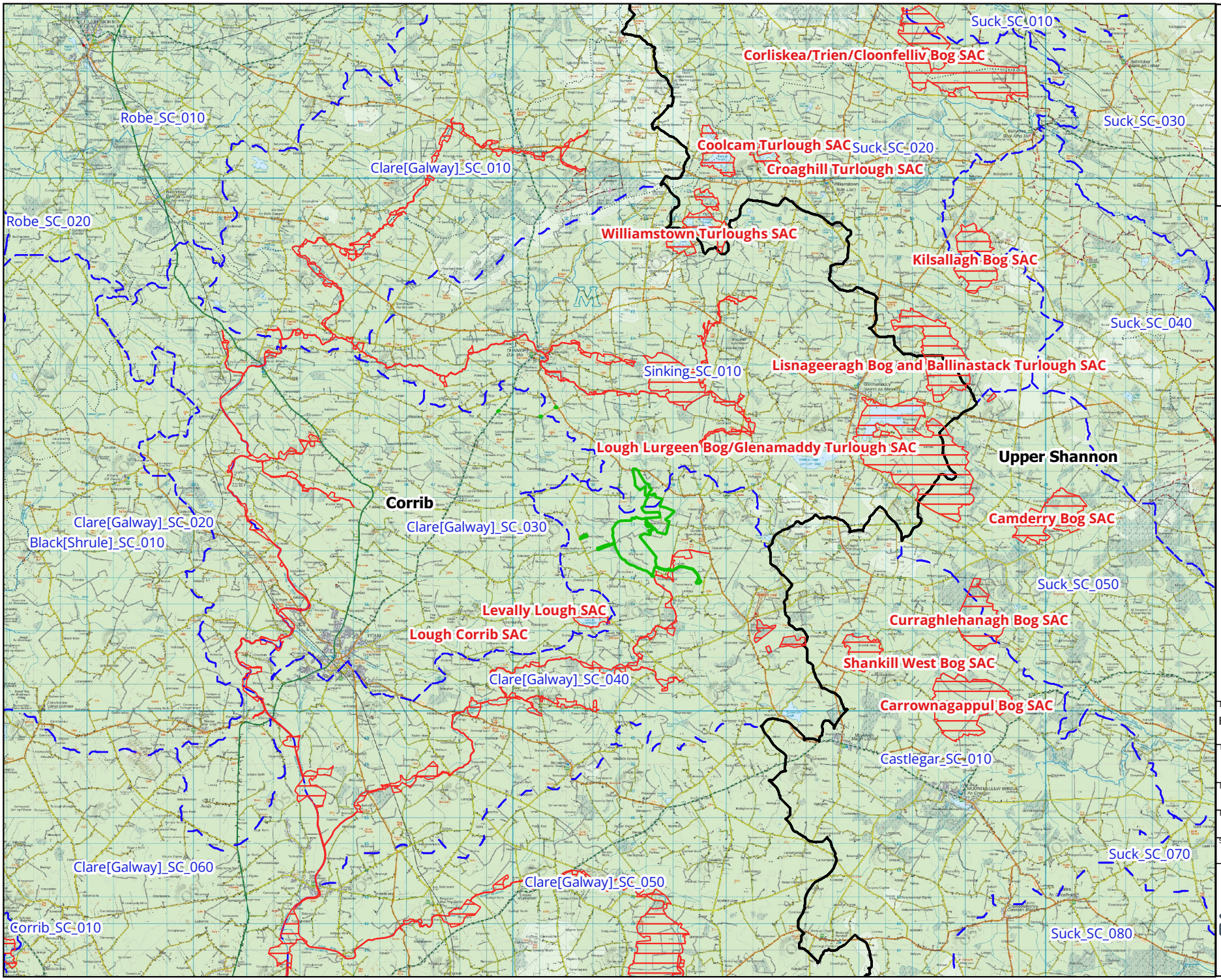
Proposed Natural Heritage Areas (pNHAs) were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this Biodiversity Chapter.

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) on the 25/06/2024. The datasets were utilised to identify Designated Sites which could feasibly be affected by the Proposed Project.
- All designated sites surrounding the development site that could potentially be affected were identified using a source-pathway-receptor model. In addition, the potential for connectivity with European or Nationally designated sites that were

further away from the Proposed Project was also considered in this initial assessment.

- A map of all the European Sites and WFD catchments is provided in Figure 6-4:4 with all Nationally designated sites shown in Figure 6-5:5.
- Table 6-3 provides details of all relevant Nationally designated sites as identified in the preceding steps and assesses which are within the likely Zone of Impact. All European Designated Sites are fully described and assessed in the Screening for Appropriate Assessment and Natura Impact Statement 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 25/06/2024.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and further assessment is required.



Map Legend

- Site Location
- Special Area of Conservation (SAC)
- WFD Hydrological Catchments
- WFD Hydrological Subcatchments

Drawing Title	European Designated Sites within the Likely Zone of Influence
Project Title	Proposed Clonberne Wind Farm, Co. Galway
Drawn By: KB	Checked By: KOD
Project No.: 180740	Drawing No.: Figure 6-4
Scale: 1:185,000	Date: 21.03.2024

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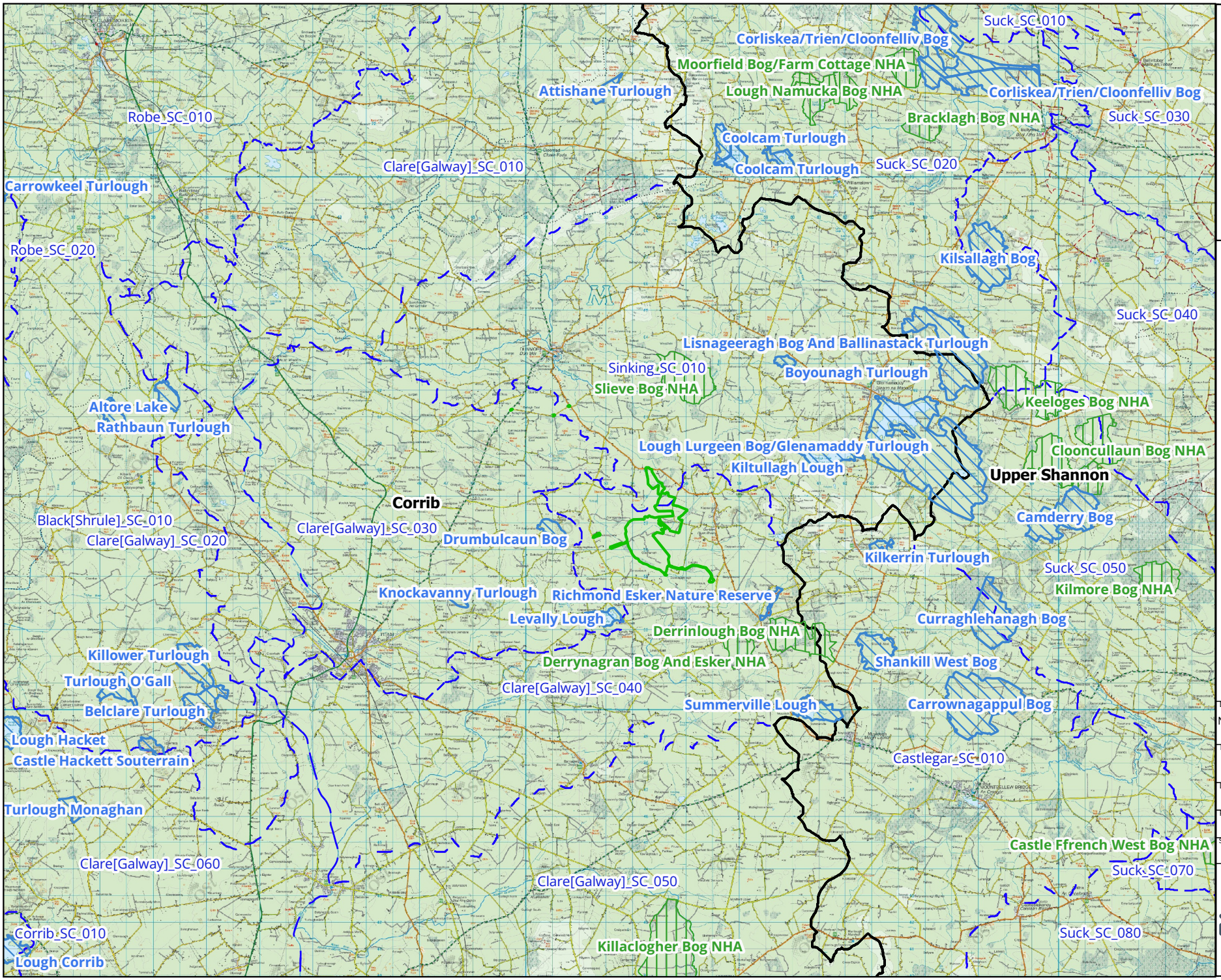

Map Legend

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

Drawing Title
Nationally Designated Sites within the Likely Zone of Influence

Project Title
Proposed Clonberne Wind Farm, Co. Galway

Drawn By	Checked By
KB	KOD
Project No.	Drawing No.
180740	Figure 6-5
Scale	Date
1:185,000	21.03.2024

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Table 6-3: Identification of Nationally designated sites within the Likely Zone of Impact

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
Natural Heritage Areas		
Slieve Bog NHA [000247]	2.8km from Site 6.0km from grid connection route	There is no potential for direct effects on this NHA as the project footprint is located entirely outside the designated site. This partially overlaps with Lough Corrib SAC [000297]. This NHA is designated for raised bog habitats, pools and flushes. There is no identifiable surface water connectivity between the Proposed Project and this NHA. This NHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. However, following hydrological assessments of the Site by HES (see Chapter 9), it was found that groundwater flows off from the site in a southwesterly direction. Therefore, given the northeasterly location of this NHA relative to the Site, there is no potential for indirect effects on this NHA as a result of groundwater deterioration arising from the Proposed Project. As such, there is no hydrological link between the NHA and Proposed Project. Given this and due to the distance between the Proposed Project and the NHA, there is no potential for any direct or indirect effects on this NHA. **This NHA is outside the Likely Zone of Impact and no further assessment is required.**
Derrynagran Bog And Esker NHA [001255]	3.3km from Site 2.2km from grid connection route	There is no potential for direct effects on this NHA as the project footprint is located entirely outside the designated site. The NHA is located 3.3km from the site. This NHA is designated for raised bog, esker ridges and dry deciduous woodlands. Due to the distance between the Proposed Project and the pNHA, and the terrestrial nature of the habitats, there is no potential for indirect effects on the pNHA. **This NHA is outside the Likely Zone of Impact and no further assessment is required.**

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
Derrinlough Bog NHA [001254]	4.2km from Site 2.6km from grid connection route	There is no potential for direct effects on this NHA as the project footprint is located entirely outside this designated site. Derrinlough Bog NHA partially overlaps with Lough Corrib SAC [000297]. This NHA is designated for raised bog and fen habitats. There is no identifiable surface water connectivity between the Proposed Project and this NHA. This NHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. As outlined in Chapter 9 'Hydrology' of this EIAR, groundwater drains from the site in a southerly/south-westerly direction. Given the southeasterly location of this NHA relative to the Site, there is no potential for indirect effects on this NHA as a result of groundwater deterioration arising from the Proposed Project. **This NHA is outside the Likely Zone of Impact and no further assessment is required.**
Killaclogher Bog NHA [001280]	12.2km from Site 12.0km from grid connection route	There is no potential for direct effects on this NHA as the project footprint is located entirely outside the designated site. This site is also designated as a small portion of the Lough Corrib SAC [000297]. This NHA is designated for raised bog habitats, an in-filled lake and flushes. There is no identifiable surface water connectivity between the Proposed Project and this NHA. This NHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. As outlined in Chapter 9 'Hydrology' of this EIAR, groundwater drains from the site in a southerly/south-westerly direction. However, given the distance between the NHA and the site, there is no potential for indirect effects on this NHA as a result of groundwater deterioration arising from the Proposed Project. **This NHA is outside the Likely Zone of Impact and no further assessment is required.**
Keeloges Bog NHA [000281]	12.3km from Site	

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
	12.6km from grid connection route	There is no potential for direct effects on these NHAs as the project footprint is located entirely outside these designated sites. These sites are located over 12km from the Site. There is no identifiable surface water connectivity between the Proposed Project and these sites. Furthermore, these sites are also underlain by a different groundwater body, the Suck South groundwater body, than the Proposed Project, therefore there is no potential for indirect effects as a result of groundwater deterioration. **These NHAs are outside the Likely Zone of Impact and no further assessment is required.**
Clooncullaun Bog NHA [000245]	12.7km from Site 12.4km from grid connection route	
Lough Namucka Bog NHA [000220]	13.9km from Site 17.1km from grid connection route	
Leaha Bog NHA [000292]	14.4km from Site 13.9km from grid connection route	
Funshin Bog NHA [000267]	14.8km from Site 14.6km from grid connection route	
Proposed Natural Heritage Area (pNHA)		
Drumbulcaun Bog pNHA [000263]	1.0km from Site 3.3km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside this designated site. This pNHA is designated for raised bog, fen, open water and flooded grassland habitats. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. This pNHA is underlain by the same groundwater body, the Clare-Corrib, as the Site however given the westerly location of this NHA relative to the Site and the groundwater dependent nature of the fen habitat for which the site is designated, taking a precautionary approach there is potential for indirect effects on the site via deterioration of groundwater arising from the Proposed Project.

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
		A pathway for likely significant effect on this pNHA was identified. This site is within the Likely Zone of Impact and is considered further in this assessment.
Levally Lough pNHA [000295]	2.0km from Site 2.2km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside this designated site. This site is also designated under the Levally Lough SAC [000295]. This pNHA is designated for a turlough. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. However, this pNHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. Therefore, given the south-westerly location of this pNHA relative to the Site and the groundwater dependent nature of the habitat for which the site is designated there is potential for indirect effects on the site via deterioration of groundwater arising from the Proposed Project. **A pathway for likely significant effect on this pNHA was identified. This site is within the Likely Zone of Impact and is considered further in this assessment.**
Richmond Esker Nature Reserve pNHA [000323]	3.8km from Site 2.1km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside this designated site. The pNHA is located 3.8km from the site. This pNHA is designated for a wooded esker ridge. Due to the distance between the Proposed Project and the pNHA, and the terrestrial nature of the habitat, there is no potential for indirect effects on the pNHA. **This pNHA is outside the Likely Zone of Impact and no further assessment is required.**
Kiltullagh Lough pNHA [001282]	4.6km from Site	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside the designated site.

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
	5.5km from grid connection route	This pNHA is designated for lake habitats and waterfowl populations. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. This pNHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. As outlined in Chapter 9 'Hydrology' of this EIAR, groundwater drains from the site in a southerly/south-westerly direction. Given the northeasterly location of this pNHA relative to the Site, there is no potential for indirect effects on this pNHA as a result of groundwater deterioration arising from the Proposed Project. **A pathway for likely significant effect on this pNHA was identified. This site is within the Likely Zone of Impact and is considered further in this assessment.**
Knockavanny Turlough pNHA [000289]	5.3km from Site 7.0km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside the designated site. This pNHA is designated for a turlough. There is no identifiable surface water connectivity between the Proposed Project and this NHA. However, this pNHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. Therefore, given the south-westerly location of this pNHA relative to the Site and the groundwater dependent nature of the habitat for which the site is designated there is potential for indirect effects on the site via deterioration of groundwater arising from the Proposed Project. **A pathway for likely significant effect on this pNHA was identified. This site is within the Likely Zone of Impact and is considered further in this assessment.**
Boyounagh Turlough pNHA [001237]	6.1km from Site 8.0km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside the designated site. This pNHA is designated for a turlough. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. This pNHA

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
		is underlain by the same groundwater body, the Clare-Corrib, as the Site. As outlined in Chapter 9 'Hydrology' of this EIAR, groundwater drains from the site in a southerly/south-westerly direction. Given the northeasterly location of this pNHA relative to the Site, there is no potential for indirect effects on this pNHA as a result of groundwater deterioration arising from the Proposed Project. **This pNHA is outside the Likely Zone of Impact and no further assessment is required.**
Summerville Lough pNHA [001319]	6.9km from Site 5.5km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside the designated site. This pNHA is designated for a permanent lake, raised bog and wet species-rich grassland. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. This pNHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. As outlined in Chapter 9 'Hydrology' of this EIAR, groundwater drains from the site in a southerly/south-westerly direction. Given the southeasterly location of this pNHA relative to the Site, there is no potential for indirect effects on this pNHA as a result of groundwater deterioration arising from the Proposed Project. **This pNHA is outside the Likely Zone of Impact and no further assessment is required.**
Kilkerrin Turlough pNHA [001279]	6.9km from Site 6.0km from grid connection route	There is no potential for direct effects on these pNHAs as the project footprint is located entirely outside these designated sites. These sites are designated for turloughs, rivers and raised bog habitats. There is no identifiable surface water connectivity between the Proposed Project and these pNHAs. Furthermore, these sites are also all underlain by a different groundwater body, the Suck South groundwater body, than the Site
Lough Lurgeen Bog/Glenamaddy Turlough pNHA [000301]	7.2km from Site 7.5km from grid connection route	

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
Shankill West Bog pNHA [000326]	7.5km from Site 5.8km from grid connection route	and grid connection route, therefore there is no potential for indirect effects as a result of groundwater deterioration. **These pNHAs are outside the Likely Zone of Impact and no further assessment is required.**
Lisnageeragh Bog And Ballinastack Turlough pNHA [000296]	10.5km from Site 11.0km from grid connection route	
Coolcam Turlough pNHA [000218]	10.5km from Site 14.8km from grid connection route	
Carrownagappul Bog pNHA [001242]	11.3km from Site 9.6km from grid connection route	
Curraghlehanagh Bog pNHA [000256]	11.3km from Site 9.7km from grid connection route	
Attishane Turlough pNHA [001618]	11.4km from Site 17.2km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside the designated site. This pNHA is designated for a turlough. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. This pNHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. As outlined in Chapter 9 'Hydrology' of this EIAR, groundwater drains from the site in a southerly/south-westerly direction. Given the southeasterly location of this pNHA relative to the Site, there is no potential for indirect effects on this pNHA as a result of groundwater deterioration arising from the Proposed Project.

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
		This pNHA is outside the Likely Zone of Impact and no further assessment is required.
Croaghill Turlough pNHA [000255]	11.8km from Site 15.3km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside this designated site. This site is also designated under the Croaghill Turlough SAC [000255]. This pNHA is designated for a turlough. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. Furthermore, this site is also underlain by a different groundwater body, the Suck South groundwater body, than the Site and grid connection route, therefore there is no potential for indirect effects as a result of groundwater deterioration. **This pNHA is outside the Likely Zone of Impact and no further assessment is required.**
Altore Lake pNHA [000224]	12.4km from Site 18.6km from grid connection route	There is no potential for direct effects on this pNHA as the project footprint is located entirely outside the designated site. This pNHA is designated for a lake, wet grassland, freshwater marsh and Greenland white-fronted geese. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. This pNHA is underlain by the same groundwater body, the Clare-Corrib, as the Site. As outlined in Chapter 9 'Hydrology' of this EIAR, groundwater drains from the site in a southerly/south-westerly direction. Given the southeasterly location of this pNHA relative to the Site, there is no potential for indirect effects on this pNHA as a result of groundwater deterioration arising from the Proposed Project. Furthermore, this site is located outside the core foraging range of Greenland white-fronted geese (5-8km; SNH 2016). As such, there is no potential for *ex situ* disturbance effects on this population.

Designated Site	Distance from Proposed Project (km)	Likely Zone of Impact Determination
		This pNHA is outside the Likely Zone of Impact and no further assessment is required.
Camderry Bog pNHA [000240]	12.7km from Site 11.8km from grid connection route	There is no potential for direct effects on these pNHAs as the project footprint is located entirely outside these designated sites. These pNHAs are designated for raised bog habitats. There is no identifiable surface water connectivity between the Proposed Project and this pNHA. Furthermore, these sites are also underlain by a different groundwater body, the Suck South groundwater body, than the Site and grid connection route, therefore there is no potential for indirect effects as a result of groundwater deterioration. **These pNHAs are outside the Likely Zone of Impact and no further assessment is required.**
Kilsallagh Bog pNHA[000285]	13.7km from Site 14.6km from grid connection route	
Rathbaun Turlough pNHA [000215]	14.4km from Site 20.3km from grid connection route	There is no potential for direct effects on these pNHAs as the project footprint is located entirely outside these designated sites. These sites are located over 14km from the Site, and are designated for turloughs. There is no identifiable surface water connectivity between the Proposed Project and these pNHAs. These pNHAs are underlain by the same groundwater body, the Clare-Corrib, as the Site. However, due to the distance between the Proposed Project and the pNHA, there is no potential for any direct or indirect effects on this pNHA. **These pNHAs are outside the Likely Zone of Impact and no further assessment is required.**
Killower Turlough pNHA [000282]	14.6km from Site 17.0km from grid connection route	
Belclare Turlough pNHA [000234]	14.8km from Site 16.5km from grid connection route	

The AA Screening and Natura Impact Statement that accompanies this application identifies the following European Sites as being within the Likely Zone of Impact:

- Lough Corrib SAC [000297]
- Levally Lough SAC [000295]
- Williamstown Turloughs SAC [002296]

The following Nationally Designated Sites were identified as being within the likely zone of impact:

- Drumbulcaun Bog pNHA [000263]
- Knockavanny Turlough pNHA [000289]
- Levally Lough pNHA [000295]

6.5.1.2 NPWS Article 17 Reporting

A review of the Irish Reports for Article 17 of the Habitats Directive (92/42/EEC), as well as the Irish Semi-Natural Grassland Survey datasets, National Survey of Native Woodlands and Ancient and Long Established Woodland datasets were conducted prior to undertaking the multi-disciplinary walkover survey and available datasets were downloaded and overlain on the Site Boundary.

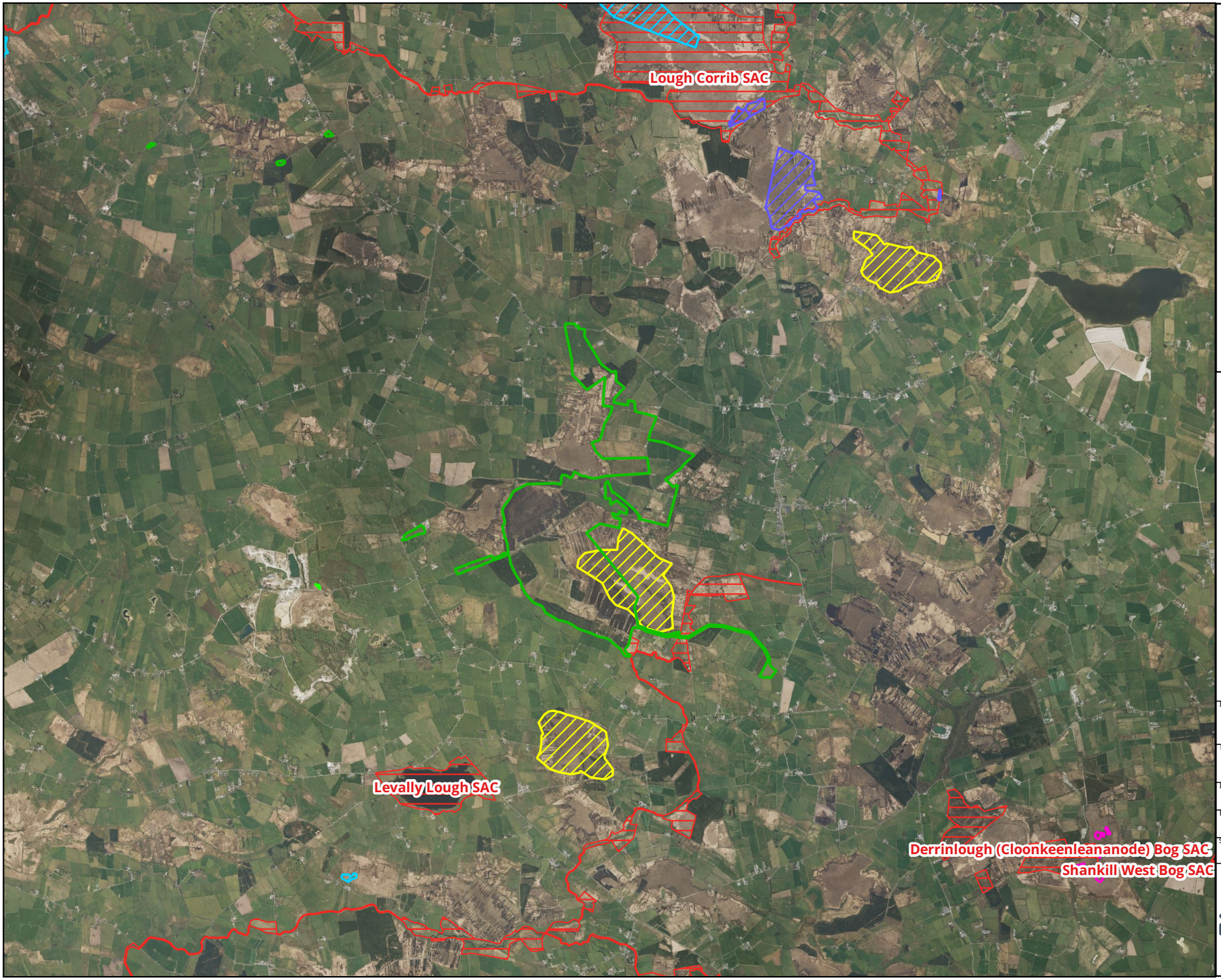
A small section of the Site, at its south eastern extent has been mapped as Article 17 degraded raised bog still capable of natural regeneration. This area is characterised by both heavily drained but uncut raised bog, as well as areas of cutover bog comprising bare peat.

