

6. BIODIVERSITY

6.1 Introduction

This chapter assesses the likely significant effects (both alone and cumulatively with other projects) that the Proposed Development may have on Biodiversity and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified. The residual impacts on biodiversity are then assessed. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976-2022 and EU Habitats Directive 92/43/EEC. Impacts on avian receptors are considered in Chapter 7 of this EIAR. The full description of the Proposed Development is provided in Chapter 4 of this EIAR.

The chapter is structured as follows:

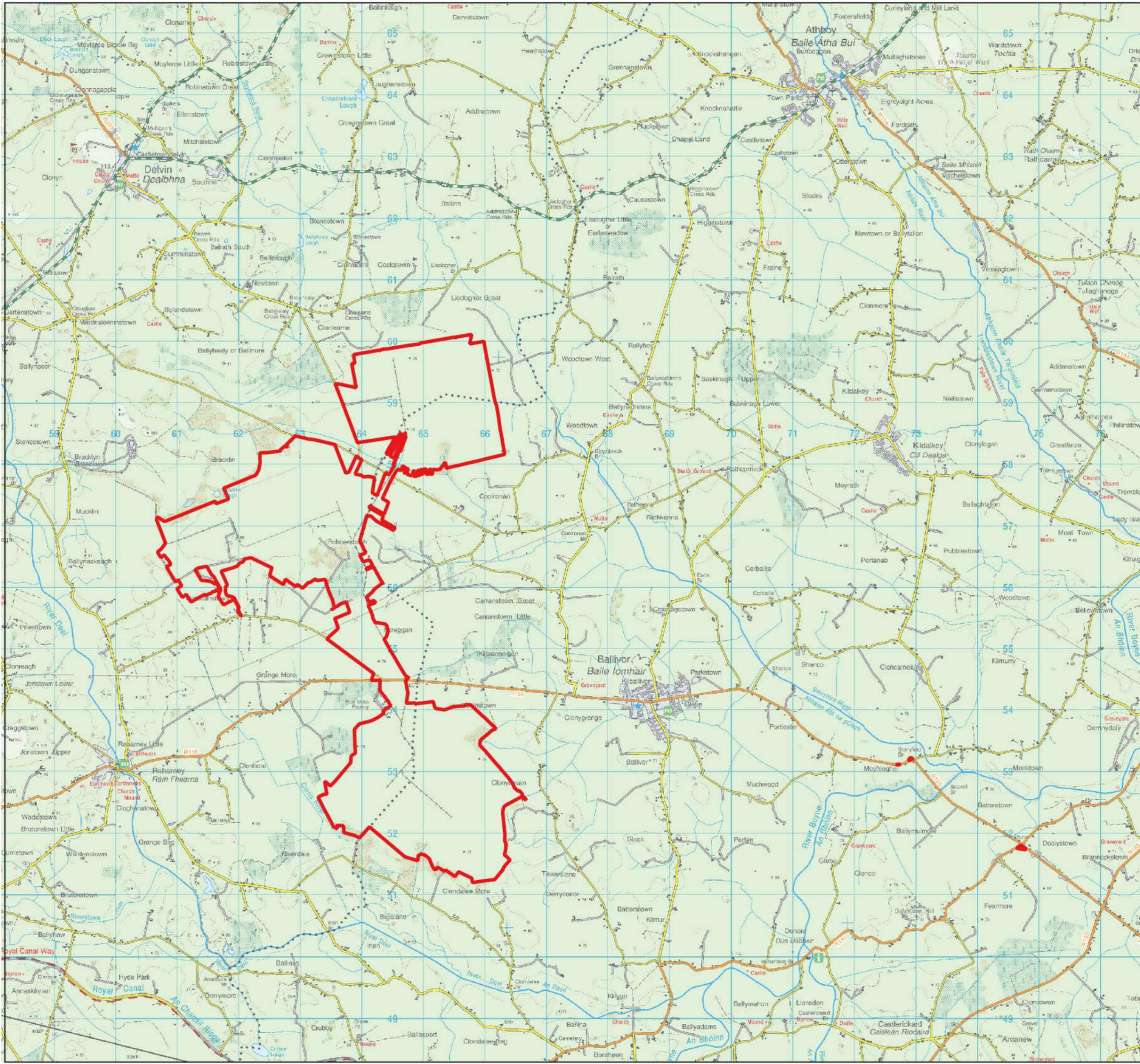
- The Introduction provides a description of the legislation, guidance and policy context applicable to Biodiversity.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant 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 Proposed 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 defined terms are utilised in this chapter:

- As per Chapter 1 of the EIAR, the term ‘Application Site’ refers to the proposed wind farm site and two areas of temporary accommodating works along the haul route as shown in Figure 6-1 below. This is also referred to in this Chapter as the Proposed Development Site/Site Boundary.
- As per Chapter 1 the ‘Wind Farm Site Boundary’ for the purposes of this EIAR corresponds with the red-line boundary of the wind farm site proper and encompasses an area of approximately 1,770 hectares. This is illustrated on Figure 6-2 below.
- As per Chapter 1 of the EIAR, for the purposes of this EIAR, the construction footprint of the entire renewable energy development is referred to as the ‘Proposed Development’. This layout of the Proposed Development is shown in Figure 1-3 of this EIAR.
- The study area for this Biodiversity Chapter is the ‘Application Site’ boundary as shown in Figure 6-1 as well as the watercourses immediately downstream of the Application site.
- “Key Ecological Receptor” (KER) is defined as a species or habitat occurring within the zone of influence of the Proposed 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.



Map Legend

 Application Site Boundary



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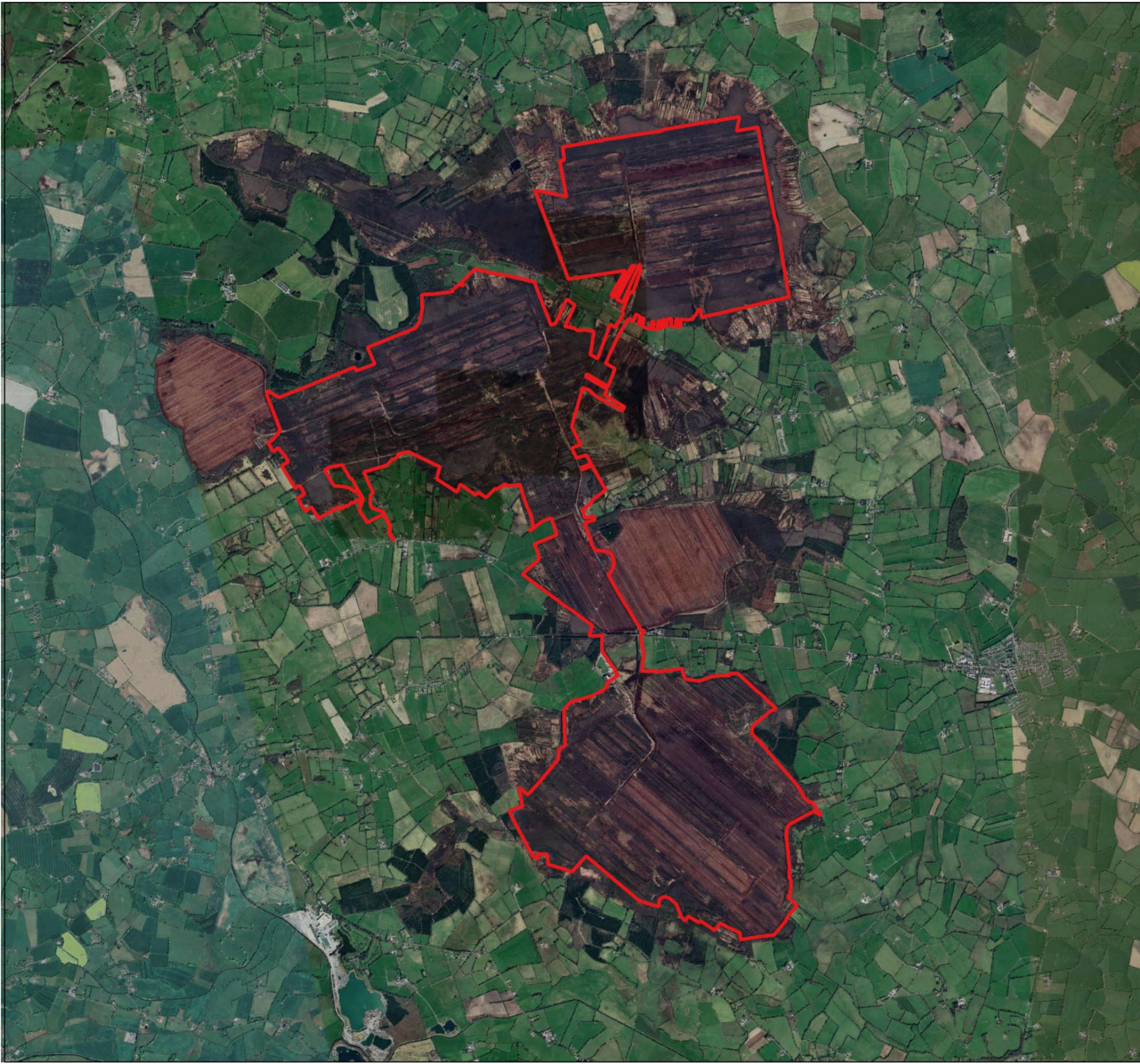
Drawing Title
Application Site Boundary

Project Title
Proposed Ballivor Wind Farm

Drawn By	DOS	Checked By	KM
Project No.	191137	Drawing No.	Figure 6-1
Scale	1:60,000	Date	2023-03-01



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Map Legend

 Site Boundary



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Drawing Title

Wind Farm Site Boundary

Project Title

Proposed Ballivor Wind Farm

Drawn By

DOS

Checked By

KM

Project No.

191137

Drawing No.

Figure 6-2

Scale

1:40,000

Date

2023-03-01



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Requirements for Ecological Impact Assessment

National Legislation

The Wildlife Act, 1976–2022 is the principal piece of national 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 2020. These sites do not form part of the Natura 2000 network of European sites and the Appropriate Assessment (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. However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future (NPWS, 2023).¹

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

The National Biodiversity Action Plan 2017-2021 (NBAP) (Department of Culture, Heritage and the Gaeltacht, 2017) (the “**Plan**”) demonstrates Ireland’s continuing commitment to meeting and acting on its obligations to protect Ireland’s biodiversity for the benefit of future generations through a series of targeted strategies and actions. The main objective of the Plan is to bring biodiversity into the mainstream of policy and decision-making. Objective 1 (*Mainstream biodiversity into decision-making across all sectors*) of the Plan identifies the following relevant measures in relation to future developments:

- “Incorporate into legislation the requirement for consideration of impacts on biodiversity to ensure that conservation and sustainable use of biodiversity are taken into account in all relevant plans and programmes and relevant new legislation;
- Public and Private Sector relevant policies will use best practice in SEA, AA and other assessment tools to ensure proper consideration of biodiversity in policies and plans;
- All Public Authorities and private sector bodies move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting and/or investment in Blue-Green infrastructure;
- Strengthen ecological expertise in local authorities and relevant Government Departments and agencies;
- Local Authorities will review and update their Biodiversity and Heritage Action Plans;
- Local Authorities will review and update their Development Plans and policies to include policies and objectives for the protection and restoration of biodiversity;
- Develop a Green Infrastructure at local, regional and national levels and promote the use of nature based solutions for the delivery of a coherent and integrated network;
- Continue to produce guidance on the protection of biodiversity in designated areas, marine and the wider countryside for Local Authorities and relevant sectors;

¹ <https://www.npws.ie/protected-sites/nha> (accessed 28 February 2023).

- Integrate Natura 2000 and Biodiversity financial expenditure tracking into Government Programmes internal paying agency management procedures including linkage to the Prioritised Action Framework and this NBAP;
- Develop a Natural Capital Asset Register and national natural capital accounts by 2020, and integrate these accounts into economic policy and decision-making;
- Initiate natural capital accounting through sectoral and small scale pilot studies, including the integration of environmental and economic statistics using the framework of the UN System of Experimental-Ecosystem Accounting (SEEA);
- Establish a national Business and Biodiversity Platform under the CBD’s Global Business Partnership;
- Ensure Origin Green produces tangible benefits for biodiversity with increased emphasis on conservation and restoration of biodiversity;
- Implement actions from Ireland’s Biodiversity Climate Change Sectoral Adaptation Plan;
- Identify and take measures to minimise the impact of incentives and subsidies on biodiversity loss, and develop positive incentive measures, where necessary, to assist the conservation of biodiversity;
- Establish and implement mechanisms for the payments of ecosystem services including carbon stocks, to generate increased revenue for biodiversity conservation and restoration;
- Develop and implement a National Biodiversity Finance Plan to set out in detail how the actions and targets of this NBAP will be delivered from 2017 and beyond; and
- Monitor the implementation of the Plan.”

Such policies have informed the evaluation of ecological features recorded within the study area and the ecological assessment process. The draft 4th National Biodiversity Action Plan (NBAP 2023 - 2027) is currently at the public consultation phase.

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 ELAR.

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).

Article 3 of the EIA Directive states that an EIAR must ‘describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: [...] (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC’. Annex IV, point 4 of the EIA Directive requires a “description of the factors specified in Article 3(1) likely to be significantly affected by the project: [...] biodiversity (for example fauna and flora)”

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 Development 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 Report and Natura Impact Statement. A separate assessment has not been carried out in this chapter, to avoid duplication of assessments. However, the relevant conclusions have been cross-referenced and incorporated.

6.3 Relevant Guidance and Sources of Consultation

The assessment methodology is based primarily upon Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine Version 1.2 (CIEEM, 2018, updated 2022) and the National Road Authority’s (NRA)’s *Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2* (TII, 2009a) (referred to hereafter as the NRA Ecological Impact Assessment Guidelines).

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 and survey methodologies 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:

- Bats and onshore wind turbines: survey, Assessment and mitigation (NatureScot August 2021)
- NIEA, Natural Environment Division - Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland (May 2022)
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency (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).
- Guidelines for assessment of Ecological Impacts of National Road Schemes, (TII, 2009a).
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (TII, 2008a).

- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA, 2003).
- Guidance on the preparation of the Environmental Impact Assessment Report (European Commission (EC), 2017)

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).
- Planning and Development Acts 2000 (as amended).

The following legislation applies with respect to non-native species:

- Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

This assessment has taken into account the various planning policies and strategy guidance documents listed below:

- Meath County Development Plans 2021-2027,
- Westmeath County Development Plan 2021-2027
- National Biodiversity Action Plan 2017-2021
- Regional Spatial and Economic Strategy, Eastern and Midland Regional Assembly 2019-2021
- County Westmeath Biodiversity Action Plan 2014-2020
- County Meath Biodiversity Plan 2015-2020

6.3.1 Statement of Authority

This report has been prepared by Sarah Mullen (B.Sc., M.Sc., Ph.D., ACIEEM) with input from Pat Roberts (B.Sc., MCIEEM). Pat Roberts is Principal Ecologist at MKO with over 16 years' experience. He currently manages the ecological team within MKO. Pat holds B.Sc. (Hons) in Environmental Science. He has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage

Sarah holds a B.Sc. (Hons) in Botany, an M.Sc. in Biodiversity and Conservation and a Ph.D. in Botany. Sarah has over 6 years' experience working in ecological consultancy and has extensive experience in undertaking habitat and species surveys and working on Ecological Impact Assessment and Appropriate Assessment for a range of developments including renewable energy, residential and commercial developments.

The baseline ecological surveys undertaken to inform the assessment were undertaken between April 2020 and February 2023 by Pat Roberts (B.Sc., MCIEEM), John Hynes (B.Sc., M.Sc., MCIEEM), Sarah Mullen, Inga Reich (B.Sc., Ph.D.), Patrick Ellison (B.Sc., M.Sc., ACIEEM), Rachel Walsh (B.Sc.), Julie O'Sullivan (B.Sc., M.Sc.), Aoife Joyce (B.Sc., M.Sc.), Luke Dodebier (B.Sc.), Cathal Bergin (B.Sc.)

Neansai O'Donovan (B.Sc.), Neill Campbell (M.Sc.), Laoise Kelly (B.Sc.), Patrick O'Boyle (B.Sc., M.Sc.), Rudraksh Gupta (B.Sc., M.Sc.) and Kailan Mitchell (B.Sc.) of MKO.

MKO ecologists are trained in field ecology and are competent experts in undertaking botanical and faunal surveys.

The hydrological assessment which is included as Chapter 9 of the EIAR which accompanies the planning application for the Proposed Development, and the results of which have informed the conclusions of this assessment, has been prepared by Michael Gill (BA, BAI, Dip Geol., MSc, MIEI), Adam Keegan (B.Sc., M.Sc.) and Conor McGettigan (B.Sc., M.Sc.) of Hydro Environmental Service (HES).

6.4 Methodology

The following sections describe the methodologies followed to establish the baseline ecological condition of the Proposed Development Site as shown on Figure 6-1. Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

6.4.1 Desk Study

The desk study undertaken for this assessment included a thorough review of available ecological data pertaining to the Proposed Development Site and the wider area including the following:

- Review of NPWS Article 17 Metadata and GIS Database Files
- 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 (non-vascular, seedless plants including mosses, liverworts and hornworts)– as per NPWS online map viewer; Flora Protection Order Map Viewer – Bryophytes².
- Review of relevant Plans, including the National Biodiversity Action Plan 2017-2021, County Biodiversity Plan and the All-Ireland Pollinator Plan 2021-2025.
- Review of bat species and roost records from the Bat Conservation Ireland (BCI) Private Database.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Review of specially requested records from the NPWS Rare and Protected Species Database for the 10km grid squares (hectads) in which the Proposed Development is located.
- Review of National Bat Database of Ireland (Bat Conservation Ireland).
- Bord na Móna Draft Cutaway Bog Decommissioning and Rehabilitation Plans for Ballivor Bog Group:
 - Ballivor Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan
 - Bracklin Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan
 - Lisclogher-West Draft Cutaway Bog Decommissioning and Rehabilitation Plan
 - Lisclogher Draft Cutaway Bog Decommissioning and Rehabilitation Plan
 - Carranstown Draft Cutaway Bog Decommissioning and Rehabilitation Plan
- Bord na Móna Habitat Mapping for the Ballivor Bog Group

² NPWS, 2023, Online map viewer; Flora Protection Order Map Viewer – Bryophytes. Online, Available at: <http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e>.

- The Ballivor Bog Group site was subject to detailed habitat surveys by Bord na Móna ecologists between 2011 and 2012 (with follow-up site visits in subsequent years as outlined below) and detailed habitat maps were prepared.
 - Ballivor Bog: Site surveyed and mapped December 2011, May 2012. Follow up visits between 2011 and 2021 and habitat maps updated where required.
 - Bracklin Bog: Site surveyed and mapped July 2012. Additional walkover surveys undertaken between 2015-2017 and habitat maps updated where required.
 - Lisclogher Bog: Site surveyed and mapped April 2010. Additional walkover surveys undertaken between 2010 and 2017 and habitat map updated where required.
 - Lisclogher West: Site surveyed and mapped July 2012. Additional site visits undertaken between 2012 and 2016 (visited winter 2016/2017) and habitat maps updated where required.
 - Carranstown Bog: Site surveyed and mapped July 2012. Additional walkover surveys undertaken between 2012 and 2021 and habitat maps updated where required.

6.4.2 Scoping and Consultation

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

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

Table 6-1 Organisations consulted with regard to biodiversity

Consultee	Contact	Response	Where addressed in EIAR
An Taisce	Posted 08.05.2020; 14.05.2021	No reply	NA
Bat Conservation Ireland	Posted 08.05.2020; 14.05.2021	No reply	NA
Birdwatch Ireland	Emailed 7.5.2020 & 12.02.2021	No reply	Potential for impacts on avian receptors are assessed in Chapter 7 of this EIAR.
Butterfly Conservation Ireland	Emailed 08.05.2020 & 12.02.2021	No reply	NA
Department of Communications, Climate Action and the Environment		Response pertaining to Geological survey Ireland.	Please see chapter 8 Land, Soil and Geology
Inland Fisheries Ireland	Emailed 08.05.2020 2020 & 12.02.2021	Response received on the 19 th May 2021 and is included in Appendix 2-1 of this EIAR. Observations related to watercourse crossings, instream works, pollution control measures and biosecurity.	The description of proposed watercourse crossings are included in the CEMP in Appendix 4-3 of the EIAR. The potential impacts on water quality are assessed Chapter 9 'Hydrology' of the EIAR and summarised in Sections 6.7.3.1.1 and 6.7.4.1.1 below. Mitigation measures to ensure that there will be no significant impacts on water quality are outlined in full in Chapter 9 and in the CEMP in Appendix 4-3 of the EIAR.

Consultee	Contact	Response	Where addressed in EIAR
Irish Peatland Conservation Council	Emailed 08.05.2020 & 12.02.2021	No reply	NA
Irish Raptor Study Group	Emailed 08.05.2020 & 12.02.2021	No reply	NA
Irish Red Grouse Association	Posted 08.05.2020; 14.05.2021	No reply	NA
Irish Wildlife Trust	Emailed and posted 12.02.2021	Replied- IWT does not have the capacity to reply to scoping requests	NA
Development Applications Unit-NPWS	Emailed 07.05.2020	<p>Nature Conservation</p> <p>1. Cumulative impacts- this appears to suggest that the only cumulative impacts which will be considered are those with other wind farms within 20km of the proposed site. This would not adequately assess the potential impacts on wide ranging species especially those in migration such as geese and swans. Also cumulative effects should include more than just multiple wind farm effects. The cumulative effects of the Proposed Development with other types of projects should be considered. The indirect effects of the demands for resources to supply and build the development and the impacts these may have elsewhere should be assessed.</p>	A Cumulative Impact Assessment is undertaken in Section 6.8 of this chapter.
		<p>2. Interactions with the Proposed Development and the on-going peat extraction activities at the sites and any impacts arising should be considered. Also detailed rehabilitation plans should be prepared for the peatlands concerned within and adjacent to the proposed site and the potential impacts of the Proposed Development on rehabilitation of the peatlands should be considered and assessed in an EIAR. Hydrological changes which may prevent future rehabilitation of suitable areas of the site to peat forming habitat are of particular concern.</p>	<p>This is assessed in the Cumulative Impact Assessment in Section 6.8</p> <p>In relation to hydrology, a detailed Hydrological Assessment has been undertaken in Chapter 9 of this EIAR.</p>

Consultee	Contact	Response	Where addressed in EIAR
		3. In deciding on the proposed layout of the Proposed Development, in addition to those proposed, adequate buffers should also be placed around important habitats and species in the locations identified in flora and fauna studies.	The Proposed Development has been designed to avoid the most ecologically sensitive habitats within the site including the main areas of remnant raised bog and the vast majority of woodland habitat within the site.
		4. The EIAR should adequately address the potential impacts to determine local and international bird migration over the proposed site, particularly nocturnal migrants outlined in https://www.nature.scot/sites/default/files/2017-09/Guidance%20note%20-%20Guidance%20on%20methods%20for%20monitoring%20bird%20populations%20at%20onshore%20windfarms.pdf should be carried out.	The potential impact on bird species is assessed in full in Chapter 7 of this EIAR.
		5. Passive bat surveying at height should be undertaken to document highflying species such as Leisler bat. Risk to bats in terms of collision and barotrauma should be addressed.	Details of and results from extensive bat surveys of the site are described in the Bat Survey Report in Appendix 6-2 of the EIAR.
		6. The EIAR should include a robust post development mitigation monitoring plan.	A detailed mitigation and monitoring plan is included as Chapter 17 of the EIAR.
Office of Public Works (OPW)	Posted 07.05.202; 14.05.2021	No reply	NA
The Heritage Council	Emailed 08.05.2020 2020 & 12.02.2021	No reply	NA
Waterway's Ireland	Emailed 08.05.2020	14.05.2020- stated no lands here under their jurisdiction.	NA

6.4.3 Field Surveys

A comprehensive survey of the biodiversity of the application site was undertaken on various dates set out below, between April 2020 and February 2023. Detailed ecological surveys of the Ballivor Bog Group were undertaken previously by Bord na Móna ecologists between 2011 and 2012 and updated in subsequent years as detailed in Section 6.4.1 above. A detailed habitat map of the site was produced. The habitat map of the Ballivor Bog Group provided by Bord na Móna was used to set the baseline and inform the surveys undertaken by MKO. 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 of the Proposed Development Site were undertaken on the 23rd April, 26th May, 4th June, 16th June, 20th July and 3rd September 2020, on the 26th and 27th May, the 8th and 15th July and 27th September 2021, on the 26th April and 26th September 2022 and on the 16th February 2023 in order to ground-truth the habitat-mapping provided by Bord na Móna, based on their ecological surveys of the site in 2011 and 2012 and to detect the presence, or likely presence, of a range of protected habitats and species.

The Bord na Móna ecology team originally classified the habitats on site according to the Bord na Móna habitat classification system, provided in Appendix 6-1. Correspondence with the Heritage Council's '*Guide to Habitats in Ireland*' (Fossitt, 2000) is also described in Appendix 6-1. Habitats recorded within the site by MKO during the walkover surveys were classified according to the guidelines set out in '*A Guide to Habitats in Ireland*' (Fossitt, 2000), which classifies habitats based on the vegetation present and management history. The survey timings fall within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011).

The surveys included a search for badger setts and areas of suitable habitat for the species, potential features likely to be of significance to bats and additional habitat features for the full range of other protected species that are likely to occur in the vicinity of the Proposed Development (e.g. otter etc.). In addition, an inventory of other species of local biodiversity interest was compiled including invertebrates (butterflies, dragonflies, damselflies, beetles), plants, fungi, etc.

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

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

Other targeted survey methodologies undertaken at the site are described in the following subsections.

6.4.3.2 Dedicated Habitat and Vegetation Composition Surveys

Detailed botanical surveys and habitat classification for all wind farm infrastructure, including turbine, road infrastructure, sub-stations, and borrow pits were undertaken on the 26th and 27th of May 2021 and 27th September 2021. In addition, detailed botanical surveys were undertaken at a number of representative habitats outside the infrastructure footprint but within the study area boundary on these dates and on 26th September 2022. Vegetation was sampled by taking botanical quadrats/relevés (i.e. list

of plants in a delimited plot). The quadrat locations are shown in Figure 6-3. Relevés were 4x4 metres for all habitats except for woodland which were 10x10 metres (Smith and Crowley 2020). The extent of each habitat on site was mapped using aerial photography, hand-held GPS and smartphone technology. A representative photograph was also taken for each of the habitats recorded on site, including all relevés.

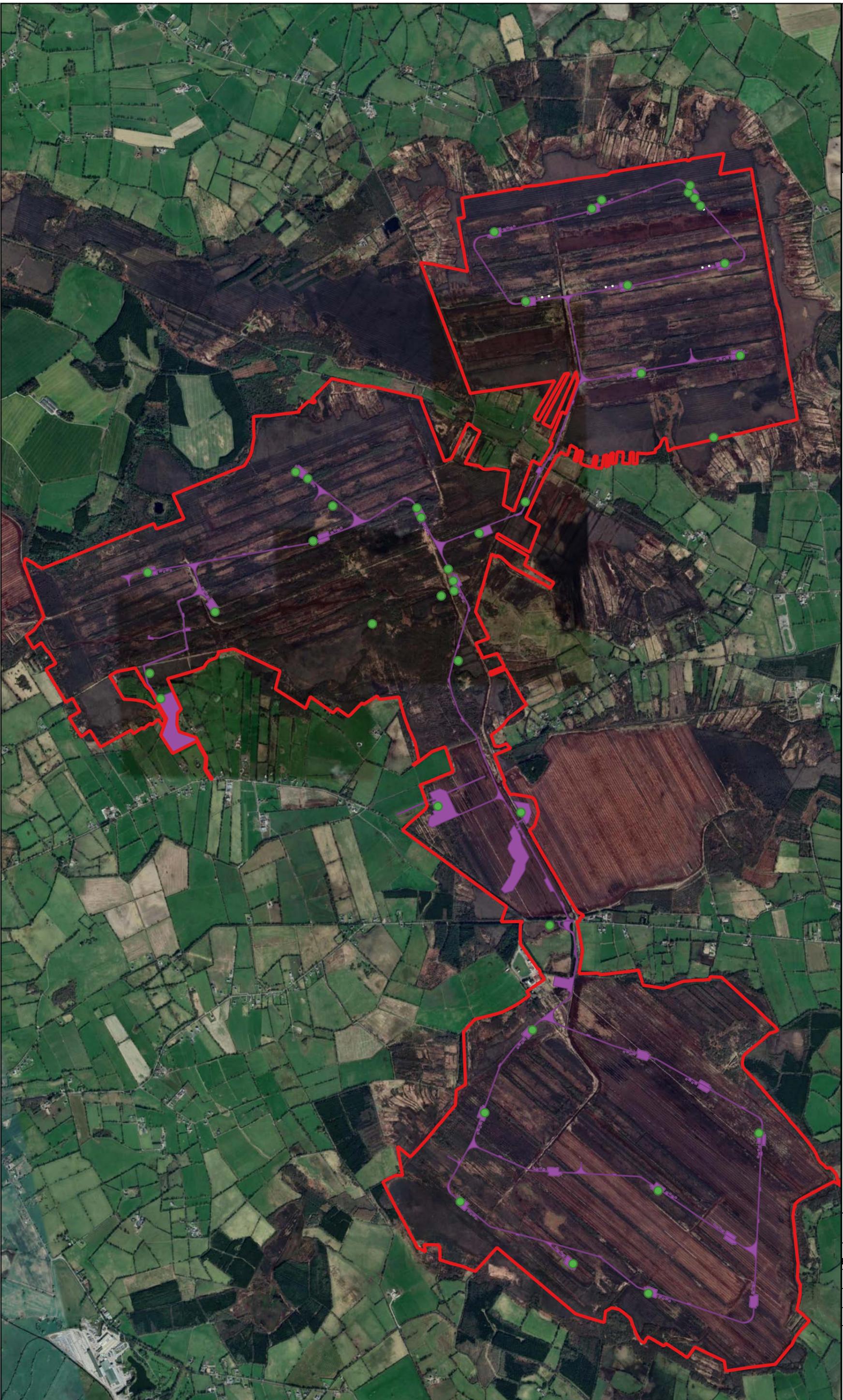
All habitats recorded on site and described in this EIAR chapter have been classified in accordance with Fossitt (2000). Full details of all the botanical surveys and results are provided in Appendix 6-1 and an assessment of the potential for the site to support Annex I habitats is also provided in this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

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 128. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Cross, J. & Lynn, D. (2013) *Results of a monitoring survey of bog woodland*. Irish Wildlife Manuals, No. 69. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- 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.
- Commission of the European Communities (2007) *Interpretation manual of European Union habitats*. Eur 27. European Commission DG Environment.
- NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. 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

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).

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



Map Legend

- Internal Infrastructure
- Releve Locations

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Relevé Locations	
Project Title	
Ballivor Wind Farm Development	
Drawn By	Checked
SM	PR
Project No.	Drawing No.
191137	Figure 6-3
Scale	Date
1:25000	24.03.2023


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6.4.3.3 Terrestrial Fauna Surveys

The results of the desk study, scoping replies and incidental records of protected species recorded during multidisciplinary walkover surveys were used to inform the scope of targeted ecological surveys required. Based on the above, dedicated surveys for marsh fritillary, bats, otter and badger were undertaken at the times set out below with the methodologies followed also provided below. Following the completion of ecological walkover surveys, no requirement for further dedicated faunal surveys was identified. During the multidisciplinary walkover surveys, records of invertebrates including butterflies, damselflies, dragonflies, moths, beetles etc. were recorded.

6.4.3.3.1 Badger Survey

Areas identified as providing potential habitat for badger were subject to specialist targeted survey. Dedicated badger surveys were conducted on the 26th and 27th May 2021 and the 8th and 15th July 2021. The badger surveys covered the entire development footprint and surrounding suitable habitats in the application site. The badger survey was not constrained by vegetation given the nature of the habitats within the site (NRA 2006a).

The badger surveys were conducted in order to determine the presence or absence of badger signs within and in close proximity to the development footprint. This involved a search for all potential badger signs as per NRA (2009) (latrines, badger paths and setts). If encountered, setts would be classified as per the convention set out in NRA (2009) (i.e. main, annexe, subsidiary, outlier).

The badger survey was conducted adhering to best practice guidance (NRA, 2009) and 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, 2013³).

Camera traps

Camera traps were deployed at the location of a badger sett identified within the study area during dedicated badger surveys undertaken on the 26th and 27th May 2021 to determine whether the sett was in use. The camera traps were deployed for seven days. The locations of the badger sett are shown in Figure 6-10.

6.4.3.3.2 Otter Survey

Dedicated otter surveys were conducted on the 26th and 27th May, 8th July and 27th September 2021 of the watercourses within the Proposed Development Site which were identified as providing suitable habitat for otter. Additional otter surveys were undertaken by Ross Macklin of Triturus Environmental Ltd. during aquatic surveying of the watercourses downstream of the Proposed Development Site in July 2021.

The otter surveys were conducted as per TII (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, 2013⁴).

³ CIEEM, 2013, *Technical Guidance Series – Competencies for Species Survey*, Online, Available at: <https://cieem.net/resource/competencies-for-species-survey-css/> Accessed: 20.03.2021

6.4.3.3.3 Marsh Fritillary Surveys

Following the identification of suitable habitat for marsh fritillary within the Proposed Development Site during walkover surveys undertaken in 2020, as well as the results of the desk study, targeted larval web surveys for the species were undertaken on the 3rd September 2020, 27th September 2021 and 26th September 2022. The surveys were undertaken within the optimal period for undertaking marsh fritillary larval web surveys, i.e. August – September, on dry days, with no rain and no to little wind.

The survey methodology followed that described in the NRA (2009) best practice guidance document. This involved walked surveys to identify suitable areas of marsh fritillary habitat within or adjacent to the development footprint as the Proposed Development had the potential to impact on this species in areas where the development footprint overlaps with or is adjacent to suitable habitat for the species. Walked transects were undertaken of potentially suitable habitat within and adjacent to the Proposed Development footprint to search for larval. Areas of suitable habitat were also mapped as part of the survey effort and informed the footprint of the Proposed Development.

6.4.3.3.4 Bat Surveys

A detailed description of bat survey methodologies undertaken at the Proposed Development Site during 2022 is provided in the bat survey report in Appendix 6-2 along with dates and details of all surveyors.

Surveys carried out in 2022 in accordance with NatureScot, 2021⁵, form the core dataset for the assessment of effects on bats. 2022 results are supplemented by data collected during surveys undertaken on the Site in 2020 and designed in accordance with SNH, 2019⁶ Guidelines. The surveys included bat walkover surveys to assess the suitability of the site to support roosting, foraging and commuting bats and roost surveys, manual walked transects and ground-level static surveys in 2022.

Suitability of the Proposed Development Site to support bats was assessed according to Collins (2016) which provides a grading protocol for roosting habitats and for commuting and foraging areas. Suitability categories are divided into *High*, *Moderate*, *Low* and *Negligible*, and are described fully in Appendix 1 of the bat survey report in Appendix 6-2.

The surveys and assessment provided in the bat survey report has been designed in accordance with NatureScot 2021. Consideration was also given to the Northern Ireland Environment Agency (NIEA) Natural Environment Division (NED) Guidance⁷, which was produced in August 2021 (amended May 2022).

⁵ NatureScot published *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*. Version: August 2021 (NatureScot, 2021).

⁶ Scottish Natural Heritage published *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation* (SNH 2019).

⁷ Northern Ireland Environment Agency Natural Environment Division (NED) published *Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland* (NIEA, 2021).

6.4.3.3.5 Aquatic surveys

Aquatic surveys of the watercourses draining the Proposed Development Site were conducted by Ross Macklin of Triturus Environmental Ltd. in July 2021. A total of 20 sites were surveyed. The site locations are shown in Figure 2.1 of the Aquatic Report in Appendix 6-2.

The surveys included Biological Water Quality (Q sampling) which was assessed through kick sampling, electrofishing, a white-clawed crayfish survey, otter survey and an aquatic habitat assessment at each location which assessed watercourses in terms of:

- Physical watercourse/waterbody characteristics (i.e., width, depth etc.)
- Substrate type, listing substrate fractions in order of dominance (i.e., bedrock, boulder, cobble, gravel, sand, silt etc.)
- River profile in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition

The methodologies for the aquatic surveys are described within the aquatic report.

6.4.3.3.6 Invasive species survey

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

6.4.3.3.7 Survey limitations

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

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

6.4.4 Methodology for Assessment of Impacts and Effects

6.4.4.1 Identification of Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following a comprehensive desk study, site visits and stakeholder consultation; “Key Ecological Receptors” likely to occur in the zone of influence of the Proposed Development were identified. The receptors included habitats and species that are protected under the following legislation:

- Annexes of the EU Habitats Directive.
- Species or habitats listed as Qualifying Interests (QIs) for Special Areas of Conservation (SAC) or Special Conservation Interests (SCIs) for Special Protection Areas (SPAs) within the likely zone of influence of the Proposed Development.
- National Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs)
- Species protected under the Wildlife Acts 1976-2022.

- Species protected under the Flora Protection Order 2022.

6.4.4.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the ‘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 scale:

- 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 Development has potential to 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). These guidelines are the industry standard for the completion of Ecological Impact Assessment in the UK and Ireland. This chapter has also been prepared in accordance with the corresponding EPA guidance (EPA 2022). The headings under which the impacts are characterised follow those listed in the CIEEM (2018) guidance document and are applied where relevant. The impact characteristics considered in the assessment are provided below:

- **Positive or Negative.** Assessment of whether the Proposed Development results in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** Refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- **Duration** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.

- **Frequency and Timing.** This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility.** This is a consideration of whether an effect is reversible within a ‘reasonable’ timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

6.4.4.4 Determining the Significance of Effects

The ecological significance of the effects of the Proposed Development 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.

The EPA Guidelines on information to be included in Environmental Impact Assessment Reports (EPA, 2022) and the *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009) were also considered when determining significance and the assessment is in accordance with those guidelines. The terminology used in the determination of significance follows the suggested language set out in the EPA Guidelines (2022) as shown in Table 6-3.

Table 6-2 Criteria for determining significance of effect, based on (EPA, 2017) guidelines

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

As per TII (NRA, 2009) and CIEEM (2018) best practice guidelines, the following key elements should also be examined when determining the significance of effects:

- The likely effects on ‘integrity’ should be used as a measure to determine whether an impact on a site is likely to be significant (NRA, 2009).
- A ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2018).

Integrity

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

Conservation status

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

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

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

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

The conservation of a species is favourable when:

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

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

6.4.4.5 Incorporation of Mitigation

Section 6.7 of this EIAR assesses the potential effects of the Proposed Development 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 or offset potential significant residual effects, post mitigation.

6.5 Establishing the Ecological Baseline

6.5.1 Desk Study

The following sections describe the results of a survey of published material that was consulted as part of the desk study for the purposes of the ecological assessment. It provides a baseline of the ecology known to occur in the existing environment.

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 Development

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

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European Sites'. The potential for significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the AA Screening Report and Natura Impact Statement that accompanies this application. As per EPA Guidance 2022 *"a biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process"* but should *"refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive"*. Section 6.7.2 of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites.

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

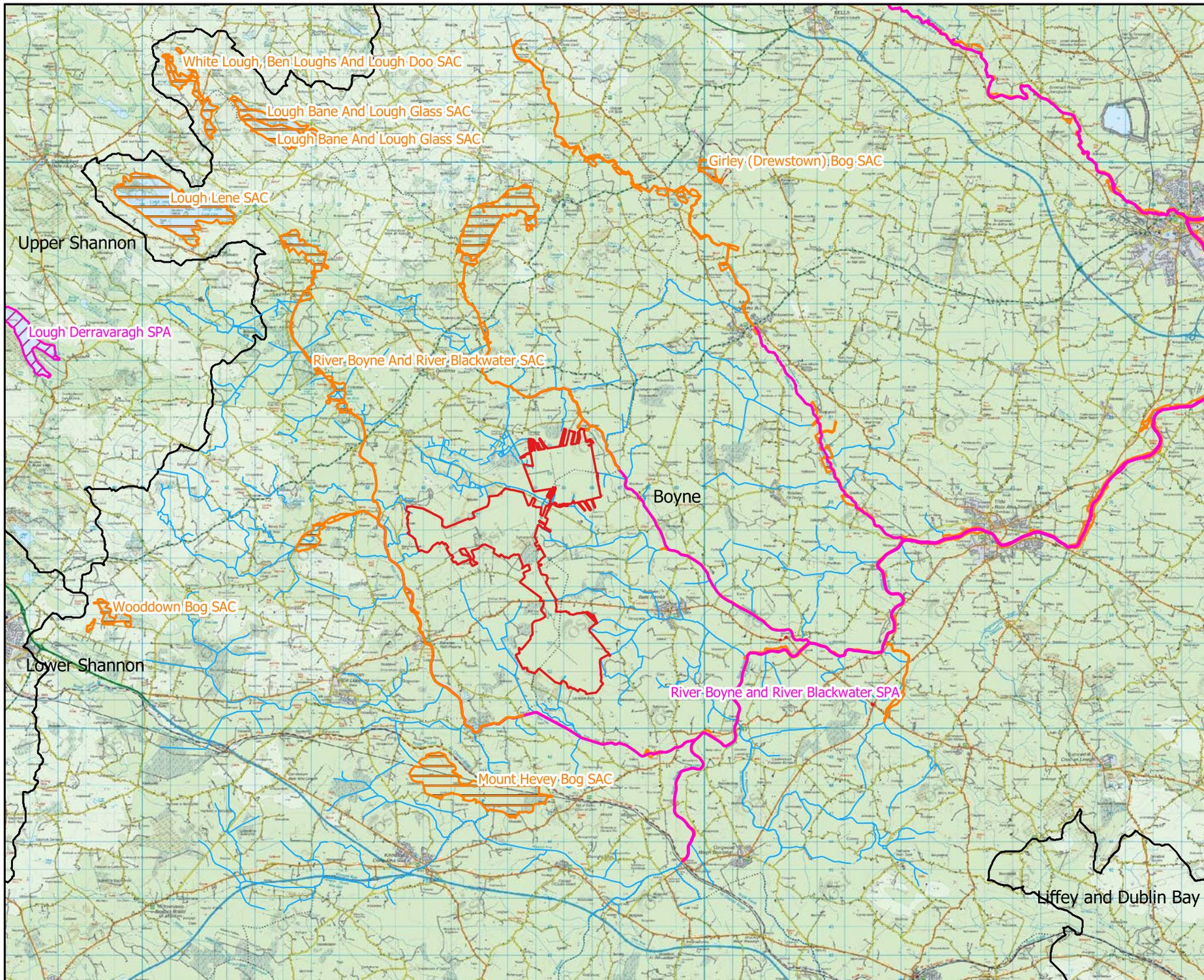
Proposed Natural Heritage Areas (pNHAs) were listed on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this chapter.

The following methodology was used to establish which sites that are designated for nature conservation are within the Likely Zone of Influence of the Proposed Development and have the potential to be impacted by the Proposed Development:

- 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 22/03/2023. The datasets were utilised to identify Designated Sites which could feasibly be affected by the Proposed Development. All Designated Sites that could potentially be affected were identified using a source-pathway-receptor model. To provide context for the assessment, Designated Sites surrounding the Proposed Development Site are shown on Figure 6-4 and 6-5.
- The catchment mapping was used to establish or discount potential hydrological connectivity between the site of the Proposed Development and any Designated Sites. The hydrological catchments are also shown in Figures 6-4 and 6-5.

- Table 6-3 provides details of all relevant European and Nationally designated sites as identified in the preceding steps and assesses which are within the likely Zone of Influence. 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 22/03/2023.

Where potential pathways for significant effect are identified, the site is included within the Likely Zone of Influence and further assessment is required.



Map Legend

- Proposed Development site
- WFD Watercourses
- WFD Catchments
- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)

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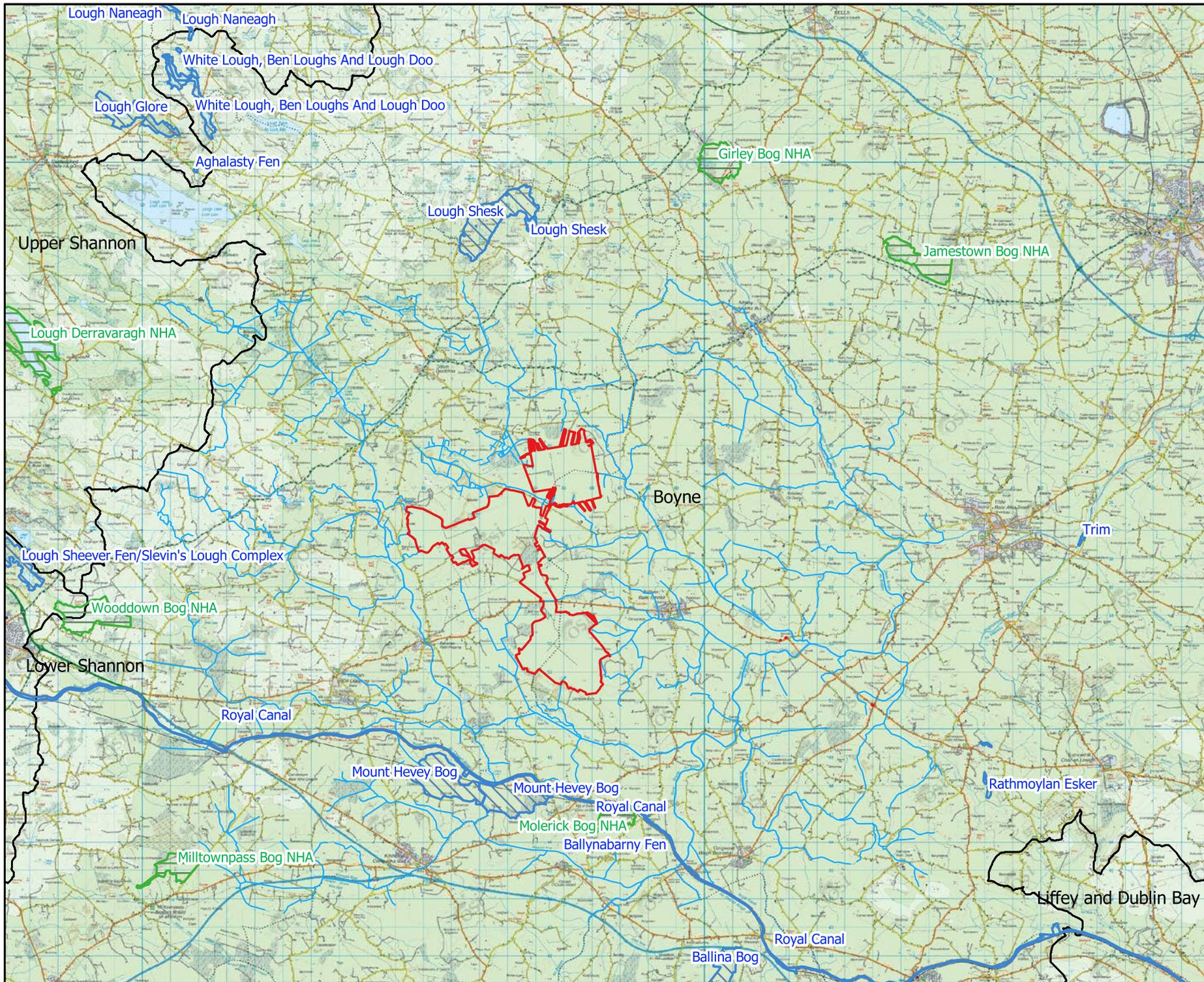


Drawing Title
EU Designated Sites surrounding the Proposed Development site

Project Title
Proposed Ballivor Windfarm

Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137	Figure 6-4
Scale	Date
1:175000	2023.03.24

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- ### Map Legend
- Proposed Development site
 - WFD Watercourses
 - WFD Catchments
 - Natural Heritage Areas (NHAs)
 - Proposed Natural Heritage Areas (pNHAs)



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Drawing Title	
National Designated Sites surrounding the Proposed Development site	
Project Title	
Proposed Ballivor Windfarm	
Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137	Figure 6-5
Scale	Date
1:175000	2023.03.24



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

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Special Area of Conservation		
River Boyne and River Blackwater SAC [002299]	412m North-East	<p>This European Site is located adjacent to the application site boundary at its closest point. Taking a precautionary approach, a potential pathway for direct effects on the QI otter where they occur outside the SAC as a result of ex-situ habitat loss within the Proposed Development Site was identified. Direct habitat loss could potentially occur if any otter resting or breeding sites are present within small watercourses within the construction footprint at the time of construction works. Taking a precautionary approach, a potential pathway for indirect effects on otter as a result of disturbance during construction works was also identified.</p> <p>There is hydrological connectivity between the Proposed Development and this SAC via watercourses within and adjacent to the site boundary which discharge to the Stonyford River to the east and the Deel (Raharney) River to the south-west, both of which are designated as part of the SAC at this location.</p> <p>Following the precautionary principal, given that there is hydrological connectivity between the Proposed Development and the SAC, a potential pathway for indirect effects on the aquatic QIs of this SAC was identified. The Proposed Development has the potential to cause deterioration in water quality due to run off of and infiltration of pollutants, including silt, hydrocarbons and cement-based products, during construction activities associated with the Proposed Development. These include construction of turbine hardstands, windfarm access roads, substations, borrow pits and amenity paths and associated carparks and other associated activities. There is also potential for run-off of pollutants from turbine hardstand areas, access tracks and any other hard surfaces during the operational phase of the development as well as during activities associated with the decommissioning of the Proposed Development.</p> <p>The works along the proposed haul route will include temporary road widening works at two locations to facilitate turbine component delivery. Although there is no direct hydrological connectivity between these works and the SAC, and the SAC or nearest watercourse with connectivity to the SAC is located >200m from any land take/road</p>

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		<p>widening works, taking the precautionary approach, there is potential for indirect effects on the aquatic QIs of the SAC due to deterioration in water quality as a result of overland release of silt laden waters or accidental spillage of hydrocarbons, during road widening works along the proposed haul route.</p> <p>This SAC is therefore within the likely zone of influence of the Proposed Development and following the precautionary principle the potential for significant effects on the SAC exists. The potential for adverse effects on this European Site is fully assessed in the Natura Impact Statement (NIS) which accompanies the planning application for the Proposed Development .</p>
Mount Hevey Bog SAC [002342]	3.4 km South-West	<p>No hydrological or habitat connectivity was identified between the Proposed Development Site and these SACs.</p> <p>There is no surface water or habitat connectivity between the Proposed Development and these SACs. Surface water from the Proposed Development Site drains to the Deel (Raharney) River to the west and south of the site and to the Stonyford River to the east of the site, both of which discharge to the River Boyne which in turn flows east before discharging to the Irish Sea >70km downstream of the site. These SACs are not designated for ground-water dependent habitats or species and therefore no potential for indirect effects via groundwater pathways was identified.</p> <p>Given the absence of habitat and hydrological connectivity and the distance between the Proposed Development and these SACs, there is no potential for indirect effects on these European Sites.</p> <p>These SACs are therefore not within the likely zone of influence of the Proposed Development.</p>
Girley (Drewstown) Bog SAC [002203]	10.3 km North-East	
Wooddown Bog SAC [002205]	11.4 km West	
Lough Lene SAC [002121]	13 km North-West	<p>There will be no direct effects as these European Sites lie entirely outside of and >13km from the Proposed Development Site.</p> <p>There is no hydrological connectivity between the Proposed Development and these SACs, which are located in a different surface water sub-catchment to the majority of the Proposed Development Site. Given the absence of</p>
Lough Bane and Lough Glass SAC [002120]	13.4 km North-West	
White Lough, Ben Loughs and Lough Doo SAC [001810]	15.8 km North-West	

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		<p>hydrological connectivity and the distance between the Proposed Development and these SACs, there is no potential for indirect effects on these European Sites.</p> <p>These SACs are therefore not within the likely zone of influence of the Proposed Development.</p>
<p>Boyne Coast and Estuary SAC [001957]</p>	<p>48km North-East >70km downstream</p>	<p>No pathway for direct effects was identified as this European Site lies entirely outside of and approximately 48km from the Proposed Development Site boundary.</p> <p>The potential for the development to result in indirect effects on this European Site was considered. There is hydrological connectivity between the Proposed Development and this SAC via watercourses within and adjacent to the site boundary which discharge to the Stonyford River to the east and the Deel (Raharney) River to the south-west. These discharge to the River Boyne which in turn discharges to the SAC. The SAC is located >70km downstream of the Proposed Development Site and designated for coastal habitats. Given the significant distance between the development and the SAC, and the attenuation properties of the intervening watercourses, no potential for significant indirect effects on this European Site was identified.</p> <p>There is no potential for significant effect on this European Site. It is not located within the zone of likely influence and no further assessment is required.</p>
<p>Special Protection Areas (SPA)</p>		
<p>River Boyne and River Blackwater SPA [00232]</p>	<p>486m East</p>	<p>This European Site is located approximately 486m from the Proposed Development Site boundary at its nearest point. Taking a precautionary approach, a potential pathway for direct effects on the SCI species kingfisher, where it occurs outside the SAC, as a result of ex-situ habitat loss within the Proposed Development Site was identified. If Kingfisher nesting habitat is present within the Proposed Development Site at the time of construction, there is potential for loss of this habitat during windfarm construction works.</p> <p>Taking a precautionary approach, a potential pathway for indirect effects on kingfisher as a result of disturbance during the construction phase of the development and collision risk during the operational stage of the development was also identified and considered.</p>

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		<p>There is hydrological connectivity between the Proposed Development and this SPA via watercourses within and adjacent to the site boundary which discharge to the Stonyford River to the east, the Deel (Raharney) River to the south-west, both of which are designated as part of the SPA at this location.</p> <p>The Proposed Development has the potential to cause deterioration in water quality due to run off of and infiltration of pollutants, including silt, hydrocarbons and cement-based products, during construction activities associated with the Proposed Development. These include construction of turbine hardstands, windfarm access roads, substations, borrow pits and amenity paths and associated carparks and other associated activities. There is also potential for run-off of pollutants from turbine hardstand areas, access tracks and any other hard surfaces during the operational phase of the development as well as during activities associated with the decommissioning of the Proposed Development. Deterioration of water quality could potentially affect availability of food resources for kingfisher.</p> <p>The works along the proposed haul route will include temporary road widening works at three locations to facilitate turbine component delivery. Although there is no direct hydrological connectivity between these works and the SPA, and the SPA or nearest watercourse with connectivity to the SPA is located >200m from any land take/road widening works, taking the precautionary approach, there is also potential for indirect effects on the SPA due to deterioration in water quality as a result of overland release of silt laden waters.</p> <p>This SPA is therefore within the likely zone of influence of the Proposed Development and following the precautionary principle the potential for significant effects on the SPA. The potential for adverse effects on this European Site is fully assessed in the Natura Impact Statement (NIS) which accompanies the planning application for the Proposed Development.</p>
Lough Derravaragh SPA [004030]	13.4km North-West	There will be no direct effects as this European Site lies entirely outside of and >13km from the development footprint.