According to the Irish Semi-natural Grassland Survey dataset, a small area of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] is located 1.5km to the west of the Site boundary. Areas of Northern Atlantic wet heaths with *Erica tetralix* [4010], European dry heaths [4030], Active raised bogs [7110] and Degraded raised bogs still capable of natural regeneration [7120] are located within 4km of the study site.

See Figure 6-6 which shows mapped Article 17 habitats within and in the vicinity of the site boundary.

NPWS datasets for Ancient & Long-Established Woodlands, Native Woodland Surveys 2003-2008 and Irish Seminatural Grassland Surveys were reviewed in relation to the site. There are no mapped areas of native, ancient, or long established woodland within the site boundary, or downstream of the site. No semi-natural grasslands mapped as part of the Irish Semi-natural Grassland Survey are located within the site boundary or downstream of the site.

Online mapping tools were reviewed in relation to the site, including the forestry license viewer and Heritage maps. There are no areas of forestry within the site licensed by Coillte.



Map Legend

- EIAR Site Boundary
- Special Area of Conservation (SAC)
- Active raised bogs [7110]
- Degraded raised bogs still capable of natural regeneration [7120]
- European dry heaths [4030]
- Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites) [6210]
- Northern Atlantic wet heaths with Erica tetralix [4010]

Drawing Title

Article 17 Habitats

Project Title: Proposed Clonberne Wind Farm, Co. Galway	
Drawn By: KB	Checked By: KOD
Project No.: 180740	Drawing No.: Figure 6-6
Scale: 1:60,000	Date: 21.03.2024

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6.5.1.3 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 (Wyse Jackson *et al.,* 2016) or the Flora (Protection) Order (2022) had been recorded in the relevant 10km squares in which the study site is situated (M55). Each hectad contains 100 whole one kilometre squares containing terrestrial habitats. Species of conservation concern are given in Table 6-4 below. No species listed under Annex II of the Habitats Directive or protected under the Flora Protection Order were identified.

Table 6-4: Species listed designated under the Flora Protection Order or the Irish Red Data Book within hectad M55

Common Name	Scientific Name	Status
Greater knapweed	*Centaurea scabiosa*	NT
Corn marigold	*Chrysanthemum segetum*	NT
Autumn gentian	*Gentianella amarella*	NT
Least bur-reed	*Sparganium natans*	NT
Marsh fern	*Thelypteris palustris*	NT

6.5.1.4 Bryophytes

A search of the NPWS online database for bryophytes (non-vascular land plants comprising of mosses, hornworts, and liverworts) was also undertaken with no protected bryophytes recorded within or adjacent to the proposal (NPWS, 2018).

6.5.1.5 National Biodiversity Data Centre (NBDC) Records

A search of the National Biodiversity Data Centre (NBDC) website was conducted prior to the commencement of site surveys, on the 12/02/2020. This helped to inform survey effort and provide a baseline of likely species composition in the area. Records of protected fauna recorded from hectad M55 are provided in Table 6-5. The results of desktop studies in relation to birds is included in Chapter 7. This data was updated on 13/02/2024.

Table 6-5: NBDC records for species of conservation interest in hectad M55

Common name	Scientific name	Designation
Common Frog	*Rana temporaria*	Annex V, WA
Marsh Fritillary	*Euphydryas aurinia*	Annex II
White-clawed Crayfish	*Austropotamobius pallipes*	Annex II, V, WA
Fallow Deer	*Dama dama*	WA
Hedgehog	*Erinaceus europaeus*	WA
Otter	*Lutra lutra*	Annex II, IV, WA
Pine Marten	*Martes martes*	Annex V, WA
Badger	*Meles meles*	WA

Common name	Scientific name	Designation
Pygmy Shrew	*Sorex minutus*	WA
Red Squirrel	*Sciurus vulgaris*	WA
Irish Hare	*Lepus timidus subsp. hibernicus*	Annex V, WA
Irish Stoat	*Mustela erminea subsp. hibernica*	WA
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Annex IV, WA
Common Pipistrelle	*Pipistrellus pipistrellus sensu stricto*	Annex IV, WA

Annex II, IV, V = Annexes of EU Habitats Directive; WA = Wildlife Acts (as amended) (Ireland).

6.5.1.6 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectad. Records of 'high impact' invasive species for hectad M55 are provided in Table 6-6.

Table 6-6: NBDC records for invasive species in hectad M55

Common Name	Scientific Name
Rhododendron	*Rhododendron ponticum*
Fallow deer	*Dama dama*

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. Rhododendron (*Rhododendron ponticum*) is a species subject to restrictions under Regulations 49 and 50 while Fallow deer is subject to specified provisions of Regulations 49 and 50, and all are included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

6.5.1.7 Bat Records

The National Bat Database of Ireland holds records of bat observations received and maintained by BCI. These records include results of national monitoring schemes, roost records as well as ad-hoc observations. A search of the National Bat Database of Ireland was last carried out on the 13th March 2024 and examined bat presence and roost records within a 10 km radius of a central point within the Wind Farm Site (Grid Ref M 54825 56653) (BCI 2012, Hundt 2012, NatureScot 2021). Available bat records were provided by Bat Conservation Ireland on 30/06/2023. Results from the National Biodiversity Data Centre were also reviewed for bat species present within the relevant 10km grid squares of the Proposed Project. The results of the database search are provided in the Bat Report (Refer to Appendix 6-2).

6.5.1.8 National Parks and Wildlife Service (NPWS) Records

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded within a 10km radius of the Site. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 2nd February 2024. A response was received on the 12th February 2024. Table 6-7 lists rare and protected species records.

Table 6-7 NPWS records for rare and protected species

Common name	Scientific name	Red List Status	Wildlife Act/ Flora Protection Order	Habitats Directive
Eurasian Otter	*Lutra lutra*	LC	WA	Annex II, IV
Sika Deer	*Cervus nippon*	NA	WA	-
Fallow Deer	*Dama dama*	LC	WA	-
Irish Hare	*Lepus timidus hibernicus*	LC	WA	Annex V
Pine Marten	*Martes martes*	LC	WA	Annex V
Eurasian Badger	*Meles meles*	LC	WA	-
Irish Stoat	*Mustela erminea* subsp. *Hibernica*	LC	WA	-
Eurasian Red Squirrel	*Sciurus vulgaris*	LC	WA	-
West European Hedgehog	*Erinaceus europaeus*	LC	WA	-
Harbour Seal	*Phoca vitulina*	LC	WA	Annex II, V
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	LC	WA	Annex II, IV
Common Frog	*Rana temporaria*	LC	WA	Annex V
Smooth Newt	*Lissotriton vulgaris*	LC	WA	-
White-clawed Crayfish	*Austropotamobius pallipes*	EN	WA	Annex II, V
Geyer's Whorl Snail	*Vertigo geyeri*	VU	-	Annex II
Marsh Fritillary	*Euphydryas aurinia*	VU	-	Annex II
Cladonia ciliata	*Cladonia ciliata*	-	-	Annex V
Cladonia portentosa	*Cladonia portentosa*	-	-	Annex V
Reindeer Moss	*Cladonia rangiferina*	-	-	Annex V
Heath Cudweed	*Gnaphalium sylvaticum*	EN	FPO	-
Henbane	*Hyoscyamus niger*	NT	-	-
Narrow-leaved Helleborine	*Cephalanthera longifolia*	VU	FPO	-

FPO = Flora Protection Order; WA = Wildlife Act; Red List Status: LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, NA = Not Assessed; Annex II, IV, V = Of EU Habitats Directive.

6.5.1.9 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The most up to date Freshwater Pearl Mussel sensitive areas data were reviewed[5]. The site is not located within or adjacent to any Freshwater Pearl Mussel sensitive area. The site has no upstream or downstream connectivity to any *Margaritifera* sensitive areas of previously recorded populations.

6.5.1.10 Marsh Fritillary (*Euphydryas aurinia*)

The National Biodiversity Data Centre (NBDC) and NPWS Article 17 GIS Datasets were consulted on the 13th September 2023 for records of Marsh Fritillary. As per the NBDC map viewer and NPWS data sets, Marsh Fritillary butterflies have been recorded within the hectad M55. The closest NPWS records for marsh fritillary were located 200m to the south of the Site boundary. This was taken into account when carrying out the site surveys and the larval food plant, Devil's bit scabious, where present within the site boundary, was surveyed for larval webs (See section 6.4.3.3.4).

6.5.1.11 Inland Fisheries Ireland Data

The site boundary is located within the Clare River catchment. The Clare River catchment is located within the Western River Basin District and covers an area of approximately 900 km^2. The Clare River rises north of Ballyhaunis in Co. Mayo and flows in a south westerly direction before entering Lower Lough Corrib approximately seven kilometres west of Clare Galway. The Levally Stream and Sinking River are tributaries of the Clare River. These two watercourses flow through the site. A search of the Inland Fisheries Ireland (IFI) online database was carried out to ascertain the Fish Ecological Status of the watercourses flowing off site.

A total of 38 sites were surveyed on the Clare River catchment in 2019 to determine the status of their fish stocks using Ten-minute electrofishing. Only three of these have connectivity with the Site and these are listed below along with the fish species recorded and the assigned Fish Ecological Status.

- One of these sites is located approximately 10km upstream of the site boundary in the Sinking River. Salmon (*Salmo salar*), Brown Trout (*Salmo trutta*) and Stone Loach (*Barbatula barbatula*) were recorded, giving a Fish Ecological Status of 'Good' [Sample ID: NRSP19R_30_3356_117A_a].
- A second site approximately 1km downstream of the site boundary in the Levally Stream, a tributary of the Grange River, was also surveyed and likewise recorded Salmon, Brown trout and Stone loach, giving a Fish Ecological Status of 'Good' [Sample ID: NRSP19R_30_2785_134A_a].
- Approximately 2km upstream of the site boundary in the Levally Stream, Brown Trout and Three-spined Stickleback (*Gasterosteus aculeatus*) were recorded, also giving a Fish Ecological Status of 'Good' [Sample ID: NRSP19R_30_3259_283A_a].

Atlantic Salmon is listed on Annex II and Annex V of the EU Habitats Directive.

6.5.1.12 Water Quality

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. The EPA Envision map viewer was consulted on 3rd of April 2024 regarding the water quality status of the rivers which run within and directly adjacent to the Site.

[5] *https://www.npws.ie/maps-and-data/habitat-and-species-data*

The site is intersected by the several tributaries of the Levally Stream_010, which flow through the site and along the site boundary before flowing in a southerly direction and joining the Grange(Galway) River. Downstream this then joins the Clare(Galway) River which flows in a westerly direction into the lower Lough Corrib. The northern area of the Site is intersected by the Sinking River which flows in a northerly direction before also joining the Clare(Galway) River further upstream.

The Levally Stream_010 has a Water Framework Directive (WFD) status of 'Good' from the last round of testing (2016-2021) with a risk status of 'Not At Risk'. Downstream this joins the Grange(Galway)_020, which also has a WFD status of 'Good' and a risk status of 'Not At Risk'. The Sinking_020 River in the north of the site also has a WFD status of 'Good' and a risk status of 'Not At Risk'

The Biotic Index of Water Quality (BIWQ) was developed in Ireland by the Environmental Protection Agency (EPA). Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate community within the waterbody. Individual macro-invertebrate families are classified according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample. The EPA sampling station result provides a baseline against which any water quality changes occurring in the future can be measured. Q values at downstream monitoring stations for the watercourses flowing through site and are given in Table 6-8 below.

A Water Framework Directive Compliance Assessment was undertaken by Hydro-Environmental Services and is provided in Appendix 9-5 of Chapter 9 Hydrology and Hydrogeology of the EIAR. This provides further detail on the status of all river waterbodies in the Site.

Table 6-8: Water quality monitoring stations and associated Q values

River Waterbody	Monitoring Station	Year	Location from Proposed Site	Q Values with Status
Levally Stream_010	Bridge N. of Mahanagh (RS30L070050)	1989	Downstream	3 (Poor)
Grange(Galway)_020	Bridge near Levally (RS30L070100)	2021	Downstream	4 (Good)
	GRANGE (GALWAY) - Ford N.N.W. of Cornacartan (RS30G020300)	2012	Downstream	4 (Good)
	Grange Bridge (RS30G020400)	2021	Downstream	4 (Good)
Sinking_020 and _030	SINKING - Dunmore Bridge (RS30S010200)	1989	Downstream	4 (Good)
	Dunmore WWTP – Upstream (RS30S010240)	No records	Downstream	-
	Br at Dunmore Castle (RS30S010300)	2021	Downstream	4 (Good)

6.5.1.13 Local Hydrology and Hydrogeology

The following description has been summarised from Chapter 9 '*Hydrology and Hydrogeology'* of the EIAR and provides baseline information on the local watercourses within and downstream of the site of the Proposed Project.

The Site is located in the regional Lough Corrib (Corrib_030) surface water catchment within Hydrometric Area 30 of the Western River Basin District (WRBD). A regional hydrology map is shown Figure 9-1 (in Chapter 9 of this EIAR).

On a more local scale the Site is located in the River Clare catchment wherein it exists within two surface water sub-catchments. The majority (80%) of the Wind Farm site which includes all 11 no. turbine locations, 1 no. temporary construction compound, borrow pit, peat repositories (4 no.) and spoil repository area (1 no.) are located in the Clare[Galway]_SC_040. The Wind Farm site drains to the River Clare, which is located approximately 23km downstream (southwest) of the Site, via the Grange River.

The northern portion of the Wind Farm site (20%) is located in the Sinking River sub-catchment (Sinking_SC_010). The Sinking River is located to the northwest and approximately 5.5km downstream of the Wind Farm site. Proposed infrastructure within the Sinking River sub-catchment is limited to the Wind Farm site entrance, ~1.6km of access road and 1 no. construction compound. The Sinking River drains into the River Clare approximately 22km downstream of the Wind Farm site.

The portion of the Wind Farm Site within the Clare[Galway]_SC_040 sub-catchment is drained by a network of 3 no. tributary streams (1st/2nd order) that merge together at the western boundary of the Wind Farm site to form the Levally Stream which then flows southerly along the south-western and southern Site boundary.

The larger of the 3 no. tributary streams (referred to as Stream A) draining the Wind Farm site rises to the northeast of the Site and flows in a south-westerly direction through the central area of the Site forming the main drainage artery of the Wind Farm site. The majority of the proposed Wind Farm infrastructure (including turbine locations T1, T2, T3, T4, T5, T6, T8 and T11, southern construction compound along with 3 no. peat repositories) drain towards Stream A via various bog drains, forestry and field drainage networks.

The second of the tributary streams (Stream B) emerges just inside the northwestern boundary of the Wind Farm site and then flows southerly along the western boundary of the Site prior to merging with Stream A at the existing road entrance to the bog immediately west of the Wind Farm site. The flow in Stream B largely comprises groundwater discharge from the Gurteen/Cloonmore Group Water Scheme (GWS) source spring which is discussed in detail in Section 9.3.15. Proposed turbine location T7 drains westerly towards Stream B as it flows southerly from the spring.

The third stream, Stream C emerges at the location of Gortagarraun Turlough, which is situated 1.5km to the northwest and upstream of the Wind Farm site. Stream C flows in a south-easterly direction prior to merging with the Levally Stream immediately downstream of the Stream A/Stream B confluence on the west of the Wind Farm site. The proposed borrow pit area, which is located on the west of the Wind Farm site, drains to Stream C via a field drain that starts close to the eastern boundary of the proposed borrow pit location. Gortagarraun Turlough is only typically present over the winter period when groundwater levels are highest.

The portion of the Wind Farm site within the Sinking River sub-catchment is drained by a headwater stream (Stream D) of the Sinking River main channel which flows 3.1km to the north of the Site. Stream D emerges from an area of cutaway bog located on the northwest of the Wind Farm site.

The proposed Grid Connection (including substation and 2 no. end masts) is located in the Clare[Galway]_SC_040 sub-catchment and is also drained locally by the Levally Stream.

The proposed Grid Connection (including substation) drains directly to the Levally Stream as it flows nearby along the southern boundary of the Wind Farm site. There are several bog drains that run south, which intercept the proposed substation area and cable route, before flowing into the Levally Stream. There is 1 no. existing bridge crossing on the Levally Stream where it follows the public road.

With regard the TDR works, 2 no. proposed road junction upgrades are located in the Clare[Galway]_SC_030 and 1 no. junction upgrade in the Sinking_SC_010 sub-catchment.

The Site is located in the Clare-Corrib Groundwater Body (IE_WE_G_0020) which has a mapped surface area of 1,344km^2.

The bedrock type of the Clare-Corrib GWB is predominantly Dinantian Pure Bedded Limestone (Burren Formation) which also underlies the Site. The Burren Formation is classified by the GSI as a Regionally Important Karstified Aquifer which is dominated by conduit flow (Rkc).

It's also worth noting that the overall surface water drainage pattern of the Levally Stream and its tributaries in the area of the Site is southerly. The hydrochemistry of the surface water (high electrical conductivity) suggests that there is a large groundwater component to the flow in the tributaries of the Levally Stream sub-basin in which the Site is located.

This suggests there is groundwater discharge (baseflow) from the underlying bedrock aquifer to the Levally Stream and therefore surface water flows patterns are likely to influence groundwater flow patterns to some extent.

However, the surface water / bedrock aquifer hydraulic connection within the Wind Farm Site itself is very limited due to underlying deposits of clays/marls and thick glacial deposits. This is discussed further in Section 9.3.9.

6.5.1.14 Conclusions of the Desktop Study

The desktop study has provided information about the existing environment in hectad M55, within which the Site is located. The site is situated within the Corrib surface water catchment within both the Clare(Galway)_SC_040 and Sinking_SC_010 Sub catchments. The Levally Stream_010 and Sinking_020 Rivers flow through the site in southerly and northerly directions respectively, before both joining the Clare(Galway) River and flowing westerly into Lower Lough Corrib.

A number of watercourses that drain the site, have connectivity downstream with Lough Corrib SAC and is further considered in the Natura Impact Statement prepared for the Proposed Project.

Levally Lough SAC [000295] is also vulnerable to the deterioration of ground water as a result of the Proposed Project, and is further considered in the Natura Impact Statement prepared for the Proposed Project.

The following Nationally Designated Sites were identified as being within the likely zone of impact:

- Drumbulcaun Bog pNHA [000263]
- Knockavanny Turlough pNHA [000289]
- Levally Lough pNHA [000295]

Within the site boundary, there is a large areas of Article 17 mapped Degraded raised bogs still capable of natural regeneration [7120]. This is located in the southeastern area of the site. This is not mapped within the adjacent Lough Corrib SAC [0002927] as it is outside the boundary of the designated site.

The desk study identified that a variety of protected faunal species are known to occur within the wider site, including bats, marsh fritillary, otter, freshwater white-clawed crayfish, pine marten, badger and red

squirrel. A review of bat roost records for the area did not identify any roosts within or immediately adjacent to the Proposed Project. The habitat and species recorded during the desk study informed the survey methodologies undertaken during the site visits.

The desk study also 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.

6.6 Description of the Existing Environment

6.6.1 Description of Habitats and Flora

The habitats recorded within the Site are listed in Table 6-9 and described further in the sections below. Habitats recorded along the proposed access route are described in Section 6.6.1.1.18, along the proposed turbine delivery route in Section 6.6.1.3 and along the proposed grid connection route in Section 6.6.1.2.1 below. Detailed botanical data from relevés recorded at turbine base locations and other locations are provided in Appendix 6-1 of this report. A habitat map of the site is provided in Figure 6-7. A habitat map is also provided with the proposed infrastructure footprint overlain in Figure 6-8.

Table 6-9: Habitats recorded within the Site Boundary

Habitat Name	Fossitt Code
Buildings and artificial surfaces	BL3
Spoil and bare ground	ED2
Recolonising bare ground	ED3
Tall-herb swamp	FS2
Depositing/lowland river	FW2
Drainage ditches	FW4
Improved agricultural grassland	GA1
Improved agricultural grassland / Wet grassland mosaic	GA1/GS4
Wet grassland	GS4
Wet grassland / Scrub mosaic	GS4/WS1
Raised bog	PB1
Cutover bog	PB4
Conifer plantation	WD4
Hedgerows	WL1
Treelines	WL2
Wet willow-alder-ash woodland	WN6
Bog woodland	WN7

Habitat Name	Fossitt Code
Scrub	WS1
Immature woodland	WS2

6.6.1.1 Proposed Wind Farm Site

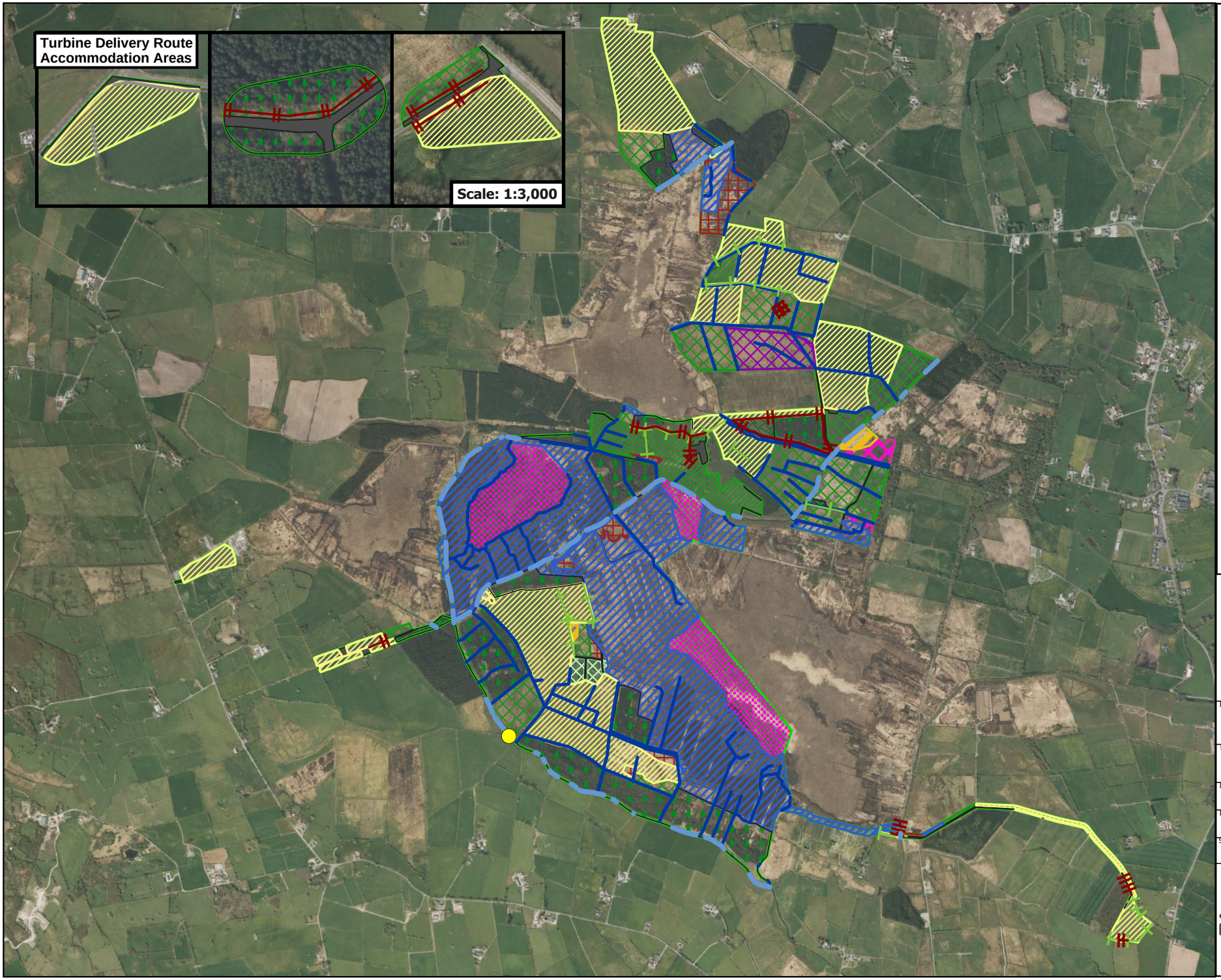
The habitats within the Proposed Wind Farm Site boundary are dominated by grassland and peatland habitats. Grassland habitats are predominantly characterised by agricultural land, including improved agricultural grassland and agricultural wet grassland, while peatland habitats are characterised predominantly by cutover raised bog with areas of drained but uncut raised bog also present. The site is accessed via a network of bog roads/tracks and local roads. Other habitats within the Proposed Wind Farm Site boundary include conifer plantation, Molinia meadow and woodland dominated by birch or alder.