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		<p>There is no hydrological connectivity between the Proposed Development and the SPA which is located in a different surface water catchment to the Proposed Development. Therefore no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>The Proposed Development Site lies outside the core foraging distance of the SCI species Whooper swan (core range of <5km) as per Scottish Natural Heritage Guidelines (SNH, 2016) and following extensive bird surveys undertaken by MKO (detailed in Chapter 7 ‘Ornithology’ of this EIAR), there is no evidence to suggest that the Proposed Development Site lies on a migratory/regular commuting route for this species.</p> <p>None of the other SCI species were recorded utilising the site in significant numbers and the site does not support significant suitable habitat for pochard or tufted duck. Taking the above into consideration and given the distance between the Proposed Development and the SPA, i.e. >13km, there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the Proposed Development.</p> <p>Similarly, taking the above into consideration, there is no potential for significant effects on the SCI species of the SPA due to increased collision risk during the operational stage of the Proposed Development.</p> <p>There is no potential for significant effect on this European Site. It is not located within the zone of likely influence and no further assessment is required.</p>
Lough Owel SPA [004030]	18.3km West	<p>There will be no direct effects as this European Site lies entirely outside of and >18km from the development footprint.</p> <p>There is no hydrological connectivity between the Proposed Development and the SPA which is located in a different surface water catchment to the Proposed Development. Therefore no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>During the extensive bird surveys undertaken by MKO, shoveler was not recorded utilising the site and coot was recorded on just a single</p>

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		<p>occasion. Give the absence of/small number of observations of these species and given the distance between the Proposed Development and the SPA there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the Proposed Development.</p> <p>Similarly, taking the above into consideration, there is no potential for significant effects on the SCI species of the SPA due to increased collision risk during the operational stage of the Proposed Development.</p> <p>There is no potential for significant effect on this European Site. It is not located within the zone of likely influence and no further assessment is required.</p>
Lough Ennell SPA [004044]	19.8km West	<p>There will be no direct effects as this European Site lies entirely outside of and >19km from the development footprint.</p> <p>There is no hydrological connectivity between the Proposed Development and the SPA which is located in a different surface water catchment to the Proposed Development. Therefore no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>During the extensive bird surveys undertaken by MKO, pochard was not recorded utilising the site and coot and tufted duck were recorded only occasionally and in small numbers. Give the absence of/small number of observations of these species and given the distance between the Proposed Development and the SPA there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the Proposed Development.</p> <p>Similarly, taking the above into consideration, there is no potential for significant effects on the SCI species of the SPA due to increased collision risk during the operational stage of the Proposed Development.</p> <p>There is no potential for significant effect on this European Site. It is not located within the zone of likely influence and no further assessment is required.</p>

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Garriskil Bog SPA [004102]	25.2km	<p>There will be no direct effects as this European Site lies entirely outside of and >25km from the development footprint.</p> <p>There is no hydrological connectivity between the Proposed Development and the SPA which is located in a different surface water catchment to the Proposed Development. Therefore no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>The Proposed Development Site lies outside the core foraging distance of the SCI Greenland white-fronted goose (5-8km) as per Scottish Natural Heritage Guidelines (SNH, 2016) and the species was not recorded during the extensive bird surveys undertaken by MKO. Taking the above into consideration and given the distance between the Proposed Development and the SPA there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the Proposed Development.</p> <p>There is no potential for significant effect on this European Site. It is not located within the zone of likely influence and no further assessment is required.</p>
Lough Iron SPA [004046]	24.4km	<p>There will be no direct effects as this European Site lies entirely outside of and >24km from the development footprint.</p> <p>There is no hydrological connectivity between the Proposed Development and the SPA which is located in a different surface water catchment to the Proposed Development . Therefore no potential for indirect effects on supporting wetland habitat for SCI of bird species due to deterioration in water quality exists.</p> <p>The Proposed Development Site lies outside the core foraging distance of the SCI species Whooper swan (core range of <5km), golden plover (3km) and Greenland white-fronted goose (5-8km) as per Scottish Natural Heritage Guidelines (SNH, 2016). Following extensive bird surveys undertaken by MKO (detailed in Chapter 7 ‘Ornithology’ of this EIAR), there is no evidence to suggest that the Proposed Development Site lies on a migratory/regular commuting route for whooper swan or golden plover. Greenland-white fronted goose was not</p>

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		<p>recorded during the MKO bird surveys undertaken.</p> <p>None of the other SCI species were recorded utilising the site in significant numbers and the site does not support significant suitable habitat for wigeon, teal or shoveler. Taking the above into consideration and given the distance between the Proposed Development and the SPA there is no potential for significant indirect disturbance or displacement effects on the SCI species for which the SPA is designated as a result of the Proposed Development.</p> <p>There is no potential for significant effect on this European Site. It is not located within the zone of likely influence and no further assessment is required.</p>
Boyne Estuary SPA [004046]	47.3km North-East >70km downstream	<p>No pathway for direct effects was identified as this European Site lies entirely outside of and approximately 47.3km from the Proposed Development Site boundary.</p> <p>The potential for the development to result in indirect effects on this European Site was considered. There is hydrological connectivity between the Proposed Development and this SPA via watercourses within and adjacent to the site boundary which discharge to the Stonyford River to the east and the Deel (Raharney) River to the south-west. These in turn discharge to the River Boyne which in turn discharges to the SPA. The site is located >70km downstream of the Proposed Development. Given the significant distance between the development and the SPA, and the attenuation properties of the intervening watercourses, no potential for significant indirect effects on this European Site due to deterioration of water quality was identified.</p> <p>The site either lies outside the core foraging range (SNH 2016) or does not provide significant suitable habitat for the SCI species associated with the SPA. Therefore no potential for significant effects on the SPA as a result of disturbance or displacement of SCI species are anticipated.</p> <p>There is no potential for significant effect on this European Site. It is not located within the Zone of Likely Impact and no further assessment is required</p>

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Natural Heritage Areas (NHA)		
Molerick Bog NHA [001582]	3.9km south	<p>There will be no direct effects on these sites given that the Proposed Development is located entirely outside and >3km from any of these designated sites.</p> <p>No habitat or surface water connectivity was identified between the Proposed Development and these designated sites. Surface water from the Proposed Development Site drains to the Deel (Raharney) River to the west and south of the site and to the Stonyford River to the east of the site, both of which discharge to the River Boyne which in turn flows east before discharging to the Irish Sea >70km downstream of the site.</p> <p>Given the absence of connectivity and the distance between the Proposed Development and these NHAs, no potential for indirect effects on these sites due to deterioration of water quality or habitat loss/degradation has been identified.</p> <p>No pathway for effect was identified and these sites are not within the likely zone of influence.</p>
Girley Bog NHA [001580]	10.3km north-east	
Wooddown Bog NHA [000694]	11.4km west	
Jamestown Bog NHA [001324]	12.5km north-east	
Milltownpass Bog NHA [002323]	13.1km north-west	
Lough Derravaragh NHA [000684]	14.4km south-west	
Proposed Natural Heritage Area (pNHA)		
Royal Canal pNHA [002103]	3.3km south	<p>There will be no direct effects as the Proposed Development is located entirely outside of and >3km from the designated sites.</p>
Lough Shesk pNHA [000556]	7km north	
Ballina Bog pNHA [000390]	10km south-east	<p>No hydrological connectivity has been identified between the Proposed Development Site and these pNHAs. Given the absence of hydrological connectivity and the significant separation in distance between the Proposed Development Site and these pNHAs, no potential for any indirect effects on these sites has been identified.</p> <p>No pathway for effect was identified and these sites are not within the likely zone of influence.</p>
Aghalasty Fen pNHA [001349]	15.2km north-west	
Lough Sheever Fen/Slevin's Lough Complex pNHA [000690]	14.2km west	
Trim pNHA [001357]	17km east	<p>These sites are located >20km downstream of the Proposed Development Site via the River Boyne, which itself is located hydrologically downstream of the Proposed Development Site. Taking a precautionary approach a potential pathway for indirect effects on these sites via deterioration in water quality due to run-off of pollutants during the construction, operational and decommissioning phases of the Proposed Development was identified.</p>
Boyne Woods pNHA [001592]	26.7km north-east	
Crewbane Marsh pNHA [000553]	34.5km north-east	
Rossnaree Riverbank pNHA [001589]	35.8km north-east	

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Dowth Wetland pNHA [001861]	48km north-east	These sites are within the likely zone of influence and assessed further in Section 6.7 below.
Boyne River Islands pNHA [001862]	41.2km north-east	
Boyne Coast and Estuary SAC and pNHA [001957]	48km north-east	

6.5.1.2 NPWS Article 17 Reporting

The most recent National Parks and Wildlife Service (NPWS, 2019) data on the recorded distribution of EU Habitats Directive Annex I listed habitats was reviewed in relation to the Proposed Development Site. This data is available in the form of the NPWS (2019) Article 17 reporting, and associated GIS data, on ‘*The Status of EU Protected Habitats and Species in Ireland*’ (NPWS, 2019).

An area mapped as Active raised bog (7110) is present in an area of uncut raised bog at the southern extent of Bracklin Bog. This raised bog remnant is located approximately 722m from the nearest windfarm infrastructure (access road) and approximately 944m from the nearest turbine (T13). It is separated from the Proposed Development infrastructure by drained, cutover bog habitats and will not be impacted by the Proposed Development.

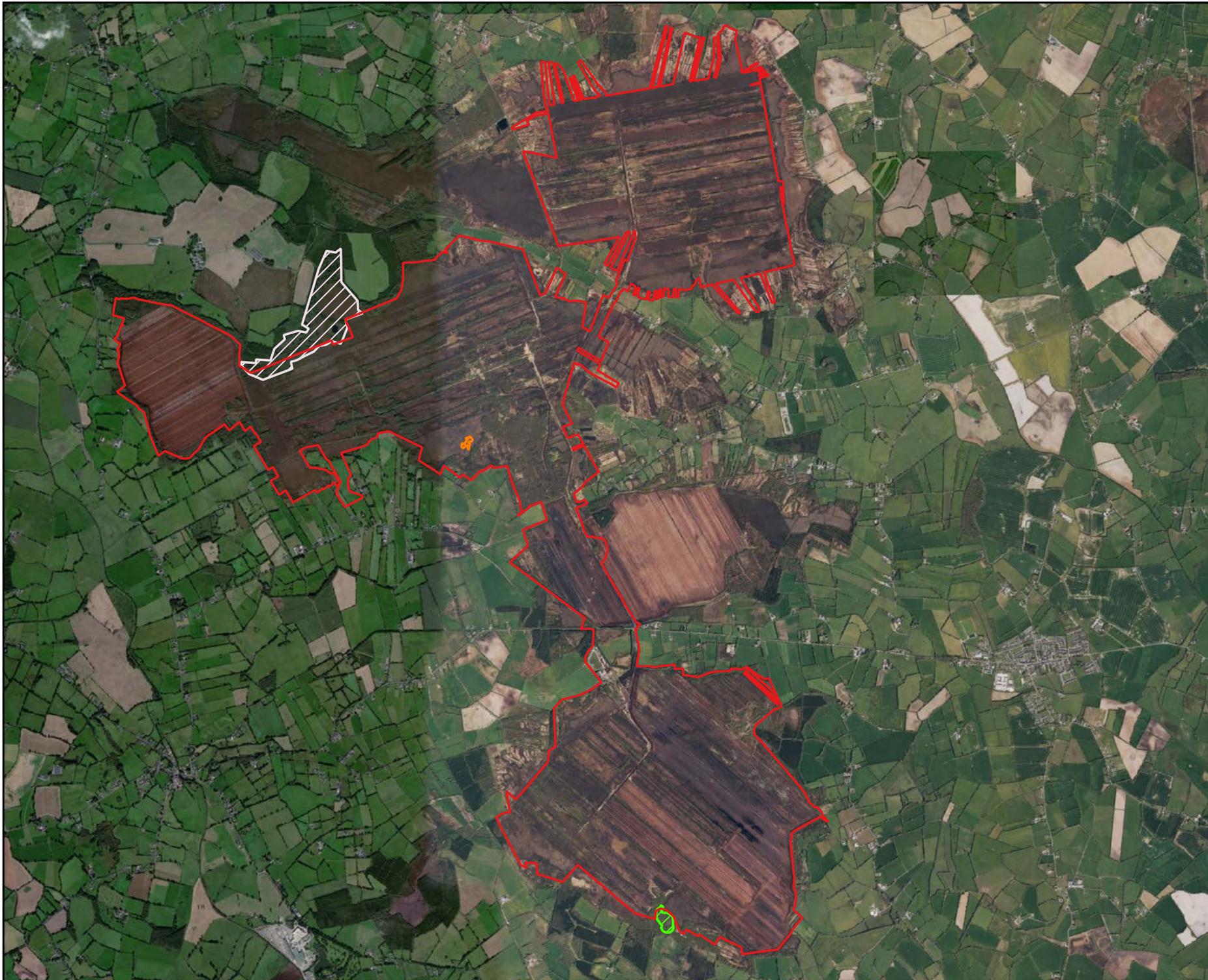
An area mapped as Annex I Alkaline fen (7230), Cladium fen (7210) and Transition mire (7140) in the Article 17 Habitats dataset is present to the north of the proposed Turbine 18 and associated access road. The mapped habitats are located partially within the windfarm site boundary, however, the mapped area is located approximately 180m from the infrastructure associated with T18, which is the closest turbine, and will not be impacted by the Proposed Development.

An area mapped as Annex I Old Oak Woodland 91A0 is present at the south of the Proposed Development Site, situated to the south-west of and >230m from the infrastructure associated with Turbine 8 at Ballivor Bog and will therefore not be impacted by the Proposed Development.

The mapped habitats outlined above are shown in Figure 6-6 below. No other mapped habitats from the above datasets are mapped within or in close proximity to the Windfarm Site Boundary.

6.5.1.3 Westmeath Wetland Survey 2020

Westmeath County Council commissioned a field survey of 12 wetland sites within Co. Westmeath in 2020 to gather baseline information on the type, extent and conditions of selected sites. One of the sites was Lislogher/Bracklin Bog, located to the north of the Bracklin Bog and outside the windfarm study area boundary. The report describes the majority of the site as degraded raised bog with a small lake in the centre and a fringe of woodland. According to the report, a variety of vegetation encircles Bracklin Lough, in the centre of the site, the surrounds of which are mainly wooded. The outer, higher area of bog woodland is dominated by a canopy of Scot’s pine with a well-developed ground layer of heather and bilberry. This transitions into a wetter type of bog woodland which was found to correspond to Annex I Bog Woodland (91D0) towards the lake. An area of transition mire was also recorded along the northern and western edges of the lake.



Map Legend

- Proposed Development site
- Alkaline Fens (7230),
Calcareous Fens (7210),
Transition Mires (7140)
- Old Oak Woodlands (9A01)
- Active Raised Bog (7110)



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Drawing Title	
Article 17 Mapped Habitats	
Project Title	
Proposed Ballivor Windfarm	
Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137	Figure 6-6
Scale	Date
1:50000	2023.03.24

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6.5.1.4 Water Quality Data

6.5.1.4.1 Surface Water Quality

The Q-Rating is a water quality rating system based on both the habitat and the invertebrate community assessment and is divided into status categories ranging from 0-1 (Poor) to 4-5 (Good/High).

EPA Q-rating monitoring is undertaken at multiple locations on the Deel (Raharney), Stonyford and Boyne rivers in the vicinity and downstream of the site. No Q-ratings are available for any of the smaller watercourses which receive discharge from the proposed site.

To the west of the proposed site, the Deel(Raharney) River achieved ‘Good’ status at Cumber Bridge (Station ID: RS07D010200) and at Raharney Bridge (Station ID: RS07D010300) in 2020. Further downstream to the southwest of Ballivor Bog, the Deel(Raharney) River achieved a Q-score of Q3-4, i.e. Moderate status, at Inan Bridge (Station ID: RS07D010400). Upstream of its confluence (Station ID: RS07D010600) with the River Boyne, the Deel(Raharney) was of ‘Good’ status in 2020. Downstream of this confluence the Boyne was of ‘Good’ status (Station ID: RS07B040800 and RS07B040900).

The Stonyford River was of ‘Poor’ status (Q3) at Stonestown Bridge (Station ID: RS07S020075) to the north and upstream of the proposed site. Further downstream the Stonyford also achieved ‘Poor’ status at a bridge upstream of Rathkenna Bridge (Station ID: RS07S020100). Upstream of its confluence with the Boyne River the Stonyford River was assigned a Q-status of Q3-4 (Station ID: RS07S020400). Downstream of this confluence the

River Boyne was found to be of ‘Moderate’ status (Station ID: RS07B041000 and RS07B041200).

The most recent available Q-rating data for the Deel (Raharney), Stonyford and Boyne rivers is presented in Table 6-4 below. This data shows that the Q-status of the Deel (Raharney), Stonyford and Boyne rivers downstream of the site ranges from ‘Poor’ to ‘Good’ status. No available EPA Biological Q-rating monitoring data post-dates 2020.

Table 6-4 Most recent (2020) EPA Q-ratings

WFD SWB	Station ID	Easting	Northing	EPA Q-Rating Status
Deel(Raharney)_030	RS07D010200	258458	257621	Q4 (Good)
Deel(Raharney)_040	RS07D010300	260085	253021	Q4 (Good)
Deel(Raharney)_050	RS07D010400	263452	250407	Q3-4 (Moderate)
Deel(Raharney)_060	RS07D010600	269031	249313	Q4 (Good)
Boyne_050	RS07B040800	271093	249913	Q4 (Good)
Boyne_060	RS07B040900	273392	252679	Q4 (Good)
Stonyford_020	RS07S02075	263805	261681	Q3 (Poor)
Stonyford_030	RS07S020100	268303	257165	Q3 (Poor)
Stonyford_040	RS07S020400	273148	253252	Q3-4 (Moderate)

WFD SWB	Station ID	Easting	Northing	EPA Status	Q-Rating
Boyne_070	RS07B041000	276679	253937	Q3-4	Moderate
Boyne_080	RS07B041200	279942	256977	Q3-4	Moderate

6.5.1.4.2 Water Framework Directive Surface Water Body Status

A summary of the WFD status and risk result of Surface Water Bodies (SWBs) in the vicinity and downstream of the Ballivor Bog Group are shown in Table 6-5 below.

The western section of Bracklin Bog is drained by the Deel(Raharney)_030 SWB. The status of this SWB has decreased from “Good” in the 2010-2015 round to “Moderate” in the latest round (2013-2018). Further downstream the Deel(Raharney)_040 SWB achieved “Good” status in both monitoring rounds while the Deel(Raharney)_050 SWB was assigned “Moderate” status. The Deel(Raharney)_060 SWB drains the western section of Ballivor Bog and its status has increased from “Moderate” to “Good”.

The Boyne_060 SWB drains the eastern section of Ballivor Bog and Carranstown Bog. This SWB has also experienced an improved status from “Moderate” in 2010-2015 to “Good” in 2013-2018. The Stonyford River drains Lisclogher Bog, Lisclogher West Bog and Bracklin Bog with both SWBs (Stonyford_030 and _040) recording a deteriorating in status from “Good” in 2010-2015 to “Moderate” in 2013-2018. Further downstream the Boyne_070 and Boyne_080 both achieved “Moderate” status in the latest WFD round.

The majority of these SWBs have been deemed to be “At risk” of not meeting their WFD objectives. Hydromorphological changes have been deemed to be significant stressors on several of these SWBs. Hydromorphological pressures mean that the waterbody has experienced change to its physical habitat or natural functioning caused by, for example, channelisation and straightening of rivers or land drainage.

Table 6-5: Summary WFD Information for Surface Water Bodies

River Waterbody	Status 2010-2015	Risk Status 2010-2015	Status 2013-2018	Risk Status 2013-2018	WFD Pressures
Deel (Raharney)_030	Good	Not at Risk	Moderate	At Risk	-
Deel (Raharney)_040	Good	Not at Risk	Good	Not at Risk	-
Deel (Raharney)_050	Moderate	At Risk	Moderate	At Risk	Hydromorphology
Deel (Raharney)_060	Moderate	At Risk	Good	Under Review	Hydromorphology
Boyne_050	Good	Not at Risk	Good	Not at Risk	-
Boyne_060	Moderate	At Risk	Good	At Risk	Hydromorphology
Stonyford_030	Good	Not at Risk	Moderate	At Risk	-
Stonyford_040	Good	Not at Risk	Moderate	At Risk	-
Boyne_070	Good	Not at Risk	Moderate	At Risk	-
Boyne_080	Moderate	At Risk	Moderate	At Risk	Hydromorphology

6.5.1.4.3 Groundwater Body Status

The Athboy Groundwater Body (GWB) (IE_EA_G_001) underlies the Ballivor Bog Group. This GWB has been assigned ‘Good Status’ in both the 2010-2015 and 2013-2018 Water Framework Directive monitoring rounds. This status is defined based on the quantitative status and chemical status of the GWB. The Athboy GWB is deemed to be “At risk” of not meeting its WFD objectives, however, no significant pressures have been identified to be impacting this GWB.

6.5.1.5 Vascular plants

A search was made in the New Atlas of the British and Irish Flora (Preston et al, 2002) to investigate whether any rare or unusual plant species listed under Annex II of the EU Habitats Directive, The Irish Red Data Book - 1 Vascular Plants (Curtis, 1988 and Wyse Jackson *et.al.* 2016) or the Flora (Protection) Order (1999, as amended 2022) had been recorded in the relevant 10km grid square in which the Proposed Development Site is situated (N55, N65 and N66). Each hectad contains 100 whole one kilometre squares containing terrestrial habitats. Species of conservation concern are listed in Table 6-6. No species listed under Annex II of the Habitats Directive or the Flora (Protection) Order are shown in the atlas for squares N55, N65, and N66.

Table 6-6 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad N55, N65 and N66

Common name	Scientific name	Designation	Hectad
Marsh saxifrage	<i>Saxifraga hirculus</i>	Annex II, FPO, Near Threatened (NT)	N65, N66
Shepherd's-needle	<i>Scandix pecten-veneris</i>	Regionally Extinct (RE)	N55
Good-King-Henry	<i>Chenopodium bonus-henricus</i>	Vulnerable (VU)	N55
Irish whitebeam	<i>Sorbus hibernica</i>	Vulnerable (VU)	N66
Upright brome	<i>Bromopsis erecta</i>	Near Threatened (NT)	N55
Smooth brome	<i>Bromus racemosus</i>	Near Threatened (NT)	N55
Dwarf spurge	<i>Euphorbia exigua</i>	Near Threatened (NT)	N55
Autumn gentian	<i>Gentianella amarella</i>	Near Threatened (NT)	N55
Common gromwell	<i>Lithospermum officinale</i>	Near Threatened (NT)	N55
Tubular water-dropwort	<i>Oenanthe fistulosa</i>	Near Threatened (NT)	N55
Black horehound	<i>Ballota nigra</i>	Near Threatened (NT)	N55, N65
Greater knapweed	<i>Centaurea scabiosa</i>	Near Threatened (NT)	N55, N65
Round-leaved wintergreen	<i>Pyrola rotundifolia</i> subsp. <i>Rotundifolia</i>	Near Threatened (NT)	N65, N66
Brown beak-sedge	<i>Rhynchospora fusca</i>	Near Threatened (NT)	N65
Marsh fern	<i>Thelypteris palustris</i>	Near Threatened (NT)	N65
Vervain	<i>Verbena officinalis</i>	Near Threatened (NT)	N65
Bur chervil	<i>Anthriscus caucalis</i>	Near Threatened (NT)	N66
Frog orchid	<i>Coeloglossum viride</i>	Near Threatened (NT)	N55, N66

Least bur-reed	<i>Sparganium natans</i>	Near Threatened (NT)	N66
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Near Threatened (NT), Vulnerable (VU), Critically Endangered (CR), Regionally Extinct (RE)

6.5.1.6 Bryophytes

A search of the NPWS online data map for bryophytes (NPWS, 2020) was also undertaken to establish whether there are records for protected bryophytes within and in the vicinity of the Proposed Development Site. The mapper shows no records for protected bryophytes within or adjacent to the site.

6.5.1.7 National Biodiversity Data Centre (NBDC) Records

A search of the National Biodiversity Data Centre (NBDC) website was conducted on the 22/02/2023 and again on the 4th November 2021 and 23rd August 2022. Records of protected flora and fauna (excluding birds) recorded from hectad N55, N65 and N66 are provided in Table 6-7.

Table 6-7 NBDC records for species of conservation interest in hectad N55, N65 and N66.

Common name	Scientific name	Designation	Hectad
Large white-moss	<i>Leucobryum glaucum</i>	HD Annex IV	N55, N65, N66
Marsh fritillary	<i>Euphydryas aurinia</i>	HD Annex II	N55, N65
Freshwater White-clawed Crayfish	<i>Austropotamobius pallipes</i>	HD Annex II, V, WA	N55, N66
Common frog	<i>Rana temporaria</i>	HD Annex V, WA	N55, 65
Brown long-eared bat	<i>Plecotus auritus</i>	HD Annex IV, WA	N55, N65, N66
Common pipistrelle	<i>Pipistrelle (Pipistrellus pipistrellus sensu lato)</i>	HD Annex IV, WA	N55, N65
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	HD Annex IV, WA	N55, N66
Daubenton's Bat	<i>Myotis daubentonii</i>	HD Annex IV, WA	N55, N66
Lesser Noctule	<i>Nyctalus leisleri</i>	HD Annex IV, WA	N55, N66
Otter	<i>Lutra lutra</i>	HD Annex V, WA	N55, N65, N66
Pine Marten	<i>Martes martes</i>	HD Annex II, V, WA	N55, N65, N66
Common lizard	<i>Zootoca vivipara</i>	WA	N66
Eurasian badger	<i>Meles meles</i>	WA	N55, N65, N66
Eurasian Pygmy shrew	<i>Sorex minutus</i>	WA	N55
Eurasian red squirrel	<i>Sciurus vulgaris</i>	WA	N55, N66
Irish hare	<i>Lepus timidus subsp. Hibernicus</i>	WA	N55, N65, N66
Irish stoat	<i>Mustela erminea subsp. Hibernica</i>	WA	N55

West European hedgehog	<i>Erinaceus europaeus</i>	WA	N55, N65, N66
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HD = EU Habitats Directive; WA = Wildlife Acts (Ireland).

6.5.1.8 Bat Records

The National Bat Database of Ireland was searched for records of bat activity and roosts within a 1km and 10 km radius of both the northern and southern sections of the Proposed Development Site (IG Ref: E265605 N254031; last search (15/6/2021). The search yielded no results of roosts within a 1km radius of the Proposed Development. Six bat species were recorded within a 10km radius of the site, Common Pipistrelle (*Pipistrellus pipistrellus*), Leisler's bat (*Nyctalus leisleri*), Brown-eared Bat (*Plecotus auritus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Daubenton's Bat (*Myotis daubentonii*) and Natterer's bat (*Myotis nattereri*), and some instances of *Myotis* bats were only identified at genus level. The full results of the database search are provided in the bat survey report in Appendix 6-2.

6.5.1.9 NPWS Protected Species Records

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectads N55, N65 and N66. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 10th August 2020. A response was received on the 19th August 2020. An updated request was sent on the 23rd August 2022 and a response received on the 1st September 2022. Table 6-8 lists rare and protected species records obtained from NPWS.

Table 6-8 NPWS records for rare and protected species

Common name	Scientific name	Designation	Hectad
Reindeer lichen	<i>Cladonia ciliata</i> var. <i>tenuis</i>	Annex V	N65
Reindeer lichen	<i>Cladonia portentosa</i>	Annex V	N55, N65
Hairy St John's-wort	<i>Hypericum hirsutum</i>	Annex II, FPO, RL	N55
Round-leaved Wintergreen	<i>Pyrola rotundifolia</i> subsp. <i>Rotundifolia</i>	RL	N66
Marsh Saxifrage	<i>Saxifraga hirculus</i>	Annex II, IV, FPO, RL	N66
Corncockle	<i>Agrostemma githago</i>	N/A	N55
Bur chervil	<i>Anthriscus caucalis</i>	RL	N66
Alder Buckthorn	<i>Frangula alnus</i>	N/A	N65
Common frog	<i>Rana temporaria</i>	Annex V, WA	N55, N65, N66
White-clawed Crayfish	<i>Austropotamobius pallipes</i>	Annex II, Annex V, WA	N55, N65, N66
Smooth Newt	<i>Lissotriton vulgaris</i>	WA	N65

Common name	Scientific name	Designation	Hectad
West European Hedgehog	<i>Erinaceus europaeus</i>	WA	N55
Irish Hare	<i>Lepus timidus</i> <i>subsp. Hibernicus</i>	Annex V, WA	N55, N65, N66
Badger	<i>Meles meles</i>	WA	N55
Otter	<i>Lutra lutra</i>	Annex II, Annex IV, WA	N55, N65, N66

FPO = Flora Protection Order; RL = Red List, VU = Vulnerable, WA = Wildlife Act

6.5.110 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The NPWS *Margaritifera* Sensitive Area map (Version 8, 2017) was consulted during the desk study. There is no surface water connectivity between the proposed wind farm site and any *Margaritifera* sensitive catchments shown on the *Margaritifera* Sensitive Area map (Version 8, 2017).

6.5.111 Inland Fisheries Ireland Data

The IFI online database was reviewed for fish species records within the catchments downstream of the EIAR study area boundary. The site drains into the River Boyne. It is located predominantly within the within the Boyne_SC_050 sub-catchment, with the southernmost section being located partially within the Boyne_SC_040 sub-catchment and a small part of the westernmost section located in the Deel (Raharney)_SC_010 sub-catchment.

Fish stock assessments were undertaken by IFI in 2014 for the River Boyne close to the river's source, approximately 1.5km north of Edenderry. Brown trout, stone loach and 3-spined stickleback were the only species recorded in 2014, with brown trout the most commonly encountered species.

Species recorded during previous surveys in 2010 and 2009 included Brown trout (*Salmo trutta*), European eel (*Anguilla Anguilla*), Lamprey spp (*Lampetra* sp.), Minnow (*Phoxinus phoxinus*), Stone Loach (*Barbatula barbatula*) (Inland Fisheries Ireland, 2014).

The River Boyne is listed in the first schedule of the 'European Communities (Quality of Salmonid Waters) Regulations, 1988' (S.I. No. 293) as a 'salmonid water'.

European eel (*Anguilla anguilla*), is classified as 'critically endangered' in 'Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish' (King *et al.*, 2011). Lamprey (*Lampetra* sp.) are classified as 'near threatened' in 'Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish' (King *et al.*, 2011). All three species of Irelands lamprey are protected under Annex II of the EU habitats directive, with River Lamprey classified under Annex II and Annex V. Salmon (in freshwater) is listed on Annexes II and V of the EU Habitats Directive, and is listed as "Vulnerable," on King *et al.*'s Red list (2011).

6.5.112 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectad. Records of 'high impact' invasive species for hectads N55, N65 and N66 are provided in Table 6-9

Table 6-9 NBDC records for invasive species (hectads N55, N65 and N66)

Common Name	Scientific Name	Hectad
Canadian waterweed	<i>Elodea canadensis</i>	N55
Nuttall's waterweed	<i>Elodea nuttallii</i>	N55
Japanese knotweed	<i>Fallopia japonica</i>	N65
Rhododendron	<i>Rhododendron ponticum</i>	N65
Brown Rat	<i>Rattus norvegicus</i>	N55
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	N55, N66
American Mink	<i>Mustela vison</i>	N55, N65, N66
Fallow deer	<i>Dama dama</i>	N65

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. Japanese knotweed (*fallopian japonica*), Rhododendron (*rhododendron ponticum*), Brown Rat (*Rattus norvegicus*), American Mink (*Mustela vison*) and Fallow Deer (*Dama dama*) are species subject to restrictions under Regulations 49 and 50 and are included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

6.5.1.13 Marsh Fritillary (*Euphydryas aurinia*)

There are NBDC records of the species from the southern end of Bracklin Bog. In addition, NPWS Article 17 data shows a number of records for marsh fritillary at the southern extent of Bracklin Bog. As a result, dedicated surveys for marsh fritillary were undertaken at the site in September 2020, 2021 and 2022.

6.6 Ecological Walkover Survey Results

6.6.1 Description of Habitats and Flora within the Proposed Development Site

The habitats at the application site were the subject of a detailed survey and assessment by Bord na Móna ecologists between 2011 and 2012 and a detailed habitat map was produced of the entire Ballivor Bog Group. This habitat mapping and assessment was undertaken following the Bord na Móna habitat classification scheme and was cross referenced with ‘*A Guide to Habitats in Ireland*’ (Fossitt, 2000).

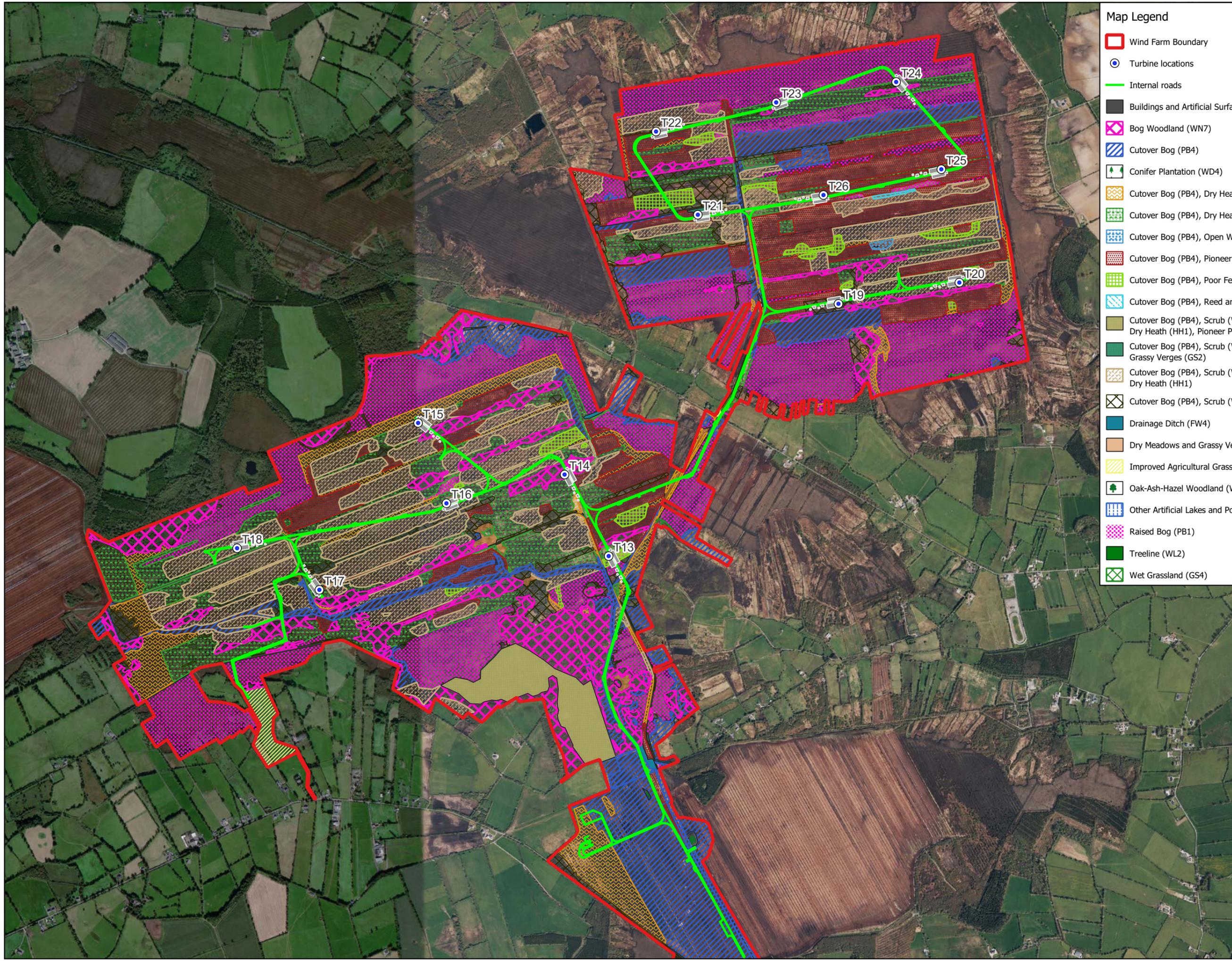
Between 2020 and 2023, MKO ecologists visited the site to ground-truth the results of the Bord na Móna habitat surveys and mapping and to undertake detailed habitat and botanical surveys. The habitat descriptions in this section are based on the walkover surveys and detailed vegetation surveys undertaken by MKO in 2021, 2022 and 2023. Detailed botanical quadrat data is provided in Appendix 6-1 of this EIAR and a habitat map of the site is provided in Figures 6-7a and 6-7b. A habitat map with the construction footprint of the Proposed Development overlain is shown in Figures 6-8a to 6-8d. All habitats described below have been classified in accordance with Fossitt (2000).

The Proposed Development Site comprises four large cutover raised bogs classified as **Cutover Bog (PB4)**. Large areas of the cutover bog have been in commercial peat production by Bord na Móna until relatively recently (up to 2020) and are characterised by bare peat. Where areas of the cutover bog have been out of commercial peat production for a significant period of time, i.e. since the late 80s and early 90s, these areas have since largely revegetated, primarily by dry heath type vegetation dominated by ling heather (*Calluna vulgaris*), birch (*Betula pubescens*) dominated scrub and woodland, pioneer poor fen communities characterised by common cottongrass (*Eriophorum angustifolium*) and small areas of grassland which occur mostly along the existing railway tracks traversing the site. In some areas, particularly lower lying areas where drainage is impeded, embryonic bog communities dominated by common cottongrass and with a rich Sphagnum component have begun to form. The habitats described above occur in variable habitat mosaics within the site as shown in the Habitat Map in Figures 6-7a and b which show the location and relative cover of the habitats recorded within the site at a high level. The habitats are described in greater details in the sections below.

In addition to the habitats of the cutover bog, there are also a number of small areas of remnant uncut raised bog at various locations throughout the Proposed Development Site, predominantly but not exclusively at the edges of the site.

Waterbodies within the site include a network of drainage ditches, small streams/watercourses classified as lowland depositing rivers, small areas of standing open water and artificial silt ponds. The watercourses including streams and drainage ditches provide hydrological connectivity with downstream EU and Nationally designated sites and are described in more detail below.

Where detailed habitat and botanical surveys were undertaken, the details are provided in Appendix 6-1 of this EIAR.



Map Legend

- Wind Farm Boundary
- Turbine locations
- Internal roads
- Buildings and Artificial Surfaces (BL3)
- Bog Woodland (WN7)
- Cutover Bog (PB4)
- Conifer Plantation (WD4)
- Cutover Bog (PB4), Dry Heath (HH1)
- Cutover Bog (PB4), Dry Heath (HH1), Scrub (WS1)
- Cutover Bog (PB4), Open Water
- Cutover Bog (PB4), Pioneer Poor Fen (PF2), Dry Heath (HH1)
- Cutover Bog (PB4), Poor Fen and Flush (PF2)
- Cutover Bog (PB4), Reed and Large Sedge Swamp (FS1)
- Cutover Bog (PB4), Scrub (WS1), Bog Woodland (WN7), Dry Heath (HH1), Pioneer Poor Fen (PF2)
- Cutover Bog (PB4), Scrub (WS1), Dry Meadows and Grassy Verges (GS2)
- Cutover Bog (PB4), Scrub (WS1), Pioneer Poor Fen (PF2), Dry Heath (HH1)
- Cutover Bog (PB4), Scrub (WS1)
- Drainage Ditch (FW4)
- Dry Meadows and Grassy Verges (GS2)
- Improved Agricultural Grassland (GA1)
- Oak-Ash-Hazel Woodland (WN2)
- Other Artificial Lakes and Ponds (FL8)
- Raised Bog (PB1)
- Treeline (WL2)
- Wet Grassland (GS4)



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Habitat Map - North	
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Ballivor Wind Farm	
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Project No.	Drawing No.
191137	Figure 6-7a
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- Raised Bog (PB1)
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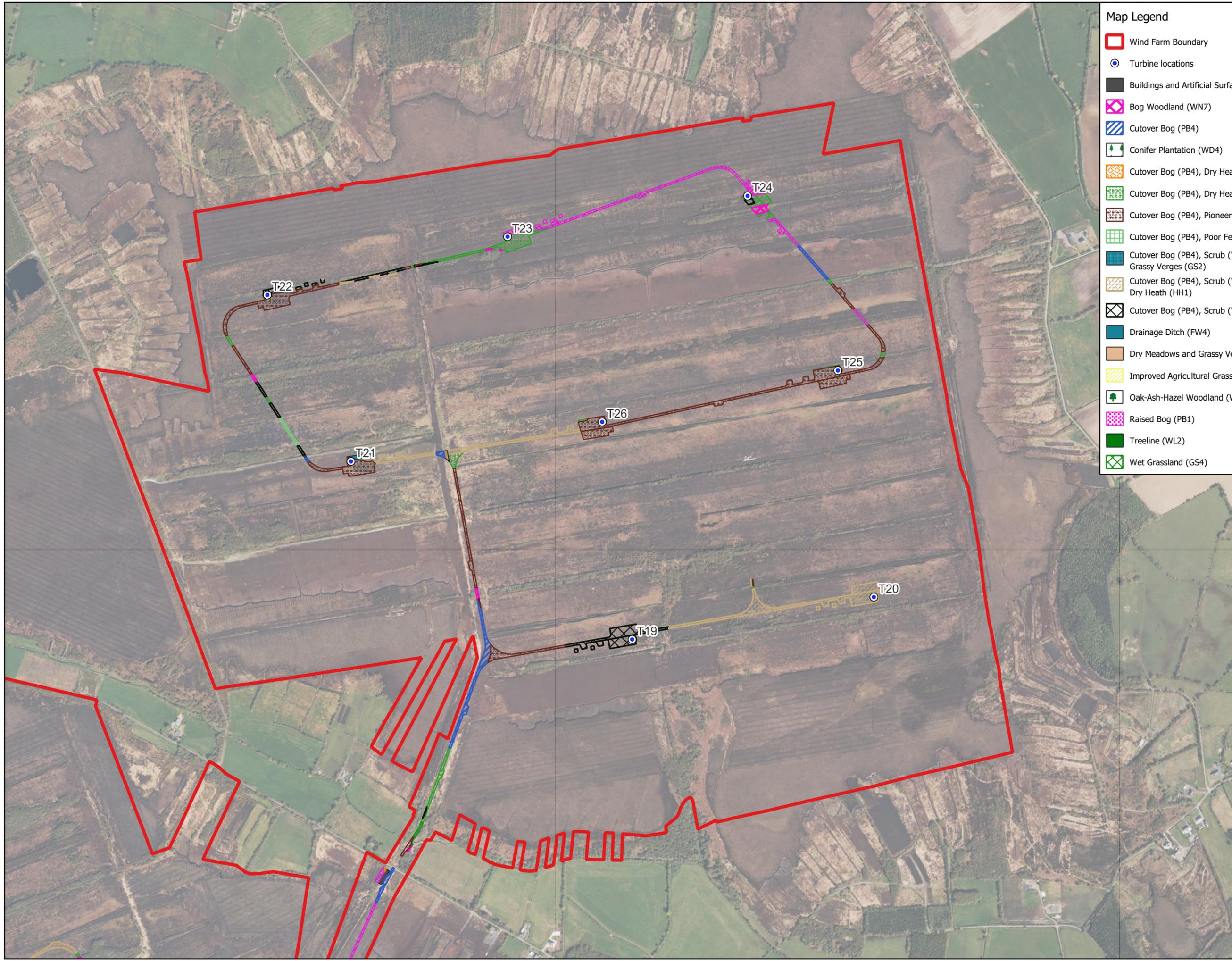


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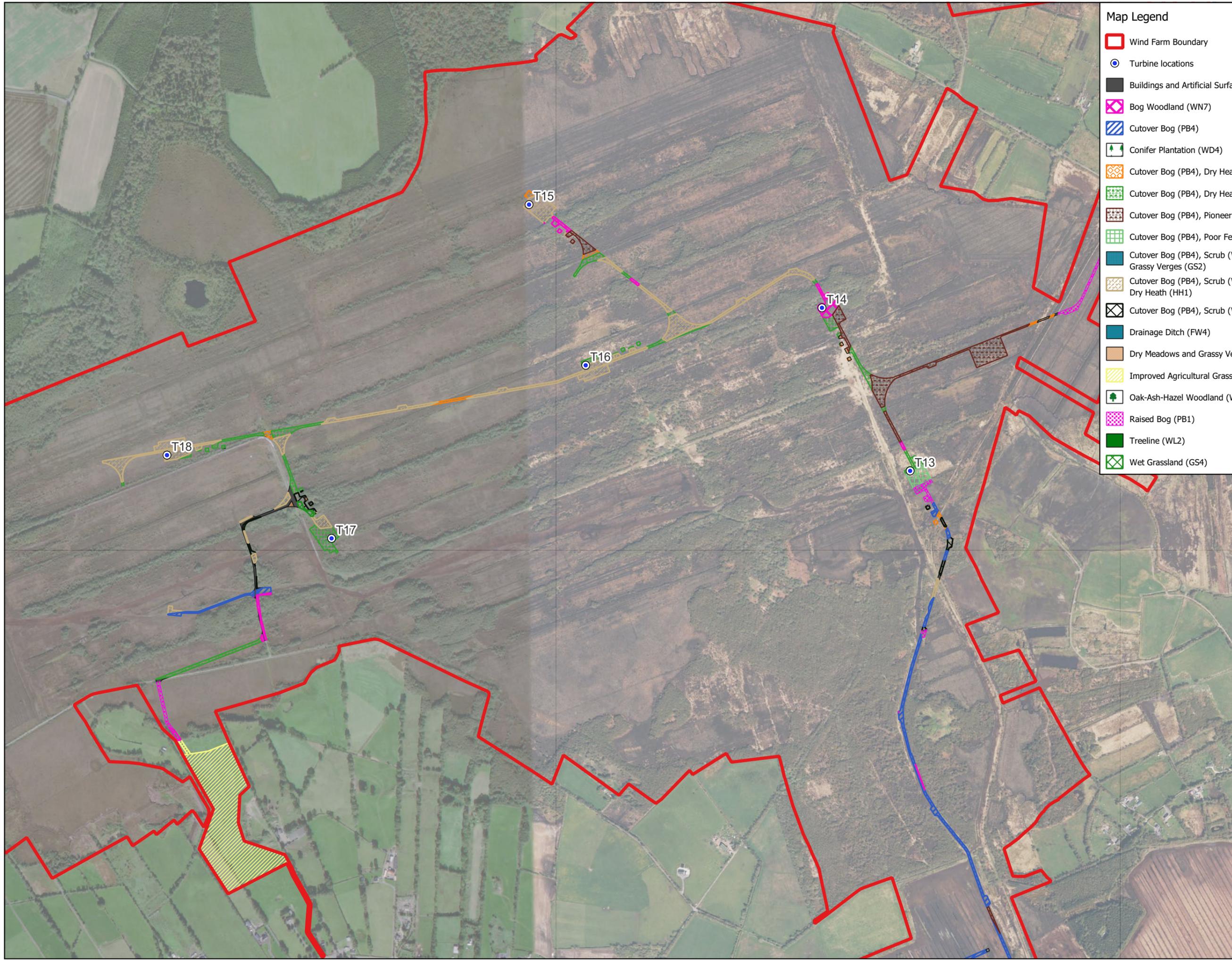
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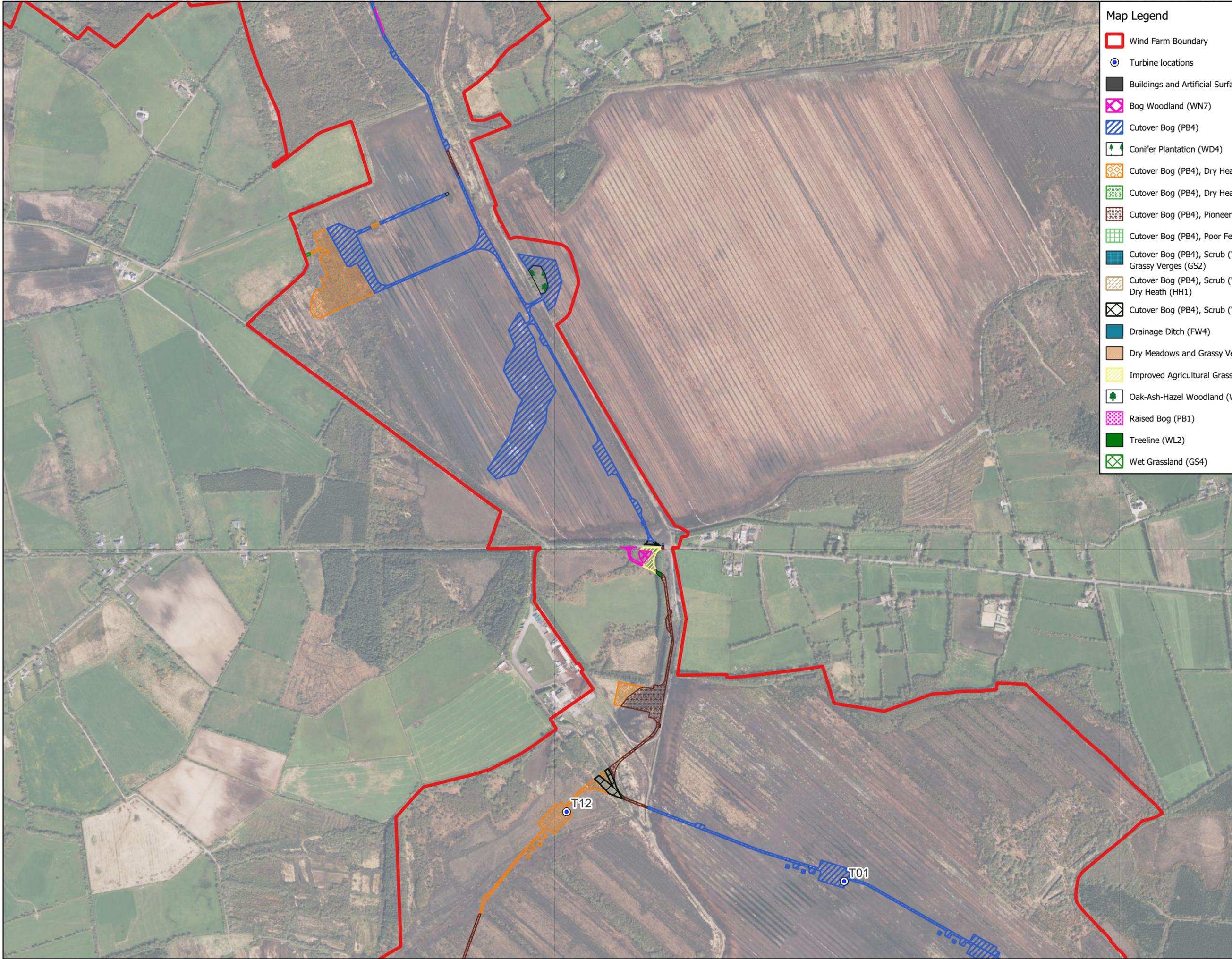
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-  Drainage Ditch (FW4)
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-  Treeline (WL2)
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Drawing Title
Habitats lost to Proposed Development Footprint

Project Title
Ballivor Wind Farm

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Map Legend

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6.6.11 Cutover Bog (PB4)

The vast majority of the Proposed Development Site, with the exception of small remnant sections of raised bog mainly around the peripheries of the site, comprise of cutover raised bog or cutaway peat classified as **cutover Bog (PB4)**. Where peat cutting has ceased relatively recently on large areas of the Proposed Development Site, e.g., parts of Ballivor Bog and Lisclogher East, these areas are dominated by bare peat with little growth of vegetation (Plate 6-1). Where vegetation has begun to colonise relatively recently, areas consist of mosaics of bare peat and pioneer open cutaway communities, including pioneer ling heather (*Calluna vulgaris*) dominated **dry heath (HH1)** vegetation and pioneer common cottongrass (*Eriophorum angustifolium*) dominated **poor fen (PF2)** or a mosaic of both.

Where peat production/extraction has ceased for some time, e.g. much of Bracklin Bog as well as southern extent of Ballivor Bog and Lisclogher Bog, mosaics of well-established secondary dry heath and poor fen type communities as well as birch (*Betula pubescens*) dominated **scrub (WS1)** and **dry bog woodland (WN7)** are present.

A small number of areas of cutover bog within the study area, particularly those in low lying areas with impeded drainage, are relatively wet with some standing water and an abundant Sphagnum component in comparison to drier cutover habitats. These often occur in association with areas of standing water and poor fen and flush communities with abundant common cottongrass.

The following sub-sections provide a description of the secondary habitats that have begun to form on the cutover bog following cessation of peat extraction/milling.



Plate 6-1 Cutover bog characterised predominantly by bare peat

6.6.1.1.1 Bog Woodland (WN7)

Birch dominated **bog woodland (WN7)** is common throughout the Proposed Development Site (Plate 6-2), most notably in Bracklin Bog where it occurs alongside birch dominated Scrub, predominantly as long linear strips on the cutover bog alongside existing drainage channels. Smaller areas of this habitat are also present at various locations throughout Lislogher and Ballivor Bogs.

Bog woodland within the site is generally dominated by downy birch (*Betula pubescens*) with some willows (*Salix* sp.), and occasional lodgepole pine (*Pinus contorta*), rowan (*Sorbus aucuparia*) and sitka spruce (*Picea sitchensis*). The shrub layer is mostly dominated by brambles (*Rubus fruticosus* agg.) with ivy (*Hedera helix*) and bracken (*Pteridium aquilinum*) also occurring frequently and bilberry (*Vaccinium myrtillus*) occasionally. Ground flora frequently included wild strawberry (*Fragaria vesca*) and occasionally field woodrush (*Luzula sylvatica*), purple moor grass (*Molinia caerulea*), soft rush (*Juncus effusus*) and hart's tongue fern (*Asplenium scolopendrium*). The areas of bog woodland were mostly dry underfoot with little to no Sphagnum cover and did not conform to Annex I Bog Woodland (91DO). Bryophytes recorded typically included *Thuidium tamariscinum* and *Hypnum jutlandicum*. Areas of bog woodland within the site are generally small in size, often comprising wide linear strips running parallel to drainage ditches, however larger more extensive areas of bog woodland are present in some areas, including at the southern and northern ends of Bracklin Bog and at the southern end of Ballivor Bog. The Annex I Bog Woodland habitat (91DO) was not recorded on the site during the Bord na Móna habitat surveys in 2011 and 2012 or during the detailed habitat surveys undertaken by MKO between 2020 and 2022.

Small sections of the proposed turbine infrastructure and associated access roads are located in areas of bog woodland, most notably at Lislogher East and Bracklin Bogs.



Plate 6-2 Area of birch dominated bog woodland at Bracklin Bog

6.6.1.1.2 Scrub (WS1)

Birch dominated **scrub (WS1)** is also common throughout the study area, where it has developed on drier areas of the cutover bog (Plate 6-3). Scrub is generally dominated by downy birch, along with willow species. The ground flora is generally comprised of ling heather (*Calluna vulgaris*), purple moor grass (*Molinia caerulea*) and common cottongrass (*Eriophorum angustifolium*). Scrub habitat within the site often forms mosaics with heath-type vegetation described below. Where scrub was greater than 4 metres in height, it was classified as bog woodland (WN7 as per Fossitt, 2000).



Plate 6-3 Example of birch dominated scrub in the background

6.6.1.1.3 Cutover bog supporting Secondary dry heath (HH1) type communities

This habitat type covers a broad range of conditions from bare peat and dry but vegetated peat to much wetter areas that grade into poor fen (Plate 6-4 to Plate 6-6). The habitat frequently occurred in a mosaic alongside other habitats including scrub and pioneer poor fen habitat.

Secondary **dry heath (HH1)** type communities throughout the Proposed Development Site are largely dominated by ling heather (*Calluna vulgaris*) along with common cottongrass (*Eriophorum angustifolium*) on dry peats with little to no Sphagnum present. Areas of bare peat are common, particularly where the cutover bog has begun to revegetate more recently. Cross-leaved heath (*Erica tetralix*), hare's tail cottongrass (*Eriophorum vaginatum*) and purple moor grass are also frequent components of the vegetation of these communities and occasional birch and self-seeded lodgepole pine and/or larch saplings are also common.

Wetter areas are characterised by a greater abundance of common cottongrass and also supported occasional deergrass (*Trichophorum germanicum*) and bog asphodel (*Narthecium ossifragum*). These areas occasionally graded into poor fen.

According to Smith and Crowley (2020) cutover bogs should only rarely be considered examples of dry siliceous heath (HH1) or wet heath (HH3). These habitats are defined by peat depths of <0.5m which rarely occur on cutover bog. *Only where a habitat is underlain by shallow peat and good indicators of heath are present, such as Carex binervis, Galium saxatile and Juncus squarrosus, should heath habitats be considered for cutover bog.* The vast majority of heath and heath mosaic habitat within the study area occurs on peat with a depth of >0.5m and none of these heath indicator species were recorded within heath habitat during the field surveys undertaken. Therefore the secondary heath type communities within the site do not conform to Annex I heath habitats. They are secondary, cutover raised bog habitats that are located on deep peat and level ground. They do not conform to Annex I wet heath habitat as defined by the Irish Wildlife Manual (Perrin et.al. 2014). Neither do they conform to Annex I raised bog habitats or any other Annex I habitat.



Plate 6-4 Dry heath type vegetation with areas of bare peat and encroaching scrub at Lisclogher Bog



Plate 6-5 Dry ling heather dominated dry heath type vegetation in the foreground grading into wetter common cottongrass dominated vegetation in the background at Ballivor Bog.



Plate 6-6 Mosaic of ling heather dominated dry heath and scrub at Bracklin Bog

6.6.1.1.4 Poor Fen (PF2)

This habitat occurs within the Proposed Development Site predominantly as pioneer poor fen vegetation with established poor fen and flush being less common within the site.

Many sections of the site supported cutaway bog characterised by pioneer common cottongrass dominated **poor fen** (PF2) communities, most notably Lisclogher and Bracklin Bogs. This is one of the first vegetation communities to colonise bare peat following cessation of peat cutting. The habitat was widespread but highly variable mostly occurring as a habitat mosaic along with bare peat, dry heath type vegetation and scrub (Plate 6-7).

Wetter sections of the cutover bog associated with areas of standing water and with a more established poor fen vegetation are also present throughout the site. These areas are dominated by common cottongrass with soft rush (*Juncus effusus*) and *Sphagnum cuspidatum* also present (Plate 6-8) These areas also supported abundant purple moor grass and hummocks of the moss *Polytrichum commune*, whilst the wettest areas with pools of standing water were characterised by bottle sedge (*Carex rostrata*) alongside marsh pennywort (*Hydrocotyle vulgaris*), heath bedstraw (*Galium saxatile*), cuckoo flower (*Cardamine pratensis*) and occasional willow (*Salix* sp.) saplings (Plate 6-9).



Plate 6-7 Pioneer common cottongrass dominated poor fen vegetation forming a mosaic with scrub and heath type vegetation at Lisclogher Bog



Plate 6-8 Area of common cottongrass dominated poor fen at Bracklin Bog



Plate 6-9 Example of poor fen with bottle sedge at Lisclogher Bog

6.6.1.1.5 Open water

No significant areas of permanent open water are present within the Proposed Development Site.

Numerous smaller areas of open water are present in the wettest and lower lying areas of the study area, often associated with poor fen and flush communities (Plate 6-10). These areas have previously been subject to peat extraction and are often revegetating with bottle sedge (*Carex rostrata*) and common cottongrass. Areas of standing water were also recorded in association with low lying regenerating areas of cutaway bog where embryonic *Sphagnum* communities were beginning to establish comprising abundant *Sphagnum cuspidatum* and common cottongrass.



Plate 6-10 Small area of open water associated with poor fen and flush vegetation

6.6.1.1.6 Other Artificial Lakes and Ponds (FL8)

Silt ponds are present at various locations throughout the Proposed Development and have been classified as **other artificial lakes and ponds** (FL8). Drainage ditches throughout the study area are directed to these silt ponds prior to discharge from the site.

6.6.1.1.7 Drainage Channels (FW4)

The Proposed Development Site is extensively drained with channels that run through the study area. Drainage ditches ranged from approximately 0.3m in width to approximately 3m in width. Whilst many of the drains within the site have a poor structure and were devoid of vegetation, common components of vegetated drains included bulrush (*Typha latifolia*), horsetails (*Equisetum* sp.), willowherbs (*Epilobium* sp.), hard rush (*Juncus effusus*), and occasionally floating vegetation such as pondweeds. Substrates were predominantly silt/peat. In the areas where the drains are surrounded by heath, scrub and woodland the vegetation within them is sparse and the substrate comprises of bare silt (Plate 6-11 and 6-12)



Plate 6-11 Drainage ditch through an area of birch woodland



Plate 6-12 Example of typical drainage ditch within the site

6.6.1.1.8 Lowland depositing streams (FW2)

The Proposed Development Site is drained by a number of watercourses within and surrounding the site including the Cartenstown stream, Stonestown river, Ballinn stream, Bolandstown river, Woodtown West stream, Stonyford river, Carranstown Little river, Killaconnigan stream, Kilballivor stream, Ballivor river and two unnamed tributaries, Graffanstown stream, Ballynaskeagh Stream, Mucklin Stream, River Deel, Craddanstown stream and Clondalee More stream.

The Deel (Raharney) river is located approximately 2km to the west of the Proposed Development Site and the Stonyford River is located approximately 450m to the east of the Proposed Development Site. Both rivers are designated as the River Boyne and River Blackwater SAC. A number of the streams within and adjacent to the Proposed Development Site discharge to these rivers which in turn discharge to the River Boyne downstream of the site. The watercourses above are described in the Aquatic Survey report in Appendix 6-3 of the EIAR. A map showing the location of watercourses draining and surrounding the Proposed Development Site is shown in Figure 6-9.