6.6.1.1.1 *Cutover Bog (PB4) and Associated Habitats*

A large proportion of the land within the Proposed Wind Farm Site boundary is classified as cutover raised bog (PB4). Peat extraction was ongoing at various locations during the site visits and cutover bog within these areas was characterised by a high percentage of bare peat cover (80% or more) with sparsely growing vegetation including toadrush (*Juncus bufonius*), low growing, sparse purple moor grass (*Molinia caerulea*), ling heather (*Calluna vulgaris*), bog asphodel (*Narthecium ossifragum*) and common cottongrass (*Eriophorum angustifolium*) (Plate 6-1 and 6-2). Turbines 6, 7, 10 and 11, as well as part of the southern construction compound, are located in areas of cutover bog dominated by bare peat.

In other areas, where peat extraction has ceased for some time, the cutover bog has revegatated with dry heath and scrub type vegetation (Plate 6-3 and 6-4). Vegetation in these areas is typically dominated by purple moor grass, knapweed (*Centurea nigra*), common cottongrass, cocksfoot (*Dactylis glomerata*), sweet vernal grass (*Anthoxanthum odoratum*), soft rush (*Juncus effusus*), hawkbits (*Leontodon* sp.) and occasional devil's bit scabious (*Succisa pratensis*), or heath and scrub species including ling heather (*Calluna vulgaris*), bog myrtle (*Myrica gale*), gorse (*Ulex europaeus*) and willow species (*Salix* sp.) along with purple moor grass. Lesser butterfly orchid (*Platanthera bifolia*) was occasionally recorded in areas of revegetating cutover bog.

Four peat repository areas are proposed to the southwest of Turbine 10, southeast of Turbine 7, northwest of Turbine 11 and north of Turbine 6. All peat repository areas are located within Cutover bog (PB4) of varying degree of revegetation and regeneration. The areas to the southwest of Turbine 10, southeast of Turbine 7 and north of Turbine 6 are dominated by bare peat with little revegetation except for small amounts of rushes (*Juncus* spp.) and cottongrass (*Eriophorum angustifolium*) (Plate 6-5 and 6-6). The proposed peat repository area to the northwest of Turbine 11 is more highly revegetated with species including ling heather (*Calluna vulgaris*), purple moor grass (*Molinia caerulea*) and cottongrass as well as small areas of gorse (*Ulex europaeus*) scrub (Plate 6-7). The southern proposed construction compound is also partially located within an area of cutover bog.


Turbine Delivery Route Accommodation Areas
Scale: 1:3,000
Map Legend
EIAR Site Boundary
Stone walls and other stonework
Depositing/ Lowland rivers
Drainage ditches
Hedgerows
Treelines
Buildings and artificial surfaces
Spoil and bare ground
Recolonising bare ground
Improved agricultural grassland
Imrpoved agricultural grassland/Wet grassland
Wet grassland
Wet grassland/Scrub
Raised bog
Cutover bog
Conifer plantation
Wet willow-alder-ash woodland
Bog woodland
Scrub
Immature woodland
Annex I Molinia Meadow
Annex I Hydrophilous tall herb fringe communities
N
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Drawing Title
Habitats within the Site
Project Title
Proposed Clonberne Wind Farm, Co. Galway
Drawn By
KB
Checked By
KOD
Project No.
180740
Drawing No.
Figure 6-7
Scale
1:23,000
Date
27.06.2024
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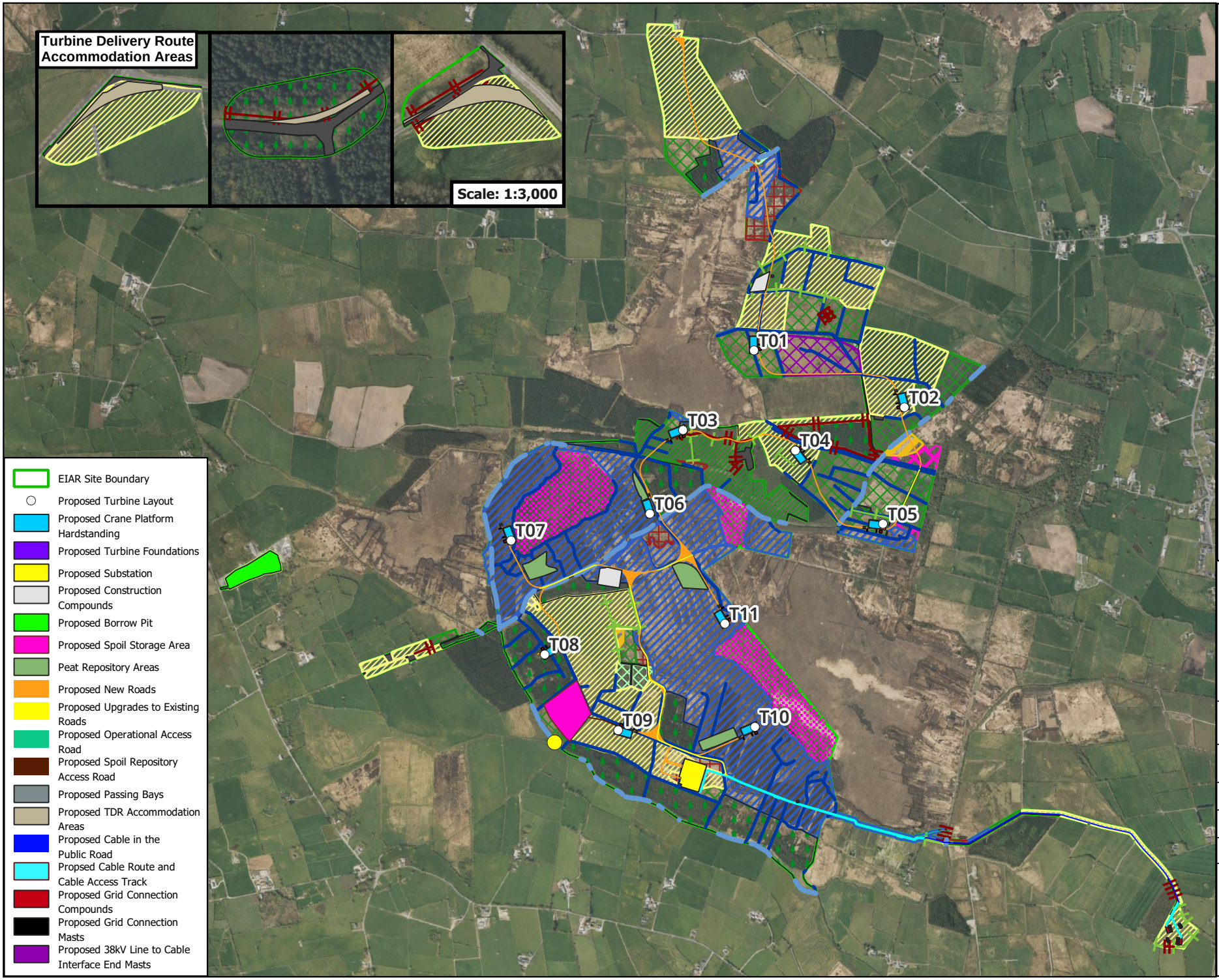

Map Legend

- Stone wall and other stonework
- Depositing/ Lowland rivers
- Drainage ditches
- Hedgerows
- Treelines
- Buildings and artificial surfaces
- Spoil and bare ground
- Recolonising bare ground
- Improved agricultural grassland
- Imrpoved agricultural grassland/Wet grassland
- Wet grassland
- Wet grassland/Scrub
- Raised bog
- Cutover bog
- Conifer plantation
- Wet willow-alder-ash woodland
- Bog woodland
- Scrub
- Immature woodland
- Annex I Molinia Meadow
- Annex I Hydrophilous tall herb fringe communities

Drawing Title
Habitats within the Site with Proposed Infrastrucutre

Project Title
Proposed Clonberne Wind Farm, Co. Galway

Drawn By	Checked By
KB	KOD
Project No.	Drawing No.
180740	Figure 6-8
Scale	Date
1:23,000	27.06.2024

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A small section of the Site to the south of Turbine 6 supported an area of cutover bog that was relatively wet underfoot and dominated by common cottongrass (*Eriophorum angustifolium*), Yorkshire fog (*Holcus lanatus*), bottle sedge (*Carex rostrata*), soft rush (*Juncus effusus*) and marsh pennywort (*Hydrocotyle vulgaris*). Other species included purple moor grass, lesser spearwort (*Ranunculus falmmula*), creeping bent (*Agrostis stolonifera*), devil's bit scabious (*Succisa pratensis*), meadowsweet (*Filipendula ulmaria*) and marsh bedstraw (*Galium palustre*). The Levally stream flows adjacent to the northern section of this habitat and wetter areas were characterised by stands of bulrush (*Typha latifolia*). Drier sections were characterised by dominant purple moor grass and areas of willow (Salix sp.) scrub. A small part (approx. 0.09ha) of this habitat lies within the footprint of proposed wind farm road widening works (Figure 6-8) (Plate 6-8).

The revegetating areas of cutover bog were assessed for their potential to conform to the Annex I habitat 'Active Raised Bog [7110]' as per IWM 128 The habitats of cutover raised bog (Smith and Crowley, 2020). Sphagnum cover was less than 40%, the habitat did not contain the sufficient indicator species and contained species not typical of raised bog. Therefore, the habitat did not conform to the Annex I habitat 'Active Raised Bog [7110]'.

Plate 6-1 Cutover bog characterised by bare peat

Plate 6-2 Cutover bog characterised predominantly by bare peat

Plate 6-3 Revegetating cutover bog

Plate 6-4 Revegetating cutover bog with purple moor grass, ling heather and birch scrub

Plate 6-5 The peat repository area to the southeast of T7 is dominated by bare peat with little revegetation

Plate 6-6 The peat repository area to the north of T6 is dominated by bare cutover peat

Plate 6-7 The peat repository area to the northwest of Turbine 11 is more highly revegetated

Plate 6-8 Revegetating Cutover bog south of T6 which was relatively wet underfoot.

6.6.1.1.2 Bog Woodland (WN7)

Small areas of dry birch-dominated woodland categorised as Bog woodland (WN7) has developed on areas of cutover bog throughout the site. The woodlands are dominated by birch (*Betula pubescens*), with willow (*Salix* sp.) and occasional pine (*Pinus* sp.) in some areas. The wooded areas are predominantly very dry and have not established on *Sphagnum* rich substrates. A small area of bog woodland is located within the construction footprint to the south of T2 along the access track between T2 and T5 (Plate 6-9). None of the areas of woodland within the Site, including the section within the construction footprint, were found to correspond to Annex I habitat Bog Woodland (91D0). They were very dry in nature with no *Sphagnum* species present (Refer to Relevé data in Appendix 6-1).

Plate 6-9: Dry birch-dominated Bog woodland along the access track to the south of T2

6.6.1.1.3 Scrub (WS1)

Areas of scrub dominated by willow (*Salix* sp.), gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus* agg.) are common throughout the development site, mostly associated with colonising areas of former cutover bog or occurring in association with areas of grassland (Plate 6-10 and 6-11). The proposed substation and southern proposed construction compound are partially located within areas of scrub (Plate 6-12).

Plate 6-10 Willow scrub colonising cutover bog within the Site.

Plate 6-11 Willow dominated Scrub along the proposed wind farm access road

Plate 6-12 The southern proposed construction compound in an area of buildings and artificial surfaces, scrub, cutover bog and conifer forestry

6.6.1.1.4 *Raised Bog (PB1)*

Small areas of fragmented Raised bog (PB1) are present throughout the site boundary. These areas have been entirely avoided by the development infrastructure. The majority of areas of remnant uncut bog are small in size, heavily drained through the insertion of parallel drainage ditches and are subject to ongoing peat extraction at the facebank (Plate 6-13), where they are surrounded by deep drains and extensive areas of bare peat and/or revegetating cutover bog. They are dry in nature and the vegetation is typically dominated by abundant ling heather with little Sphagnum cover. See Appendix 6-1 for relevé data of this habitat.

These areas were assessed for their potential to conform to the Annex I habitat 'Active Raised Bog [7110]' as per IWM 81. Raised Bog Monitoring and Assessment Survey 2013 (Fernandez *et al.*, 2013). Sphagnum cover was low the habitat did not contain the sufficient indicator species and contained species not typical of raised bog. Therefore, the habitat did not conform to the Annex I habitat 'Active Raised Bog [7110]'.

Plate 6-13 Raised bog (PB1) dominated by ling heather at top of facebank where there is ongoing peat extraction

6.6.1.1.5 Wet Grassland (GS4)

Wet grassland is abundant throughout the Proposed Wind Farm Site boundary. The majority of wet grassland (GS4) throughout the site is agricultural in nature, grazed and dominated by common species including Yorkshire fog (*Holcus lanatus*) or soft rush dominated swards. Other species present include meadow buttercup (*Ranunculus acris*), white clover, common mouse-ear (*Cerastium fontanum*) and marsh thistle (*Cirsium palustre*). T1 and T5 are both located in habitat classified as Wet grassland (GS4). (Plate 6-14). The proposed northern construction compound and proposed spoil repository areas are also located within fields characterised as wet grassland. Wet grassland was also recorded along forestry rides including to the west of T3 and to the east of T9 where it was interspersed with areas of bramble (*Rubus fruticosus* agg.) and gorse scrub on areas of higher ground. Species present in these areas included false oat grass (*Arrhenatherum elatius*), Yorkshire fog (*Holcus lanatus*), meadowsweet (*Filipendula ulmaria*), horsetails (*Equisetum* sp.), wild angelica (*Angelica sylvestris*), greater tussock sedge (*Carex paniculata*), silverweed (*Potentilla anserina*), bird's foot trefoil (*Lotus corniculatus*), meadow buttercup (*Ranunculus acris*) and self-heal (*Prunella vulgaris*)

An area of species-rich wet grassland is present to the east of T1 within the same field boundary (Plate 6-15 and 6-16, Figure 6-7). This area of grassland was characterised by a different species composition and greater species richness than the location of T1 and is separated from the location of the proposed T1 by a drainage ditch. Species recorded in this habitat included brown sedge (*Carex disticha*), sweet vernal grass (*Anthoxanthum odoratum*), marsh cinquefoil (*Potentilla palustris*) with smaller amounts of purple moor grass (*Molinia caerulea*), creeping bent grass (*Agrostis stolonifera*) jointed rush (*Juncus articulatus*), meadowsweet (*Filipendula ulmaria*) and meadow thistle (*Cirsium dissectum*). Small areas of this wet grassland habitat contained elements of cutover bog habitat and supported species including bog myrtle (*Myrica gale*), *Sphagnum* species, devil's bit scabious (*Succisa pratensis*), star sedge (*Carex echinata*), carnation sedge (*Carex panicea*), black bog rush (*Schoenus nigricans*), purple moor grass and deergrass (*Trichophorum germanicum*). Wetter areas associated with artificial drains throughout the field supported cuckoo flower (*Cardamine pratensis*), lesser spearwort (*Ranunculus flammula*), ragged robin (*Silene flos-cuculi*) and occasional bog pimpernel (*Anagallis tenella*). The proposed access

track between T1 and T2 runs along the very southern boundary of this habitat, adjacent to the existing field boundary wall (refer to habitat map Figure 6-7).

A detailed botanical assessment was carried out in the species-rich area of grassland and the results are included in Appendix 6-1 of this chapter. The area of grassland was found to correspond to the Annex I habitat *'Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) 6410* (O'Neill *et al.* 2014).

Plate 6-14 Wet grassland in the vicinity of T5

Plate 6-15 Species rich grassland to the east of T1 but outside the T1 construction footprint was found to correspond to the Annex I habitat Molinia meadows

Plate 6-16 Species rich grassland to the east of T1 but outside the T1 construction footprint was found to correspond to the Annex I habitat Molinia meadows

6.6.1.1.6 Improved Agricultural Grassland (GA1)

Improved agricultural grassland (GA1) within the Site Boundary is typically dominated by perennial rye grass (*Lolium perenne*) as well as forbs typical of the habitat including broad-leaved dock (*Rumex obtusifolius*), white clover (*Trifolium repens*) and creeping buttercup (*Ranunculus repens*) with some soft rush (*Juncus effusus*). T2, T4 and T9 are all located in Improved agricultural grassland, as well as the proposed substation and proposed borrow pit (Plate 6-17).

The proposed borrow pit is located to the west of the main wind farm site. It is accessed via a local road to the west of the proposed borrow pit, with an existing track of Buildings and artificial surfaces (BL3) entering the site from this road. The field is an Improved agricultural grassland (GA1) of low botanical diversity (Plate 6-18). The area was dominated by perennial ryegrass (*Lolium perenne*) and Yorkshire fog (*Holcus lanatus*) with some white clover (*Trifolium repens*) and small amounts of dandelion (*Taraxacum officinale*), common daisy (*Bellis perennis*) and broad-leaved dock (*Rumex obtusifolius*).

The proposed substation is located in the south of the Site. The field in which it is located is predominantly Improved agricultural grassland (GA1), transitioning into Wet grassland (GS4) in the south as the terrain gently slopes into wetter areas (Plate 6-19). Small pockets of Scrub (WS1) are also present within this field, to the north and west of the proposed substation location. A wet Drainage ditch (FW4) flows in a southerly direction through the proposed substation to join another deep drain that delineates the southern boundary of the field and the edge of the adjacent Conifer plantation (WD4). Plant species recorded at this location were dominated by perennial ryegrass (*Lolium perenne*) and Yorkshire fog (*Holcus lanatus*). Other species recorded in small numbers included common mouse ear (*Cerastium fontanum*), white clover (*Trifolium repens*), ribwort plantain (*Plantago lanceolata*), gorse saplings (*Ulex europaeus*), common sorrel (*Rumex acetosa*), sheep's sorrel (*Rumex acetosella*), creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), meadow thistle (*Cirsium dissectum*), creeping thistle (*Cirsium arvense*), perennial sowthistle (*Sonchus arvensis*) and tufted vetch (*Vicia cracca*).

Plate 6-17 Improved agricultural grassland in the vicinity of T4

Plate 6-18 The proposed borrow pit is within a field of improved agricultural grassland

Plate 6-19 The proposed substation location within improved agricultural grassland, transitioning into wet grassland and scrub

6.6.1.1.7 Conifer Plantation (WD4)

Small areas of conifer plantation (WD4) of various ages are common throughout the site (Plate 6-20). Conifer plantation was dominated by either sitka spruce (*Picea sitchensis*), lodgepole pine (*Pinus contorta*) or both. T3 and T8 are both located within areas of dense immature sitka spruce and lodgepole pine plantation. Willow, birch and alder (*Alnus glutinosa*) are present around the forestry edge at the location of T3. The location of the proposed southern construction compound is also partially located within conifer plantation forestry.

Plate 6-20 Conifer plantation in the vicinity of T3

6.6.1.1.8 Immature Woodlands (WS2)

A small area of young, planted ash (*Fraxinus excelsior*)-dominated woodland is present within the Site (Plate 6-21). The woodland lies to the north of T4, adjacent to agricultural grassland, with conifer plantation to the east. The woodland was recently planted and is dominated by immature ash. A treeline of hazel (*Corylus avellana*), alder (*Alnus glutinosa*), beech (*Fagus sylvatica*), willow (*Salix* sp.), rowan (*Sorbus aucuparia*), hawthorn (*Crataegus monogyna*) and guelder rose (*Viburnum opulus*) is present along the northern and southern boundaries of this area of woodland.

A small area of immature woodland is also located to the west of the proposed wind farm access road, to the north of T1.

Plate 6-21 Immature ash woodland bounded by a treeline east of T4

6.6.1.1.9 Wet Willow-Alder-Ash Woodland (WN6)

A small area of alder (*Alnus glutinosa*) dominated woodland classified as wet willow-alder-ash woodland is present within the Site to the north of T9 (Plate 6-22). Other species present included ash, sycamore (*Acer pseudoplatanus*), willow (*Salix* sp.), beech (*Fagus sylvatica*) and hawthorn (*Crataegus monogyna*). Ground flora included soft rush (*Juncus effusus*), creeping buttercup (*Ranunculus repens*), Yorkshire fog (*Holcus lanatus*), willowherb (*Epilobium* sp.), cleavers (*Galium aparine*) and meadowsweet (*Filipendula ulmaria*), floating sweet-grass (*Glyceria fluitans*), broad buckler fern (*Dryopteris dilatata*), ivy (*Hedera hibernica*), hawthorn (*Crataegus monogyna*), rough meadow-grass (*Poa trivialis*).

A small section (approx. 0.15ha) of this habitat lies within the footprint of road widening works associated with the proposed wind farm infrastructure. This area was subjected to a condition assessment to assess the potential for this area to conform to the Annex I habitat 'Alluvial forests with *Alnus glutinosa* and F*raxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]'. The results of the condition assessment concluded that, despite the high quality of the wet woodland habitat within the footprint of the works, it did not meet the criteria necessary to be considered an Annex 1 habitat. As a result, it is classified as wet willow-alder-ash woodland (WN6) grown on cut-over bog, dominated by alder and subjected to waterlogged conditions.

A further area of this habitat is also located to the east of the proposed wind farm access track north of T1, along the Sinking River.

Plate 6-22 Woodland classified as wet willow-ash-alder woodland dominated by alder. The woodland also supports non-native species including sycamore and beech

6.6.1.1.10 Depositing/Lowland River (FW2)

A number of small watercourses drain the proposed wind farm site. The majority of the streams were 1-2m in width (up to 4m at the location of bridges). The main watercourse running through the site is the Levally stream which drains towards the southern end of the site. It is a Depositing/lowland river (FW2). It contains sections with a predominantly silty substrate along its length (Plate 6-23) and varies in width from 1m to 4m. Flow ranges from stagnant to moderate/fast depending on the area of the site as well as recent rainfall levels. Instream vegetation included watercress (*Rorippa nastutium-aquatica*), fool's water cress (*Apium nodiuflorum*), unbranched bur-reed (*Sparganium emersum*), broad-leaved pondweed (*Potamogeton natans*), water figwort (*Scrophularia umbrosa*), water mint (*Mentha aquatica*), and branched bur-reed (*Sparganium erectum*). Bankside vegetation recorded around the bridge crossing points included meadowsweet (*Filipendula ulmaria*), nettles (*Urtica dioica*), water figwort (*Scrophularia umbrosa*), tufted hair grass (*Deschampsia cespitosa*), great willowherb (*Epilobium hirsutum*), marsh horsetail (*Equisetum palustre*), soft rush (*Juncus effusus*) hard rush (*Juncus inflexus*), false oat grass (*Arrhenatherum elatius*), red fescue (*Festuca rubra*), meadow vetchling (*Lathyrus pratensis*), yorkshire fog (*Holcus lanatus*) and alder (*Alnus glutinosa*). Parts of the river have been subjected to alterations, including historical bank re-profiling and concreate culverts.