Map Legend

- Proposed Development site
- WFD Watercourses



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 Government of Ireland

Drawing Title
Watercourses draining the Proposed Development Site
 Project Title

Proposed Ballivor Windfarm

Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137	Figure 6-9
Scale	Date
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6.6.1.2 Grasslands Habitats

6.6.1.2.1 Dry calcareous and neutral grassland (GS1) and Dry meadows and grassy verges (GS2)

Small areas of dry grassland are present within the Proposed Development Site, along the sides of the railway lines and existing track verges as well as in areas where underlying glacial till has been exposed (Plate 6-13). The majority of grassland areas are classified as **dry meadows and grassy verges (GS2)** with grass species including Yorkshire fog (*Holcus lanatus*), cocks foot (*Dactylis glomerata*), sweet vernal grass (*Anthoxanthum odoratum*) and false oat grass (*Arrhenatherum elatius*). Encroaching scrub was common comprising bramble (*Rubus fruticosus* agg.) and bilberry (*Vaccinium myrtillus*). Other species recorded include bird's foot trefoil (*Lotus corniculatus*), knapweed (*Centaurea nigra*), meadowsweet (*Filipendula ulmaria*), tormentil (*Potentilla erecta*), ribwort plantain (*Plantago lanceolata*), silverweed (*Potentilla anserina*), germander speedwell (*Veronica chamaedrys*) and occasional devil's bit scabious (*Succisa pratensis*). Smaller areas of Dry calcareous and neutral grassland (GS1) were also present throughout the site.

A number of orchid species were recorded in grassy verges along the existing railway lines including twayblade (*Listera ovata*), heath spotted orchid (*Dactylorhiza maculata*), common spotted orchid (*Dactylorhiza fuchsii*) and butterfly orchid (*Platanthera* sp.).

Other areas of grassland habitats comprised of a mix of species typical of both calcareous and peatland habitats. This diversity in species recorded has resulted from the importing of stone for the construction of railway tracks throughout the peatland.



Plate 6-13 Example of dry grassland adjacent to the railway line within the site

6.6.1.2.2 **Grassland Habitats: Improved agricultural grassland (GA1), Wet grassland (GS4), Amenity Grassland (GA2)**

The Ballivor Bog group is surrounded by agricultural fields classified as **improved agricultural grassland (GA1)** and **wet grassland (GS4)**. Small areas of Improved agricultural grassland are present in the Proposed Development Site, close to the entrance to Ballivor Bog at its northern extent and at the southern extent of Lisclogher Bog. Improved agricultural grassland is also present at the location of the proposed Flanagan’s Field borrowpit to the south of Bracklin Bog (Plate 6-14). The fields are characterised by species including perennial rye grass (*Lolium perenne*), cocksfoot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*), common sorrel (*Rumex acetosa*), broadleaved dock (*Rumex obtusifolius*) and dandelion (*Taraxacum officinale*).

Wet grassland occurs mainly around the edges of the Proposed Development Site associated with wetter agricultural fields with abundant soft rush (*Juncus effusus*). Small areas of wet grassland dominated by purple moor grass are also present throughout the site on cutover bog, however, these areas occur predominantly as a habitat mosaic alongside scrub and dry heath type communities.

A small area of **amenity grassland (GA2)** is present at the northern extent of Ballivor Bog in the built area around the Bord na Móna buildings.



Plate 6-14 Improved agricultural grassland at the location of the proposed borrowpit at Flanagan's field

6.6.1.3 Oak-ash-hazel woodland (WN2)

Two small mineral islands are located on the Carranstown Bog site; these areas contain woodland that is dominated by hazel (*Corylus avellana*), downy birch and ash (*Fraxinus excelsior*) with smaller amounts of young oak (*Quercus robur*) and are classified as **oak-ash-hazel woodland (WN2)** (refer to habitat map Figure 6-7b).

A small woodland copse area with elements of oak-ash-hazel woodland is also present at Bracklin Bog where it has developed on a mound close to the remains of an old Famine House (Plate 6-15). Plate 6-15 There are several mature Sycamore (*Acer pseudoplatanus*) trees around the house forming the woodland copse. Other species present include hazel (*Corylus avellana*), holly (*Ilex aquifolium*), hawthorn (*Crataegus monogyna*) and ash (*Fraxinus excelsior*).



Plate 6-15 Oak-ash-hazel woodland close to the remnants of the Famine House at Bracklin Bog

6.6.1.4 Uncut raised bog (PB1)

There are a number of areas of remnant uncut raised bog habitat within the Proposed Development Site. These are classified as **raised bog (PB1)**.

Whilst many areas of remnant raised bog recorded within the Proposed Development Site boundary are typically small in area and very dry, with little to no *Sphagnum* cover, other areas are in relatively good condition, slightly wetter and support a more diverse raised bog vegetation with a greater abundance and cover of *Sphagnum* species.

Some areas of remnant raised bog have been subject to previous extensive drainage measures, with several parallel drainage channels inserted throughout, but never put into peat production and as a result these areas are extremely dry e.g. northern sections of Bracklin Bog and Lislogher East. Other sections of remnant raised bog at Lislogher Bog and Bracklin Bog had also been burned in recent years and, although recovering, still remained relatively dry and degraded. The driest, drained areas of remnant raised bog within the Proposed Development Site are generally dominated almost exclusively by ling heather. Other species recorded in the drier raised bog remnants included *Cladonia* sp., cross leaved heath (*Erica tetralix*), cottongrasses and deergrass (*Trichophorum germanicum*). These dry areas were characterised by very low and in some cases no *Sphagnum* cover and variable areas of bare ground.

The wettest areas of remnant raised bog within the Proposed Development Site support bog asphodel (*Narthecium ossifragum*), areas of white beak sedge (*Rhychospora alba*) and a greater abundance and cover of *Sphagnum* species. However, in general, *Sphagnum* cover did not exceed 30% cover and was more typically < 10% cover. These wetter areas were not characterised by standing water/pools and were not associated with lawns of *Sphagnum*.

The Proposed Development has been specifically designed to avoid areas of uncut raised bog wherever possible as part of an iterative layout design process. The wettest and largest areas of undrained and

uncut remnant raised bog within the site have been avoided by the Proposed Development. However, approximately 1.03ha of highly degraded, uncut raised bog is located within the construction footprint of the Proposed Development. Sections of the proposed turbine infrastructure for T13, T23 and T24 traverse areas of highly degraded, dry and fragmented remnant raised bog at Lisclogher East Bog and Bracklin Bogs. The proposed floating access track linking Lisclogher East and Bracklin Bogs also traverses an area of degraded remnant raised bog, surrounded by facebanks and cutover bare peat, while the temporary floating access road to Borrowpit No. 2 to the south of Bracklin Bog will also traverse a small area of dry but uncut remnant raised bog. These areas of remnant raised bog habitat within the Proposed Development footprint were found to be highly degraded, either being very small and fragmented in nature, surrounded by extensive cutover bog and/or subject to extensive drainage through the insertion of parallel drainage ditches and very dry underfoot with little to no *Sphagnum* cover (Plates 6-16 – 6-20). Detailed botanical assessments were undertaken at these locations and are presented in Appendix 6-1.

The potential for these raised bog fragments within the Proposed Development footprint to conform to the Annex I habitats Active Raised Bog (7110) and Degraded Raised Bog still capable of Natural Regeneration (7120) was considered. ‘*The Status of EU Protected Habitats in Ireland*’ (Article 17 report (NPWS, 2013) provides definitions for both Active Raised Bog (7110) and Degraded Raised Bog still capable of Natural Regeneration (7120).

According to the above Article 17 report, Active Raised Bog (ARB) ‘*is characterised by the presence of an acrotelm, which is defined as the living, actively growing upper layer of a raised bog, the surface of which is composed mainly of living bog mosses (Sphagnum species)*’. In addition, as outlined in Smith and Crowley (2020), previous raised bog research in Ireland indicated that ARB, at least in the midlands, generally supports cover of *Sphagnum* greater than 40% (Fernandez Valverde et al. 2005, 2012).

The raised bog remnants within the construction footprint, lacked a diverse or abundant *Sphagnum* component. *Sphagnum* cover was generally <10% or absent within these areas, with the exception of the raised bog remnant along the proposed temporary access track to the Borrowpit 2 to the south of Bracklin Bog. Typical Raised bog microtopography, including hummocks, bog pools and *Sphagnum* lawns were absent from these habitats. The areas of remnant raised bog within the construction footprint, given their highly degraded and fragmented nature, and absence of typical raised bog micro-topography, do not conform to the Annex I habitat Active Raised Bog [7110].

According to the above Article 17 report, Degraded Raised Bog (DRB) is characterised by the complete absence, or at best the presence of only a patchy thin cover of an ‘acrotelm’ layer. According to the report, while previously all the vegetated areas of high bog which were not delineated as Active Raised Bog (ARB) were classified as DRB, on the assumption that most of it could be restored to active peat-forming condition after implementation of comprehensive restoration works, the results of recent research show that only those areas with the right combination of physical conditions (including surface shape, slope and drainage patterns) ultimately capable of supporting ARB are now considered DRB. To qualify as DRB, these areas must still be capable of natural regeneration to active bog within 30 years if their hydrology is repaired (usually after restoration works, particularly blocking of drains).

The conditions outlined in the Article 17 report as being suitable for supporting DRB include:

‘a) sites over 30ha of high bog with typical bog vegetation which were part of a larger bog and contain drains which could be blocked and b) smaller sites (< 30 ha) which are part of small basins with drains present which could be blocked.....The occurrence of DRB is ruled out from those sites where the high bog area is below 30ha, which were once part of a much larger site and are now surrounded by facebanks and without drains to be blocked.’

The 1.03ha of uncut raised bog within the Proposed Development footprint is made up of small marginal sections of the habitat, located within six separate fragments of highly degraded bog. The raised bog fragments are in general of a very small size (well below 30ha), are highly degraded and are drained on all sides. One section of remnant raised bog located at the northern extent of Lisclogher Bog, while it is of a larger size, is also highly degraded and heavily drained through the insertion of parallel drainage

ditches. The section of this area of remnant raised bog within the construction footprint was dry, dominated almost exclusively by ling heather and cottongrass, and was characterised by an absence of *Sphagnum* cover and the presence of areas of bare disturbed ground. q

The majority of raised bog remnants within the construction footprint best conform to Marginal and Facebank ecotopes as per Fernandez et al. (2014), i.e. *Sphagnum* cover is <10% (or often absent). While other larger areas of undrained raised bog within the Application Site boundary were found to best fit the description of Sub-marginal ecotype, i.e. *Sphagnum* cover >10% but less than 30% and pool cover <15% (Fernandez et al. 2014), these have been avoided by the construction footprint.



Plate 6-16 Highly degraded raised bog habitat at the northern extent of Lislogher Bog (within the construction footprint)



Plate 6-17 Dry degraded raised bog within the construction footprint at Lislogher Bog



Plate 6-18 Example of uncut but drained and dry raised bog between Lislogher East and Bracklin Bogs



Plate 6-19 Uncut raised bog along the proposed floating access track to Borrowpit 2



Plate 6-20 Dry degraded raised bog at Bracklin Bog, south of T13

6.6.15 Conifer Plantation

Small areas of **conifer plantation (WD4)** are present at the very northern extent of Ballivor Bog.

6.6.16 Spoil and bare ground (ED2) and Recolonising bare ground (ED3)

Existing unpaved access tracks throughout the study area are classified as **spoil and bare ground (ED2)**. Areas of spoil and bare ground and recolonising bare ground are also present in works areas associated with the Bord na Móna buildings at the northern extent of Ballivor Bog.



Plate 6-21 Access track at Bracklin Bog classified as Spoil and bare ground

6.6.17 Buildings and Artificial Surfaces (BL3)

There are some areas of **buildings and artificial surfaces (BL3)** within the Proposed Development Site, including the existing railway infrastructure and associated road crossing, existing local roads throughout the Proposed Development Site and storage buildings associated with the Bord na Mona works area at Ballivor Bog. The main works buildings themselves are located outside the Proposed Development Site boundary.

6.6.18 Treeline and Hedgerow (WL2 & WL1)

Treeline (WL2) and hedgerow (WL1) habitats make up a very small proportion of the habitats within the site. Hedgerows of hawthorn (*Crataegus monogyna*) and immature willow, with scattered ash trees, are present in the land-take areas along the proposed haul route and are described in the section below.

6.6.1.9 Habitats along the proposed haul route

The proposed turbine component haul route is located predominantly within existing road infrastructure. Where road widening works are required to accommodate the proposed haul route at 3 locations, the habitats within the footprint of the works are described below.

Junction between the R156 and the R161

The land-take area at this location consists of an **improved agricultural grassland (GA1)** field bordered by a **hedgerow (WL1)** with some sparsely distributed semi-mature Ash (*Fraxinus excelsior*) trees (Plate 6-22).

Species found within the field include perennial rye grass (*Lolium perenne*), Cow parsley (*Anthriscus sylvestris*), Mouse-ear chickweed (*Cerastium fontanum*), Nettles (*Urtica dioica*), Broad-leaved dock (*Rumex obtusifolius*), and Ragwort (*Jacobaea vulgaris*). Giant Hogweed (*Heracleum mantegazzianum*), Ivy (*Hedera helix*) and Hart's-tongue fern (*Asplenium scolopendrium*) were identified in drainage ditches at the base of the hedgerow.

The hedgerow itself comprised of bracken (*Pteridium aquilinum*), bramble (*Rubus fruticosus*), juvenile willow (*Salix* spp.) trees and semi-mature Ash (*Fraxinus excelsior*) trees.



Plate 6-22 Improved agricultural grassland and hedgerow along the proposed haul route

East of Ballivor Village on the R156

The northern land-take area along the haul route at this location consists of **improved agricultural grassland (GA1)** which contains species including perennial rye grass (*Lolium perenne*), white clover (*Trifolium repens*), broad-leaved plantain (*Plantago major*), dandelion (*Taraxacum officinale* agg.), creeping buttercup (*Ranunculus repens*), mouse-ear chickweed (*Cerastium fontanum*), and occasional red clover (*Trifolium pratense*), Yorkshire fog (*Holcus lanatus*), cock's foot (*Dactylus glomerata*), pineapple weed (*Matricaria discoidea*), shepherd's purse (*Capsella bursa-pastoris*) and creeping thistle (*Cirsium arvense*).

A **hedgerow (WL1)** runs along the south of the area containing hawthorn (*Crataegus monogyna*), common hogweed (*Heracleum sphondylium*), bramble (*Rubus fruticosus*), nettle (*Urtica dioica*), false oat grass (*Arrhenatherum elatius*), immature ash (*Fraxinus excelsior*), and blackthorn (*Prunus spinosa*) (Plate 6-23). A hedgerow running south-north separates two fields, which consists of hawthorn, ivy (*Hedera helix*), nettles and spear thistle (*Cirsium vulgare*). Two ash trees are also found within the land-take area along this hedgerow. A large ash tree is situated to the west of the land-take area.

The agricultural grassland to the east of the hedgerow described above contains similar species to the eastern field, as well as a small, disturbed, quarried area which contains common poppy (*Papaver rhoeas*) (Plate 6-24). A wooden fence runs along the south of this field.



Plate 6-23 Agricultural grassland and hedgerow along the south within western field of northern land-take area.



Plate 6-24 Eastern field of northern land-take area, with disturbed ground.

6.6.1.10 Protected Flora

No botanical species protected under the Flora (protection) Order (1999, as amended 2022) were recorded during the surveys of the Proposed Development Site.

6.6.1.11 Invasive species

No invasive species, listed on the Third Schedule of the S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, were recorded within or in close proximity to the construction footprint of the Proposed Development during the walkover surveys undertaken.

6.6.2 Fauna in the Existing Environment

The following subsections provide a breakdown of the species recorded within the study area during the site visits and assessments.

6.6.2.1.1 Badger

A badger sett was recorded at Carranstown Bog in an area of dry heath and scrub within the Proposed Development Site boundary (Plate 6-25). This comprised a main sett with 5 entrances located approximately 90m to the south of a proposed substation and outside of the construction footprint and a single entrance located approximately 195m to the north of the main sett, considered to be an outlier sett

(as per Smal, (1995)⁸), all of which showed signs of use by badger including badger hairs, foraging evidence and paths. The outlier sett is located within the footprint of the proposed substation. A camera trap was deployed at the location of the outlier sett. A single badger was recorded outside the sett on one occasion but was not recorded entering or exiting the sett.

The locations of the setts are shown in Figure 6-10 in confidential Appendix 6-4.



Plate 6-25 Badger sett entrance at Carranstown Bog

6.6.2.1.2 Otter

No otter resting or breeding sites were recorded within the Proposed Development Site during dedicated otter surveys undertaken by MKO. Neither were any otter resting or breeding sites recorded during the aquatic surveys of the watercourses downstream of the Proposed Development Site undertaken by Triturus Environmental Ltd.

Otter spraints were recorded within the Proposed Development Site in proximity to a drainage ditch in Lisclogher Bog during the multi-disciplinary walkover surveys undertaken in May 2020. Otter prints were recorded within the Proposed Development Site in Lisclogher Bog, in proximity to a wide drainage ditch during dedicated otter surveys undertaken in May 2021. No other signs of this species were recorded.

Signs of otter (spraints and/or prints) were recorded outside of and downstream of the Proposed Development Site in the Craddanstown stream to the west of Ballivor Bog and in the Ballivor river to the east of Ballivor Bog during the aquatic surveys of these watercourses undertaken by Triturus Environmental Ltd.

⁸ Smal, C. (1995) *The Badger and Habitat Survey of Ireland. Unpublished Report to the Department of Agriculture and the National Parks & Wildlife Service.*

The majority of the drainage ditches within the site are small and are thus not suitable for otter given their small size and highly modified channels of low fisheries value, however it is possible that otter utilise some of the larger drains for foraging and commuting. The main watercourse/larger artificial drainage channels within and draining the site were assessed as providing suitable commuting and foraging habitat for the species.

6.6.2.1.3 Bats

The results of the dedicated bat surveys undertaken in 2022 are outlined in full in the bat survey report in Appendix 6-2 and summarised below.

Bat Habitat Appraisal

Wind Farm Site Boundary

With regard to foraging and commuting bats, areas of cutover bog, dry heath, poor fen, spoil and bare ground, and grassland habitats were considered to have *Low* suitability, i.e. suitable but isolated habitat that could be used by small numbers of commuting or foraging bats (Collins, 2016). Scrub, bog woodland, oak-ash-hazel woodland, conifer/forestry edge habitats, lowland depositing streams, drainage ditches and artificial lakes/ponds were assessed as having *Moderate* potential for commuting or foraging bats (i.e. habitat that is connected to the wider landscape that could be used by bats for foraging bats such as trees, scrub grassland or water (Collins, 2016)). However, these habitats are surrounded by wide expanses of cutover bog habitat.

With regard to roosting bats, an assessment of the various woodland and forestry habitats was undertaken. Trees present on site comprise a mixture of mature and immature birch, willow, hazel, ash, oak, sycamore, rowan, commercial coniferous species. Overall, the majority of trees within the site did not provide optimal habitat for roosting bats and were assessed as having *Negligible – Low* roosting potential.

Structures within the Proposed Development Site include Bord na Móna out buildings, storage containers and railway crossings which were assessed as having *Negligible-Low* roosting potential. These structures will be fully retained. The main Bord na Móna works buildings are located outside the Proposed Development Site boundary.

All other habitats present were assessed as having *Negligible* roosting potential.

Haul Route

The proposed haul route is located primarily within the existing road infrastructure classified as Buildings and artificial surfaces (BL3). The haul route traverses small areas of Improved agricultural grassland (GA1), Recolonising bare ground (ED3) and Dry meadows and grassy verges (GS2), Treeline (WL2) and Hedgerow (WL1).

With regard to commuting and foraging bats, the habitats within the haul route land-take area were assessed as having *Low-Moderate* suitability i.e. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water (Collins, 2016).

With regard to roosting bats, the majority of habitat features within the haul route land-take area were assessed as having *Negligible* suitability i.e. Negligible habitat features likely to be used by roosting bats/trees of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential (Collins, 2016). One mature ash tree with extensive ivy cover located within the north-to-south aligned hedgerow within the land-take area was identified as having *Moderate* potential for roosting bats (IG Ref: N 72887 53184).

Roost surveys

Following a search for roosts in 2022, no structures containing potential suitable bat roost features were identified within 200m plus the rotor radius of the Proposed Development.

The Proposed Development Site was checked for potential tree roosts, the majority of trees within the site did not provide optimal habitat for roosting bats and were assessed as having *Negligible – Low* roosting potential. Trees may have increased or decreased probability of hosting roosting bats in certain

circumstances i.e. Having large broadleaf trees with cavities or other damage such as rot or loose bark increased probability whereas, Conifer plantations and young trees with little – no damage have a decreased probability of hosting bats (Marnell, F., Kelleher, C. & Mullen, E., 2022). The surrounding habitats were assessed as *Low* suitability for roosting bats with few suitable structures or trees with Potential Roosting Features (PRFs) and extensive peatlands in the area.

Manual transects

Transect manual surveys of the Proposed Development Site were undertaken in Spring, Summer and Autumn in 2022. Bat activity was recorded on all surveys, a total of 108 bat passes were recorded. In general, Common pipistrelle was recorded most frequently (n=96), followed by Leisler's bat (8) and Soprano pipistrelle (n=4). Low activity was recorded across the site. Species composition and activity levels did not vary significantly between surveys.

Ground-level Static Surveys

In total, 44,101 bat passes were recorded across all deployments during 2022. In general, Common pipistrelle (n=24,670) occurred most frequently, followed by Soprano pipistrelle (n=11,871) and Leisler's bat (n=6,711). Instances of *Myotis* spp. (n=645), Brown long-eared bat (n=192) were significantly less and Nathusius' pipistrelle (n=12) were rare.

Bat activity was calculated as total bat passes per hour (bpph) per season to account for any bias in survey effort, resulting from varying night lengths between seasons. Species composition was similar across seasons, however relative activity was high in Summer, low in Spring and very low in Autumn. No instances of Nathusius' pipistrelle were recorded in Autumn, and activity by all other species declined relative to Spring and Summer. In terms of total passes, Brown long-eared bat activity remained constant between Summer and Autumn, and *Myotis* spp. activity slightly increased between seasons through the year.

Spring activity was dominated by Leisler's bats at most detectors, with activity overall being low for all species (<10bpph), with a few exceptions. All detectors presented low median activity in spring (<10bpph).

Summer activity was largely dominated by Common pipistrelles at most detectors, with some detectors (refer to bat report in Appendix 6-2) presenting slightly higher Leisler's bat activity, with low bpph recorded.

In Autumn, median bat activity was low at all detectors and for all species recorded. Species composition was more variable in Autumn at detectors.

Ecobat Analysis

Ecobat was not available for analysis of 2022 data as the website has been down for maintenance. In 2022 bat activity level assessment was based on Kepel et al. 2011 activity index categories.

In 2020, Median activity levels for common pipistrelle peaked at **High** for Spring and Summer. Median activity levels for soprano pipistrelle and Leisler's bat peaked at **Moderate to High** for at least two seasons. Median activity levels for Nathusius' pipistrelle peaked at **Moderate** for two seasons. Brown long-eared bat and *Myotis* sp. peaked with **Low to Moderate** activity for at least one season. Maximum activity levels peaked with **High** activity for all species for at least one season, with the exception of brown long-eared bat, which peaked at **Moderate to High**. The results are described in detail in Appendix 6-2 of the bat survey report.

6.6.2.1.4 Reptiles and Amphibians

Common frog (*Rana temporaria*) was recorded on a number of occasions throughout the site. The species is likely to breed in wetland areas within the Proposed Development Site. Smooth newt (*Lissotriton vulgaris*) was recorded during aquatic surveys undertaken on the Woodtown stream, downstream of the Proposed Development Site boundary, however it was not recorded within the Proposed Development Site. While not recorded during the site visits, the drainage ditches within the Proposed Development Site provide suitable habitat for this species.

Common lizard (*Zootoca vivipara*) while not recorded during the site visits, is likely to occur within the site.

It is considered that suitable habitat for these species is widespread in the Proposed Development Site and that the Proposed Development will not result in a significant loss of suitable habitat these species.

6.6.2.1.5 Fisheries and Aquatic Fauna

Triturus Environmental Ltd. undertook fisheries and aquatic faunal assessments of all freshwater watercourses which could be affected directly or indirectly by the Proposed Development, due to their location within or downstream of the Proposed Development Site. The results of Aquatic surveys undertaken by Triturus Environmental Ltd. are described in full in the aquatic report in Appendix 6-3.

In summary, the majority of watercourses draining the Proposed Development Site were of local importance (higher value) in terms of their aquatic ecology. However, historical drainage pressures and ongoing peat escapement (siltation) had significantly reduced the quality and or presence of aquatic habitats on the Cartenstown Stream (EPA code: 07C60), Stonestown River (07S11), Ballinn Stream (07B47), Bolandstown River (07B45), Woodtown West Stream (07W06), Carranstown Little River (07C87), Killaconnigan Stream (07K34), Kilballivor Stream (07B35), Ballivor River (07B52) and two unnamed tributaries, Graffanstown Stream (07G10), Ballynaskeagh Stream (07B24), Mucklin Stream (07M13), Craddanstown Stream (07C550) and Clondalee More Stream (07C77). Typically, larger watercourses with higher flow rates are better able to buffer against such impacts and these proved the better-quality aquatic habitat, i.e., Stonyford River, River Deel, River Boyne which are located outside and downstream of the site. With the exception of survey sites on these three watercourses, biological water quality was of $\leq Q3$ (poor status) across all survey sites sampled and this contributed to the reduction in habitat quality for salmonids, macro-invertebrates (including white-clawed crayfish) and other aquatic species and habitats of conservation value. The Stonyford River, River Deel and the River Boyne all of which are located downstream of the site provide suitable habitat for a range of aquatic species including salmonids, freshwater crayfish and European eel.

The vast majority of the watercourses within the Proposed Development Site itself comprise artificial drains with a poor structure and silty substrate which are of low fisheries value. The Boldanstown Stream, Cartenstown Stream, Killaconnigan Stream and Clondalee More Stream are the only watercourses located within 100m of the proposed turbine and associated infrastructure. These streams are described in the Aquatic report in Appendix 6-3 and were all found to be of low fisheries value given their small size, highly modified nature, having been historically straightened and deepened and high levels of siltation. These watercourses provide poor quality or unsuitable habitat for salmonids, crayfish and European eel, given the above characteristics. While they provide some suitability for lamprey, only low densities of lamprey were recorded during the electrofishing surveys which are described in full in Appendix 6-3.

6.6.2.1.6 **Marsh Fritillary**

The desk study undertaken above identified records for marsh fritillary from the Proposed Development Site but outside of the construction footprint. Adult marsh fritillary were identified during the multi-disciplinary walkover survey of the Proposed Development Site in April 2020.

No suitable habitat for marsh fritillary was identified within the construction footprint of the Proposed Development during the multi-disciplinary walkover surveys of the Proposed Development Site. While small areas of suitable habitat were identified within the Proposed Development Site boundary, these were located outside the construction footprint, along existing railway tracks. No marsh fritillary larval webs were recorded within these areas during dedicated larval web surveys undertaken in September 2020, 2021 and 2022.

6.6.2.1.7 Other species

During the multi-disciplinary walkover surveys of the Proposed Development Site, signs of the following mammal species were recorded:

- Fox (*Vulpes vulpes*) scat was recorded at various locations throughout the study area. As signs of fox were regularly recorded throughout the site, the distribution of the species has not been mapped. The species was also caught on the camera trap deployed at the badger sett entrance at Bracklin Bog.
- Hare (*Lepus timidus hibernicus*) was frequently recorded throughout the study area along with its droppings and footprints. The species is widespread throughout the habitats present and no dedicated survey for the species was required.
- Mustelid scat that was likely to be that of pine marten (*Martes martes*) was recorded infrequently throughout the site. No dens were recorded and no requirement for additional survey was identified.
- Deer prints were recorded regularly throughout the entire site.
- Pygmy shrew (*Sorex minutus*) was recorded at Bracklin Bog.

In addition to the above mammal species (or signs thereof) that were recorded, it is likely that other species also occur on or around the site but were not recorded during the site surveys that were undertaken. These include small mammal species such as wood mouse (*Apodemus sylvaticus*) but also larger mammals such as stoat (*Mustela erminea*) and mink (*Mustela vison*). No signs of any of these species were recorded during the walkover surveys and no requirement for dedicated surveys was identified.

The Proposed Development Site provides suitable habitat for a range of other faunal species as described in the preceding sections. No records of common lizard were recorded within the site. However, the species is likely to occur in the area. No evidence of populations of species such as common frog, Irish hare, pine marten or deer species being significant at more than a local level was recorded. These species have been assessed as of local importance (higher value) in accordance with NRA (2009) guidelines. However, due to scale of the site and the considerable presence of vegetation, woodland and scrub cover within the wider site, these species are unlikely to be significantly affected by the Proposed Development. For this reason, these species are not considered further in this EIAR.

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 include the species commonly recorded within the study area:

- Common hawker dragonfly (*Aeshna juncea*)
- Four spotted chaser (*Libellula quadrimaculata*)
- Large red damselfly (*Pyrrosoma nymphula*)
- Common carder bee (*Bombus pascuorum*)
- Buff-tailed bumblebee/white-tailed bumblebee (*Bombus terrestris/Bombus lucorum*)
- Red-tailed bumblebee (*Bombus lapidarius*)
- Heath bumble bee (*Bombus jonellus*)
- Small copper butterfly (*Lycaena phlaeas*)
- Common blue butterfly (*Polyommatus icarus*)
- Green hairstreak butterfly (*Callophrys rubi*)
- Peacock butterfly (*Inachis io*)
- Green tiger beetle (*Cicindela campestris*)
- Narrow-bordered bee hawkmoth (*Hemaris tityus*)
- Small heath butterfly (*Coenonympha pamphilus*)
- Meadow brown butterfly (*Maniola jurtina*)
- Speckled wood butterfly (*Pararge aegeria*)

6.6.3 Identification of Key Ecological Receptors

Table 6-10 lists all identified ecological 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). The potential impacts of the Proposed Development on these ecological receptors is considered in Section 6.7 of this report and mitigation/ measures will be incorporated into the Proposed Development where required, to avoid potential significant impacts on these receptors.