The location of new watercourse crossings has been specifically chosen to facilitate the use of precast concrete bottomless box culverts, see the site layout drawings in Appendix 4-1 of this EIAR, thereby ensuring that no instream works are necessary in these locations and minimising potential for impact on the receiving environment.

The rivers draining the site have been subject to detailed assessment and kick sampling and the results are presented in Section 6.6.2.7 below.

Plate 6-23 The Levally stream which drains the site to the south

6.6.1.1.11 Drainage Ditches (FW4)

The site is extensively drained with channels that run through the site, predominantly within cutover bog and around the edges of remnant areas of uncut raised bog, as well as along road verges and forming the boundaries of agricultural fields. The majority of the drains associated with cutover bog within the site are devoid of vegetation (Plate 6-24). Many of the drainage ditches associated with road verges and agricultural fields were dry and vegetated at the time of the site visit (Plate 6-25). The wetter drainage ditches supported soft rush and lesser spearwort (Plate 6-26).

Plate 6-24 Example of drainage ditch at the intersection between cutover bog and uncut raised bog facebank

Plate 6-25 Example of dry vegetated drainage ditch forming boundary of agricultural field within the site boundary

Plate 6-26 Drainage ditch within the site boundary close to T1

6.6.1.1.12 Buildings and Artificial Surfaces (BL3)

Local paved roads within the development site boundary as well as agricultural buildings such as sheds were classified as Buildings and artificial surfaces (BL3) (Plate 6-27Several Treelines (WL2) were recorded within the Site. These were mostly found within agricultural areas, delineating field margins and along access tracks, in places in association with Hedgerows (WL1). Species included sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*) and beech (*Fagus sylvatica*) (Plate 6-32).).

Plate 6-27 Bog roads classified as Buildings and artificial surfaces are present throughout the site

6.6.1.1.13 Spoil and Bare Ground (ED2)

Local unpaved bog roads and farm tracks were classified as Spoil and bare ground (ED2), often in association with areas of Buildings and artificial surfaces (BL3) such as in farmyards within the site (Plate 6-28). These areas had low vegetation cover, with more highly vegetated tracks constituting Recolonising bare ground (ED3).

Plate 6-28 Agricultural shed and hardstanding area classified as buildings and artificial surfaces and spoil and bare ground.

6.6.1.1.14 Recolonising Bare Ground (ED3)

Small areas of Recolonising bare ground are present along farm tracks including to the south of T3 (Plate 6-29). Recolonising species included dandelion (*Taraxacum officinale*), silverweed (*Potentilla anserina*), broadleaf plantain (*Plantago major*), meadowsweet (*Filipendula ulmaria*) and grass species including Yorkshire fog (*Holcus lanatus*) and perennial rye grass (*Lolium perenne*).

Plate 6-29: More highly vegetated farm tracks were classified as recolonising bare ground, such as the track to the south of T3

6.6.1.1.15 Tall-herb Swamps (FS2)

An area of Tall-herb swamp was recorded along the western boundary of the site (Plate 6-30). This habitat comprised of in stream species including broad leaved pondweed (*Potamogeton natans*), duckweed (*Lemna minor*), fools water cress (Apium nodiflorum), marsh marigold (*Caltha palustris*) and branched bur reed (*Sparganium erectum*). Bankside vegetation present included nettles (*Urtica dioica*), valerian (V*aleriana officinalis*), meadowsweet (*Filipendula ulmaria*), hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), tufted hair grass (*Deschampsia cespitosa*), cocks foot (*Dactylis glomerata*), great willowherb (*Epilobium hirsutum*), wild Angelica (*Angelica sylvestris*), curly dock (*Rumex crispus*), false oat grass (*Arrhenatherum elatius*), bindweed (*Calystegia sepium*), Yorkshire fog (*Holcus lanatus*), cleavers (*Galium aparine)*, silverweed (*Potentilla anserina*), red fescue (*Festuca rubra*), field horsetail (*Equisetum arvense*), rough meadow grass (*Poa trivialis*), common sorrel (*Rumex acetosa*), marsh horsetail (*Equisetum palustre*), soft rush (*Juncus effusus*), floating sweet grass (*Glyceria fluitans*), and water mint (*Mentha aquatica*).

This habitat was subjected to a condition assessment to assess the potential for this area to conform to the Annex I habitat 'Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430)'. The results of the condition assessment concluded that, due to the presence of more than three indicator species, the absence of Common reed (*Phragmites australis*) and less than 30% cover of floating sweet grass, it met the criteria necessary to be considered an Annex 1 habitat.

Plate 6-30: Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430) recorded along the Levally Stream on the western boundary of the Site

6.6.1.1.16 Hedgerow (WL1)

Hedgerows (WL1) within the site are predominantly associated with agricultural lands, delineating field margins and along access tracks (Plate 6-31). Common hedgerow species include hawthorn (*Crataegus monogyna*), brambles (*Rubus fruticosus*) and gorse (*Ulex europaeus*) in association with herbaceous species such as rosebay willowherb (*Chamaenerion angustifolium*), nettles (*Urtica dioica*) and bracken (*Pteridium aquilinum*).

Plate 6-31: Hedgerows were most commonly associated with agricultural farmlands

6.6.1.1.17 Treelines (WL2)

Several Treelines (WL2) were recorded within the Site. These were mostly found within agricultural areas, delineating field margins and along access tracks, in places in association with Hedgerows (WL1). Species included sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*) and beech (*Fagus sylvatica*) (Plate 6-32).

Broadleaf treelines were also commonly associated with forestry plantations, including the area of immature ash woodland to the east of T4, as well as along the boundaries of the conifer plantation within which T3 is located. These treelines comprised hazel (*Corylus avellana*), alder (*Alnus glutinosa*), beech (*Fagus sylvatica*), willow (*Salix* sp.), rowan (*Sorbus aucuparia*), hawthorn (*Crataegus monogyna*) and guelder rose (*Viburnum opulus*).

Plate 6-32 Treelines of sycamore, ash and beech along agricultural access tracks

6.6.1.1.18 Watercourse Crossings

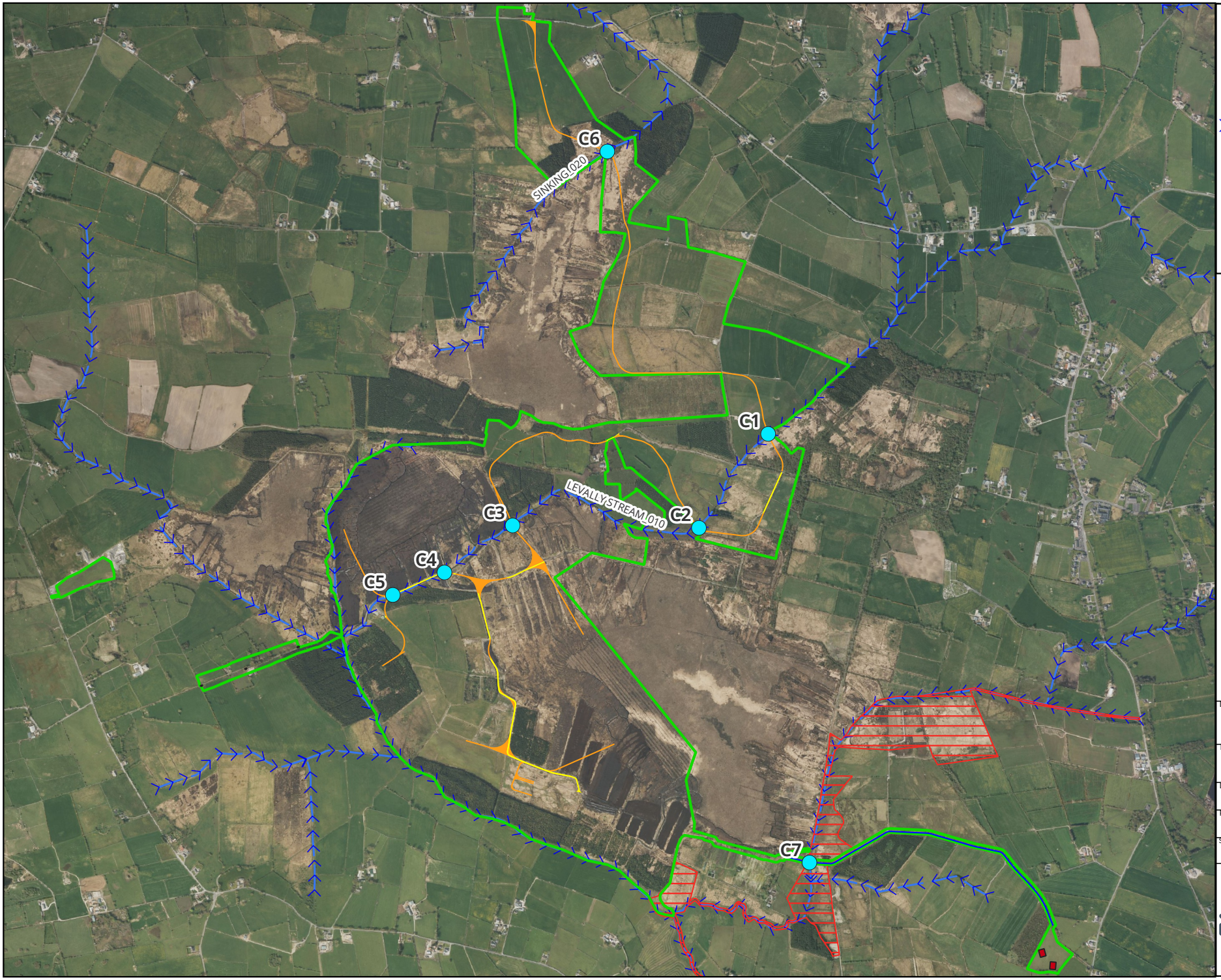
The Proposed Wind Farm will involve 5 No. watercourse crossings, four of which are proposed new crossings involving a clear span bridge and one which is an upgrade to an existing watercourse crossing. The Proposed Wind Farm also crosses a number of Drainage ditches (FW4). These vary in width and depth from approximately 1.5m wide and 1m deep to approximately 3m wide and 4-5m deep, with water flow depending on recent rainfall levels.

No instream works are required along the Wind Farm Site. Watercourse crossing points are shown in Figure 6-9 below and listed in the Table 6-10 below starting with the first water crossing to the north of the site (e.g. C1).

Table 6-10: Watercourse Crossings within the Wind Farm Site

Crossing ID	Works Proposed	Photo
C1	Clear span bridge (no instream works).	
C2	Clear span bridge (no instream works).	
C3	Clear span bridge (no instream works).	

Crossing ID	Works Proposed	Photo
C4	Upgrade to existing watercourse crossing (no instream works).	
C5	Clear span bridge (no instream works).	



Map Legend

- EIAR Site Boundary
- Watercourse Crossings
- WFD River Waterbodies
- Special Area of Conservation (SAC)
- Existing Roads to be Upgraded
- Proposed New Roads
- Cable in the Public Road

N

Drawing Title

Watercourse Crossings

Project Title	
Proposed Clonberne Wind Farm, Co. Galway	
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6.6.1.2 Habitats along the Proposed Access Route

The proposed wind farm access road is located in the north of the Proposed Wind Farm Site. It approaches Turbine 1 from the R328 Regional Road, traversing fields classified as Improved agricultural grassland (GA1), rush dominated Wet grassland (GS4) (Plate 6-33) with meadowsweet (*Filipendula ulmaria*), wild angelica (*Angelica sylvestris*) and Yorkshire fog (*Holcus lanatus*), pockets of dry birch-dominated Scrub (WS1) with gorse (*Ulex europeas*), immature sitka spruce (*Picea sitchensis*) dominated Conifer plantation (WD4) and Cutover bog (PB4). The cutover bog was dominated by purple moor grass (*Molinia caerulea*) and common cottongrass (*Eriophorum angustifolium*) with bog myrtle (*Myrica gale*), ling heather (*Calluna vulgaris*) and cross-leaved heath (*Erica tetralix*) also present (Plate 6-34). It was predominantly dry in nature but wetter pockets supported bog asphodel (*Narthecium ossifragum*) and round-leaved sundew (*Drosera rotundifolia*). Some areas of *Sphagnum capillifolium* are present. The road cuts through willow Scrub (WS1) (Plate 6-35) as it continues south.

None of the habitats that the proposed access route traverses correspond to Annex I habitats.

Plate 6-33 Improved agricultural grassland (background) and wet grassland along the proposed wind farm access road

Plate 6-34 Purple moor grass dominated cutover bog along the proposed wind farm access road

Plate 6-35 Cutover bog with (PB4) willow scrub (WS1) in the background

6.6.1.2.1 Watercourse Crossings

There is one proposed water crossing along the access route within the Sinking Stream classified as Depositing/lowland River (FW2) (Plate 6-36). This crossing will be via a new clear span bridge and no instream works are proposed. The location of this water crossing is shown in Figure 6-9. This watercourse has been subject to historical re-profiling and culverting. The water crossing is located north of T1 located in the north of the site. At the water crossing survey point, the river was 1.5m at its widest point and 40cm deep with a slow flow. There is no pre-existing water crossing and the crossing point is located in an area of thick willow scrub within an area of peatland. The stream is narrow with peaty sediment and slow flow. No vegetation is present within the water. Bankside vegetation consists of meadowsweet (Filipendula ulmaria), bindweed (Calystegia sepium), angelica (Angelica sylvestris), watercress (Nasturtium officinale), agrostis sp., nettles (Urtica dioica), water figwort (Scrophularia umbrosa), tufted hair grass (Deschampsia cespitosa), cleavers (Galium aparine), overhanging willows (salix sp.), lady fern (Athyrium filix-femina), dryopteris sp., hawthorn sapling (Crataegus monogyna) and herb robert (Geranium robertianum).

Plate 6-36: Proposed access route crossing location on the Sinking Stream

6.6.1.3 Habitats along the Proposed Turbine Delivery Route

There are 3 no. land take areas located along the proposed turbine delivery route on the L6466 Local Road between the N83 and R328, approximately 2km south of Dunmore, Co. Galway. The easternmost land take area at the junction of the L6466 with the R328 is located within a field classified as Improved agricultural grassland (GA1) to the south of the existing road. This field is not highly improved, with areas of nettles (*Urtica dioica*) and common ragwort (*Jacobaea vulgaris*) dominant towards the field boundaries, and wetter, rush dominant areas towards the southern field boundary (Plate 6-37). The field to the north of the road is classified as Wet grassland (GS4). A mature Treeline (WL2) is present in the verge to the south of the road comprising several ash (*Fraxinus excelsior*) trees

which will lie within the footprint of the proposed land take (Plate 6-38). A less mature, sparser treeline is also present along the verge to the north of the road.

The central land take area along the L6466 is located at a junction with a forestry road to the south. Conifer plantation (WD4) is located on all sides of the junction. A Treeline (WL2) of willow (*Salix* sp.) and alder (*Alnus glutinosa*) is present along the road verge to the north of the road, which lie within the footprint of the proposed land take (Plate 6-39). The invasive alien plant species Rhododendron (*Rhododendron ponticum*) was recorded growing extensively in all road verges in this area. This species is listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (S.I. 477 of 2011). An Invasive Species Management Plan has been prepared along with this planning application and can be found in Appendix 6-4. The highly invasive plant species cherry laurel (*Prunus laurocerasus*) was also found growing in large stands along with the Rhododendron (Plate 6-40).

The western land take area is located at the junction of the L6466 and the N83. Fields classified as Improved agricultural grassland (GA1) are located on all sides of this junction and are characterized by low plant species diversity (Plate 6-41). A Stone wall (BL1) is located along the southern boundary of the L6466 with further walls within the adjacent field. These lie within the footprint of the proposed land take.

Plate 6-37: Improved agricultural grassland (GA1) with areas of nettles and rushes at the eastern land take area

Plate 6-38 Mature treeline of ash at the eastern land take area

Plate 6-39 A broadleaf treeline of willow and alder is growing along the northern road boundary in front of the conifer forestry at the central land take area

Plate 6-40 The highly invasive alien plant species Rhododendron and cherry laurel were found growing extensively along roadsides at the central land take area

Plate 6-41 The western land take area is surrounded by improved agricultural grassland with a stone wall along the southern road boundary

6.6.1.4 Habitats along the Proposed Grid Connection Route

The proposed Grid Connection comprises of an 220kV underground cable route of approximately 2.8km in length. The proposed Grid Connection will originate at a proposed new substation within the south-eastern extent of the Proposed Wind Farm Site in the townland of Cloonarkan. The proposed substation is located within a field classified as Improved agricultural grassland (GA1) and Wet grassland (GS4) with areas of Scrub (WS1). It then travels in an easterly direction for approximately 1.1km towards the eastern boundary and the public road network (L6501 local road). Within the Site the Proposed Grid Connection traverses Cutover bog (PB4) which consists of actively cut bare peat (Plate 6-42). This is in places becoming colonised by grassland species including silverweed (*Potentilla anserina*) and Yorkshire fog (*Holcus lanatus*).

Immediately east of the Proposed Wind Farm the Grid Connection will be laid within the existing road infrastructure for approximately 1.4km. Adjacent habitats include Improved agricultural grassland (GA1), Conifer plantation (WD4), grassland classified as Wet grassland (GS4), areas of Scrub (WS1) and short stretches of Hedgerow (WL1).

The Proposed Grid route terminates at two proposed new grid connection compounds, within a field categorised as Improved agricultural grassland (GA1) (Plate 6-43) in the townland of Laughil. This field is bordered by Hedgerows (WL1) to the north, east and south, with three mature sycamore (*Acer pseudoplatanus*) along the southern boundary. An area of Conifer plantation (WD4) is located to the west of the proposed compounds.

Plate 6-42 Field of improved agricultural grassland in which two grid connection compounds are proposed

Plate 6-43 Actively cut peat along the grid route.

6.6.1.4.1 Watercourse Crossings

There is one water crossing of a mapped EPA watercourse where the proposed grid connection route traverses the Levally Stream classified as Depositing/lowland river (FW2) (Plate 6-44) within the boundary of Lough Corrib SAC. This location of this water crossing is shown on Figure 6-9. It is proposed to horizontally directional drill beneath the Levally stream. The launch pit will be located to the west of the watercourse and the reception pit will be located to the east of the watercourse. The top of the cable ducts will be a minimum of 1.5m below the watercourse bed as advised by Inland Fisheries Ireland. At this crossing location, it is proposed to construct a temporary accommodation area around the launch and reception pits to facilitate the horizontal directional drilling process.

This water crossing is located within the existing road, consisting of a concrete box culvert (Plate 6-45). This culvert extends into the riverbed for approximately 2m before grading into natural substrate large of large and small gravel upstream and cobbles and boulders downstream. A ditch feeds into the stream upstream of the crossing, the left bank in this area slopes downwards around the drain. The stream is slow flowing with some glides upstream and has a moderate flow downstream with riffles.

Upstream of the crossing, the in stream submerged vegetation consists of unbranched bur-reed (*Sparganium emersum*), emerging vegetation includes Yellow Isis (*Iris pseudacorus*) and floating sweet grass (*Glyceria fluitans).* Downstream of the crossing, submerged vegetation includes Yellow Isis (Iris pseudacorus) with green filamentous algae. Bankside vegetation up and downstream of the water crossing consists of species including; common duckweed (*Lemna minor*), fool's water cress (*Apium nodiflorum*), branched bur-reed (*Sparganium erectum*), great willowherb (*Epilobium hirsutum*), meadowsweet (*Filipendula ulmaria*), tufted hair grass (*Deschampsia cespitosa*), yorkshire fog (*Holcus lanatus*), marsh horsetail (*Equisetum palustre*), soft rush (*Juncus effusus*) hard rush (Juncus inflexus), false oat grass (*Arrhenatherum elatius),* red fescue (*Festuca rubra*), meadow vetchling (*Lathyrus pratensis*), cocks-foot (*Dactylis glomerata*), bindweed (Calystegia sepium) curly dock (*Rumex crispus*) and knapweed (*Centaurea nigra*). Additionally, alder (*Alnus glutinosa*), grey willow (*Salix cinerea*) and male fern (*dryopteris filix mas*) are present on the downstream banks.

Approximately 17 metres to the west of this watercourse crossing is a stand of the invasive alien plant species Rhododendron (*Rhododendron ponticum*), which is listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (S.I. 477 of 2011). An Invasive Species Management Plan has been prepared along with this planning application and can be found in Appendix 6-4.

As the proposed grid route crosses the Cutover bog (PB4) it crosses a number of Drainage ditches (FW4) (Plate 6-46). These vary in width and depth from approximately 1.5m wide and 1m deep to approximately 3m wide and 4-5m deep, with water flow depending on recent rainfall levels.

Plate 6-44 The Levally Stream along the grid connection route.

Plate 6-45 Proposed Grid Connection crossing point at box culvert over the Levally Stream

Plate 6-46 Typical drainage ditch within the cutover bog crossed by the proposed grid connection route.

6.6.1.5 Invasive species

One invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (S.I. 477 of 2011) was recorded during the surveys of the site of the Proposed Project. Rhododendron (*Rhododendron ponticum*) was recorded at a number of locations within the site.

This species was recorded within the construction footprint of the Proposed Project within the Proposed Wind Farm site in an area of birch-dominated dry bog woodland along the proposed access road to the south of T2. It was also recorded along the proposed Grid Connection route, to the west of the Levally Stream at the location of the stream crossing.

Rhododendron was also identified along the proposed turbine delivery route at the central land take area along the L6466 at the junction with a forestry road to the south (Plate 6-47). Rhododendron was recorded growing extensively along all road verges in this area.

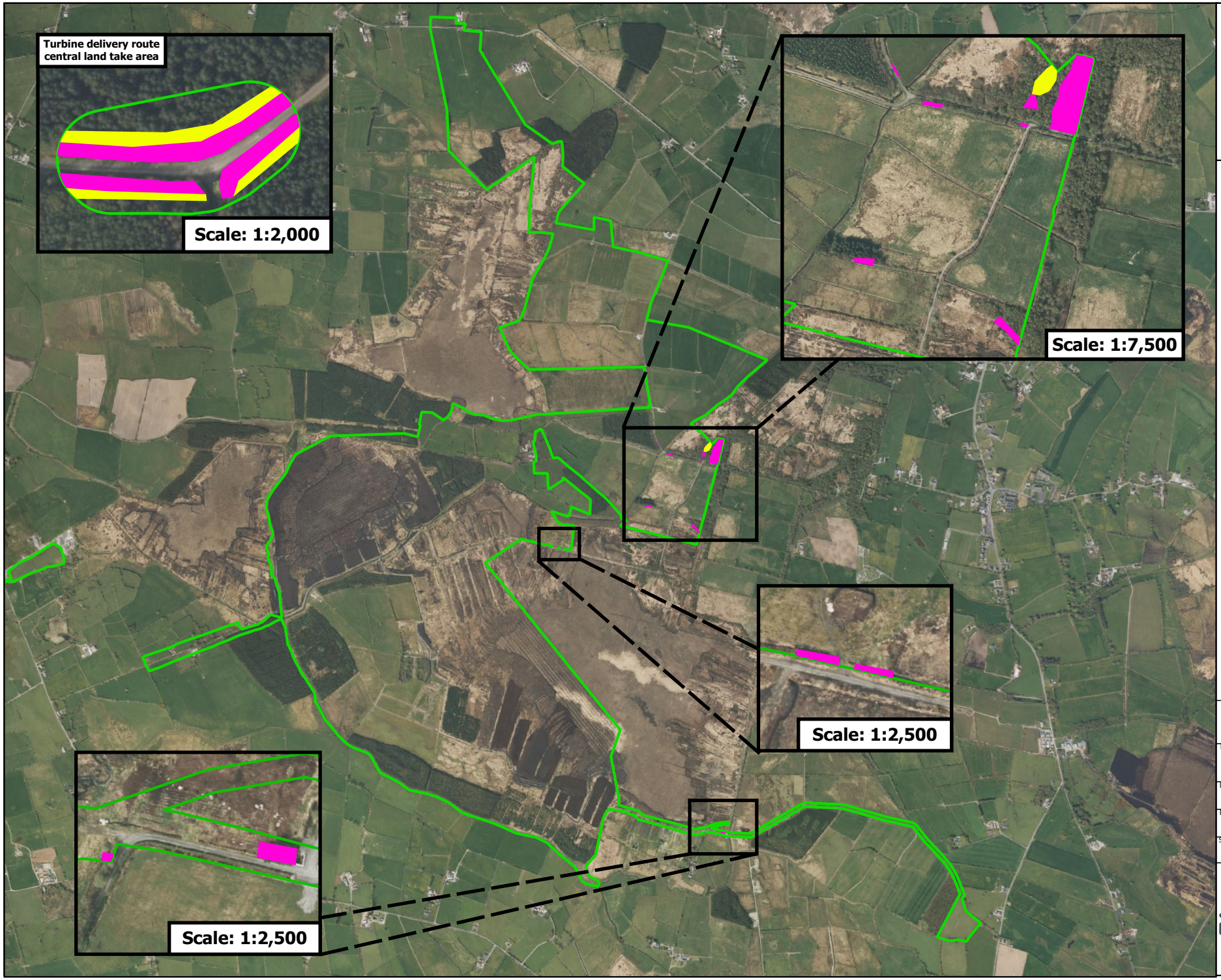
In addition, the invasive species Cherry Laurel (*Prunus laurocerasus*), was also recorded growing in association with the Rhododendron on the site. This species is not listed on the Third Schedule of the Birds and Natural Habitats Regulations but is highly invasive.

The locations of recorded Rhododendron and Laurel are shown in Figure 6-10.

Plate 6-47 Rhododendron ponticum seen growing in the central land take area of the proposed turbine delivery route

6.6.1.6 Protected flora

No botanical species protected under the Flora (Protection) Order (2022) were recorded during the surveys of the site of the Proposed Project.



Map Legend

- EIAR Site Boundary
- Rhododendron ponticum
- Cherry laurel

N

Drawing Title:
Invasive Species within the Site

Project Title
Proposed Clonberne Wind Farm, Co. Galway

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KB	KOD
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6.6.2 Fauna

The following sections provide the results of the dedicated faunal walkover surveys undertaken within the Site.

In addition to the above targeted surveys, additional faunal signs/sightings were also recorded during other surveys including bat surveys and bird surveys.

6.6.2.1 Badger (*Meles meles*)

One active badger sett was identified approximately 5m outside of the Site and 30m from the proposed grid connection route (Plate 6-48). This sett consisted of four entrances and was classified as a main sett as per Smal (1995)[6]. Trail camera footage from 27th November 2023 to 11th December 2023 showed active use of all four entrances by at least four adult badgers. The location of the badger sett is provided in Confidential Appendix 6-5[7].

Plate 6-48: Badger Sett approximately 30m for the proposed grid connection route

Evidence of badger activity (Refer to Table 6-11) was also recorded from within the proposed wind farm site including foraging signs, prints and badger hairs caught on a fence adjacent to an area of wet-

[6] *Smal, C. (1995) The Badger and Habitat Survey of Ireland. Unpublished Report to the Department of Agriculture and the National Parks & Wildlife Service.*
[7] *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.*

willow-alder ash woodland to the north of Turbine 9. The area of wet willow-ash-alder woodland was searched thoroughly for badger, however, no setts were identified.

A disused badger/mammal hole was identified in the forestry south of the proposed substation.

6.6.2.2 Otter (*Lutra lutra*)

No evidence of otter activity and no otter resting or breeding sites were recorded within the Proposed Wind Farm Site or along the Proposed Grid Connection route during the surveys undertaken by MKO. The streams within the site including the Levally stream and its tributaries the Lomaunaghroe and Dunblaney provide suitable commuting and foraging habitat for otter, however.

Otter spraints were recorded at the Levally stream, approximately 550m downstream of the Wind Farm Site boundary during kick sampling surveys in August 2021. Furthermore, a regular spraint site was identified during aquatic surveys undertaken by Triturus Environmental Ltd. at site B1 on the upper reaches of the Levally Stream, as well as fresh otter prints in soft marginal mud at site B3 on the Lomaunaghroe Stream within the Wind Farm Site. These locations were sites for aquatic surveys and are shown in Figure 4-1 of the Aquatic baseline report prepared by Triturus Environmental Ltd. in Appendix 6-3.

6.6.2.3 Other Mammals

Irish hare (*Lepus timidus*) and fox (*Vulpes vulpes*) were both observed within the Site boundary during the walkover surveys and droppings of these species were also recorded. Footage of pine marten (*Martes martes*) was caught on a trail camera set outside the disused badger/mammal hole in the forestry south of the proposed substation.

The locations of all mammal signs recorded during the walkover surveys are shown in Figure 6-11 and summarised in Table 6-11 below.

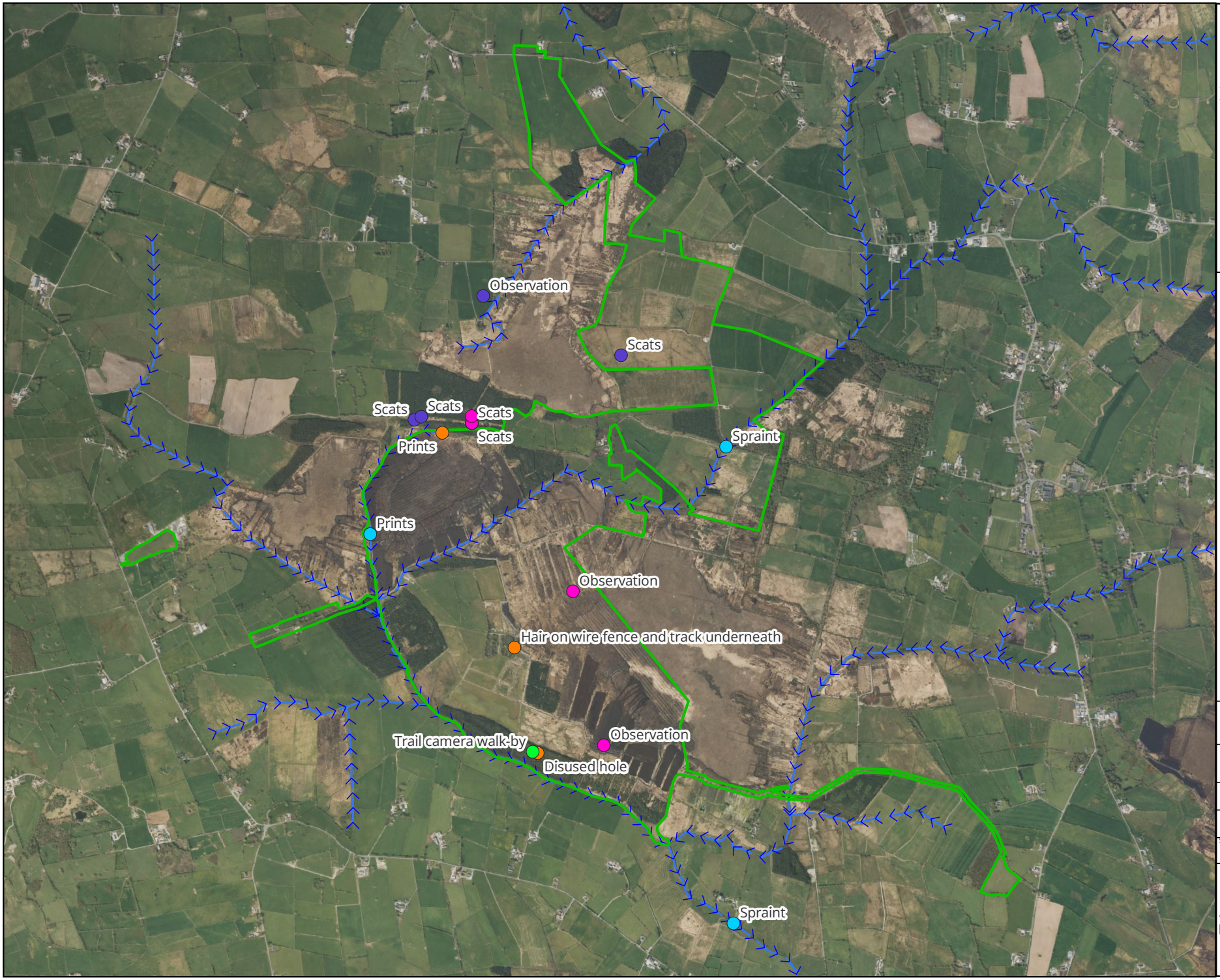
Table 6-11 Locations of mammal signs within and in the vicinity of the Site

Common name	Scientific name	Sign	ITM Grid Reference
Badger	*Meles meles*	Disused hole	X554590 Y755517
		Hairs on barbed wire fence & path/track	X554472 Y756052
		Prints	X554108 Y757138
Fox	*Vulpes vulpes*	Observation	X554317 Y757832
		Scats	X553965 Y757207
		Scats	X554000 Y757221
		Scats	X555017 Y757533
Irish hare	*Lepus timidus*	Scats	X554257 Y757190
		Scats	X554256 Y757225
		Observation	X555045 Y755505

Common name	Scientific name	Sign	ITM Grid Reference
		Observation	X554769 Y756336
Otter	*Lutra lutra*	Spraint	X555584 Y754652
		Spraint	X555547 Y757072
		Prints	X553741 Y756628
Pine marten	*Martes martes*	Trail camera walk-by	X554590 Y755517

6.6.2.4 Reptiles and Amphibians

Common frog (*Rana temporaria*) was recorded at a number of locations throughout in the site in wet grassland and peatland habitats. The species is likely to breed in wet habitats within the site. Suitable habitat is widespread throughout the site. Common lizard (*Zootoca vivipara*) and smooth newt (*Lissotriton vulgaris*), while not recorded during the site visits, are also likely to occur within the site.



Map Legend

- Site Boundary
- WFD River Waterbodies
- Badger
- Fox
- Hare
- Otter
- Pine marten

N

Drawing Title
Mammal Signs within the Site

Project Title
Proposed Clonberne Wind Farm, Co. Galway

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6.6.2.5 Bats

Bat surveys undertaken in 2022, in accordance with NatureScot (2021) form the core dataset for the assessment of effects on bats at the Site. It is supplemented by additional data derived from surveys undertaken on the site in 2019 which were designed in accordance with the Bat Conservation Trust's guidelines for wind turbine developments (Hundt, 2012) and Scottish Natural Heritage Guidance (SNH 2019). Bat surveys included roost survey, manual transect surveys and ground-level static surveys.

6.6.2.5.1 *Roost Surveys*

Following the search for roosts in 2022, two potential roosting sites were identified within 281m of the proposed turbine infrastructure – a derelict dwelling and a stone ruin. Both structures were subject to roost assessments. All structures will be retained and avoided as part of the Site.

An emergence survey was carried out on the derelict dwelling (Grid Ref: M 54978 57099) on the evening of the 11th of May 2022 with two surveyors strategically positioned to focus on the structure. No bats were observed emerging from the structure during the survey. 1 Common and 10 Soprano pipistrelles were observed commuting and foraging around the dwelling.

The stone ruin (Grid Ref: M 54427 56048) was surveyed on the 8th of September 2022 with two surveyors strategically positioned to focus on the structure. Bats were observed commuting and foraging in the area during the emergence survey, but no bats were observed emerging from the stone ruin itself.

The woodlands and scrub on the site were surveyed and assessed with no trees being identified as being of high or medium potential to support roosting bats.

6.6.2.5.2 *Manual Transects*

Manual transects were undertaken in spring and summer 2022. Bat activity was recorded in both surveys. A total of 299 bat passes were recorded. In general, Common pipistrelle (n=149) was recorded most frequently, followed by Soprano pipistrelle (n=139). Leisler's bat (n=10) and Myotis spp. (n=1) were less frequent or rare.

Plate 4.16, of the EIAR 'Bat Report' (Appendix 6-2) presents results for individual species per survey period.

6.6.2.5.3 *Ground-level Static Surveys*

In total, 80,651 bat passes were recorded across all deployments. In general, Common pipistrelle (n=45,111) occurred most frequently, followed by Soprano pipistrelle (n=26,741). Leisler's bat (n=6,985), *Myotis* spp. (n=1,188), and brown long-eared bat (n=464) were recorded less frequently. Nathusius' pipistrelle (n=162) were recorded but not abundant.

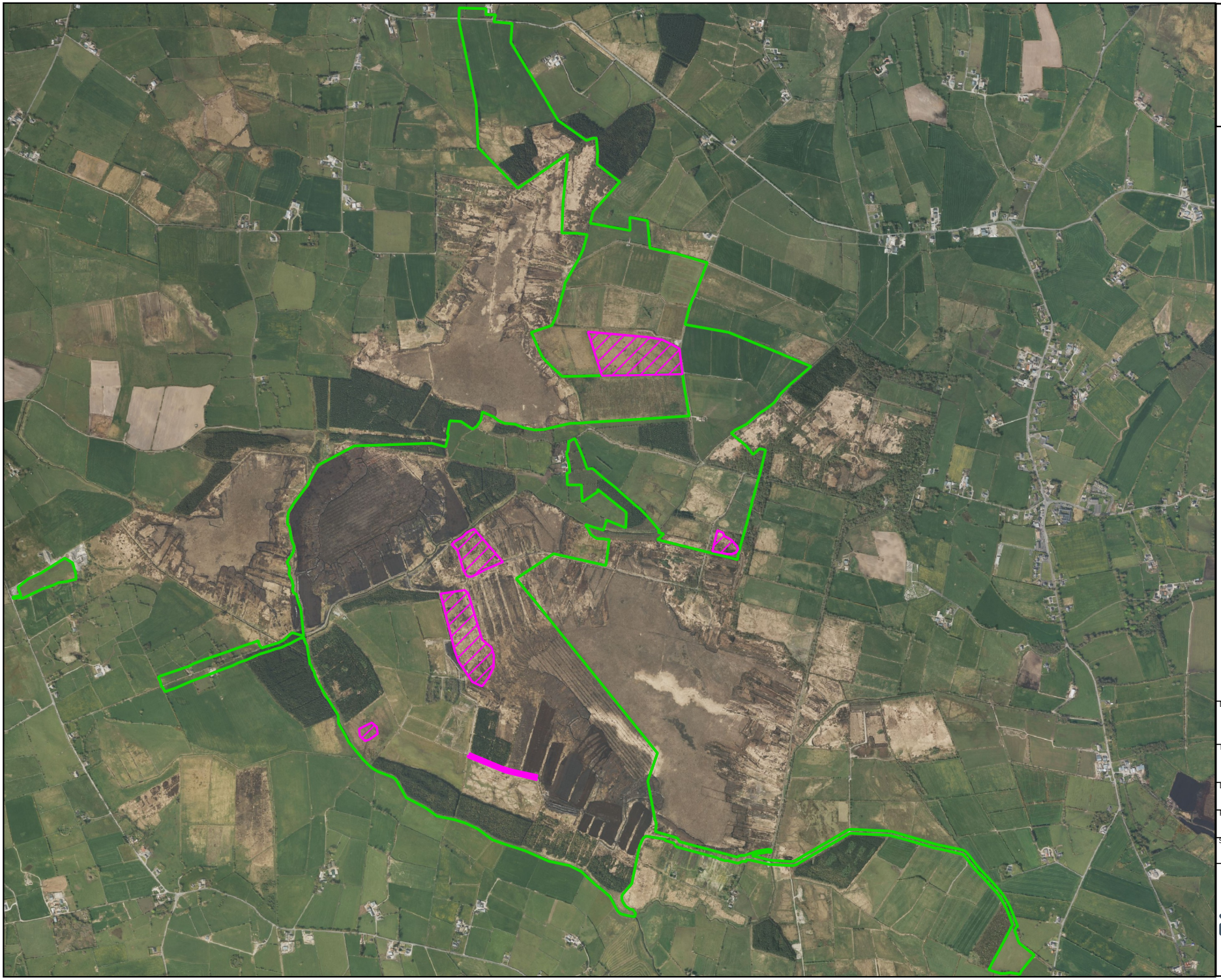
The Nightly Pass Rate (i.e. total bat passes per hour, per night) was used to determine typical bat activity at the Wind Farm Site. Activity is often variable between survey nights. Therefore, the median Nightly Pass Rate was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018).

High median activity was observed for Common pipistrelle at T03 and T06, while Soprano pipistrelle recorded High median activity at T04 and T05. Median activity for all other species at all other locations ranged from Low to Moderate.

Results for each species can be found in Section 4.3.4 of the bat report, Appendix 6.2 of the EIAR.

6.6.2.6 Marsh Fritillary

The desk study identified records for marsh fritillary in the wider area and an adult marsh fritillary was recorded within a forestry glide to the west of the proposed T3, in proximity to but outside the Site during initial walkover surveys. This record was not located in proximity to the footprint. In addition to this, areas of potential suitable marsh fritillary habitat were identified. These are shown in Figure 6-12 below. A small section of this habitat overlaps the construction footprint along a proposed road between T2 and T3. Dedicated marsh fritillary larval web surveys were undertaken in areas of suitable habitat throughout the site in August 2018 and August 2022. Larval foodplant, devil's bit scabious (*Succisa pratensis*), was recorded at a number of locations within the site, mostly in grassy verges, existing grassy access tracks and areas of wet grassland. Despite a comprehensive search for larval webs in these locations no marsh fritillary larval webs or adult marsh fritillary were recorded during the dedicated surveys undertaken.



Map Legend

- EIAR Site Boundary
- Suitable Marsh Fritillary Habitat

N

Drawing Title
Suitable Marsh Fritillary Habitat

Project Title
Proposed Clonberne Wind Farm, Co. Galway

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6.6.2.7 Fisheries and Aquatic Fauna

Full details of results of aquatic surveys undertaken in August 2021 by Triturus Environmental Ltd. are provided in the Aquatic Baseline Report (Appendix 6-3) and are summarised in this section. All survey locations (n=20) are shown in Figure 2.1 in the Aquatic Baseline report. The following summary has been extracted from the baseline report. In addition, as noted in Section 6.4.3.3.2 otter surveys were also conducted along the Proposed Grid Connection Route.

6.6.2.7.1 Watercourses

The watercourses and aquatic surveys sites in the vicinity of the Site Boundary were typically small, lowland depositing channels (FW2; Fossitt, 2000) and peat drainage ditches (FW4) (see Section 4 of Appendix 6-3 for more details). Land use practices in the wider survey area were primarily peat bogs (CORINE 412) bordered by pastures (231) and land principally occupied by agriculture, with significant areas of natural vegetation (243). Predominantly, the watercourses flowed over areas of Carboniferous limestone and calcareous shale (Geological Survey of Ireland data).

The fenced-off riparian zone of site B4 (refer to Appendix 6-3) on the Levally Stream located within the Wind Farm Site was found to support the Annex I habitat 'Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]'. This was considered based on the good diversity of riparian plants at the site and the presence of ≥3 indicator species (EC, 2013; Devaney et al., 2013), including meadowsweet (*Filipendula ulmaria*), great willowherb (*Epilobium hirsutum*), water forget-me-not (*Myosotis scorpioides*) and abundant water mint (*Mentha aquatica*).

The Annex I habitat 'Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation or aquatic mosses [3260]' was recorded at survey site B5 on the Levally Stream (Mahanagh Bridge) located outside of the site. This was based on the presence of ≥3 indicator species for the habitat (EC, 2013; Weekes *et al.*, 2018), namely broad-leaved pondweed (*Potamogeton natans*; 50% cover), water starwort (*Callitriche* sp.), fool's watercress (*Apium nodiflorum*) and a high coverage of aquatic bryophytes such as *Leptodictyum riparium* and *Fontinalis antipyretica*. Although further work to define the quality of FRV habitat in an Irish context is required, the presence of three indicator species can typically be considered more representative of the Annex I habitat '*Ranunculion fluitantis* and *Callitricho-Batrachion* or aquatic mosses [3260]' (Denyer, 2017).

6.6.2.7.2 Fish Species

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

- **Salmonids:** Atlantic salmon were recorded from a total of four survey sites namely site A3 (unnamed Sinking River tributary) and sites B1, B4 & B5 on the Levally Stream. Brown trout were also recorded from these sites, in addition to site B2 on the Levally Stream. Salmonids were absent from sites A1 and A2 on the unnamed Sinking River tributary and B3 on the Lomaunaghroe Stream, which was considered a result of low flows and considerable siltation pressures (i.e. poor quality salmonid habitat).
- **Lamprey:** *Lampetra* sp. ammocoetes were recorded from two sites on the Levally Stream (B4 and B5) as well as site A3 on the unnamed Sinking River tributary. The highest density recorded were present at site B5, where an average density of 9.3 ammocoetes per m^2 of targeted larval habitat was recorded. This density was high relative to the wider Clare River catchment (i.e., a mean density of <1 per m^2; O'Connor, 2007).
- **European eel:** On both a global and Irish scale, the European eel is listed as 'critically endangered' (Pike et al., 2020; King et al., 2011). Despite some suitability across the survey area, no European eel were recorded during the current survey. This was considered

primarily as a result of historical drainage (i.e., removal of instream refugia and habitat heterogeneity) in addition to siltation (peat escapement) pressures within the vicinity of the proposed wind farm. Nevertheless, even smaller channels with poor or little fisheries value overall can offer potential as European eel migratory pathways, provided they maintain downstream connectivity to larger channels. (e.g. adult migration seawards, usually from September/October onwards).

6.6.2.7.3 White-Clawed Crayfish & Crayfish Plague

The below paragraphs should be read in conjunction with Figure 2.1 (survey locations) in the Aquatic Baseline Report (Appendix 6-3).

White-clawed crayfish were recorded via hand-searching and sweep netting at sites A2 and A3 on an unnamed Sinking River tributary. Both sites supported very low densities of crayfish (2 per 30 refugia searched at each site).

Despite good suitability throughout the Levally Stream (particularly at site B5), white-clawed crayfish were only recorded from site B1 during the August 2021 survey period (via hand searching/sweep netting) within the Site. However, crayfish eDNA was detected at site B5 (see section 6.6.2.7.4 below) outside the Site boundary.

6.6.2.7.4 eDNA Analysis

White-clawed crayfish was detected from eDNA in a water sample collected from the Levally Stream at Mahanagh Bridge, site B5. This result was considered as evidence of the species' presence at and or upstream of this site.

The water sample from site B5 returned a negative result for both crayfish plague and freshwater pearl mussel. These results were considered as evidence of the species' absence at and or upstream of site B5.

6.6.2.7.5 Kick-sampling and Q-Value

The following summarises the results of kick-sampling and Q-Value evaluation carried out by Triturus Environmental Ltd.

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from n=8 sites.

Good status (Q4) water quality was only recorded from site A2 on an unnamed Sinking River tributary. Primarily due to peat harvesting pressures and historical modifications, all remaining survey sites achieved Q3-4 (moderate status) or Q3 (poor status) water quality and, thus, failed to meet the good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC).

While many of the watercourses in the vicinity of the proposed Site had aquatic ecological features that can be considered of high conservation value, historical drainage pressures and ongoing peat escapement (siltation) had reduced the ecological quality of aquatic habitats. These included survey sites on the Levally Stream and Lomaunaghroe Stream (draining southwards) and, to a lesser extent, the unnamed Sinking River tributary (draining northwards). However, larger watercourses with higher flow rates, including the Levally Stream, were better able to buffer against such impacts. This watercourse supported the best quality aquatic habitat within vicinity of the proposed wind farm, despite evident pressures.

6.6.2.8 Aquatic and River Habitat Surveys

The following sections outline the results of river habitat surveys and macro-invertebrate sampling carried out by MKO in the watercourses within and downstream of the the Site in February 2024. The survey locations are shown in Figure 6-3.

6.6.2.8.1 *Site 1*

Site 1 was at ITM X 555557, Y 757089 on the Levally stream in the Corrib catchment. The sampling point was upstream of a bridge on the local road between Turbines 1 & 2 and Turbine 4.

The properties of the stream at the sample point are shown in Table 6-12 below:

Table 6-12 Properties of the stream at sampling Site 1,

Property	Recorded Value
Bank width	Approx. 2.5m
Wet width	Approx 2.5m
Left bank height	1.5m
Right bank height	1m
Average depth	40-70cm
Velocity at sampling	Slow
Colour	Highly coloured
Clarity	Slightly turbid
Sampled in	Glides
Dominant substrates	10% cobble, 30% gravel, 40% fine gravel, 20% sand and silt layer covering gravel
Main land use upstream	Pasture
Modifications	Watercourse culverted downstream, banks historically artificially raised

There was no sign of filamentous algae, gelatinous complexes, or sewage fungus. The watercourse was moderately vegetated with submerged vegetation including water mint (*Mentha aquatica*) and unbranched bur-reed (*Sparganium emersum*). Emergent vegetation also included branched bur-reed (*Sparganium erectum*) and fool's water cress (*Apium nodiflorum*).