Table 6-10 Key Ecological Receptors identified during the assessment

Ecological feature or species	Reason for inclusion as a KER	KER
Designated sites	<p>Nationally Designated Sites</p> <p>The following pNHAs are located downstream (in excess of 20km) of the Proposed Development Site via the River Boyne. These sites have been assessed as of National importance in line with NRA (2009) guidelines as they are proposed as Natural Heritage Areas (NHAs).</p> <ul style="list-style-type: none"> > Trim pNHA > Boyne Woods pNHA > Crewbane Marsh pNHA > Rossnaree Riverbank pNHA > Dowth Wetland pNHA > Boyne River Islands pNHA > Boyne Coast and Estuary pNHA <p>Taking a precautionary approach there is potential for indirect effects on these pNHAs due to deterioration of water quality arising from run-off of and infiltration of pollutants including silts and hydrocarbons during construction and operation associated activities associated with the Proposed Development. Given the potential pathway for impacts and their national importance, these sites are included as a KER.</p>	Yes
	<p>European Designated Sites</p> <p>The following Special Area of Conservation (SAC) and Special Protection Area (SPA) are identified in the AA Screening which accompanies the planning application as being within the Likely Zone of Influence of the Proposed Development. These sites are assessed fully in the NIS that accompanies this application:</p> <ul style="list-style-type: none"> > River Boyne and River Blackwater SAC > River Boyne and River Blackwater SPA <p>These sites are assigned International importance given their designation as European Sites (NRA, 2009). They are</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	<p>located hydrologically downstream of the Proposed Development. As the AASR identified a potential pathway for indirect effects on these sites due to deterioration of water quality arising from run-off of and infiltration of pollutants, including silts and hydrocarbons, during the construction and operation of the Proposed Development, these internationally importance sites have been included as a KER.</p>	
<p>Aquatic Habitats and related species</p>	<p>Drainage Ditches</p> <p>The site of the Proposed Development is drained by numerous artificial drainage ditches. These are predominantly small man-made, slow flowing channels that are often devoid of vegetation.</p> <p>These drains are assigned Local Importance (Lower Value) given their artificial nature and limited biodiversity value. They are therefore not included as a KER.</p>	<p>No</p>
	<p>Rivers and Streams</p> <p>The Deel (Raharney) River is located approximately 2km to the west of the site and the Stonyford River is located approximately 450m to the east of the site. Both rivers are designated as part of the River Boyne and River Blackwater SAC and SPA and have therefore been assigned International Importance.</p> <p>In addition, a number of smaller natural or slightly modified watercourses are located either within or at the perimeter of the site. These watercourses include:</p> <ul style="list-style-type: none"> ➤ Cartenstown Stream (EPA code: 07C60), Stonestown River (07S11), Ballinn Stream (07B47), Bolandstown River (07B45), Woodtown West Stream (07W06), Carranstown Little River (07C87), Killaconnigan Stream (07K34), Kilballivor Stream (07B35), Ballivor River (07B52) and two unnamed tributaries, Graffanstown Stream (07G10), Ballynaskeagh Stream (07B24), Mucklin Stream (07M13), Craddanstown Stream (07C550) and Clondalee More Stream (07C77). <p>These smaller rivers and Streams have been assigned Local importance (Higher Value) in that, whilst many are highly modified, heavily silted and of low fisheries value given historical channelisation and sedimentation, a small number of these provide some suitable, albeit sub-optimal habitat for aquatic fauna including lamprey species, brown trout, salmon, European eel and otter. They are also</p>	<p>Yes</p>

Ecological feature or species	Reason for inclusion as a KER	KER
	<p>conduits to waterbodies with a high biodiversity value in the local area and provide a conduit to downstream European Sites of international importance.</p> <p>A potential pathway for indirect effects on these watercourses via deterioration of water quality during the construction and operational phases of the Proposed Development has been identified. Therefore rivers and streams within and downstream of the site have been identified as a KER.</p> <p>Aquatic and Fisheries Species</p> <p>Aquatic species associated with The River Boyne and River Blackwater SAC, including Atlantic salmon, are assigned International Importance.</p> <p>The aquatic species associated with the smaller rivers and streams that drain the site are assigned Local Importance (Higher Value) in that they are likely to represent resident or regularly occurring populations of no more than local importance given the sub-optimal quality of the habitat (refer to Aquatic report, Appendix 3). These species include salmon, brown trout and lamprey (recorded in small numbers in a small number of streams) as well as three spined stickleback and European eel (not recorded but suboptimal habitat recorded. Taking a highly precautionary approach, there is potential for indirect effect on the above listed aquatic receptors in the form of water pollution during the construction and operational phases of the Proposed Development and therefore aquatic species of Local importance (higher value) and International importance are included as a KER.</p>	<p></p> <p>Yes</p>
<p>Uncut Raised Bog</p>	<p>The largest, undrained areas of remnant raised bog within the Proposed Development Site Boundary are assigned County Importance on a highly precautionary basis. This is because they contain some highly degraded areas of the Annex I Habitat ‘Degraded Raised Bog still Capable of Natural Regeneration (7120)’ that do not fulfil the criteria for National or International Importance as per NRA (2009). These larger, undrained areas have been avoided by the Proposed Development.</p> <p>Small areas of the Proposed Development infrastructure are located within uncut but heavily drained and degraded or highly fragmented, small areas of remnant raised bog. These areas are either small and isolated, surrounded by cutover bog or have been subject to extensive drainage through the insertion of numerous parallel drainage ditches. They are extremely dry and support little to no <i>Sphagnum</i> cover and have been assigned Local importance (higher value).</p>	<p>Yes</p>

Ecological feature or species	Reason for inclusion as a KER	KER
	As there will be some minor loss of these highly degraded areas of uncut raised bog habitat, this habitat is included as a KER.	
Cutover bog and associated secondary habitats	<p>Bare peat habitats</p> <p>Areas of bare peat within the Proposed Development Site are of low ecological importance in their current, highly modified state and have therefore been assigned Local Importance (Lower Value). They are not included as a KER.</p>	No
	<p>Bog Woodland, Oak-ash-hazel woodland and pioneering Scrub</p> <p>The habitats listed above are assigned Local Importance (Higher Value). This is on the basis that they consist of semi-natural habitats with high biodiversity in the local context and a high degree of naturalness but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive (see appendix 6.1). The footprint of the Proposed Development will result in direct loss of small areas of these habitats and therefore they included as a KER.</p> <p>Note: The bog woodland does not correspond to the Annex I Habitat Bog Woodland 91D0. See classification in Appendix 6.4</p>	Yes
	<p>Poor fen</p> <p>Areas of poor fen habitat within the cutover bog have been assigned Local Importance (Higher Value). This is on the basis that they comprise of semi-natural (although artificial) habitat with high biodiversity in the local context but do not correspond to any habitats that are listed on Annex I of the EU Habitats Directive. The footprint of the Proposed Development has the potential to result in direct and indirect effects on this habitat and it is therefore included as a KER.</p>	Yes
	<p>Heath type Communities</p> <p>This habitat is assigned Local Importance (Higher Value). This is on the basis that it consists of semi-natural (although artificial) habitats with a high biodiversity value in the local area but does not correspond to habitats that are listed on Annex I of the EU Habitats Directive (See Appendix 6.4). The footprint of the Proposed Development has the potential to result in direct effects on the receptor and it is included as a KER for further assessment.</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	<p>Open water</p> <p>No large oligotrophic (nutrient poor) lakes were recorded within the Proposed Development Site. Whilst wetter areas of the cutover habitats within the site contained small areas of open water, these are not permanent waterbodies. There will be no infrastructure located in or in close proximity to any permanent area of open water and no loss or degradation of this habitat will occur. Given the absence of significant areas of open water habitat within or in close proximity to the Proposed Development this habitat is not included as a KER.</p>	No
Grassland Habitats	<p>Dry meadows and grassy verges (GS2) and Dry calcareous and neutral grassland (GS1)</p> <p>The habitats have been assessed as of Local Importance (lower value) as they are largely associated with artificial site access tracks and railway tracks and are relatively species poor and of relatively low biodiversity value where they occur within the Proposed Development footprint.</p> <p>Areas of orchid rich grassland also occur within the site, however, these were recorded outside of the Proposed Development footprint. For these reasons, these grassland habitats are not included as a KER.</p>	No
	<p>Improved agricultural grassland (GS1), Wet grassland (GS4), Amenity grassland (GA1)</p> <p>These areas are predominantly associated with agricultural fields and amenity areas close to the BnM works area at Ballivor Bog. These habitats are assigned Local importance (lower value) as although they contain small areas of semi-natural habitat that are of some importance for local wildlife they are common and widespread in the local and wider landscape. These habitats are not included as KERs.</p>	No
Spoil and bare ground (ED2), Recolonising bare ground (ED3) & Buildings and artificial surfaces (BL3)	<p>These habitats are common and widespread in the wider area. The habitats have been assessed as of Local Importance (lower value) as they are highly modified and/or largely associated with artificial site access tracks and are of low biodiversity value. For this reason, they have not been included as a KER.</p>	No
Otter	<p>Otter is assigned International importance as, although the watercourses within the Proposed Development Site are of low suitability for otter, the River Deel (Raharney) to the west and the Stonyford River to the east of the site are designated under The River Boyne and River Blackwater SAC for which otter is listed as a Qualifying Interest. As there is likely to be a regularly occurring population of otter utilising these watercourses, and because otter are likely to</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	utilise the small streams and larger drains within the site for commuting and foraging, at least on occasion, otter is included as a KER.	
Badger	Badger has been assigned Local Importance (Higher Value) on the basis that the habitats within and adjacent to the site boundary are likely to be utilised by a locally occurring badger population. As badger setts were recorded within the Proposed Development Site, including a single entrance sett within the footprint of a proposed substation, there is potential for impacts on this species as a result of the Proposed Development. Badger is therefore included as a KER.	Yes
Marsh fritillary	<p>This species is listed under Annex II of the EU Habitats Directive and there are records of marsh fritillary from the Proposed Development Site (outside the construction footprint). As the species utilising the Proposed Development Site is likely to represent a population of importance at the county level it has been assigned County importance.</p> <p>During the design process, small areas which were identified as potential suitable habitat following surveys undertaken in 2020, were avoided by the Proposed Development. No areas identified as providing suitable habitat for this species are located within the development footprint. No larval webs were recorded in areas of suitable habitat during dedicated marsh fritillary surveys undertaken in 2020, 2021 and 2022.</p> <p>Therefore marsh fritillary is not included as a KER.</p>	No
Bats	Bat species have been assessed as of Local Importance (Higher Value) as they represent a resident or regularly occurring populations assessed to be important at the Local level and are listed in Annex IV of the EU Habitats Directive.	Yes
Reptiles and Amphibians	The Proposed Development will not result in a significant loss of suitable habitat for reptiles and amphibians and no evidence of populations of amphibians being significant at more than a local level was recorded. Therefore no significant effects on these species are anticipated and further survey/ assessment was not deemed necessary. Based on the low number of amphibian records for the site and the nature of the habitats within the site, amphibians and reptiles have been assessed as of Local Importance (lower value) and are not included as a KER.	No

Ecological feature or species	Reason for inclusion as a KER	KER
Additional protected fauna	The site surveys did not identify any other protected faunal species with the potential to be significantly affected by the Proposed Development at the population level.	No

6.7 Ecological Impact Assessment

6.7.1 Do-Nothing Effect

If the Proposed Development were not to proceed, the site would continue to be managed as it has been operating, under the requirements of IPC licence P0501-01, since the cessation of peat extraction activities at the site in 2020.

Since the cessation of peat extraction activities in 2020, the main activities at the site have included removal of stockpiled peat to the Ballivor works for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare and the Edenderry Power Plant and Derrinlough Briquette Factory, both in Co. Offaly. In addition to these works, rehabilitation works at Carranstown Bog under the Peatland Climate Action Scheme (PCAS) have been commenced and are currently ongoing. These include enhanced measures which are designed to exceed the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Carranstown Bog. These include:

- Deep Peat measures including field re-profiling, bunding and drain-blocking, resulting in banded wetlands suitable for Sphagnum inoculation, on deeper peat;
- Intensive drain blocking around shallow peat areas / modelled depressions on little or no peat to create/promote the spread of wetland habitats
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls
- Regular drain blocking on dry cutaway along with the blocking of outfalls and management of water levels
- Intensive drain blocking in areas to develop wetlands in areas of shallow peat. Measures include the blocking of outfalls, management of water levels and transplanting reeds and other rhizomes
- Berms and field re-profiling (45m x 60m cell) in deep peat areas, along with blocking outfalls and managing overflows with a controlled weir outfall, includes drainage channels for excess water and Sphagnum inoculation
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Seeding of vegetation and inoculation of Sphagnum will be undertaken where required.

If the Proposed Development were not to go ahead, the above, currently ongoing operations would continue until completion.

In order to satisfy Condition 10 of the IPC licence for Ballivor Bog, Draft Cutaway Bog Decommissioning and Rehabilitation Plans have been prepared for the bogs within Ballivor Bog Group, including Ballivor Bog, Carranstown Bog (in which advanced PCAS rehabilitation measures as described above have already commenced), Bracklin Bog and Lislogher east, all of which are partially or wholly within the Proposed Development Site boundary. These plans will be implemented following cessation of peat

extraction at Ballivor Bog and if the Proposed Development were not to go ahead these plans will still be implemented in full. The Draft Rehabilitation Plans are included as Appendix 6-6.

The overall aim of the rehabilitation plans is environmental stabilisation of the former peat production areas, putting the bogs comprising the site on a trajectory towards becoming naturally functioning peatland systems. According to the rehabilitation plans, natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. However, re-wetting of the cutaway, where possible, will also be a rehabilitation strategy and will be undertaken via drain blocking and cell bunding. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. While it is anticipated that the combination of rehabilitation measures and natural colonisation will result in environmental stabilisation, according to the rehabilitation plans it will still take, in most cases, some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish. It is not expected, with the exception of Lislogher West Bog, which lies outside the application site boundary, that the majority of the peatland habitat within the application site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a small proportion of the bog has potential to develop Sphagnum-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, will improve overall habitat conditions of the whole bog, making it wetter and encouraging re-vegetation. It is anticipated that a mosaic of peatland habitats will continue to colonise the site, including dry heath, scrub and bog woodland in drier areas and wet heath, poor fen and flush and potentially embryonic Sphagnum rich bog communities in the wetter areas.

In the absence of the Proposed Development, it is likely that faunal assemblages would be similar to those utilising the cutover habitats within the site today. This includes assemblages of bird species typical of cutover and raised bog habitats including skylark and meadow pipit. Otter would likely continue to use the streams and rivers within and surrounding the site for commuting and foraging. The scrub and woodland habitats which would likely continue to colonise drier areas of the site would provide potential habitat for a range of bird species as well as badger, pine marten. They would also provide linear foraging and commuting habitat for a range of bat species. The cutover habitats within the site, particularly grassland and heath, would provide suitable habitat for a range of invertebrates including the Annex II species marsh fritillary, where abundant devil's bit scabious is present.

6.7.2 Effects on Designated 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 Development in compliance with Article 6(3) of the Habitats Directive.

As per the aforementioned EPA Guidance (2022), “a biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process” but should “refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive”. This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The Screening for Appropriate Assessment concluded as follows:

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

- River Boyne and River Blackwater SAC

➤ River Boyne and River Blackwater SPA

As a result, an Appropriate Assessment is required, and a Natura Impact Statement has been prepared in respect of the Proposed Development in order to assess whether the Proposed Development will adversely impact the integrity of these European Sites’.

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 Development does not adversely affect the integrity of European sites.

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

The following pNHAs have hydrological connectivity with the Proposed Development Site and are located more than 20km downstream of the site via the River Boyne:

- Trim pNHA
- Boyne Woods pNHA
- Crewbane Marsh pNHA
- Rossnaree Riverbank pNHA
- Dowth Wetland pNHA
- Boyne River Islands pNHA
- Boyne Coast and Estuary SAC and pNHA

A potential pathway for indirect effects on these pNHAs as a result of deterioration of water quality arising from run-off of pollutants during construction, operation and decommissioning of the Proposed Development was identified. Tables 6-11 and 6-18 and Section 6.7.5 below provide an assessment of the potential for impacts on water quality during construction, operation and decommissioning of the Proposed Development. A range of best practice pollution prevention measures are in place and described below, in Chapter 9 ‘Hydrology’ of this EIAR and in the CEMP included as Appendix 4-3 to this EIAR, to ensure that there is no potential for impacts on water quality within and downstream of the Proposed Development Site. Therefore there is no potential for indirect effects on these pNHAs due to deterioration of water quality.

6.7.3 Likely Significant Effects During Construction Phase

6.7.3.1 Effects on Habitats During Construction

Potential impacts on habitats include direct loss of habitat within the Proposed Development footprint and indirect deterioration of aquatic habitats due to deterioration of water quality.

The Proposed Development will result in the loss of a number of habitats of Local importance (higher value) which were identified as KERs in Table 6-10 above. The Proposed Development will result predominantly in the loss of cutover peatland habitats including bare peat, and mosaics of establishing dry heath, pioneer poor fen and scrub. In addition to this there will be some small-scale loss of birch dominated dry bog woodland, a small area of oak-ash-hazel woodland on a mineral island at Carranstown Bog, small areas of highly degraded, dry remnant uncut raised bog and sections of hedgerow with scattered trees.

There is also potential for deterioration of stream and river habitats as a result of the Proposed Development due to run-off of pollutants during the construction and operational phases of the Proposed Development.

The potential impacts on habitats as a result of the Proposed Development are discussed in detail in the sections below.

6.7.3.1.1 Assessment of Potential Effects on Rivers and Streams and Sensitive Aquatic Faunal Species

Table 6-11 Potential for impact on rivers, streams, Open Waterbodies and Sensitive Aquatic Species

Description of Effect	
	<p>The construction footprint of the Proposed Development has been specifically designed to avoid the main watercourses within the Proposed Development Site, with a 50m buffer between the main wind farm infrastructure and any natural watercourses (with the exception of upgrades to existing watercourse crossings and existing site access tracks). There will also be a requirement for the proposed turbine access roads to cross artificial drains throughout the Proposed Development Site, 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 that surround the site.</p> <p>Upgrade works at only one natural watercourse crossing, i.e that of the Bolandstown stream between Lisclogher East Bog and Bracklin Bog, will require the installation of a culvert. While the crossing will utilise an existing bridge, the requirement for road widening at this location will necessitate the installation of a bottomless/clear span culvert. The existing bank will remain undisturbed and there will be no requirement for instream works. Therefore here will be no direct loss of potential fisheries habitat.</p> <p>There is potential for construction activities associated with the Proposed Development, including construction of turbine hardstands and access tracks, 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 Proposed Development Site. This could also result from the removal of vegetation, large-scale movement of peat or the use of concrete and other construction materials. This represents a potential indirect effect on aquatic receptors in the form of habitat degradation as a result of water pollution.</p> <p>There is no potential for significant effects as a result of direct habitat loss for fisheries and aquatic fauna. While the crossing of artificial bog drains will require instream works to facilitate the installation of culverts, these artificial drainage ditches provide poor fisheries and aquatic faunal habitat. Where the installation of a culvert this will be a bottomless or clear span culvert which will not require instream works. Therefore there will be no direct loss of or disturbance to supporting habitat for fisheries or aquatic fauna.</p> <p>The potential impacts on water quality are fully described in Chapter 9 ‘Hydrology’ of this EIAR and are described here in relation specifically to ecology.</p> <p>Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the Proposed Development on aquatic species including salmonids,</p>

	<p>lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species.</p>
<p>Characterisation of unmitigated effect</p>	<p>In the absence of mitigation, and taking a precautionary approach, there is potential for a temporary significant negative effect on water quality of the watercourses within and downstream of the site during the construction of the Proposed Development. This has potential to cause degradation of habitat for aquatic receptors.</p> <p>The artificial drainage ditches and the small stream to be crossed by the proposed wind farm access roads do not provide optimal habitat for fisheries and other aquatic fauna, being highly modified and subject to siltation. Furthermore the proposed culvert at the crossing of the Bolandstown stream will be a bottomless or clear span culvert. The existing bank will remain undisturbed and no instream works are proposed. Therefore there will be no direct loss of supporting habitat for fisheries or aquatic fauna and no potential for significant effects in this regard.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>In the absence of mitigation and following the precautionary principle, there is potential for the Proposed Development to result in significant indirect effects on the identified aquatic habitats and species at a local geographic scale in the form of habitat degradation arising from water pollution during the construction phase of the Proposed Development.</p> <p>No significant effects due to direct habitat loss are anticipated as there will be no instream works in any natural watercourse.</p>
<p>Mitigation</p>	<p>The pathways that would allow potential impacts to occur due to deterioration of water quality were considered in the design of the Proposed Development. The environmental management framework to be adhered to during the construction phase of the Proposed Development includes comprehensive detail regarding site set up, pollution prevention and hydrocarbon management and incorporates mitigating measures as detailed in Chapter 9 ‘Hydrology’ of the EIAR and in the CEMP in Appendix 4-3 of the EIAR to ensure that there are is no significant effect on water quality or aquatic receptors within or downstream of the Proposed Development.</p> <p>The measures include the use of interceptor drains and collector drains to collect and intercept run-off from construction areas, temporary settlement ponds to attenuate and treat run-off, the use of silt fences between works and watercourses and dewatering silt bags to remove silts from pumped waters. The existing drainage system at the proposed site, which is operating in accordance with IPC licence requirements, with environmental monitoring and silt control measures being implemented, will be maintained and expanded locally as required for use within the Proposed Development drainage system. The measures are outlined in full in Chapter 9.</p>

	While there will be no requirement for instream works (with the exception of artificial drains), all works adjacent to watercourses, will adhere to Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016).
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 Development. The design of the Proposed Development (including a 50m buffer between the main watercourses within the Proposed Development Site and the main infrastructure for the Proposed Development) and the best practice measures to be implemented for the protection of water quality will ensure that there is no significant residual effect on watercourses or aquatic fauna
Potential for Cumulative Effect	The Proposed Development will not result in any significant effect on aquatic habitats or species of biodiversity value as outlined above, given the mitigation measures in place to ensure that there will be no significant effects on water quality. It therefore cannot contribute to any cumulative effect in this regard.

6.7.3.1.2 Assessment of Potential Effects on Uncut Raised Bog

Table 6-12 Loss of Uncut Raised Bog

Description of Effect	<p>The Proposed Development has been specifically designed to avoid areas of remnant uncut raised bog where possible and avoids the largest, undrained areas of remnant raised bog within the Proposed Development Site. However, the construction of the proposed windfarm and associated infrastructure will result in the permanent loss of approximately 1.03 hectares of highly degraded, heavily drained and/or fragmented uncut raised bog habitat within the Proposed Development Site. These areas of degraded raised bog within the infrastructure footprint have been assigned local importance (higher value). The loss of this habitat is associated with the construction of T23 and T24 hardstand areas and access tracks at the northern end of Lisclogher East Bog, the construction of the access track between Lisclogher East and Bracklin Bog, and the construction of T13 hardstand area and associated access track at Bracklin Bog.</p> <p>There will also be temporary loss of this habitat to facilitate the temporary floating access road to the proposed Borrowpit No. 2 located to the south of Bracklin Bog. This access road will be floated over an existing drain which traverses the uncut raised bog habitat at this location. This area will be fully reinstated following completion of construction works.</p> <p>There is also potential for the Proposed Development to result in indirect effects on raised bog habitat immediately adjoining the construction footprint through drainage.</p>
Characterisation of unmitigated effect	The total area of uncut remnant raised bog within the Proposed Development Site is 317.1 ha and the loss of 1.03ha represents approximately 0.3% of the total area of this habitat within the Proposed Development Site. The loss of 1.03ha of this habitat will occur across marginal areas of 6 separate fragments of highly degraded bog. These bog remnants are either very small and fragmented, surrounded by cutover bog and with no potential for re-wetting and/or are heavily drained through the insertion of numerous parallel drainage ditches. They are extremely dry in nature, dominated either exclusively or predominantly by ling heather with little to no <i>Sphagnum</i> cover.

	<p>The proposed access road to the proposed borrowpit to the south of Bracklin Bog will be a floating, temporary road which follows an existing drainage ditch across the area of raised bog and will be fully reinstated following completion of the works.</p> <p>The infrastructure is confined to heavily modified and drained peatland habitats. It is also buffered from the larger, uncut and undrained areas of raised bog within the site boundary by heavily modified and drained peatland habitats. No significant drainage related impacts on are anticipated as a result of the Proposed Development.</p> <p>The loss and degradation of 1.03ha of highly degraded, drained and fragmented uncut raised bog is a permanent and irreversible negative impact on this habitat of local importance (higher value). The magnitude of this impact is Slight as it only affects a very small percentage of the overall habitat area within the site and avoids the largest, undrained, wetter areas of this habitat.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>The loss or degradation of degraded raised bog habitat is not a significant effect as it is restricted to a very small percentage of highly degraded, fragmented habitat within the site, which has no to low potential for re-wetting. The vast majority of uncut remnant raised bog within the site has been avoided by the Proposed Development.</p>
<p>Mitigation</p>	<p>While the Proposed Development has been deliberately designed to minimise the loss of uncut raised bog within the site, there will be some loss of small areas of highly degraded remnants of this habitat.</p> <p>Therefore a Habitat Management and Enhancement Plan has been prepared for the Proposed Development which provides for the ecological enhancement of approximately 12ha of uncut but drained raised bog at the northern extent of Bracklin Bog through drain blocking and rewetting to promote the development of wetland vegetation. This area is located directly adjacent to and south of an area of uncut remnant raised bog. The proposed measures for habitat enhancement are described in the Habitat Management and Enhancement Plan that is provided as Appendix 6-5 to this EIAR. The habitat enhancement area is mapped in Figure 1.1a of the Habitat Management and Enhancement Plan.</p> <p>In addition to the above, during construction activities within or adjacent to this habitat, the works area will be fenced off to prevent encroachment onto areas of habitat outside the Proposed Development Footprint.</p>
<p>Residual Effect following Mitigation</p>	<p>Following the implementation of mitigation, there will be no significant residual negative effect on raised bog habitat. The Proposed Development will result in the loss of approximately 1.03ha of highly degraded, fragmented raised bog. The Habitat Management and Enhancement Plan provides for the enhancement of approximately 12ha of uncut raised bog, through drain blocking measures designed to improve the overall condition of the habitat by maintaining water levels close to the surface of the peat.</p>
<p>Potential for Cumulative Effect</p>	<p>The Proposed Development will not result in any significant negative effect on the raised bog habitat on the site. The fragments of uncut raised bog to be lost are highly degraded in nature and the Habitat Management and Enhancement Plan provides for the enhancement of approximately 12ha of uncut but drained raised bog habitat through re-wetting.</p>

	As there will be no residual negative effects on this habitat, it therefore cannot contribute to any cumulative effect in this regard.
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6.7.3.1.3 Assessment of Potential Effects on Revegetated Cutover Bog Habitats and Associated Woodlands

Table 6-13 Loss of Revegetated Cutover Bog Habitats and Woodlands

Description of Effect	<p>The construction of the proposed windfarm and associated infrastructure will result in the direct loss of approximately 32.8 hectares (1.9% of the total habitat within the Proposed Development Site) of revegetated cutover bog which is developing as a mosaic of pioneer poor fen, dry heath type vegetation communities, scrub and bog woodland. Approximately 1.0ha of this will be dry birch-dominated bog woodland habitat. The loss of these cutover bog habitats will occur as a result of the construction of turbine hardstands, access tracks and other associated infrastructure. There will also be loss of approximately 0.28 ha of oak-ash-hazel woodland which occurs on a small mineral island at Carranstown Bog in order to facilitate the construction of a borrowpit at this location.</p> <p>In addition to the above, in accordance with NatureScot Guidance, a minimum 50m buffer to all habitat features used by bats should be applied to the siting of all wind turbines. Therefore an additional 1.5ha of dry bog woodland are proposed to be felled in order to maintain the recommended buffers. The total area of woodland to be lost to the Proposed Development amounts to 2.78ha which represents 2.2% of the overall area of woodland habitat within the Proposed Development Site boundary.</p> <p>The tree felling activities required as part of the Proposed Development will be the subject of a Felling Licence application to the Forest Service, under Section 17 of the Forestry Act 2017 and as per the Forest Service’s policy on felling licenses. The policy requires that the area to be felled is identified, as well as proposing replanting areas and identifying the proposed new land-use of the site. In line with the Forest Service’s published policy on granting felling licences, areas cleared of forestry will have to be replaced by replanting an area of equivalent size at an alternative site.</p> <p>The areas proposed for replanting are located within the Proposed Development Site Boundary and are shown in the Habitat Management and Enhancement Plan in Appendix 6-5 and include an area of proposed oak-ash-hazel woodland planting on a glacial mound at Bracklin Bog and birch/willow woodland on an area of bare peat at the western extent of Carranstown Bog. The Forest Service policy requires replanting on a hectare for hectare basis for the footprint of the proposed infrastructure. It is proposed to plant an area of woodland in excess of the area to be felled to facilitate the Proposed Development.</p> <p>There is also the potential for the Proposed Development to result in indirect effects on cutover bog habitats immediately adjoining the footprint through drainage.</p>
Characterisation of unmitigated effect	<p>The loss of the above cutover bog habitats (bare peat, establishing heath, poor fen, scrub and dry bog woodland) is a permanent and irreversible impact on these peatland habitats of Local Importance (Higher Value). These habitats are highly modified from their original state, i.e. uncut raised bog, and have come about through natural recolonisation of cutaway bog and the dry bog woodland does not conform to Annex I Bog Woodland.</p>