The banks were vegetated with willowherbs (*Epilobium* sp.), cock's foot grass (*Dactylis glomerata*), wild angelica (*Angelica sylvestris*), hard rush (*Juncus inflexus*) and other grass species (Plate 6-49).

The results (i.e. identification and numbers of aquatic macroinvertebrates) of two minutes of kick sampling are shown in Table 6-13.

An individual three-spined stickleback (*Gasterosteus glomeratus*) was also caught and released during this kick sample.

Table 6-13 Results of kick sampling at Site 1

Taxa	Species/Group	Abundance Category (%)	Sensitivity Group
Ephemeroptera	*Ecdyonurus*	Small numbers (<5)	A
Trichoptera	*Sericostoma*	Fair numbers (5-10)	B
	Anabolia	Scarce/few (<1)	B
Coleoptera	*Limnius* larvae	Small numbers (<5)	C
	Coleoptera	Small numbers (<5)	C
Crustacea	*Gammarus*	Common (10-20)	C
Diptera	Chironomidae	Small numbers (<5)	C
	Simuliidae	Scarce/few (<1)	C
Ephemeroptera	*Baetis rhodani*	Common (10-20)	C
	Caenis	Small numbers (<5)	C
Hydracarina	Hydracarina	Fair numbers (5-10)	C
Trichoptera	*Rhyacophila*	Scarce/few (<1)	C
Crustacea	*Asellus*	Numerous (25-50)	D
Hirudinea	*Glossiphonia*	Scarce/few (<1)	D
Megaloptera	*Sialis*	Small numbers (<5)	D

Taking into account the biological data, the stream has been assigned a Q-value of Q3-4.

Plate 6-49 Kick sampling Site 1, February 2024, showing culvert on of the watercourse downstream of the sampling location

6.6.2.8.2 Site 2

Site 2 was at ITM X 553916, Y 756438 on the Levally stream, at the bridge just upstream of its confluence with the Levally stream. The sampling point was at a bridge on the local bog road to south of T7 and north of T8.

This sample was taken just downstream of the bridge. The properties of the stream at the sample point are shown in Table 6-14 below:

Table 6-14 Properties of the stream at sampling Site 2,

Property	Recorded Value
Bank width	3m
Wet width	3m
Left bank height	2m
Right bank height	3m
Average depth	20cm
Velocity at sampling	Moderate-fast
Colour	Slightly coloured
Clarity	Clear
Sampled in	Riffles

Property	Recorded Value
Dominant substrates	10% boulders, 30% cobbles, 35% gravel, 20% fine gravel, 5% sand and silt
Main land use upstream	Bog, pasture
Modifications	Channelised, culvert upstream of sampling point

There was no sign of filamentous algae, gelatinous complexes, or sewage fungus. The watercourse was lowly vegetated with submerged vegetation comprising fool's water cress (*Helosciadium nodiflorum*). Emergent vegetation also included common reed (*Phragmites australis*) downstream, however this was outside the sampling area.

The banks were vegetated with willowherbs (*Epilobium* sp.), cock's foot grass (*Dactylis glomerata*), wild angelica (*Angelica sylvestris*), hard rush (*Juncus inflexus*), hart's tongue fern (*Asplenium scolopendrium*), fescues (*Festuca* sp.) and other grass species (Plate 6-50).

The results (i.e. identification and numbers of aquatic macroinvertebrates) of two minutes of kick sampling are shown in Table 6-15.

Evidence of cattle access to the stream was observed upstream of the sampling point and culvert (Plate 6-51).

Table 6-15 Results of kick sampling at at site 2

Taxa	Species/Group	Abundance Category (%)	Sensitivity Group
Ephemeroptera	*Rhithrogena*	Small numbers (<5)	A
Trichoptera	*Sericostoma*	Common (10-20)	B
Coleoptera	*Limnius* larvae	Scarce/few (<1)	C
Crustacea	*Gammarus*	Numerous (25-50)	C
Diptera	Chironomidae	Fair numbers (5-10)	C
	Simuliidae	Small numbers (<5)	C
Ephemeroptera	*Baetis rhodani*	Numerous (25-50)	C
	Hydropsyche	Common (10-20)	C
Hydracarina	Hydracarina	Small numbers (<5)	C
Crustacea	*Asellus*	Scarce/few (<1)	D

Taking into account the biological data, the stream has been assigned a Q-value of Q3-4.

Plate 6-50 Kick sampling Site 2, February 2024, downstream of the bridge culvert

Plate 6-51 Evidence of cattle access to the watercourse upstream of Site 2

6.6.2.8.3 Site 3

Site 3 was at ITM X 555572, Y 754662 on the Levally stream, approximately 550m downstream of the site. The sampling point was at a bridge on a track to a dwelling off the local road to the south.

This sample was taken just downstream of the bridge. The properties of the stream at the sample point are shown in Table 6-16 below:

Table 6-16 Properties of the stream at sampling Site 3,

Property	Recorded Value
Bank width	3.5m
Wet width	3.5m
Left bank height	2m
Right bank height	2m
Average depth	80cm
Velocity at sampling	Moderate-fast
Colour	Slightly coloured
Clarity	Slightly turbid
Sampled in	Glides
Dominant substrates	10% boulders, 20% cobbles, 50% gravel, 10% fine gravel, 10% sand and silt
Main land use upstream	Pasture
Modifications	Crossing upstream, bridge downstream, banks historically artificially raised

There was no sign of filamentous algae, gelatinous complexes, or sewage fungus. The watercourse was lowly vegetated with no submerged vegetation and emergent vegetation comprising brooklime (*Veronica beccabunga*) and fool's water cress (*Helosciadium nodiflorum*).

The banks were vegetated with brambles (*Rubus fruticosus*), ivy (*Hedera helix*), creeping buttercup (*Ranunculus repens*), white clover (*Trifolium repens*), dock (*Rumex* sp.)fescues (*Festuca* sp.) and other grasses (Plate 6-52).

The results (i.e. identification and numbers of aquatic macroinvertebrates) of two minutes of kick sampling are shown in Table 6-17.

Table 6-17 Results of kick sampling at at Site 3

Taxa	Species/Group	Abundance Category (%)	Sensitivity Group
Ephemeroptera	*Rhithrogena*	Small numbers (<5)	A
	Ecdyonurus	Common (10-20)	A

Taxa	Species/Group	Abundance Category (%)	Sensitivity Group
	Ephemera danica	Scarce/few (<1)	A
Plecoptera	*Protonemura*	Small numbers (<5)	A
Plecoptera	*Leuctra*	Scarce/few (<1)	B
Trichoptera	*Sericostoma*	Fair numbers (5-10)	B
	Limnephelidae	Small numbers (<5)	B
Coleoptera	Coleoptera	Fair numbers (5-10)	C
Crustacea	*Gammarus*	Common (10-20)	C
Diptera	Chironomidae	Small numbers (<5)	C
	Simuliidae	Scarce/few (<1)	C
	Dicranota	Scarce/few (<1)	C
Ephemeroptera	*Baetis rhodani*	Common (10-20)	C
	Hydropsyche	Common (10-20)	C
Hydracarina	Hydracarina	Small numbers (<5)	C
Crustacea	*Asellus*	Small numbers (<5)	D
Hirudinea	*Glossiphonia*	Scarce/few (<1)	D
	Erpobdella	Scarce/few (<1)	D
Oligochaeta	Tubificidae	Scarce/few (<1)	E

Taking into account the biological data, the stream has been assigned a Q-value of Q4-5. This is due to the relative proportion and diversity of Group A species, and the lack of dominance of any one group or species within the sample.

Plate 6-52 Kick sampling Site 3

6.6.2.8.4 Site 4

Site 4 was at ITM X 555008, Y 758501 on the Sinking River. The sampling point was alongside an area of sitka spruce conifer (*Picea sitchensis*) forestry, downstream of a proposed new access road.

The properties of the stream at the sample point are shown in Table 6-18 below:

Table 6-18 Properties of the stream at sampling Site 4

Property	Recorded Value
Bank width	1.5m
Wet width	1.5m
Left bank height	1m
Right bank height	1m
Average depth	30cm
Velocity at sampling	Slow
Colour	Slightly coloured
Clarity	Slightly turbid
Sampled in	Glides
Dominant substrates	100% peat and silty layer on top

Property	Recorded Value
Main land use upstream	Bog, forestry
Modifications	Modified banks built up, straightened

There was no sign of filamentous algae, gelatinous complexes, or sewage fungus. The watercourse was immediately adjacent to conifer forestry on the left bank and therefore had overhanging sitka spruce (*Picea sitchensis*) branches at the location of the sample. An area of wet-willow-alder-ash woodland (WN6) is also located adjacent to the sample on the right bank, with overhanging grey willows (*Salix cinerea*).

The banks were alo vegetated with brambles (*Rubus fruticosus*), bracken (*Pteridium aquilinum*), ivy (*Hedera helix*), cleavers (*Galium aparine*), hart's tongue fern (*Asplenium scolopendrium*) and common tamarisk moss (*Thuidium tamariscinum*) (Plate 6-53).

The watercourse had no submerged or emergent vegetation.

The results (i.e. identification and numbers of aquatic macroinvertebrates) of two minutes of kick sampling are shown in Table 6-19.

Table 6-19 Results of kick sampling at at site 2

Taxa	Species/Group	Abundance Category (%)	Sensitivity Group
Crustacea	*Gammarus*	Dominant (50-75)	C
Crustacea	*Asellus*	Numerous (25-50)	D

Taking into account the biological data, the stream has been assigned a Q-value of Q3.

Plate 6-53 Kick sampling Site 4

6.6.2.9 Invertebrates

Incidental records of invertebrate were recorded during the walkover surveys of the site. In addition to the aquatic invertebrates identified during kick samples of the watercourses on site, the following invertebrate species were recorded within the site:

- Common hawker dragonfly (*Aeshna juncea*)
- Peacock butterfly (*Inachis io*)
- Green veined white (*Pieris napi*)
- Common blue damselfly (*Polyommatus icarus*)
- Meadow brown butterfly (*Maniola jurtina*)
- Common blue butterfly (Polyommatus icarus)
- Painted lady butterfly (*Cynthia cardui*)
- Small tortoiseshell butterfly (*Aglais urticae*)
- Common carder bee (*Bombus pascuorum*)
- Buff-tailed bumblebee (*Bombus terrestris*)
- Red tailed bumblebee (*Bombus lapidarius*)
- Early bumblebee (*Bombus pratorum*)
- Speckled wood (*Pararge aegeria*)
- Red admiral (*Vanessa atalanta*)
- Small white (*Pieris rapae*)

6.6.3 Importance of Ecological Receptors

Table 6-20 lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats and species that are

Key Ecological Receptors (KERs). These ecological receptors are considered in Section 6.7 of this report and mitigation/ measures incorporated into the Proposed Project where required, to avoid potential significant impacts on the KERs.

Table 6-20 Key Ecological Receptors identified during the assessment

Ecological feature or species	KER Y/N	Reason for inclusion as a KER
European Designated Sites › Lough Corrib SAC [000297] › Levally Lough SAC [000295] › Williamstown Turloughs SAC [002296] *International Importance*	Y	These SACs are identified in the AA Screening as being within the Likely Zone of Impact and are assessed fully in the NIS that accompanies this application. These sites are assigned **International Importance** and included as a KER as there is potential for direct and indirect effects via deterioration of water quality, habitat loss, and disturbance arising from the construction, operational and decommissioning phases of the Proposed Project. **Therefore, these European sites are included as KERs.**
Nationally Designated Sites › Drumbulcaun Bog pNHA [000263] › Levally Lough pNHA [000295] › Knockavanny Turlough pNHA [000289] *National Importance*	Y	These sites are assigned **National Importance** and included as a KER as there is potential for direct and indirect effects via deterioration of groundwater quality arising from the construction, operational and decommissioning phases of the Proposed Project.
› Wet grassland corresponding to the Annex I habitat *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] *County Importance*	Y	Although the vast majority of wet grassland within the site is agricultural in nature and of relatively low biodiversity value, 6.39ha of species-rich wet grassland to the east of T1 was found to correspond to the Annex I habitat '*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)' (Figure 6-7). This habitat is of **County Importance**, and 0.22ha of the southern edge of this habitat, forming an existing field boundary lies within the construction footprint of a proposed access road between T1 and 2. **Therefore, this habitat has been included as a KER.**
› Uncut Raised Bog included on the Mapping of Article 17 Degraded raised bog still capable of natural regeneration [7120] *County Importance*	N	The areas of remnant uncut raised bog within the site have been heavily drained through the insertion of parallel drainage ditches and are very dry in nature. These areas have been entirely avoided by the proposed wind farm infrastructure. A small section of the site, at its south eastern extent has been mapped as Article 17 degraded raised bog still capable of natural regeneration. This area is characterised by both heavily drained but uncut raised bog, as well as areas of cutover bog comprising bare peat. While T11 is located within this mapped area, it is located entirely in the area of cutover bog dominated by bare peat. These cutover areas do not meet the criteria required to be

Ecological feature or species	KER Y/N	Reason for inclusion as a KER
		classified as degraded raised bog still capable of natural regeneration (NPWS, 2019[8]). While fragmented and dry in nature, the remnant raised bog habitats within the site are assigned county importance. The uncut but heavily drained section of raised bog at the south-eastern extent of the site which has been mapped degraded raised bog still capable of natural regeneration (NPWS, 2019.) is assigned county importance. As all uncut raised bog habitat within the site has been avoided this habitat is **not included as a KER.**
› Drainage ditches (FW4) *Local Importance (Lower Value)*	N	The site of the Proposed Project is drained by numerous drainage ditches. These are small man-made channels that are often devoid of vegetation or choked with vegetation and are slow flowing. These drains are therefore assigned **Local Importance (Lower Value).** **Therefore, this habitat is not included as a KER.**
› Depositing/lowland rivers (FW2) *Local Importance (Higher Value)*	Y	The larger watercourses within the development site include the Levally stream and its tributaries. These Rivers and Streams have been assigned **Local importance (Higher Value)** in that whilst they are small, they provide potential foraging and breeding habitat for species such as otter, kingfisher and are conduits to waterbodies with a higher biodiversity value in the local area. They also provide a conduit to Lough Corrib SAC downstream of the development site. **Therefore, this habitat is included as a KER.**
› Sensitive aquatic receptors: lamprey, salmonids, European eel, coarse fish, white-clawed crayfish, Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] *International Importance*	Y	The Levally stream was recorded to have suitable habitat for lamprey, salmonids, European eel, coarse fish and crayfish by Triturus Environmental Ltd. Lamprey, salmonids and crayfish associated with the Levally Stream are of **International Importance** as they are listed as QIs within the Lough Corrib SAC. Coarse fish is assigned **Local importance (Higher Value)** and European eel is assigned **International Importance**. Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] was also recorded along the banks of the Levally stream within the site. This is assigned **County Importance** as it is an example of an Annex I habitat and is not designated for conservation and covers only a small area. There is potential for indirect effect on these features as a result of impacts on water quality. These species include salmonid and lamprey species, as well as aquatic invertebrates and other aquatic species.

[8] *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*

Ecological feature or species	KER Y/N	Reason for inclusion as a KER
		Therefore, these species are included as a KERs.
› Cutover bog (PB4) *Local Importance (Higher Value)*	Y	A mosaic of cutover bog habitats ranging from wet to dry were recorded within the site. Condition assessments were undertaken as per IWM 128 The habitats of cutover raised bog (Smith and Crowley, 2020 and it was found that the cutover bog on site didn't correspond to Annex I peatland habitats. These areas have been assigned Local Importance (Higher Value) as they provide high biodiversity value in a local context. **As cutover bog habitats are located within the construction footprint they are therefore included as a KER.**
› Hedgerows (WL1) › Treelines (WL2) *Local Importance (Higher Value)*	Y	Treelines and hedgerows have been assigned local importance (higher value) as they provide connectivity to the wider landscape and provide habitat for a range of faunal species. As there will be some loss of treeline and hedgerows to accommodate the proposed infrastructure **these linear habitats are included as a KER.**
› Wet willow-alder-ash woodland (WN6) › Bog woodland (WN7) › Immature woodland (WS2) › Scrub (WS1) *Local Importance (Higher Value)*	Y	The small areas of wet willow-alder-ash woodland, bog woodland, immature woodland and scrub within the Site are assigned **Local Importance (Higher Value)**. As there will be some loss of small areas of these habitats in order to accommodate the bat felling buffer around each turbine and the construction of site infrastructure, **these habitats are included as a KER.**
› Conifer plantation (WD4) › Spoil and bare ground (ED2) › Recolonising bare ground (ED3) › Stone walls and other stonework (BL1) › Buildings and artificial surfaces (BL3) › Improved agricultural grassland (GA1) › Wet grassland (GS4)	N	These habitats are highly modified and common in the wider landscape with limited biodiversity value. They have been assigned **Local importance (lower value)** and are not included as KERs.

Ecological feature or species	KER Y/N	Reason for inclusion as a KER
Local Importance (Lower Value)		
Otter *International Importance*	Y	Whilst no signs of otter activity were recorded within the site of the Proposed Project, evidence of otter was recorded downstream of the site and there is also hydrological connectivity between the site and Lough Corrib SAC, for which otter is a QI. As otter is a QI of the SAC it has been assigned International Importance **and is therefore included as a KER.**
Badger *Local Importance (Higher Value)*	Y	Badger as an ecological receptor has been assigned **Local Importance (Higher value))** on the basis that the habitats within the site are utilised by a locally occurring badger population of Local Importance. One active badger sett was identified immediately adjacent to the site boundary, approximately 20m from the proposed grid connection route. **Therefore, badger is included as a KER.**
Marsh Fritillary *Local Importance (Higher Value)*	Y	Potential suitable marsh fritillary habitat was identified during surveys undertaken in 2019. Dedicated marsh fritillary surveys were undertaken in these areas in 2022. Although patches of devil's bit scabious (*Succisa pratensis*) were recorded throughout the development site, particularly in road verges, wet grassland and the edges of cutover bog, no larval webs were recorded during the dedicated marsh fritillary larval web surveys. 1.44ha of habitat identified as potential suitable for marsh fritillary is located within the construction footprint. **Therefore on a precautionary basis, marsh fritillary is included as a KER.**
Bats *Local Importance (Higher Value)*	Y	Bat species has been assessed as of **Local Importance (Higher Value)** as they represent a resident or regularly occurring population assessed to be important at the local level and are listed in Annex IV of the EU Habitats Directive. During the dedicated bat surveys, two structures were assessed as having *Low* suitability to host roosting bats (Collins, 2016); However, no roosting bats were observed emerging. Bats were recorded commuting and foraging within the site. **Therefore, bats are included as a KER.**
Additional protected fauna	N	The site surveys did not identify any other protected faunal species with the potential to be significantly affected by the Proposed Project at the population level.

Ecological feature or species	KER Y/N	Reason for inclusion as a KER
		Therefore, no additional species are included as KERs.

6.7 Ecological Impact Assessment

6.7.1 Do-Nothing Effect

If the Proposed Project were not to proceed, the peatland habitats within the site would continue to be managed for active peat extraction including areas of uncut raised bog. With time, areas of bare peat would likely begin to revegetate with pioneer vegetation communities typical of cutover bog. The agricultural areas in the north and southeast of the site would continue to be managed for pastural agriculture, and those areas of conifer plantation within the site would continue to be managed, matured and harvested for commercial forestry. The biodiversity on the site would likely remain similar to its current state as activity levels and land use would not change significantly.

6.7.2 Likely Significant Effects During Construction Phase

The assessment of impacts in the sections that follow assess the Proposed Project which consider all elements the projects as set out in Section 6.1 above. Where impacts are considered which may only be relative to the Proposed Wind Farm or the Proposed Grid Connection, this is set out in the description of the effects with a series of mitigation measures provided where required. A Residual Effect is then provided for the Proposed Project (the Proposed Wind Farm Site and the Proposed Grid Connection) for each potential effect assessed.

6.7.2.1 Effects on Habitats During Construction

Table 6-21 below provides details of the of the recorded habitats on the site and the extent of the habitat that will be lost to facilitate the Proposed Project (Figure 6-8).

Table 6-21 Extent of habitat lost to the Proposed Project and the percentage of the total area/length of that habitat on site

Habitats	Area to be lost (ha)	KER (Y/N)
Buildings and artificial surfaces (BL3)	1.2173	No
Spoil and bare ground (ED2)	0.0	No
Recolonising bare ground (ED3)	0.0788	No
Improved agricultural grassland (GA1)	6.8406	No
Improved agricultural grassland (GA1) / Wet grassland (GS4) mosaic	0.8739	No
Wet grassland (GS4)	2.9767	No
Wet grassland (GS4) that conforms to the Annex I habitat Molinia Meadows	0.217	Yes
Wet grassland (GS4) / Scrub (WS1) mosaic	0.0550	Yes
Raised bog (PB1)	0	No
Cutover bog (PB4)	7.7315	Yes
Conifer plantation (WD4)	6.2997	No
Wet willow-alder-ash woodland (WN6)	0.1481	Yes
Bog woodland (WN7)	0.2970	Yes
Scrub (WS1)	1.6144	Yes

Habitats	Area to be lost (ha)	KER (Y/N)
Immature woodland (WS2)	0.0293	Yes
Total	**30.8801**	
Linear Habitats	**Length to be lost (m)**	
Stone walls and other stonework (BL1)	69	No
Depositing / lowland river (FW2)	0	Yes
Drainage ditches (FW4)	0	No
Hedgerows (WL1)	635	Yes
Treelines (WL2)	520	Yes
Total	**2427**	

While the Proposed Project will result in the loss of areas of habitat that have been assigned Local Importance (Lower Value) and have therefore not been identified as KERs, the loss of these habitats is not considered significant. These habitats include bare peat, improved agricultural grassland, conifer plantation and wet grassland that did not conform to the Annex I habitat Molinia Meadows. They are of relatively low ecological value and are not considered further in this assessment.

The effects on habitats that are identified as KERs are described in the below tables.

6.7.2.1.1 *Assessment of Potential Effects on Rivers, Streams, Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] and Sensitive Aquatic Faunal Species*

Table 6-22: Assessment of Potential Effects on Rivers, Streams Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] and Sensitive Aquatic Species During Construction

Description of Effect	The effects on water quality are fully described in Chapter 9 ' Hydrology and Hydrogeology' of this EIAR and are described here in relation specifically to ecology. This section assesses the potential for likely significant effects on groundwater/surface watercourses, Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] and aquatic faunal species, including white-clawed crayfish, European eel, salmonids, coarse fish, and other aquatic species identified during the desk study and dedicated aquatic surveys and likely to occur within or downstream of the site. The footprint of the Proposed Project has been specifically designed to avoid the watercourses within the site. However, four new watercourse crossings and upgrades to two existing watercourse crossings will be required to facilitate the proposed internal wind farm access road infrastructure. The proposed grid connection cable will also involve the crossing of one watercourse (Levally Stream) to the south-east of the Proposed Wind Farm site boundary. This is located within Lough Corrib SAC at this location. In addition, there will be a requirement for the proposed turbine access roads and grid connection cable to cross artificial drains throughout the site boundary, which will require installation of culverts. While these artificial drainage ditches, are not themselves ecologically sensitive and provide poor fisheries and aquatic faunal habitat, they do provide connectivity to the larger watercourses within and downstream of the site. The watercourse crossing methodologies are described in full in Chapter 4 of this EIAR. It is proposed to use pre-cast concrete bottomless box culverts or clear span culverts for the watercourses within the site boundary. The watercourse crossing along the proposed grid connection route will be crossed by Horizontal Directional Drilling (HDD). No instream works will be required at the location of any of the watercourse crossings and therefore there will be no direct loss of fisheries habitat and no barrier to the movement of aquatic species.