	<p>The magnitude of this impact is Slight as it only affects a tiny percentage of the cutover peatland habitat, which makes up the vast majority of the land area within the Proposed Development Site.</p> <p>The cutover habitats within the site are highly modified having been subject to extensive drainage. No significant drainage related impacts on are anticipated as a result of the Proposed Development.</p> <p>While the area of oak-ash-hazel woodland to be lost to facilitate the Proposed Development is small in size, i.e. 0.28ha approx, this habitat is not widespread within the Proposed Development Site and, in the absence of mitigation, the loss of this habitat represents a permanent moderate negative effect on this habitat at the local scale.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>The loss or degradation of the cutover bog habitats, including the bog woodland habitat, is not a significant effect as it covers a very small percentage of the overall cutover bog habitat mosaic on the site and has predominantly avoided the most sensitive raised bog habitats on the site.</p> <p>In the absence of mitigation, the loss of the small area of oak-ash-hazel woodland is assessed as a significant effect at the local scale.</p>
<p>Mitigation</p>	<p>While no significant effects are anticipated as a result of the loss of the cutover bog habitats, a Habitat Management and Enhancement Plan has been prepared for the Proposed Development which provides for the ecological enhancement of approximately 12ha of uncut but drained raised bog at the northern extent of Bracklin Bog through drain blocking and rewetting to promote the development of wetland vegetation.</p> <p>The Habitat Management and Enhancement Plan also provides for the setting aside of an area approximately 6.5ha in size for replanting with native birch and willow woodland and an area of approximately 1.5ha in size for the planting of oak-ash-hazel woodland. This will compensate for the loss of approximately 2.78ha of woodland habitat within the Proposed Development Site.</p> <p>The proposed measures for habitat enhancement are described in the Habitat Management and Enhancement Plan that is provided as Appendix 6-5 to this EIAR. The habitat enhancement areas are mapped in Figures 1-1a and 1-1b of the Plan.</p>
<p>Residual Effect following Mitigation</p>	<p>Following the implementation of mitigation, there will be no significant residual effect on these cutover bog habitats and associated woodlands. There may be a short-term slight negative effect in the early stages of implementation of the Habitat Management and Enhancement Plan in the form of habitat loss but as the woodland and wetland habitats develop as a result of the proposed enhancement measures, there is potential for the Proposed Development to result in an overall long-term positive effect on the habitats within the study area.</p>
<p>Potential for Cumulative Effect</p>	<p>The Proposed Development will not result in any significant negative effect on the cutover bog and associated woodland habitats on the site. It will result in the loss of only a very small percentage (1.9ha) of the overall area of cutover bog habitats within the Proposed Development Site. It therefore cannot contribute to any cumulative effect in this regard.</p> <p>While it will also result in the loss of approximately 0.28ha of oak-ash-hazel woodland within the Proposed Development Site boundary, the planting of</p>

	<p>approximately 1.5ha of similar native woodland within the site boundary will fully compensate for this loss. It will therefore not contribute to any cumulative effect in this regard.</p> <p>In addition to the above Draft Cutaway Bog Decommissioning and Rehabilitation Plans have been prepared by Bord na Mona for each of the bogs within the Ballivor Bog Group, including those within which the proposed wind farm infrastructure is located i.e. Ballivor Bog, Bracklin Bog, Carranstown Bog and Lisclogher East, to satisfy Condition 10 of its EPA licence P0501-01. The aim of the rehabilitation plans is to stabilise and rehabilitate the peatland habitats within the site and it is proposed that natural recolonisation will form the basis for the environmental stabilisation of these areas. Under this approach, it is anticipated that considerable areas of the peatland habitats within the vicinity of the Proposed Development will re-vegetate with cutover bog habitats, including birch-dominated scrub and woodland over time as they have done in the past in areas where peat cutting has ceased for some time. Therefore it is anticipated that over time, there will be an overall increase in the area of revegetated cutover bog, including birch dominated woodland and scrub within the Proposed Development Site as a result of natural regeneration.</p>
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6.7.3.1.4 Assessment of Potential Effects on Treeline and Hedgerow

Table 6-14 Loss of Revegetated Cutover Bog Habitats and Woodlands

Description of Effect	The construction of the proposed Borrowpit No. 2 (to the south of Bracklin Bog) and the road widening works along the proposed haul route will result in the removal of approximately 315m of hedgerow habitat with scattered small ash trees. In addition, the construction of the access road between Carranstown Bog and Ballivor Bog will also result in the removal of approximately 60m of conifer treeline.
Characterisation of unmitigated effect	This is a permanent and irreversible negative impact on hedgerow and/or treeline habitats of Local Importance (Higher Value). These linear features provide habitat connectivity to the wider landscape. In the absence of mitigation the magnitude of this impact is assessed as a permanent slight negative at the local scale as hedgerow and treeline habitat is extremely widespread in the wider landscape.
Assessment of Significance prior to mitigation	The loss of these linear landscape features is not a significant effect as it covers a very small percentage of the overall habitat within the wider landscape.
Mitigation	<p>While no significant effects are anticipated as a result of the loss of these habitats, these linear features will be fully re-instated by replanting of the same lengths of hedgerow and treeline at the locations where they were lost following the completion of works. Planting will comprise native species.</p> <p>Vegetation removal will be undertaken in line with the Wildlife Act 1976 (updated 2022).</p> <p>In addition, the Habitat Management and Enhancement Plan in Appendix 6-5 of the EIAR allows for the setting aside of approximately 8ha for native woodland within the Proposed Development Site Boundary.</p>

Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on these linear habitats. Hedgerow and treeline are abundant and widespread in the wider area and the loss of these habitats will be fully compensated for by replanting the locations where they were removed with native hedgerow and tree species.
Potential for Cumulative Effect	The Proposed Development will not result in any significant negative effect on this habitat which is abundant and widespread in the wider area and which will be fully re-instated following completion of the works. It therefore cannot contribute to any cumulative effect in this regard.

6.7.3.2 Effects on Fauna During Construction

The Proposed Development 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 (refer to Section 6.6.3 above). Given the extensive area of cutover habitats that will remain undisturbed throughout the site and the avoidance in so much as possible of the most significant areas of faunal habitat (woodland, watercourses), no significant effects on non-KER faunal biodiversity are anticipated as a result of the Proposed Development. Therefore, these species were excluded from further assessment.

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 Development and, with the exception of the crossing of the Bolandstown stream (as assessed in Table 6-11 above, all major infrastructure is located over 50 metres from the main watercourses within the site. The potential for significant effects on aquatic species is restricted predominantly to indirect effects on their habitat resulting from water pollution in addition to the potential for direct loss of small areas of supporting habitat as a result of the culvert within the Bolandstown stream. This has been assessed in Table 6-11 above and is not repeated below.

6.7.3.2.1 Assessment of the Potential Impacts on Badger

Table 6-15 Potential impacts on badgers

Description of Effect	<p>Habitat Loss/Fragmentation</p> <p>The Proposed Development has been specifically designed to avoid identified badger setts where possible. However, there will be direct loss of a single entrance badger sett at the location of the proposed substation at Carranstown Bog. This single entrance sett is located approximately 190m to the north of a main sett, which has been avoided by the Proposed Development and is considered an outlier sett.</p> <p>There is also some potential for small scale loss of foraging habitat to facilitate the construction footprint.</p>
Description of Effect	<p>Disturbance/Direct Mortality</p> <p>There is potential for disturbance and direct mortality of badger as a result of the construction of the proposed substation at Carranstown Bog. At this location, a single entrance outlier sett is located within the footprint of the proposed substation</p>

	<p>and a main sett is located approximately 190m to the south of the outlier sett and approximately 90m to the south of the proposed substation access road. Piling activities up to a distance of 150m from a sett (as per NRA guidelines) has the potential to result in indirect effects on badger. In addition, construction works in close proximity to the sett could prevent badgers from occupying the sett.</p>
<p>Characterisation of unmitigated effect</p>	<p>Habitat Loss/Fragmentation</p> <p>In the absence of mitigation, the loss of a single entrance outlier sett constitutes a permanent slight negative effect at the local scale. This would not be reversible as it is within the construction footprint. The Proposed Development will not result in the loss of any main setts.</p> <p>Given the small scale of the development footprint in comparison to the size of the Proposed Development Site, the loss of foraging habitat to the footprint of the Proposed Development constitutes a permanent slight negative effect. The Proposed Development will not result in any fragmentation of badger habitat, as there will be no barriers to movement throughout the site as a result of the proposed works.</p>
	<p>Disturbance/Direct Mortality</p> <p>In the absence of mitigation, there is potential for short term significant negative effects on the local badger population in terms of disturbance, displacement and potentially mortality where works at Carranstown occur in close proximity to an identified main sett and in the footprint of an outlier sett.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>Habitat Loss/Fragmentation</p> <p>In the absence of mitigation, no significant overall loss or fragmentation of badger habitat is anticipated at any geographic scale.</p>
	<p>Disturbance/Direct Mortality</p> <p>In the absence of mitigation, there is potential for significant disturbance/displacement and/or mortality on the local badger population as a result of the Proposed Development.</p>
<p>Mitigation</p>	<p>Habitat Loss/Fragmentation</p> <p>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.</p>

	<p>Disturbance/Displacement</p> <ul style="list-style-type: none"> ➤ A pre-construction badger survey of the Proposed Development footprint and adjacent areas will be undertaken and will include the location of the identified setts at Carranstown Bog. This will be undertaken by a qualified ecologist prior to the commencement of any works to determine if the setts are in use and to identify any additional setts or sett entrances that may have been excavated in the intervening period. ➤ The outlier sett within the footprint of the proposed substation at Carranstown Bog will be monitored for 2 weeks prior to construction using a camera trap to determine if it is in use. ➤ If the outlier sett in the construction footprint is found to be in use exclusion measures will be put in place prior to construction in line with NRA Guidelines⁹ to ensure that the sett is evacuated. ➤ As per NRA guidelines exclusion from an active sett will only be carried out during the period of July to November inclusive in order to avoid the badger breeding season. ➤ During the breeding season (December to June inclusive) no works will be undertaken within 50m of active setts or pile driving within 150m of active setts. If such works are required, exclusion measures will be put in place (as outlined above) prior to construction in line with NRA Guidelines to ensure that the sett is evacuated ➤ Exclusion zone fencing and appropriate signage will be put in place around the main sett to the south of the substation which lies outside the construction footprint. This will ensure that there will be no vehicles tracking in the area and no temporary storage of construction materials that could impact the sett. <p>All of the above works will be undertaken or supervised by an appropriately qualified ecologist in advance of construction.</p>
<p>Residual Effect following Mitigation</p>	<p>Habitat Loss/Fragmentation</p> <p>No significant fragmentation to or loss of badger habitat is anticipated at any geographic scale.</p> <p>Disturbance</p> <p>Following the incorporation of the mitigation measures described above, no significant negative impacts on badger are anticipated at any geographic scale.</p>
<p>Potential for Cumulative Effect</p>	<p>The Proposed Development will not result in any significant negative effect on badger, following the implementation of the best practice mitigation measures included above. It therefore cannot contribute to any cumulative effect in this regard.</p>

⁹ National Roads Authority (2006) Guidelines for the treatment of badgers prior to the construction of National Road Schemes.

6.7.3.2.2 Assessment of Potential Effects on Otter

Table 6-16 Assessment of potential impacts on otter

Description of Effect	<p>Habitat Loss/Degradation</p> <p>As described above in Table 6-11, in relation to aquatic habitats and species, the Proposed Development has been deliberately designed such that all major infrastructure avoids the main watercourses within the site. While there will be a requirement for instream works on the Bolandstown stream to facilitate the installation of a culvert, these works will be minor in nature. No otter resting or breeding sites were recorded at this location and the stream does not provide optimal fisheries habitat. There is no potential for direct effects on otter resting or breeding sites.</p> <p>While the infrastructure has been designed to avoid major watercourses, taking a precautionary approach, the Proposed Development has the potential to result in indirect effects on otter habitat in the form of water pollution resulting from runoff of pollutants during construction activities.</p>
	<p>Disturbance</p> <p>Taking a precautionary approach, there is potential for disturbance of otter as a result of minor infrastructure including access roads which are located in close proximity to some of the watercourses on the site.</p>
Characterisation of unmitigated effect	<p>Habitat Loss/Degradation</p> <p>There is no potential for direct loss or fragmentation of significant otter habitat.</p> <p>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.</p>
	<p>Disturbance</p> <p>Given that the site has been in active peat production until 2020, and all major infrastructure is located over 50 metres from any significant watercourse, any potential disturbance to otter as a result of the Proposed Development will be a short-term, slight negative effect.</p>
Assessment of Significance prior to mitigation	<p>Habitat loss/degradation</p> <p>There is no potential for the construction phase of the Proposed Development to result in significant habitat loss or fragmentation for otter.</p> <p>In the absence of mitigation and following the precautionary principle, there is potential for the Proposed Development to result in significant indirect effects on otter in the form of habitat deterioration resulting from water pollution due to run-off of pollutants during construction activities.</p>
	<p>Disturbance</p>

	<p>There is no potential for the construction phase of the Proposed Development to result in significant disturbance of otter.</p> <p>Otter are predominantly crepuscular in nature (prefer dim light and tend to be active during dawn/dusk) and are unlikely to be adversely impacted by the proposed works. Construction activity will be confined to daytime hours, thus minimizing potential disturbance related impacts to the species. The NPWS Threat Response Plan for Otter acknowledges that “Little evidence has come to light in recent studies to suggest that disturbance by recreation is a significant pressure.” It also identifies that Otter are known to travel significant distances from streams and lakes in search of new territory and feeding areas.</p> <p>Channin P (2003) provides a literary review with regard to anthropogenic disturbance and refers to several reports which have found that disturbance is not detrimental to Otters (Jefferies (1987), (Durbin 1993). (Green & Green 1997). The report also describes successful breeding in towns, under ferry terminals and under the jetties of one of Europe’s largest oil and gas terminals at Sullom Voe in North Scotland.</p> <p>Irish Wildlife Manual No 23 (National Otter Survey of Ireland 2004/2005) found no significant relationship between disturbance and otter occurrence. In addition, no significant difference in otter presence was found between sites with and without recreational activity. It also states, “the lowest percentage occurrence was found at the sites with the lowest recorded disturbance!” Irish Wildlife Manual No 76 (National Otter Survey of Ireland 2010/2012) notes that the occurrence of Otter was unaffected by perceived levels of disturbance at the survey sites. It also notes that there is little published evidence demonstrating any consistent relationship between Otter occurrence and human disturbance (Mason & Macdonald 1986, Delibes et al. 1991; Bailey & Rochford, 2006).</p> <p>Based on the above review of scientific literature, and the absence of significant suitable habitat for otter within the Proposed Development Site, there is no potential for significant effects on otter as a result of disturbance during construction activities.</p>
Mitigation	<p>The pathways that would allow potential impacts to occur due to deterioration of water quality were considered in the design of the Proposed Development. The environmental management framework to be adhered to during the construction phase of the Proposed Development includes comprehensive detail regarding site set up, pollution prevention and hydrocarbon management and incorporates mitigating measures as detailed in Chapter 9 ‘Hydrology’ of the EIAR and in the CEMP in Appendix 4-3 of the EIAR to ensure that there are no adverse effects on the integrity of any European Sites in light of their conservation objective during the construction, operational or decommissioning phases of the Proposed Development.</p>
Residual Effect following Mitigation	<p>Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the Proposed Development.</p>
Potential for Cumulative Effect	<p>The site does not provide significant suitable habitat for this species. There will be no loss of otter resting or breeding sites and a range of mitigation measures to ensure that there will be no effects on otter due to deterioration of water quality will be in place during construction. The Proposed Development will</p>

	not result in any significant effect on otter. It therefore cannot contribute to any cumulative effect in this regard.
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6.7.3.2.3 Assessment of Potential Effects on Bats

Table 6-17 Assessment of Potential Impacts on Bats

Description of Effect	<p>As per NatureScot (2021) Guidance, wind farms present four potential risks to bats:</p> <ul style="list-style-type: none"> ➤ Collision mortality, barotrauma and other injuries ➤ Loss or damage to commuting and foraging habitat ➤ Loss of, or damage to, roosts and ➤ Displacement of individuals or populations. <p>The latter 3 are considered below in relation to the construction phase of the Proposed Development.</p>
Characterisation of unmitigated effect	<p>Loss or damage to commuting and foraging habitat</p> <p><u>Windfarm Site Boundary</u></p> <p>In absence of appropriate design, the loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. Scrub, bog woodland, oak-ash-hazel woodland, lowland depositing streams, drainage ditches and treelines within the Windfarm Site Boundary were assessed as having Moderate potential for commuting or foraging bats (i.e. habitat that is connected to the wider landscape that could be used by bats for foraging bats such as trees, scrub grassland or water (Collins, 2016).</p> <p>The Proposed Development infrastructure is primarily located in areas of cutover bog characterised by dry heath, poor fen, spoil and bare ground, and grassland habitats, which were considered to have Low suitability, i.e. suitable but isolated habitat that could be used by small numbers of commuting or foraging bats (Collins, 2016) for commuting and foraging bats. However, small sections of the Proposed Development infrastructure are located within areas of birch dominated bog woodland and scrub which are considered to be of Moderate suitability for commuting and foraging bats. The Proposed Development will only involve the loss of a very small percentage of the available woodland and scrub habitat within the site and vegetative connectivity within the site and to the wider landscape will be largely retained.</p> <p>In addition to the above the Proposed Development will result in the loss of approximately 203m of hedgerow habitat with scattered ash trees as well as 60m of conifer treeline habitat within the Windfarm Site Boundary to facilitate the construction of the proposed Borrowpit No. 2 to the south of Bracklin Bog and to facilitate the construction of the access road between Carranstown and</p>

	<p>Ballivor Bogs. These linear features were assessed as being of Moderate suitability for commuting and foraging bats.</p> <p>In the absence of mitigation the loss of a small area of woodland and scrub habitat within the Windfarm Site Boundary, as well as the loss of hedgerow and conifer treeline habitat represents only a minor loss of the overall extent of suitable commuting and foraging habitat within the site and is therefore assessed as a permanent slight negative effect on commuting and foraging bats at the local scale.</p> <p><u>Haul route</u></p> <p>The road widening works at the land take areas along the proposed haul route will result in the loss of approximately 112m of hedgerow with scattered ash trees, which has been assessed as being of Moderate suitability for commuting and foraging bats.</p> <p>In the absence of mitigation, the loss of approximately 112m of hedgerow along the proposed haul route is assessed as a permanent, slight negative effect on the local bat population, given the abundant similar linear habitat in the wider area.</p> <p>Loss of, or damage to, roosts</p> <p><u>Windfarm Site Boundary</u></p> <p>The Proposed Development is predominantly located within an area of cutover bog, comprising establishing heath and pioneer poor fen habitats, with small sections located within areas of dry birch dominated bog woodland and scrub. No roosts were recorded within these habitats and the habitats do not provide optimal suitable roosting habitat for bat species.</p> <p>None of the built structures, i.e. existing railway crossings, storage buildings/containers, within the Proposed Development site boundary were assessed as having significant roosting potential, however, there is potential for individual bats to use these structures opportunistically. These structure are being fully retained and avoided by the Proposed Development.</p> <p>Scattered ash trees within the hedgerow to be lost at the location of the proposed borrowpit No. 2, south of Ballivor Bog were assessed as being of low potential for roosting bats (Collins 2016).</p> <p>No bat roosts were recorded within the Proposed Development Site during the bat surveys undertaken in 2020 or 2022.</p> <p>There is no potential for significant effects with regard to the loss or disturbance of bat roosting habitat within the Wind Farm site boundary.</p> <p><u>Haul route</u></p> <p>The majority of the trees within the land-take area along the proposed haul route were assessed as being of low suitability for roosting bats, i.e. a structure with one or more potential roost sites that could be used by individual bats opportunistically but which do not provide enough space, shelter, protection, appropriate conditions or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (Collins, 2016). However, a single mature ash tree within the land take area had extensive ivy cover and was assessed as being</p>
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	<p>of Moderate suitability for roosting bats, i.e. a structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (Collins, 2016).</p> <p>Taking a precautionary approach, there is potential for a permanent slight negative effect as a result of the loss of bat roosting habitat at the local scale due to the loss of a mature ash tree with moderate bat roosting potential along the proposed haul route land take area and a number of trees with low roosting potential both along the haul route land-take area and at the location of borrowpit No. 2.</p> <p>Displacement of individuals or populations</p> <p>The Proposed Development is predominantly located within an area of commercial cutover bog, characterised by predominantly by revegetating dry heath, poor fen and scrub with small areas located within birch dominated woodland. As described above, there will be no significant loss of linear landscape features for commuting and foraging bats and there will be no loss of any roosting site of ecological significance. The habitats on the site will remain suitable for bats and no significant displacement of individuals or populations is anticipated.</p> <p>During the construction phase of the proposed development there is potential for some disturbance of bat species due to increased activity and noise as well as due to the potential requirement for artificial lighting on the site. However, works will be confined to daylight hours and, given the nature of the habitats within the site, the small size of the construction footprint in relation to the overall size of the Proposed Development Site and extent of suitable habitat within the Proposed Development Site boundary, no significant disturbance or displacement of bats is anticipated.</p> <p>In the absence of mitigation, the potential for disturbance or displacement of bats is assessed as a temporary slight negative effect at the local scale.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>Taking a precautionary approach, in the absence of mitigation, there is no potential for significant effects on bats at any geographic scale as a result of loss of roosting, foraging or commuting habitat or as a result of disturbance or displacement.</p>
<p>Mitigation</p>	<p>Although no significant impacts on bats during the construction phase are anticipated the following standard best practice measures will be in place during the construction phase of the Proposed Development.</p> <p>Noise restrictions</p> <p>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).</p> <p>Lighting restrictions</p> <p>Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges. Exterior lighting, during construction and post construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Development, and consequently on bats i.e.</p>

Lighting will be directed away from mature trees/treelines around the periphery of the site boundary to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.

The proposed lighting around the site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/18 Bats and artificial lighting in the UK.

In addition, the applicant commits to the use of lights during construction (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations:

- Every light needs to be justifiable,
- Limit the use of light to when it is needed,
- Direct the light to where it is needed,
- Reduce the light intensity to the minimum needed,
- Use light spectra adapted to the environment

When using white light, use sources with a “warm” colour temperature (less than 3000K). Lighting will be turned off when not in use.

Vegetation removal

A small number of mature trees presenting potential roosting features were identified within the Proposed Development site, within the borrow pit n.2 and along the haul route. No bat roost was identified, however, bats comprise mobile species that can move regularly between tree roosts. As such, the trees with potential roosting features have been considered as a “roost resource” and compensation will be provided to cover for the loss of the resource. Tree-felling of mature deciduous trees will be carried out according to the following standard mitigating procedures:

- Trees with suitable potential roost features proposed for felling will be checked for bats by a suitably qualified arborist at the time of felling.
- Trees will be nudged two or three times prior to limb removal, with a pause of 30 seconds in between, to allow bats to wake and move.
- Rigged felling shall be used to lower the limbs and trunk carefully to ground level and cavities searched by a qualified ecologist.
- Felled trees will be left in-situ for a minimum of 24 hours prior to sawing or mulching, to allow any bats present to escape (National Roads Authority, 2006).
- Any tree felling will be undertaken outside the bat maternity season (May-August) and the hibernation period (December-February)
- Woodcrete bat boxes will be provided to compensate for the loss of trees with roosting features and installed on retained trees at least 3m high.

Residual Effect following Mitigation	There is no potential for the construction of the Proposed Development to result in Significant effects on the local bat population at any geographic scale, given the small area of suitable habitat to be lost relative to the area of suitable habitat in the wider landscape and given the standard best practice measures outlined above which will be implemented during construction.
Potential for Cumulative Effect	The Proposed Development will not result in any significant negative effect on the bat species. It therefore cannot contribute to any cumulative effect in this regard.

6.7.3.3 Introduction and Spread of Invasive Species

No invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) were recorded within or adjacent to the Proposed Development footprint during the ecology surveys undertaken. Therefore there is no potential for spread of invasive species due to disturbance during the construction of the Proposed Development. Nonetheless the following best practice biosecurity measures will be in place during construction of the Proposed Development to avoid the introduction of invasive species to the site

- Good construction site hygiene will be employed to prevent introduction of problematic invasive alien plant species (e.g. Japanese knotweed, Rhododendron, Giant Rhubarb etc.) to the site by thoroughly washing vehicles prior to entering the site.
- Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present.
- A pre-commencement invasive species survey of the construction footprint will be undertaken by a qualified ecologist to determine if any invasive species have established on the site since the undertaking of the previous surveys. The treatment and control of invasive alien species if recorded will follow guidelines issued by the National Roads Authority – The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (NRA 2020).

6.7.4 Likely Significant Effects During Operational Phase

6.7.4.1 Effects on Habitats during Operation

The operation of the Proposed Development will not result in any additional land take or loss of uncut raised bog or revegetated peatland habitats and as such there is no potential for any significant effects in this regard. These habitats are not considered to be a KER in the context of the operation of the Proposed Development. However, the Proposed Development has the potential to result in enhancement of the surrounding peatland habitats through habitat rehabilitation measures that will be undertaken throughout the operational phase of the Proposed Development. Details of the management that will be undertaken are provided in the Habitat Management and Enhancement Plan in Appendix 6-5.

Measures included within the plan are additional to those that are included within the draft Cutaway Bog Decommissioning and Rehabilitation Plans for Ballivor Bog that are being implemented following cessation of peat extraction in 2020. As the Proposed Development will not result in any significant negative effects on the remnant raised bog or cutover bog habitats within the Proposed Development Site (refer to Section 6.7.3 above), it will not have any significant effect on the implementation of or outcome of the Cutaway Bog Decommissioning and Rehabilitation Plans.

Potential for effects on rivers, streams, and sensitive aquatic species during the operation of the Proposed Development is assessed in detail below.

6.7.4.1.1 Effects on Rivers and Streams and sensitive aquatic faunal species.

Table 6-18 Assessment of Potential Impacts on Rivers, Streams, Open Waterbodies and Sensitive Aquatic Faunal Species

Description of Effect	<p>The potential impacts on water quality during the operational phase of the Proposed Development are fully described in Chapter 9 ‘Hydrology’ of this EIAR and are described here in relation specifically to biodiversity. There will be no instream activity during the operational phase of the Proposed Development and therefore no potential for loss of aquatic habitat or disturbance of aquatic species.</p> <p>The Proposed Development will result in an overall increase in the area of non-permeable hard-surfaces which has potential to result in increased surface water runoff from the Proposed Development Site , which in turn has potential to cause erosion of watercourses and impact on water quality. There is also potential for runoff 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 Development. However, it is not envisaged that any significant refuelling works will be undertaken on site during the operational phase.</p> <p>Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the Proposed Development on aquatic species including salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The operation of the Proposed Development 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 during the operational phase of the development is as a result of water pollution and this is discussed in this section in relation to habitats and species.</p>
Characterisation of unmitigated effect	<p>The potential impact on water quality during the operational phase of the Proposed Development has been assessed as a permanent negative effect in the absence of mitigation. The magnitude of this impact is slight because all major infrastructure will be located over 50 metres from any significant watercourse and the footprint of the Proposed Development will be minimal when compared to the overall size of the site. Furthermore, as outlined in Chapter 9 ‘Hydrology’ the increase in runoff from the Proposed Development will, be negligible.</p>
Assessment of Significance prior to mitigation	<p>Significant effects on water quality are not anticipated at any geographic scale during the operation of the Proposed Development.</p>
Mitigation	<p>Whilst no significant effects on water quality are anticipated, potential for effects on water quality associated with the operational phase drainage of the site has been fully mitigated through appropriate drainage design and mitigation as fully described in Chapter 9 ‘Hydrology’ of the EIAR.</p>
Residual Effect following Mitigation	<p>The drainage design and detailed mitigation measures outlined in Chapter 9 ‘Hydrology’ of this EIAR ensure that there is no potential for significant negative effects on water quality during the operational phase of the Proposed Development. There will be no instream activities during the operational phase. All major infrastructure will be located over 50 metres from any significant watercourse and the drainage design will ensure that there is no potential for significant negative</p>

	impacts on watercourses during the operational phase of the Proposed Development.
Potential for Cumulative Effect	There will be no significant residual effect on water quality at any geographic scale. There will be no instream activities during the operational phase. All major infrastructure will be located over 50 metres from any significant watercourse and the drainage design will ensure that there is no potential for significant negative impacts on watercourses during the operational phase of the Proposed Development. It can therefore be concluded that there is no potential for the Proposed Development to contribute to a cumulative effect in this regard.

6.7.4.2 Effects on Fauna during Operation

The operation of the Proposed Development will not result in any additional habitat loss or deterioration for faunal species and will result in an overall decrease in anthropogenic activity when compared to the past peat production usage of the site.

There is no potential for significant negative effects during the operational phase on non-volant terrestrial fauna including badger, that were identified as KERs during the construction phase of the Proposed Development.

It is not anticipated that the operation of the Proposed Development will have any effect on marsh fritillary or habitat for the species. No works associated with the operation and maintenance of the Proposed Development are proposed in any such habitat.