	Construction activities associated with the proposed wind farm infrastructure to result in the run-off of and infiltration of pollutants, including silts, nutrients, hydrocarbons and cementitious material to drains and other watercourses within the Site. This could result from the removal of scrub and woodland, culverting of drainage ditches, large-scale movement of peat or the use of concrete and other construction materials such as hydrocarbons. As a result, there is potential for indirect effects on aquatic receptors. **Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the Proposed Project on aquatic species including salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The Proposed Project will have no direct impact on the aquatic habitat of these species and there is no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species.**
Characterisation of unmitigated effect	In the absence of mitigation, the indirect effect of water pollution on aquatic receptors during construction has the potential be a short-term reversible impact on watercourses which act as a conduit to downstream habitats. There is potential for significant negative effects on water quality within and downstream of the site in the absence of mitigation
Assessment of Significance prior to mitigation	In the absence of mitigation and following the precautionary principle, there is potential for the Proposed Project to result in significant indirect effects on the identified aquatic habitats and species at a local geographic scale in the form of pollution during the construction phase of the Proposed Project. There is also potential for significant indirect effects on habitats and species of International Importance within Lough Corrib SAC.
Mitigation	Drainage maintenance for the Proposed Project is provided in Section 4.5.8 of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: Hydrology and Hydrogeology of this EIAR. This provides specific mitigation for the protection of water quality including mitigation by avoidance, mitigation by design, mitigation against release of suspended solids, hydrocarbons, cementitious materials, dewatering works controls, prevention of contamination from wastewater disposal, and clear-felling mitigations. Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*; and the Scottish Natural Heritage (SNH) *Good Practice During Wind Farm Construction* (SNH, 2019, 4th Edition) will also be adhered to. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI). In relation to new watercourse crossings, Inland Fisheries Ireland (IFI) will be consulted a minimum of four weeks in advance of all works adjacent to watercourses. All major infrastructure is located over 50m from any watercourse, however the upgrade of existing access tracks and construction of new tracks will involve some works within 50m of watercourses and new watercourse crossings. However, no instream works are proposed to natural watercourses, and a suite of measures are in place to avoid any adverse effects on watercourses. These measures are described in full in Chapter 9 of the EIAR.
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

6.7.2.1.2 Assessment of Potential Effects on Cutover Bog Habitats

Table 6-23 Assessment of Potential Effects on Revegetated Cutover Bog Habitats During Construction

Description of Effect	The construction of the Proposed Project and associated infrastructure will result in the direct loss of approximately 7.73ha of Cutover bog (PB4) habitats within the site. The loss will occur as a result of the construction of turbine hardstands (T6,7,10 and 11), the associated access roads, and the construction compound towards the south of the site. The proposed peat repository areas are also located in cutover bog habitat and will result in the direct loss of this habitat. There is potential for construction activities to result in indirect effects on cutover bog habitat immediately adjoining the footprint through drainage. There is also potential for impact via air quality associated with increased airborne nitrogen deposition associated with the construction works. Such indirect impacts are further considered in the below paragraphs.
Characterisation of unmitigated effect	The loss of 7.45% of the highly modified cutover bog on the site constitutes an irreversible effect of moderate magnitude on a receptor of Local Importance (Higher Value). The potential for drainage or alteration of hydrochemistry of adjacent cutover bog habitats within the Site was also identified. However, as described in Chapter 9, Section 9.5.2.4, the effects will not be significant due to the relatively shallow excavation depths and the local hydrogeological regime with low permeability peat and glacial till overburden. Effects on groundwater levels will only be for a temporary basis during the construction work. Water level impacts will be temporary and are unlikely to be significant beyond 10m from any excavation. The potential for impacts on groundwater flows and hydrochemistry of adjacent habitats is assessed further below.
Assessment of Significance prior to mitigation	As described above, the loss of 7.73ha of cutover bog comprises approximately 7.45% of the area this habitat within the Site boundary. The loss of Cutover Bog (PB4) habitats to the above-described infrastructure areas has therefore been assessed as a permanent significant indirect effect on a receptor of Local Importance (Lower Value) and Local Importance (Higher Value) in the absence of mitigation.
Mitigation	The Proposed Project has been deliberately designed to avoid loss of cutover bog. The Proposed Project also provides for the ecological enhancement of areas of uncut raised bog through rewetting to promote the development of wetland vegetation. A Biodiversity Management and Enhancement Plan (BMEP) has been prepared for the Proposed Project which provides for the ecological enhancement of an area of approximately 11.8ha of uncut but drained raised bog at the south-eastern end of the site through drain blocking and rewetting. This will help to raise the water table and promote the development of wetland vegetation. The area proposed for restoration adjoins an area of larger uncut and undrained raised bog to the east and which lies outside the site boundary. The area proposed for rewetting has been heavily drained through the insertion of parallel drains and has been subject to intensive turf cutting to the north, south and west where it is characterised by steep facebank and surrounded by cutover bog. The proposed measures for enhancement are fully described in the BMEP that is provided as Appendix 6-6 to this EIAR. The habitat replacement and enhancement areas are also mapped in this management plan.
Residual Effect following Mitigation	Following the implementation of mitigation and the arising effect of the mitigation measures, there will be no significant residual effect on these cutover bog habitats. There may be a short-term slight negative effect in the early stages of implementation of the BMEP in the form of habitat loss but as the woodland and wetland habitats develop as a result of the proposed enhancement measures, though this will not be significant and there is potential for the Proposed Project to result in an overall long-term positive effect on the habitats within the site.

6.7.2.1.3 Assessment of Potential Effects on Bog Woodland (WN7), Wet Willow-Alder-Ash Woodland (WN6), Immature Woodland (WS2) and Scrub (WS1)

Table 6-24 Assessment of Potential Effects on Bog Woodland, Wet Willow-Alder-Ash Woodland, Immature Woodland and Scrub During Construction

Description of Effect	The construction of the Proposed Project will result in the direct loss of approximately 0.30 hectares woodland (14.46% of this habitat on site), of bog woodland, 0.15 hectares (7.41% of this habitat on site) of wet willow alder ash woodland, 0.03ha (1.85% of this habitat on site) of immature woodland and 1.67ha (18.68% of this habitat on site) of scrub (WS1) and wet grassland (GS4) / scrub mosaic. This totals a loss of 2.14ha of woodland and scrub habitats or 14.71% of these habitats on site. These loss of woodland and scrub habitat will occur as a result of the construction of Turbine 5, Turbine 6 and the associated felling buffers for bats proposed around these turbines, construction of new site roads and upgrades of existing site roads, construction compounds and the proposed substation. The areas where this will occur are shown in Figure 6-8. There will be no loss of woodland habitats as a result of the Grid Connection however there will be a loss of scrub habitat.
Characterisation of unmitigated effect	The loss of 2.14ha of woodland and scrub habitat within the site, the majority of which is scrub or grassland/scrub mosaic, is a permanent negative impact on habitats of local importance (higher value). None of the woodland habitats to be lost correspond to woodland habitats listed under Annex I of the EU Habitats Directive. Given the small areas of each woodland habitat to be lost, the magnitude of the impact is assessed as slight.
Assessment of Significance prior to mitigation	The permanent loss of small areas of the woodland habitats is not considered to be a significant effect at any scale.
Mitigation	Whilst no significant effects were identified, in order to compensate for the loss of woodland habitat it is proposed to plant approximately 2.89ha of native woodland comprising alder, grey willow, downy birch, pedunculate oak and hawthorn in an area of improved agricultural grassland to the north of the proposed T9. These measures are fully described in the BMEP that is provided as Appendix 6-6 to this EIAR. The habitat enhancement areas are also mapped in this management plan. The replanting measures will be monitored by a suitably qualified ecologist appointed by the wind farm operator. The replanting areas will be surveyed once annually during the first five years of the wind farm and at 5 year intervals for the lifespan of the wind farm (35 years). as part of the BMEP to confirm their effectiveness and to allow for alteration in approaches where necessary.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on these habitats as a result of the Proposed Project.

6.7.2.1.4 Assessment of Potential Effects on Molinia Meadows

Table 6-25: Assessment of Potential Effects on Molinia Meadows During Construction

Description of Effect	The construction of the proposed access road between T1 and T2 will result in the loss of approximately 0.22ha of wet grassland which has been classified as Annex I Molinia meadow within the Wind Farm Site. The proposed access road will follow an existing field boundary and therefore only the very southern edge of this habitat lies within the footprint (refer to Habitat map Figure 6-7). There will be no loss of Molinia Meadow as a result of the Grid Connection. There won't be any drainage effect associated with the construction of the proposed access road on the Molinia Meadow habitat.

Characterisation of unmitigated effect	This is a permanent and irreversible impact on a habitat County Importance. The magnitude of this impact is Slight as it only affects a small percentage of the very edge of the habitat.
Assessment of Significance prior to mitigation	The loss of approximately 0.22ha of the edge of Molinia Meadow habitat within the Wind Farm Site, although small is size, is a significant effect on a very small area of County Importance that affects only 3.54% of the habitat on site. as this habitat conforms to the Annex I habitat 'Molinia meadow on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)'
Mitigation	› The Proposed Project has been deliberately designed to avoid the majority of the Molina Meadow habitat on site. › The Molinia Meadow habitat will be fenced off during construction to ensure that there is no encroachment onto the habitat outside the footprint of the proposed access road. No machinery will be permitted to enter the fenced area. › A toolbox talk will be provided to staff by a suitably qualified ecologist outlining measured to be adhered to on site prior to the commencement of any works. › The fencing of the habitat and the works will be supervised by a suitably qualified ecologist. › A BMEP has been prepared and has been included in Appendix 6-6 and it provides for the enhancement of the remainder of the Molinia Meadow on site. Measures proposed include the following: ○ Undertake grazing at low stocking levels avoiding the main flowering period of May to July. ○ There will be no application of fertilizer ○ There will be no additional drainage of the field or surrounding area ○ If appropriate, the meadow will be cut for hay each year – ensuring that the hay is removed.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be a loss of 0.22 hectares at the very edge of this habitat. However as described above and in the BMEP, the remaining 6.17 hectares will be protected and enhanced during the lifetime of the wind farm and no significant residual effect on Molinia Meadow habitat as a result of the Proposed Project.

6.7.2.1.5 *Assessment of Potential Effects on Hedgerows and Treelines*

Table 6-26: Assessment of Potential Effects on Hedgerows and Treelines During Construction

Description of Effect	The construction of the proposed new site access roads, as well as felling associated with bat buffers around the proposed turbines, will result in the loss of 635m of hedgerow and 520m of treeline. These losses will accommodate the construction of T3, T4, T5 and the felling buffer for bats around these turbines. The areas to be lost as a result of the Proposed Project are shown in Figure 6-8.
Characterisation of unmitigated effect	The permanent loss of approximately 635m (24.64% of habitat on Site) of hedgerow and 520m (24.69% of habitat on Site) of treeline will constitute a permanent moderate negative effect at a local scale given that habitats of this nature is widespread and common in the wider area.
Assessment of Significance prior to mitigation	The permanent loss of these habitats is considered to be a significant effect at the local scale, as this habitat is widespread and common within the wider rural landscape and removal of the hedgerows/treelines would not cause any significant fragmentation of habitat connectivity within the landscape.

Mitigation	In order to compensate for the loss of linear vegetation, approximately 1,875 linear metres of new replacement hedgerow planting which will be let develop into treelines and treeline planting will be carried out along sections of proposed new and upgraded roads in order to ensure that there will be no net loss of linear habitat features. This will result in a net gain of 720m in linear habitat within the site. Tree/shrub species planted at these locations will be of a similar composition to those occurring on site, will be native and of local provenance. The areas chosen for the planting of new hedgerows to replace those lost were chosen because they provide habitat connectivity between existing treelines and hedgerows and other areas of the site. These measures are fully described in the BMEP that is provided in Appendix 6-6 of this EIAR. The hedgerow planting areas are also shown in this management plan.
Residual Effect following Mitigation	Following implementation of mitigation, no potential for significant effect exists at any geographic scale. The planting will result in an additional 720m of additional hedgerow habitat within the Proposed Project.

6.7.2.2 Effects on Protected 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. Given the extensive area of habitat that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat (natural woodlands and watercourses), no significant effects on non-KER faunal biodiversity is anticipated as a result of the Proposed Project.

It should be noted that no significant habitat for salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates or other aquatic species was recorded within the footprint of the Proposed Project and all major infrastructure is located over 50 metres from the watercourses within the site. The potential for significant effects on the above aquatic species is restricted to indirect effects on their habitat resulting from water pollution as there will be no instream works as part of the proposed project. This has been assessed in Section 6.7.2.1.1 above and is not repeated below.

The following species identified as KER's are assessed below:

- Otter
- Marsh Fritillary
- Badger
- Bats

6.7.2.2.1 *Assessment of Potential Effects on Otter*

Table 6-27: Assessment of Potential Effects on Otter During Construction

Description of Effect	No otter resting or breeding sites and no other signs of otter were recorded within the watercourses within the Site or along the proposed grid connection route during the surveys undertaken. However, signs of otter were recorded downstream of the Proposed Project on the Levally stream. **Habitat Loss/Disturbance/Mortality** There will be a requirement for new access roads associated with the Proposed Project to cross a number of watercourses within the Site. The proposed grid connection route will also cross the Levally stream within the site. There will be no instream works required as part of any of the watercourse crossing which will be undertaken using either bottomless culverts or horizontal directional drilling methodologies. Any culverts have been designed to maintain linear connectivity along the streams and thus will not

	affect the ability for otter to commute through the site. No loss of otter resting or breeding sites and no direct mortality of otter is anticipated as a result of the Proposed Project. In relation to disturbance, otter are predominantly crepuscular in nature and it is anticipated that construction activity associated with the Proposed Project including the proposed grid connection route will be confined to daytime hours, thus minimising potential disturbance related impacts to the species. **Habitat Degradation (impacts on water quality)** Taking a precautionary approach, there is potential for construction works to result in the run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream of the Proposed Project. This represents a potential indirect effect on otter in the form of habitat degradation/loss of prey resource through water pollution.
Characterisation of unmitigated effect	**Habitat Loss/Disturbance/Mortality** Given that a large portion of the site is at present in active peat production and all major infrastructure is located over 50 metres from any significant watercourse any potential disturbance to otter will be a short-term, slight negative effect. Significant habitat loss or mortality are not anticipated as outlined above. **Habitat Degradation (impacts on water quality)** In the absence of mitigation, the indirect effect of water pollution on otter during construction has the potential to be a short-term negative but reversible impact. In the absence of mitigation, the magnitude of any such impact has potential to be significant.
Assessment of Significance prior to mitigation	**Habitat Loss/Disturbance/Mortality** There is no potential for the construction phase of the Proposed Project to result in significant habitat loss, disturbance, or mortality for otter. **Habitat Degradation (impacts on water quality)** In the absence of mitigation and following the precautionary principle, there is potential for the Proposed Project to result in significant indirect effects on otter at a local geographic scale in the form of habitat deterioration resulting from pollution.
Mitigation	Mitigation as outlined in Section 6.7.2.1.1 above will be adhered to for the protection of water quality. Prior to the commencement of construction works associated with the installation of watercourse crossings, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2007): › From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that current activity levels are confirmed prior to commencement of works. In the unlikely event that an otter holt is identified within or immediately adjacent to the Proposed Project footprint, consultation will be undertaken with the National Parks and Wildlife Service and a derogation licence applied for. › All conditions of a derogation licence will be implemented in full.

	› No works will be undertaken within 150m of any holts at which breeding females or cubs are present. › No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under licence (TII, 2006[9]). › All of the above works will be undertaken or supervised by an appropriately qualified ecologist.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the Proposed Project.

6.7.2.2.2 Assessment of Potential Effects on Marsh Fritillary

Table 6-28: Assessment of Potential Effects on Marsh Fritillary During Construction

Description of Effect	**Habitat Loss** No Marsh Fritillary were recorded within the site during the extensive surveys undertaken. One adult marsh fritillary was recorded outside the Site. There is 15.96ha of potentially suitable habitat for marsh fritillary on the Site. The Proposed Project has been specifically designed to avoid areas identified as providing potentially suitable habitat for marsh fritillary where possible. However, a highly precautionary approach was taken, and small sections of potentially suitable marsh fritillary habitat were identified at the very edge of the Proposed Project footprint (Figure 6-12). Therefore, there will be a direct loss of some small areas of potential habitat, totalling approximately 1.44ha (9.04% of the habitat on site). **Disturbance** No larval webs were recorded during dedicated marsh fritillary larval web surveys within the suitable marsh fritillary habitat within the Site. Taking an extremely precautionary approach there is potential for disturbance to marsh fritillary arising from the construction phase of the Proposed Project via encroachment of machinery into the area of potentially suitable habitat to be lost.
Characterisation of unmitigated effect	**Habitat Loss** In the absence of mitigation, the loss of approximately 1.44ha of potentially suitable supporting habitat for marsh fritillary constitutes a permanent slight negative effect at the local scale. The effects would be slight at worst as the entire development has been designed to avoid the majority of these areas and the encroachment would cover a very small amount (9.04%) of the habitat within the site. **Disturbance** No larval webs were recorded on site however as a small area of potential suitable marsh fritillary habitat is to be lost, in the absence of mitigation, potential disturbance to marsh fritillary will be a short-term, slight negative effect.
Assessment of Significance prior to mitigation	**Habitat Loss** In the absence of mitigation, no significant overall loss of marsh fritillary habitat is anticipated at any geographic scale.

[9] *NRA, 2006. Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. Dublin: Transport Infrastructure Ireland. Available at: www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf*

	Disturbance In the absence of mitigation, no significant impacts are anticipated on marsh fritillary via disturbance at any geographic scale.
Mitigation	**Habitat Loss** The following mitigations will be implemented to minimise habitat loss and enhance and promote further areas of suitable habitat within the site: › The key mitigation measure during the construction phase is the avoidance of potentially suitable marsh fritillary habitat where possible. › The enhancement of the area of Molinia meadow habitat within the site as outlined in the BMEP will also provide enhanced suitable habitat for marsh fritillary through measures such grazing at low stocking levels and no application of fertilizer. › Tree-planting that is proposed as part of the BMEP will avoid areas of suitable marsh fritillary habitat. **Disturbance** The following mitigations will be implemented pre-construction to ensure that no marsh fritillary are impacted during the construction of the Proposed Project: › Pre-commencement surveys will be undertaken for marsh fritillary to determine if any marsh fritillary are using the site at that time. › All potential suitable marsh fritillary habitat to be avoided will be fenced off or clearly marked prior to the commencement of any site works under the guidance and supervision of a suitably qualified ecologist. The fences will be temporary and will be removed once the butterflies have hatched in May. No works will be undertaken where there are eggs, caterpillars, webs or cocoons. › Habitat condition monitoring will be undertaken to ensure that there are no negative effects on potentially suitable marsh fritillary habitat.
Residual Effect following Mitigation	Following the incorporation of the above avoidance and mitigation measures, there is no potential for significant negative effects on the species and the potential for the Proposed Project to increase the extent of available habitat on the site for marsh fritillary and also to increase the quality of the habitat on the site.

6.7.2.2.3 *Assessment of Potential Effects on Badger*

Table 6-29: Assessment of Potential Effects on Badger During Construction

Description of Effect	**Habitat Loss/Fragmentation** During the ecological surveys undertaken of the site, one badger sett was recorded approximately 20m from the Grid Connection (Refer to confidential Appendix 6-5). During construction of the trench for the Grid Connection there is potential for direct loss of badger habitat due to accidental destruction of the sett and/or tunnel collapse given the proximity of the sett to the grid route. Given the nature of the Proposed Project, there will also be some minimal loss of suitable badger foraging habitat i.e., agricultural grassland (GA1), conifer plantation (WD4) associated with the footprint of the Proposed Wind Farm infrastructure. **Disturbance/ Direct Mortality**

	Given the proximity of the identified sett to the proposed grid connection route, there is potential for disturbance and direct mortality of badger using the sett as a result of noise/tunnel or sett collapse during works associated with the grid connection route. Badger tunnel systems can extend some distance from sett entrances (over 20m in some cases[10]) 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 addition to this, numerous signs of badger activity within the site (latrines, snuffle holes, prints) in close proximity to the Proposed Project infrastructure . There is a potential for new badger setts to be created during the interim between baseline ecological surveying and commencement of construction.
Characterisation of unmitigated effect	**Habitat Loss/Fragmentation** In the absence of mitigation, the loss of badger habitat in proximity to the grid connection route is a slight negative effect at the local scale as suitable habitat is widespread in the wider area. **Disturbance/ Direct Mortality** In the absence of mitigation there is potential for short term significant effects on the local badger population in terms of disturbance, displacement and potential mortality where the grid connection works occur in close proximity to the sett.
Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation** In the absence of mitigation, no significant overall loss of badger habitat is anticipated at any geographic scale. **Disturbance/ Direct Mortality** In the absence of mitigation, the potential for disturbance, displacement or direct mortality of badger is a significant effect at the local geographic scale.
Mitigation	**Habitat Loss/Fragmentation** The loss of habitat will be small scale in nature and suitable habitat is abundant in the wider landscape. As such no specific mitigation is required for the avoidance of habitat loss. **Disturbance/ Direct Mortality** Prior to the commencement of any construction works associated with the wind farm, grid route or any associated infrastructure, the following measures will be undertaken for the avoidance of disturbance and/or direct mortality to badger and to ensure no additional setts have been established since the original surveys undertaken. The following measures are in line with *Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes* (TII 2009). › From a precautionary basis, a pre-commencement badger survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that no additional setts in close proximity to proposed infrastructure have been built. In the event that a badger sett is identified within or immediately

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

	adjacent to the Proposed Project footprint, mitigations as per the above referenced TII document will be implemented for the new sett. In relation to the identified sett in close proximity to the grid connection route (Refer to Confidential Appendix 6-5) an exclusion of the existing sett will be carried out to ensure no badgers are present within the sett during construction works. The exclusion will be carried out in line with TII guidelines as follows: › Local NPWS staff will be informed in advance of the exclusion works. › The exclusion will not take place during badger breeding season (December to June inclusive) › One way exclusion gates will be installed on each sett entrance. › The one-way gates will be left in place for a period of 21 days and works will proceed immediately after once exclusion of badgers has been confirmed by an Ecologist. › An Ecologist will monitor the gates every 3 to 5 days during the 21-day period to ensure badgers do not succeed in re-entering the sett. › If badgers succeed in re-entering during the 21-day period, the exclusion process and 21-day period must start again. All of the above works will be undertaken or supervised by an appropriately qualified ecologist.
Residual Effect following Mitigation	Following the implementation of the mitigation as described above, there is no potential for any significant negative effect on badger at any geographic scale as a result of the Proposed Project.

6.7.2.2.4 Assessment of Potential Effects on Bats

Table 6-30: Assessment of Potential Effects on Bats During Construction

Description of Effect	**Loss of, or Damage to, Roosts** The Wind Farm Site is predominantly located within cutover bog, agricultural grassland with areas of conifer plantation and broadleaved woodland. The trees within the plantation and woodland do not provide potential roosting habitat of significance for bats. Two structures were identified within the Wind Farm Site and were subjected to dusk activity surveys. No bats were observed emerging from either structure during the dusk surveys. These structures and the surrounding linear habitat features will be retained and avoided as part of the Proposed Project; thus, no loss of roosting habitat is anticipated. There will be no requirement to fell trees/forestry as part of the underground cable route. Therefore, there will be no loss of tree roosting habitat associated with these works. Horizontal Directional Drilling (HDD) is proposed for the watercourse crossing and given the nature of the works associated with the crossing, no loss of roosting habitat associated with the Grid Connection is anticipated. No loss of any roosting habitat is anticipated with the Proposed Project. The TDR accommodation works areas are contained within the existing road infrastructure and traverse small areas of habitats common and widespread within the surrounding area such as *grassland habitats, immature woodland* and *conifer plantation.* There will be a requirement to complete minor hedge or tree removal to transport the turbine components. While no potential roost features were identified on these trees, two trees were assessed as FAR (Further Assessment Required).

	Consequently, a confirmatory pre-construction survey will be conducted on these trees prior to removal.
	Loss or Damage to Commuting and Foraging Habitat In absence of appropriate design, the loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. However, the Proposed Project is predominantly located within agricultural grassland, cutover bog and conifer plantation. Cutover bog and open grassland areas generally provide relatively poor-quality commuting and foraging habitat for bats. However, a total of 2.14ha of broadleaved woodland will be permanently felled within and around the footprint of the Proposed Project. The felling of trees is required to achieve the required buffer distance for the protection of bats, from the turbines to the canopy of the nearest habitat feature, as recommended by the Natural England (2014) and NatureScot (2021). Further details on buffer calculations can be found in Section 6.1.3 of the Bat Report (Appendix 6-2). Approximately 1,206m of hedgerow/treeline habitat loss is required to facilitate new access roads, turbine delivery route and other ancillary works associated with the Proposed Project. Bat buffers will be created around turbines as detailed in Section 6.1.3 of the Bat Report (Appendix 6-2). Approximately 6.3ha of conifer is proposed for removal to facilitate the development. The creation of bat buffers has the potential to create additional linear edge habitats for foraging and commuting bats along proposed keyhole areas.
	Displacement of Individuals or Populations The Proposed Project is predominantly located within agricultural grassland and cutover raised bog with smaller areas of conifer plantation and broadleaved woodland. There may be a short-term negative effect on potential commuting and foraging bats as a result of linear habitat removal to facilitate the development. There will be no loss of any roosting site of ecological significance. 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. Overall, the habitats on the Site will remain suitable for bats and no significant displacement of individuals or populations is anticipated. Construction of the proposed project will result in increased human activity, noise and lighting within the Site. Therefore, the potential for indirect disturbance to bats requires consideration.
Assessment of Significance prior to mitigation	**Loss of, or Damage to, Roosts** No potential for significant effect with regard to the loss of, or damage to, roosting habitat as a result of the Proposed Project is anticipated. No mitigation is proposed.
	Loss or Damage to Commuting and Foraging Habitat In absence of appropriate design, the loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. However, the Proposed Project is predominantly located within agricultural grassland and cutover raised bog with small areas of conifer plantation. A total of 2.14ha of forestry will be permanently felled within and around the footprint of the Proposed Project. Approximately 1,206m of hedgerow/tree habitat loss is

	required to facilitate road new access roads, turbine delivery route and other ancillary works associated with the Proposed Project. Prior to mitigation, this is considered to have a potentially significant effect on bats at the local scale, despite all these felling areas being significantly geographically separated from each other and an extensive area of habitat remaining undisturbed throughout the site. However, commuting and foraging habitats will remain available to all bat species throughout the site and no significant effects are expected at any other geographic scale. The felling of plantation forestry (WD4) within the site, to facilitate site access roads and turbine infrastructure, will result in the creation of more woodland edge habitat and as such can benefit feeding and commuting bat species.
	Displacement of Individuals or Populations The habitats on the Proposed Wind Farm site will remain suitable for bats and no significant displacement of individuals or populations is anticipated as a result of the construction phase of the Proposed Project. Temporary impacts from noise and lighting have the potential to result in negative effects in the form of disturbance on local populations recorded at the site. However, this would be considered **significant at the local geographic scale only** in the absence of mitigation.
Mitigation	**Loss or Damage to Commuting and Foraging Habitat** Significant effects with regard to loss of commuting and foraging habitat are not anticipated. However, mitigation and enhancement measures in relation to habitats as detailed in the BMEP (See Appendix 6-6) will include the planting of up to 2,419 linear metres of new hedgerow and treeline will provide additional foraging and commuting habitat for bats within the Site following construction. This will result in a net gain of linear habitat features within the Proposed Wind Farm site.

	Displacement of Individuals or Populations The following construction best practice will be employed to minimise general noise and disturbance potential. During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001). In addition, the following construction best practice measures will be employed to minimise general noise and disturbance potential: › Plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001). › The proposed lighting around the Site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting in the UK (ILP, 2023). The applicant also commits to the use of lights during construction, operation and decommissioning (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations: › Every light needs to be justifiable, › Limit the use of light to when it is needed, › Direct the light to where it is needed, › Reduce the light intensity to the minimum needed, › Use light spectra adapted to the environment, › When using white light, use sources with a "warm" colour temperature (less than 3000K).
Residual Effect following Mitigation	Taking into consideration the sensitive design of the Proposed Project, the proposed best practice and adaptive mitigation measures, significant residual effects on bats as a result of loss or damage to commuting and foraging habitat, loss of, or damage to, roosts, displacement of individuals or populations, and disturbance, are not anticipated.

6.7.2.3 Invasive Species

Rhododendron (*Rhododendron ponticum*) and Cherry Laurel were recorded at a number of locations within the Site. A site specific Invasive Species Management Plan has been prepared by MKO for the treatment of Rhododendron within the site boundary and can be found in Appendix 6-4.

A full description of mitigations can be found within the ISMP. A brief summary of mitigations is presented below:

Prior to the commencement of any works, the following site setup procedures will be carried out:

› A pre-commencement survey for Rhododendron and cherry laurel will be undertaken by a fully qualified ecologist to determine the locations and extent of the species within and immediately adjacent to the Proposed Project footprint and to determine whether there have been any changes in the extent of the infestation since the undertaking of the most recent surveys in January 2024.
› The locations and extent of Rhododendron and cherry laurel within the footprint will be clearly marked out before removal.

Prior to the commencement of construction works, all Rhododendron and cherry laurel within the works footprint will be removed following the methodology outlined below for seedlings, medium and large stands. Medium plant stands are those with no flower head present or visible, thin stems, and that

cannot be removed by hand, or where the root cannot be fully removed from the ground. Large plants are those with trunk like stems that exceed 5cm in width.

- All seedlings within and adjacent to(within 3 metres) the Proposed Project footprint will be removed by hand or with a hand tool to fully remove the plant root from the ground. This can occur at any time of the year as they will not produce flowers and seeds at this early stage of growth.
- For medium and large stands, the tree/plant will be cut as close to the ground as possible. Cutting of any foliage will not occur within bird nesting season (March 1st to August 31st) in accordance with the Wildlife Act (as amended).
- The cut material will be stacked and stored on site to dry, used as firewood or mulched as this plant material is deemed inert and can be used for landscaping as natural weed barriers or other horticultural purposes. Cut material will be stacked away from the cut stumps or other plants.
- The remaining root/stump will be removed from the ground using hand tool or an excavator.
- The root/stump will be placed on an impermeable surface such as palettes or a radon barrier membrane and left to dry out.

Medium and large stands of Rhododendron and cherry laurel that are located adjacent to (within 3 metres)the Proposed Project footprint but do not require removal before the commencement of construction works will be treated using herbicide methods, as outlined below.

- Medium sized plants (stem diameter of >20mm) will be sliced at the mid-section of the stem at a 45-degree angle and treated with a herbicide immediately after being cut. Given the wet nature of the site, it is recommended that a Glyphosate-based herbicide suitable for use near watercourses be applied as a spot treatment to each individual plant to avoid contamination by spray drift to the surrounding environment and native plant species.
- For large plants (>100mm, it is recommended to treat in-situ by manually removing the upper parts of the plant and apply the Ecoplug method (www.landscapedepot.ie) as to avoid spray drift and to minimise the potential for spraying of non-target species. The Ecoplug method is outlined below.
    - The tree/plant will be cut as close to the ground as possible. Cutting of any foliage will not occur within bird nesting season (March 1st to August 31st) in accordance with the Wildlife Act (as amended).
    - The cut material can be stacked and stored on site to dry out, used as firewood or mulched as this plant material is deemed inert and can be used for landscaping as natural weed barriers or other horticultural purposes. The cut material will not be stacked on the cut stems.
    - A 30mm deep hole, and 13mm wide will be drilled into the remaining stump and the Ecoplug will be inserted into the hole until it is flush with the top of the stump.

Post implementation of mitigation measures no significant effect on biodiversity is anticipated as a result of the presence of Rhododendron or Cherry Laurel.

6.7.3 Likely Significant Effects During Operational Phase

6.7.3.1 Effects on Habitats During Operation

The operation of the Proposed Project will not result in any additional land take or loss of any habitats and as such there is no potential for any significant effects in this regard.

The implementation of the BMEP (Appendix 6-6), which will be implemented during the operation of the Proposed Project, allows for the planting of woodland and linear hedgerow habitat as well as for the rewetting of an area of uncut but heavily drained raised bog through drain blocking.

Potential pathways for effects on rivers, streams and sensitive aquatic species during the operational stage of the Proposed Project have been identified and this is assessed in detail in the following subsections.

6.7.3.1.1 Effects on Rivers, Streams, Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] and Sensitive Aquatic Faunal Species

Table 6-31: Assessment of Potential Effects on Rivers, Streams, Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] and Sensitive Aquatic Faunal Species During Operation

Description of Effect	The Proposed Project will result in an overall increase in the area of non-permeable hard-surfaces which has potential to result in increased surface water run-off from the Site, which in turn has potential to cause erosion of watercourses and impact on water quality and downstream aquatic receptors including Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] and aquatic faunal species, including white-clawed crayfish, European eel, salmonids, lamprey, coarse fish and aquatic invertebrates. There is also potential for run-off of pollutants due to accidental spillage or release of hydrocarbons from site vehicles during any routine maintenance works during the operational phase of the Proposed Project. However, it is not envisaged that any significant refuelling works will be undertaken on site during the operational phase. These impacts on water quality are fully described in Chapter 9: Hydrology and Hydrogeology of this EIAR and are described here in relation specifically to biodiversity. **Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the Proposed Project on aquatic species including salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The Proposed Project will have no direct impact on the aquatic habitat of these species and there is no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species.**
Characterisation of unmitigated effect	Impact on water quality during the operational phase of the Proposed Project has been assessed as a permanent negative effect in the absence of mitigation. The magnitude of this impact is slight as all major infrastructure will be located over 50 metres from any significant watercourse and the footprint of the Proposed Project will be minimal when compared to the overall size of the site.
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	Whilst no significant effects on water quality are anticipated, potential for impacts on water quality associated with the operational phase drainage of the site has been fully mitigated through appropriate design and mitigation as described in Section 4.6 'Site drainage', and Section 9.5.3 of the EIAR. In Section 9.5.3 of Chapter 9 ' Hydrology and Hydrogeology', the assessment concludes that with the implementation of mitigation, '*No significant effects on surface water quality will occur during the operational phase of the Proposed Project*' during the operational phase. The detailed mitigation measures are not repeated here to reduce repetition throughout the document, but are described in Section 9.5.3.1, Chapter 9; the measures used to mitigate the risk of release of hydrocarbons and other pollutants and for sediment control during the construction phase will also be employed as required during the operational phase. Drainage management measures employed during the construction phase will ensure that runoff from the operational development will be effectively mitigated.
Residual Effect following Mitigation	Following the implementation of the mitigation measures outlined above, no potential for significant effect has been identified at any geographic scale as a result of the Proposed Project.

6.7.3.2 Effects on Fauna during Operation

The operation of the Proposed Project will not result in any additional habitat loss or deterioration and will involve a decrease in anthropogenic activity when compared to the current peat production usage of the site.

There is no potential for significant negative effects on non-volant terrestrial fauna (otter, badger) during the operational phase of the Proposed Project as there will be no loss of suitable habitat for these species associated with the operational phase. Implementation of the BMEP measures during the operational phase of the development will ensure that any woodland, treelines, hedgerows and scrub that are lost to facilitate the proposed infrastructure will be replaced within the Site with linear features of value for local faunal species, providing more foraging opportunities for fauna, as well as additional shelter for birds and mammals, and commuting links for bats.

Similarly, it is not anticipated that the operation of the Proposed Project will have any effect on marsh fritillary or habitat for the species during the operation of the Proposed Project..

Implementation of the BMEP measures during the operational phase of the development will ensure that habitats are managed for marsh fritillary during the operational life of the Proposed Project having a positive impact on this species as well as other local invertebrate/pollinator species.

It should be noted that no significant habitat for salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates or other aquatic species was recorded within the footprint of the Proposed Project and all major infrastructure such as turbine bases are located over 50 metres from the watercourses and wetlands within the site. The potential for significant effects on the above aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.7.2.1.1 and is not repeated here.

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

6.7.3.2.1 *Assessment of Potential Effects on Bats During Operation*

Table 6-32: Assessment of Potential Effects on Bats During Operation

Description of Effect	The following high-risk species were recorded during the dedicated surveys: › Leisler's bat, › Common pipistrelle › Soprano pipistrelle › Nathusius' pipistrelle Together with the following low risk species: › Myotis spp. › Brown long-eared bat Overall activity levels were low for the above species; therefore, no significant collision related effects are anticipated. Activity levels for these species will continue to be assessed during operational monitoring following the implementation of best practice mitigations provided. Further mitigation will be implemented after Year 1 if deemed necessary. Site-level collision risk for high collision risk bat species was typically Low, except for Common Pipistrelle, for which was considered Medium. However, following per detector R-analysis, detectors D03, D04, D05 and D06 showed high median activity levels in spring, summer or autumn within the Wind Farm.

Assessment of Significance prior to mitigation	No significant collision related effects are anticipated on *Myotis* spp. and brown long-eared bats, as the species are considered low-risk for collision. A potential for long-term negative effects was identified for Common and Soprano pipistrelles due to the high levels of activity recorded within the Proposed Wind Farm site and their classification as high-risk species. The potential unmitigated effects on these high-risk species as a result of their potential interaction with wind turbines are **considered significant at a local geographic scale**. No significant effects are anticipated at any other geographic scale.
Mitigation	Detailed mitigation measures in relation to bats are provided in the Bat Report (see Appendix 6-2) and summarised below. Mitigation measures are proposed together with post-construction monitoring: › Introduce felling buffers around turbines › Any proposed lighting around the site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting at night (ILP, 2023). › During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001). › Implement blade feathering as a standard › Implement curtailment on proposed turbines which recorded high median activity levels, as per Table 6-1 of the Bat Report, in Appendix 6-2. › A minimum of three years operational monitoring to assess changes in bat activity patterns post construction and to monitor the implementation of the mitigation strategy. › Adaptive mitigation strategy based on the results of the post-construction monitoring.
Residual Effect following Mitigation	Taking into consideration the sensitive design of the Proposed Project, the proposed best practice and adaptive mitigation measures, significant residual effects on bats as a result of collision and barotrauma are not anticipated.

6.7.4 Likely Significant Effects During Decommissioning Phase

Decommissioning is fully described within the Decommissioning Plan (Appendix 4-6) and Chapter 4 of this EIAR. There will be no additional habitat loss associated with the decommissioning of the Proposed Project and therefore there will be no significant effects in this regard.

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

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

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent

option, as to remove that volume of reinforced concrete from the ground could result in environment emissions such as noise, dust and/or vibration.

Site roadways could be in use for purposes other than the operation of the development by the time the decommissioning of the Proposed Project is to be considered, and therefore it may be more appropriate to leave the site roads in situ for future use. It is envisaged that the roads will provide a useful means of extracting the commercial forestry crop which exists on the site. If it were to be confirmed that the roads were not required in the future for any other useful purpose, they could be removed where required.

The electrical cabling connecting the Proposed Project to the national grid in the townland of Laughil will be removed from the underground cable ducting at the end of the useful life of the Proposed Project. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance for an underground element that is not visible.

A Decommissioning Plan has been prepared (Appendix 4-6) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time.

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

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

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

6.7.5 Effects on Designated Sites

6.7.5.1 Impacts on Nationally Designated Sites

Four nationally designated sites were identified as being within the zone of influence and as KERs.

These are listed below:

- Drumbulcaun Bog pNHA [000263]
- Knockavanny Turlough pNHA [000289]
- Levally Lough pNHA [000295]

Following the precautionary principle, a potential pathway for effect on these nationally designated sites via pollution of groundwater and alteration of groundwater regimes was identified. Specific mitigation is provided in relation to protection of groundwater quality and regimes in Chapter 9: Hydrology and Hydrogeology of this EIAR. This provides specific mitigation for the protection of groundwater quality including mitigation by avoidance, mitigation by design, mitigation against release of suspended solids, hydrocarbons, cementitious materials, dewatering works controls, prevention of contamination from wastewater disposal, and clear-felling mitigations.

In addition, Chapter 9 of this EIAR describes how the effects are likely to be localised due to the relatively shallow excavation depths and the local hydrogeological regime with low permeability glacial till overburden. Effects on groundwater levels will only be for a temporary basis during the construction work. Water level impacts will be temporary and are unlikely to be significant beyond 50m from any excavation. As such, the proposed works are highly unlikely to impact on the hydrological regime at any of the identified Nationally designated sites that are located much further than this from the Proposed Project.

As discussed above and detailed in Chapter 9, Once the above prescribed methodologies and mitigations are in place, there is no potential for significant impact on local groundwater flows, quality or hydrochemistry, therefore there will be no impact on the identified pNHAs.

No potential for significant impacts on any other Nationally designated sites have been identified.

6.7.5.2 Impacts on European Sites

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

As per the aforementioned EPA Guidance (2022), *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and appropriate"*. This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The Screening for Appropriate Assessment concluded as follows:

> *"It cannot be concluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the Proposed Project, individually or in combination with other plans and projects, would not be likely to have a significant effect on the following sites:*
>
> - Lough Corrib SAC [000297]
> - Levally Lough SAC [000295]
> - Williamstown Turloughs SAC [002296]
>
> *As a result, an Appropriate Assessment is required, and a Natura Impact Statement shall be prepared in respect of the Proposed Project'.*

The findings presented in the NIS are that,

> '*Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the Proposed Project does not adversely affect the integrity of European sites.*
>
> *Therefore, it can be objectively concluded that the Proposed Project, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.'*

6.8 Cumulative impact

The Proposed Project was considered in combination with other plans and projects in the area that could result in cumulative impacts on Biodiversity. This included a review of online Planning Registers and served to identify past and future plans and projects, their activities and their predicted environmental effects. The projects considered are listed in Chapter 2: Background of the Proposed Project.

6.8.1 Assessment of Plans

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

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

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 peatlands and sustainable land use were also reviewed. An overview of the search results with regard to plans is provided in Table 6-33.

Table 6-33 Assessment of Plans

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on Biodiversity
Ireland's 4th National Biodiversity Action Plan 2023-2030	**Objective 2:** Meet urgent conservation and restoration needs **Outcome 2A:** The protection of existing designated areas and species is strengthened and conservation and restoration within the existing protected are network are enhanced **Outcome 2B:** Biodiversity and ecosystem services in the wider countryside are conserved and restored – agriculture & forestry **Outcome 2C:** Biodiversity and ecosystem services in the wider countryside are conserved and restored – peatlands & climate action **Outcome 2D:** Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored **Outcome 2H:** Invasive alien species (IAS) are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment	The objectives set out in the NBAP aim to protect and enhance and promote biodiversity, nature restoration on the Island of Ireland and also contribute to International biodiversity initiative. Mitigation and enhancement measures as outlined in the EIAR and NIS for the Proposed Project also aim to protect and enhance biodiversity as such no cumulative impacts were identified upon review of the Plan in conjunction with the Proposed Project. The Proposed Project will not contravene the proposed outcomes of the NBAP.
Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032	**Regional Policy Objective (RPO) 5.4:** Encourage the prioritisation of Site-Specific Conservation Objectives (SSCO) for all sites of Conservation Value, designated in EU Directive (i.e. SACs, SPAs) to integrate with the development objectives of this Strategy. **RPO 5.2 (a):** Protect manage and conserve the quality, character and distinctiveness of our Landscapes and seascapes. **RPO 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.	The Northern and Western Regional Assembly Regional Spatial and Economic Strategy was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests. No potential for cumulative effects when considered in conjunction with the current Proposed Project were identified.

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on Biodiversity
	RPO 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. **RPO 5.22:** To protect and conserve our designated peatlands and bogs for reasons of biodiversity, ecosystem services, carbon sinks, areas of habitat importance, amenity and landscape value.	
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 **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.	The Development Plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species, designated sites and other natural heritage interests. A comprehensive Screening for Appropriate Assessment and Natura Impact Statement has been submitted along with this application in which cumulative impacts with regard to European Sites is assessed. The Proposed Project has been designed in order to avoid loss of Annex I habitats and other sensitive habitats where possible. Where loss of treelines, hedgerows, woodlands, scrub, cutover bog or sensitive grassland is necessary, appropriate mitigation and enhancement measures have been incorporated into the Proposed Project through a BMEP to offset these losses and provide a net gain in these habitat types. The BMEP provides for enhancement within the Site through enhancement works on Article 17 degraded raised bog habitats, native woodland replanting, linear vegetation replanting and enhancement of *Molinia* meadows within the Site. During the multi-disciplinary walkover surveys, a search for non-native invasive species was also undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on Biodiversity
	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 this Plan (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.	Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015). The non-native invasive species Rhododendron (*Rhododendron ponticum*) was in several areas of the site as outlined in Section 6.6.1.5. An Invasive Species Management Plan has been prepared along with this planning application and can be found in Appendix 6-4. No potential for negative cumulative impacts when considered in conjunction with the Proposed Project were identified. No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Project.

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on Biodiversity
	NHB 8 Increased Awareness of the County's Biodiversity and Natural Heritage: Facilitate increased awareness of the County's biodiversity and natural heritage through the provision of information to landowners and the community generally, in cooperation with statutory and other partners. **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. **Water Resources (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 dependant 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. **Wetlands, Turloughs, Watercourses and Fens (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,	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on Biodiversity
	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) **Peatlands (P) 1 Protection of Peatlands**: Ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, climate regulation, education and culture, archaeological potential including any ancient walkways (toghers) through bogs. **P 2 Best Practice in Peatland conservation and management:** Work in partnership with relevant stakeholders on all suitable peatland sites to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact Assessment and Appropriate Assessment Screening, as appropriate. **P 3 Framework Plans:** Seek to support relevant agencies such as Bord na Mona in advancing rehabilitation works for the peatlands and related infrastructure, to provide for the future sustainable and environmentally sensitive use of peatlands sites including for amenity purposes. **Invasive Species (IS) 1 Control of Alien Invasive Species:** It is a policy objective of the Planning Authority to support measures for the prevention and eradication of invasive species. **IS 2 Invasive Species Management Plan:** Ensure that proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are currently or were previously present, an invasive species management plan will be required. A landscaping plan will be required for developments near water bodies and such plans must not include alien invasive species. **Trees, Woodlands, Hedgerows and Stone Walls (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	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on Biodiversity
	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 NeighbourWood 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. **Inland Waterways (IW) 1 - Inland Waterways**: **(a)** Protect and conserve the quality, character and features of inland waterways by controlling developments close to navigable and non-navigable waterways in accordance with best practice guidelines. **(b)** Preserve, protect and enhance Galway's inland lakes and waterways for their amenity and recreational resource amenity. **(c)** Protect the riparian zones of watercourse systems throughout the County, recognising the benefits they provide in relation to flood risk management and their protection of the ecological integrity of watercourse systems and ensure they are considered in the land use zoning in Local Area Plans. **(d)** The Planning Authority will support in principle the development and upgrading of the Inland Waterways and their associated facilities in accordance with legislation, best practice and relevant management strategies, key stakeholders and bodies including Waterways Ireland. **(e)** Ensure all abstractions of water will be subject to assessment for compliance with the requirements of Article 6 of the Habitats Directive.	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on Biodiversity
	(f) Seek to provide additional accesses to lake shores and rivers for public rights of way, parking and layby facilities, where appropriate. **(g)** Developments shall ensure that adequate soil protection measures are undertaken,where appropriate, including investigations into the nature and extent of anysoil/groundwater contamination.	

6.8.2 Assessment of Projects

As described in Appendix 2-1 of the EIAR, relevant projects have been assessed in-combination with the proposed wind farm development and include planning applications in the vicinity of the site and 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 this assessment in terms of their potential for impact on biodiversity.

6.8.3 Assessment of Cumulative Effects

The Proposed Project has been considered cumulatively with other plans and projects as described in Sections 6.8.1 & 6.8.2. Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed Project and those that could potentially result in cumulative impacts on designated sites, surface water, habitats and species.

Following the detailed surveys undertaken and impact assessment provided in Section 6.7, it is concluded that there will be no significant residual habitat loss, disturbance or deterioration of water quality, associated with the Proposed Project and therefore it cannot contribute to any cumulative effect when considered in combination with other plans and projects. Other wind farms in the area were considered (among other projects) but the Proposed Project has been deliberately designed to minimise the effects on biodiversity through the siting of the Proposed Project predominantly on habitats of low ecological value. Following bespoke mitigation there will be no significant residual impacts on ecological receptors associated with the Proposed Project and therefore no potential for individual or cumulative negative effects on biodiversity are likely to occur.

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

No significant residual effects as a result of the Proposed Project as a result of the loss of cutover bog, hedgerows, treelines, Molina meadow and woodland habitats has been identified. Therefore, there is no potential for the Proposed Project to contribute to any cumulative effect in this regard.

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.

6.8.4 Conclusion

With the implementation of mitigation measures as outlined in Sections 6.7.2 - 6.7.5 of the Biodiversity Chapter it can be concluded that the Proposed Project will not result in any significant residual effects on any of the identified KERs.

The potential for effects on the European Designated sites is fully described in the NIS that accompanies this application. The NIS concluded 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 an adverse effect 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 biodiversity are not anticipated at any geographic scale.