It should be noted that no significant habitat for otter, salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates or other aquatic species was recorded within the footprint of the Proposed Development and all major infrastructure such as turbine bases are located over 50 metres from the watercourses and wetlands within the site. There will be no instream activity during the operational phase of the Proposed Development and therefore no potential for habitat loss or disturbance during the operational phase.

6.7.4.2.1 Assessment of Potential Effects on Bats during operation

Table 6-19 Assessment of Potential Impacts on Bats

Description of Effect	<p>Collision Risk and Barotrauma</p> <p>The potential for collision risk for high collision risk bat species during the operational phase of the Proposed Development is assessed in the bat survey report in Appendix 6-2. Death may occur through collision with turbine blades or as a result of barotrauma. Fatalities may negatively affect local bat populations.</p> <p>The following high-risk species were recorded during the dedicated surveys:</p> <ul style="list-style-type: none"> • Leisler’s bat • Common pipistrelle • Soprano pipistrelle • Nathusius’ pipistrelle. <p>The Overall Risk Assessment for high collision risk species was determined, in accordance with Table 3b of NatureScot guidance (Appendix 4 of the bat survey report in Appendix 6-2), by a cross-tablature of the site risk level (i.e. Low) and Ecobat bat activity outputs for each species. The assessment was carried out for both median and maximum Ecobat activity categories in order to provide insight</p>
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	<p>into typical bat activity (i.e. median values) and activity peaks (i.e. maximum values).</p> <p>As per NatureScot guidance there is no requirement to complete an Overall Risk Assessment for low-risk species. During the extensive suite of surveys undertaken that following low risk species were recorded:</p> <ul style="list-style-type: none"> > <i>Myotis</i> sp., > Brown long-eared bat. <p>Overall activity levels for <i>Myotis</i> sp. and brown long-eared bat were low and therefore no significant collision related effects are anticipated.</p>
<p>Characterisation of unmitigated effect</p>	<p>The detailed collision risk assessment for high collision risk bat species is provided in the bat survey report in Appendix 6-2. The assessment identified that the collision risk for local populations of the high risk species Leisler’s bat, Nathusius’ pipistrelle and Soprano pipistrelle was low for both spring, summer and autumn.</p> <p>The assessment identified that the collision risk for Common pipistrelle was low in spring and autumn and that there is a medium collision risk to the local population in summer.</p> <p>Taking the above into account, in the absence of mitigation, there is potential for a permanent, moderate, negative effect on the local populations of the above high collision risk bat species, as a result of collision mortality during the operational phase of the Proposed Development. Collision risk was low for all high collision risk species, with the exception of common pipistrelle where collision risk was assessed as medium during the summer period.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>In the absence of mitigation, there is potential for a significant effect on local bat populations of high collision risk species, in particular common pipistrelle, as a result of collision and barotrauma.</p>
<p>Mitigation</p>	<p>Buffering</p> <p>As per the bat survey report in Appendix 6-2, in accordance with NatureScot (2021), a minimum 50m buffer to all habitat features used by bats will be applied to the siting of all wind turbines.</p> <p>This 50m buffer will be implemented from the outset and monitored as per the post construction monitoring. Where possible, the proposed location of turbines has accounted for the least possible loss of scrub and woodland habitat. All buffer zones will be maintained vegetation-free for the duration of the project. The success of the buffer mitigation will be assessed as part of post construction monitoring and updated where necessary.</p> <p>Blade feathering</p> <p>NIEA Guidelines also recommend that, in addition to buffers applied to habitat features, all wind turbines are subject to ‘feathering’ of turbine blades when wind speeds are below the cut-in speed of the proposed turbine. This means that the turbine blades are pitched at 90 degrees or parallel to the wind to reduce their rotation speed to below two revolutions per minute while idling. This measure has been shown to significantly reduce bat fatalities (by up to 50%) in some studies (NIEA, 2021).</p>

	<p>In accordance with NIEA Guidelines, blade feathering will be implemented as a standard across all proposed turbines when wind speeds are below the cut-in speed of the turbine (i.e. 3.5 m/s).</p> <p>Post Construction Monitoring</p> <p>Although collision risk for high risk species was predominantly low, taking a precautionary approach, an adaptive monitoring and mitigation strategy has been devised for the Proposed Development. This is outlined in the bat survey report in Appendix 6-2 and includes for 3 years of post-construction monitoring to assess the effects of construction related habitat modification on bat activity i.e. the 50 metre separation between the proposed turbine blade tips and the nearest landscape feature, or the influence of aviation lighting. Post construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision.</p> <p>The results of post construction monitoring shall be utilised to assess changes in bat activity patterns post construction and to monitor the implementation of the mitigation strategy. At the end of Year 1, and if a curtailment requirement is identified (i.e. significant bat fatalities encountered), a curtailment programme shall be devised around key activity periods and weather parameters in accordance with NatureScot and NIEA Guidance. The performance of any curtailment programme in terms of its ability to respond to the changes in bat abundance based on temperature and wind speed would be analysed to confirm the efficacy of the curtailment during different periods of bat activity. At the end of each subsequent year of monitoring, the efficacy of the curtailment programme will be reviewed, and any identified efficiencies incorporated into the curtailment programme. This approach allows for an evidence-based review of the potential or bat fatalities at the site, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally.</p>
Residual Effect following Mitigation	Taking into consideration the sensitive design of the project, and the proposed best practice and adaptive mitigation measures outlined above significant residual effects on bats with regard to collision mortality are not anticipated.
Potential for Cumulative Effect	No significant residual effect on bats during the operational phase of the Proposed Development are anticipated following implementation of the mitigation measures and monitoring plan outlined above. The Proposed Development therefore cannot contribute to any cumulative effect in this regard.

6.7.5 Likely Significant Effects During Decommissioning phase

Decommissioning is fully described in Chapter 4 of the EIAR. The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 30 years. Following the end of their service life, the wind turbines may be replaced with a new set of turbines or components, subject to planning permission being obtained, or the Proposed Development may be decommissioned fully. The onsite substation will remain in place as it will be under the ownership of the ESB/EirGrid.

During decommissioning of the Proposed Development, the wind turbines and meteorological masts would be disassembled. All above ground turbine and mast components would be separated and removed off-site for recycling. Turbine and mast foundations would remain underground and would be covered with earth and allowed to revegetate. Site roadways will be in use as amenity and recreational

pathways, and therefore will not be removed during decommissioning. 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. Underground cables, including grid connection, will be removed and the ducting left in place. A decommissioning plan will be agreed with Meath and Westmeath County Council prior to decommissioning the Proposed Development. A Decommissioning Plan is included as Appendix 4-5 of this EIAR.

It is anticipated that there will be no additional habitat loss associated with the decommissioning of the Proposed Development and therefore there will be no significant effects in this regard. In addition, the removal of the infrastructure will involve similar operations to those involved in construction but without the large-scale earth moving or excavations as the turbine bases and roads etc. will be left in place. These works would therefore be of a smaller scale but would have similar impacts on ecology to those experienced during construction. There would be no additional or ancillary impacts associated with the decommissioning phase.

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. In addition the following disturbance limitation measures will also be applicable:

- Plant machinery will be turned off when not in use and all plant and equipment for use will comply with the European Communities (Noise Emission by Equipment For Use Outdoors) Regulations, 2001 (S.I. No. 632/2001) and Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 359/1996).

6.8 Cumulative impact

The Proposed Development was considered in combination with other plans and projects in the area that could result in cumulative impacts on the Key Ecological Receptors (KERs) identified in Section 6.6.3 of this report, including European Sites and Nationally designated sites. This included a review of online Planning Registers, development plans and other available information and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects considered are listed in Chapter 2: Background of the Proposed Development and below.

6.8.1 Assessment of Plans

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

- Westmeath County Development Plan 2021 – 2027
- Meath County Development Plan 2021-2027
- National Biodiversity Action Plan 2017-2021
- Regional Spatial and Economic Strategy, Eastern and Midland Regional Assembly 2019-2031
- County Westmeath Biodiversity Action Plan 2014-2020
- County Meath Biodiversity Plan 2015-2020

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, as well as policies that relate to the preservation of surface water quality. An overview of the search results with regard to plans is provided in Table 6-20.

The potential for cumulative effects on European Designated sites is considered in full in the Appropriate Assessment Screening report and the Natura Impact Statement that accompanies this application.

Table 6-20 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 European Sites
<p>Westmeath County Development Plan 2021-2027</p>	<p>The overall objective of the Development Plan has been identified:</p> <p><i>Continue to protect and enhance the County’s natural heritage and biodiversity and ensure that networks of green infrastructure are identified, created, protected and enhanced to provide a wide range of environmental, social and economic benefits to communities.</i></p> <p>Policies: Natural Heritage</p> <p>It is the policy of the Council to:</p> <p>CPO 12.1</p> <ul style="list-style-type: none"> ➤ Contribute as appropriate towards the protection of designated sites in compliance with relevant EU Directives and applicable national legislation <p>CPO 12.2</p> <ul style="list-style-type: none"> ➤ Support the implementation of any relevant recommendations contained in the National Biodiversity Plan, the All-Ireland Pollinator Plan and the National Peatlands Strategy. <p>Policies: Natura 2000</p> <p>It is a policy of the Council to:</p> <p>CPO 12.4</p> <ul style="list-style-type: none"> ➤ Protect and conserve Special Areas of Conservation, candidate Special Areas of Conservation, Special Protection Areas and candidate Special Protection Areas, designated under the EU Birds and Habitats Directives respectively. 	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites.</p> <p>There will be no significant negative effects on biodiversity as a result of the Proposed Development. The Proposed Development has been designed to avoid, in so far as possible, the most sensitive habitats within the site. A range of mitigation measures are in place to ensure that there will be no significant negative effects on any habitats, species, protected sites or water quality and a Habitat Management and Enhancement Plan has been prepared, providing for the enhancement of approximately 12ha of peatland habitat within the Proposed Development Site.</p> <p>The Proposed Development is not considered to be in contravention of the policies and objectives within the development plan.</p> <p>No potential for negative cumulative impacts when considered in combination with the current proposal were identified.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>CPO 12.5</p> <ul style="list-style-type: none"> ➤ Ensure that no plans, programmes, etc. or projects 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).* <p>CPO 12.6</p> <ul style="list-style-type: none"> ➤ Ensure that any plan or project that could have a significant adverse impact (either by themselves or in combination with other plans and projects) upon the conservation objectives of any Natura 2000 Site or would result in the deterioration of any habitat or any species reliant on that habitat will not be permitted.* <p><i>* Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be a) no alternative solution available, b) imperative reasons of overriding public interest for the project to proceed; and c) Adequate compensatory measures in place.</i></p> <p>Policies: Rare and Protected Sites</p> <p>It is a policy of the Council to:</p> <p>CPO 12.13</p> <ul style="list-style-type: none"> ➤ Protect, manage, and enhance the natural heritage, biodiversity, landscape and environment of County Westmeath, in recognition of its importance as both a non-renewable resource and a natural asset. <p>CPO 12.18</p>	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<ul style="list-style-type: none"> ➤ Consult with the National Parks and Wildlife Service (NPWS) in regard to any developments (those requiring permission and those not requiring planning permission) which the Council proposes to carry out within pNHAs, NHAs, SACs, SPAs, and other important ecological sites. <p>Policies: Invasive species</p> <p>It is a policy of the Council to:</p> <p>CPO 12.27</p> <ul style="list-style-type: none"> ➤ Prevent the spread of invasive species within the plan area, including requiring landowners and developers to adhere to best practice guidance in relation to the control of invasive species <p>CPO 12.29</p> <ul style="list-style-type: none"> ➤ Support, as appropriate, the National Parks and Wildlife Service’s efforts to seek to control and manage the spread of non-native invasive species on land and water. Where the presence of non-native invasive species is identified at the site of any Proposed Development or where the proposed activity has an elevated risk of resulting in the presence of these species, details of how these species will be managed and controlled will be required. 	
<p>Meath County Development Plan 2021-2027</p>	<p>Policies and Objectives : Biodiversity</p> <p>HER POL 27</p> <ul style="list-style-type: none"> ➤ To protect, conserve and enhance the County’s biodiversity where appropriate 	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>HER POL 28</p> <ul style="list-style-type: none"> ➤ To integrate in the development management process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate. <p>HER POL 29</p> <ul style="list-style-type: none"> ➤ To raise public awareness and understanding of the County’s natural heritage and biodiversity <p>HER POL 30</p> <ul style="list-style-type: none"> ➤ To promote increased public participation in biodiversity conservation by supporting and encouraging community-led initiatives. <p>HER POL 31</p> <ul style="list-style-type: none"> ➤ To ensure that the ecological impact of all development proposals on habitats and species are appropriately assessed by suitably qualified professional(s) in accordance with best practice guidelines – e.g. the preparation of an Ecological Impact Assessment (EcIA), Screening Statement for Appropriate Assessment, Environmental Impact Assessment, Natura Impact Statement (NIS), species surveys etc. (as appropriate). <p>HER OBJ 30</p> <ul style="list-style-type: none"> ➤ To implement, in partnership with the Department of Culture, Heritage and the Gaeltacht, relevant stakeholders and the community, the objectives and actions of Ireland’s National Biodiversity Action Plan 2017 - 2021 which relate to the remit and functions of Meath County Council. <p>HER OBJ 31</p>	<p>There will be no significant negative effects on biodiversity as a result of the Proposed Development. The Proposed Development has been designed to avoid, in so far as possible, the most sensitive habitats within the site. A range of mitigation measures are in place to ensure that there will be no significant negative effects on any habitats, species, protected sites or water quality and a Habitat Management and Enhancement Plan has been prepared, providing for the enhancement of approximately 12ha of peatland habitat within the Proposed Development Site.</p> <p>The Proposed Development is not considered to be in contravention of the policies and objectives within the development plan.</p> <p>No potential for negative cumulative impacts when considered in combination with the current proposal were identified.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<ul style="list-style-type: none"> <p>➤ To implement, in partnership with the Department of Culture, Heritage and the Gaeltacht, relevant stakeholders and the community, the objectives and actions of the County Meath Biodiversity Plan 2015-2020 and any revisions thereof</p> <p>HER OBJ 32</p> <p>➤ To actively support the implementation of the All Ireland Pollinator Plan 2021-2025 and any revisions thereof.</p> <p>Policies and Objectives : Sites Designated for Nature Conservation</p> <p>HER POL 32</p> <p>➤ To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas, Statutory Nature Reserves or those proposed to be designated over the period of the Plan, only where the development has been subject to the outcome of the Appropriate Assessment process and has been carried out to the satisfaction of the Planning Authority, in consultation with National Parks and Wildlife.</p> <p>HER POL 33</p> <p>➤ To have regard to the views and guidance of the National Parks and Wildlife Service in respect of Proposed Development where there is a possibility that such development may have an impact on a designated European or National site or a site proposed for such designation.</p> <p>HER POL 34</p> 	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<ul style="list-style-type: none"> <p>➤ To undertake appropriate surveys and collect data to provide an evidence-base to assist the Council in meeting its obligations under Article 6 of the Habitats Directives (92/43/EEC) as transposed into Irish Law, subject to available resources. It is an objective of the Council:</p> <p>HER OBJ 33</p> <p>➤ To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directives (92/43/EEC) and in accordance with the Department of Environment, Heritage and Local Government Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and European Commission guidance documents, is Meath County Development Plan 2021-2027 Chapter 8 carried out in respect of any plan or project not directly connected with or necessary for the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in-combination with other plans or projects, in view of the site’s conservation objectives.</p> <p>HER OBJ 34</p> <p>➤ To protect and conserve the conservation value of candidate Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed Natural Heritage Areas as identified by the Minister for the Department of Culture, Heritage and the Gaeltacht and any other sites that may be proposed for designation during the lifetime of this Plan in accordance with the provisions of the Habitats and Birds Directives and to permit development in or affecting same only in accordance with the provisions of those Directives as transposed into Irish Law.</p> <p>Policies and Objectives : Non-Designated Sites</p>	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>HER POL 35</p> <ul style="list-style-type: none"> ➤ To ensure, where appropriate, the protection and conservation of areas, sites, species and ecological/networks of biodiversity value outside designated sites and to require an appropriate level of ecological assessment by suitably qualified professional(s) to accompany development proposals likely to impact on such areas or species. <p>Policies and Objectives: Protected Species</p> <p>HER POL 36</p> <ul style="list-style-type: none"> ➤ To consult with the National Parks and Wildlife Service and take account of their views and any licensing requirements, when undertaking, approving or authorising development which is likely to affect plant, animal or bird species protected by law. <p>HER OBJ 35</p> <ul style="list-style-type: none"> ➤ To ensure that development does not have a significant adverse impact, incapable of satisfactory avoidance or mitigation, on plant, animal or bird species protected by law. <p>Policies and Objectives: Peatlands</p> <p>HER POL 45</p>	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>HER OBJ 39</p> <ul style="list-style-type: none"> ➤ To ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, climate regulation, archaeological, cultural and educational significance. ➤ To work in partnership with relevant stakeholders on a suitable peatland site(s) 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, having regard to local and residential amenities. 	
<p>National Biodiversity Action Plan 2017-2021</p>	<p>Target 6.2 - Sufficiency, coherence, connectivity and resilience of the protected areas network substantially enhanced by 2020.</p>	<p>The plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites.</p> <p>There will be no significant negative effects on biodiversity as a result of the Proposed Development. The Proposed Development has been designed to avoid, in so far as possible, the most sensitive habitats within the site. A range of mitigation measures are in place to ensure that there will be no significant negative effects on any habitats, species, protected sites or water quality and a Habitat Management and Enhancement Plan has been prepared, providing for the enhancement of approximately 12ha of peatland habitat within the Proposed Development Site.</p> <p>The Proposed Development is not considered to be in contravention of the policies and objectives within the plan.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
		<p>No potential for negative cumulative impacts when considered in combination with the current proposal were identified.</p>
<p>Regional Spatial and Economic Strategy, Eastern and Midland Regional Assembly 2019-2021</p>	<p>Biodiversity and Natural Heritage</p> <p><u>Regional Policy Objective (RPO) 7.16</u> - Support the implementation of the Habitats Directives in achieving an improvement in the conservation status of protected species and habitats in the Region and to ensure alignment between the core objectives of the EU Birds and Habitats Directives and local authority development plans</p> <p><u>RPO 7.17:</u> Facilitate cross boundary co-ordination between local authorities and the relevant agencies in the Region to provide clear governance arrangements and coordination mechanisms to support the development of ecological networks and enhanced connectivity between protected sites whilst also addressing the need for management of alien invasive species and the conservation of native species.</p> <p>Water Quality</p> <p><u>RPO 7.10:</u> Support the implementation of the Water Framework Directive in achieving and maintaining at least good environmental status for all water bodies in the Region and to ensure alignment between the core objectives of the Water Framework Directive and other relevant Directives, River Basin Management plans and local authority land use plans.</p> <p><u>RPO 7.11:</u> For water bodies with ‘high ecological status’ objectives in the Region, local authorities shall incorporate measures for both their continued protection and to restore those water bodies that have fallen below high ecological status and areas ‘At Risk’ into the development of local planning policy and decision making any measures for the continued protection of areas with high ecological status in the Region and for mitigation of threats to waterbodies identified as ‘At Risk’ as part of a catchment based approach in consultation</p>	<p>The plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites.</p> <p>There will be no significant negative effects on biodiversity as a result of the Proposed Development. The Proposed Development has been designed to avoid, in so far as possible, the most sensitive habitats within the site. A range of mitigation measures are in place to ensure that there will be no significant negative effects on any habitats, species, protected sites or water quality and a Habitat Management and Enhancement Plan has been prepared, providing for the enhancement of approximately 12ha of peatland habitat within the Proposed Development Site.</p> <p>The Proposed Development is not considered to be in contravention of the policies and objectives within the plan.</p> <p>No potential for negative cumulative impacts when considered in combination with the current proposal were identified.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	with the relevant agencies. This shall include recognition of the need to deliver efficient wastewater facilities with sufficient capacity and thus contribute to improved water quality in the Region.	
County Meath Biodiversity Action Plan 2015-2020	<p>Objective 1: To raise awareness of biodiversity in Meath, its value and the issues facing it</p> <p>Objective 2: To better understand the biodiversity of Meath</p> <p>Objective 3: To conserve and enhance habitats and species in Meath, taking account of national and local priorities</p> <p>Objective 4: To foster active participation to help biodiversity in Meath, encouraging a partnership approach to help our species and habitats</p> <p>The specific actions in relation to the above listed biodiversity objectives set out in Section 8 of the plan were reviewed and taken into consideration in this assessment.</p>	<p>There will be no significant negative effects on biodiversity as a result of the Proposed Development. The Proposed Development has been designed to avoid, in so far as possible, the most sensitive habitats within the site. A range of mitigation measures are in place to ensure that there will be no significant negative effects on any habitats, species, protected sites or water quality and a Habitat Management and Enhancement Plan has been prepared, providing for the enhancement of approximately 12ha of peatland habitat within the Proposed Development Site.</p> <p>The Proposed Development is not considered to be in contravention of the policies and objectives within the plan.</p> <p>No potential for negative cumulative impacts when considered in combination with the current proposal were identified.</p>
County Westmeath Biodiversity Action Plan 2014-2020	<p>The Actions outlined in the plan for Westmeath County Council in relation to biodiversity fall under 3 main categories:</p> <ul style="list-style-type: none"> • Protection and Development of the Ecological Network • Monitoring and Research • Raising Awareness <p>The actions outlined in Chapter 6 of the plan were reviewed and taken into consideration in this cumulative assessment.</p>	<p>There will be no significant negative effects on biodiversity as a result of the Proposed Development. The Proposed Development has been designed to avoid, in so far as possible, the most sensitive habitats within the site. A range of mitigation measures are in place to ensure that there will be no significant negative effects on any habitats, species, protected sites or water quality and a Habitat Management and Enhancement Plan has been prepared, providing for</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
		<p>the enhancement of approximately 12ha of peatland habitat within the Proposed Development Site.</p> <p>The Proposed Development is not considered to be in contravention of the policies and objectives within the plan.</p> <p>No potential for negative cumulative impacts when considered in combination with the current proposal were identified.</p>

6.8.2 Assessment of Projects

6.8.3 Applications within the Proposed Development Site

Planning applications which are recorded as being within the planning application redline boundary are set out in Table 6-21.

Industrial scale peat extraction was permanently ceased by the applicant within the Ballivor Bog Group in June 2020. Decommissioning and maintenance activities associated with the removal of existing peat stockpiles from the Bog Group and the Applicant's statutory duties to discharge the conditions of its Integrated Pollution Control Licence (IPC) Licence (Ref. P0501-01) from the Environmental Protection Agency (EPA) for the Derrygreenagh Bog Group, which in part comprises the Ballivor Bog Group, remain on-going. The on-going decommissioning and maintenance activities ensure compliance with the Applicant's extant IPC Licence and the post-peat extraction rehabilitation of the Ballivor Bog Group.

A number of peatland restoration measures have been undertaken or are proposed for the lands within and adjacent the Proposed Development Site boundary. Draft cutaway bog rehabilitation and decommissioning plans for each of the bogs within the Proposed Development Site have been prepared by Bord na Móna in order to meet the requirements of Condition 10 of the IPC licence for the Derrygreenagh Bog Group. These draft plans will be agreed by the EPA prior to implementation. The aim of the rehabilitation plans is to stabilise and rehabilitate the peatland habitats within the site and it is proposed that natural recolonisation will form the basis for the environmental stabilisation of these areas. Re-wetting through drain blocking will also be a rehabilitation strategy. The rehabilitation plans will contribute to improving the overall condition of peatland habitats within the Proposed Development Site as well as to improving the quality of water discharging from the site as water quality of discharges from restored peatlands generally improve as a result of bog restoration measures (Bonn et al. 2017). The overall footprint of the Proposed Development makes up a very small fraction (<2%) of the entire Ballivor Bog Group and will not have a significant effect on the proposed rehabilitation plans. The decommissioning and rehabilitation plans for each of the bogs comprising the proposed site will be updated to incorporate the Proposed Development infrastructure, with the key objectives of the rehabilitation plans *i.e.* rewetting and revegetation, occurring between and surrounding the Proposed Development infrastructure. There

Peatland Climate Action Scheme (PCAS) peatland restoration measures were carried out at Carranstown East, adjacent to the Proposed Development Site boundary in 2022. This form of enhanced peatland rehabilitation, which is above and beyond what is required under IPC licence was completed in 2022. Bracklin West, also adjacent to the Proposed Development Site boundary, has been selected for PCAS and it is expected to commence in 2023.

The PCAS scheme is supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC). Please see <https://www.bnmpcas.ie/> for details. The National Parks and Wildlife Service (NPWS) acts as the Scheme regulator and there is ongoing engagement with the EPA. This scheme is in addition to the IPC licence requirements and does not form part of the Proposed Development planning application.

An application for leave to apply for Substitute Consent for peat extraction and all peat extraction related activities that have been and are currently being carried out within the Ballivor Bog Group (Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West bogs) has been made to An Bord Pleanála (Planning ref: 311646, date 13/10/2021). The application for Substitute Consent will be accompanied by an EIAR, AASR and NIS which will assess the impacts that historical peat extraction activities are likely to have had on biodiversity and Designated Sites.

Table 6-21 Planning Applications within and adjacent to the Proposed Development Site Boundary

Local Authority	Planning Ref.	Lodgement Date	Description	Location	Final grant
Westmeath	83382	01/01/1983	Bulk loading facility	Grangemore, Raharney	Conditional
Westmeath	90554	18/11/1990	Extension to storage facilities	Grangemore, Raharney	Conditional
Westmeath	8814	01/01/1988	Erect tea centre	Grangemore, Raharney	Conditional
Westmeath	052348	01/11/2005	To construct a 10/20kv ESB substation, to service Ballivor horticulture factory	Grangemore, Raharney	Conditional
Westmeath	082218	12/09/2008	The extension of use of an existing quarry granted under planning reference 04/2153 for the extraction of sand and gravel on approximately 3.65 hectares. Permission also sought for reinstatement of the quarry to existing ground level with suitable materials, existing road access and entrance and all associated site works and services	Riverdale, Raharney	Conditional
Westmeath	092084	14/07/2009	The erection of a 30m high antenna support structure with 3 no. Panel antennas & 3 no. Dishes with the development forming part of the National Broadband Scheme (NBS)	Grangemore, Raharney	Conditional

Local Authority	Planning Ref.	Lodgement Date	Description	Location	Final grant
Westmeath	092084	14/07/2009	The erection of a 30m high antenna support structure with 3 no. Panel antennas & 3 no. Dishes with the development forming part of the National Broadband Scheme (NBS)	Grangemore, Raharney (adjacent to the subject site)	Conditional
Westmeath	122067	05/12/2012	Laying two intersecting grass strips, 150m x 7m and 75m x 7m, for use as a take-off and landing area for model aircraft and a grass area, 10m x 30m for car parking	Ballyhealy / Ballinure & Bracklyn (adjacent to the subject site)	Conditional
Meath	TA1300 56	01/02/2013	Continuance of use of an existing 30m lattice tower structure carrying telecommunications equipment, associated equipment container with palisade fencing as previously granted under Local Authority reference TA70722	Killaconnigan, Ballivor	Conditional
Westmeath	146082	05/06/2014	Permanent Retention Permission for existing 30m Multiuser Support Structure, carrying associated telecommunications equipment, associated equipment cabinet and Permission for additional telecommunications equipment and cabinet, all within existing secure compound, including access track	Grangemore Td, Raharney	Conditional
Meath	TA1406 15	16/07/2014	Retention of an existing 30-metre-high telecommunications support structure carrying antennas and link dishes together with associated equipment containers and security fencing which was previously granted under planning reference TA900185	Killaconnigan, Ballivor	Conditional

There will be no significant negative effects on biodiversity as a result of the Proposed Development. The Proposed Development has been designed to avoid, in so far as possible, the most sensitive habitats within the site. A range of mitigation measures are in place to ensure that there will be no significant negative effects on any habitats, species, protected sites or water quality and a Habitat Management and Enhancement Plan has been prepared, providing for the enhancement of approximately 12ha of peatland habitat within the Proposed Development Site.

The planning applications and associated environmental documentation for the planning applications in the table above were reviewed. No potential pathways for significant negative cumulative impacts on biodiversity when considered in combination with the current proposal were identified.

6.8.4 **Wind Energy Applications Within 25km of the Proposed Development**

On a precautionary basis a 25km zone of influence was used to identify wind farm developments in the wider area. The Wind Energy Development Guidelines (2006) recommend a 20km zone of influence is used from the Proposed Development Site boundary. There are no wind energy developments within 25km of the Proposed Development. The following permitted and proposed wind energy developments (Table 6-22) are located within 25km of the Proposed Development Site and considered in this cumulative impact assessment.

Table 6-22 Wind Energy Planning Applications within 25km of the Proposed Development

Permitted Windfarms within 25km from subject site								
Wind Farm	Pl. Ref.	Applicant	Lodgement	Description	Location	Local Authority Decision	Appeal/ABP decision	Operational Status
Bracklyn	PA25M.311565	Bracklyn Wind Farm Limited	05/10/2021	Proposed 11 no turbine wind farm and 110kV loop-in/loop-out electricity substation	Bracklyn, Co. Westmeath (0.5km – 5km)	SID app	ABP – Conditional (07/07/2022)	No
Yellow River	PA19.PA0032	Greenwind Energy (Wexford) Ltd	28/11/2013	A 15 year permission for 32 turbines with a total height of 166m.	Derryarkin and other townlands – to the north of Rhode, Co. Offaly (c. 15.5 km southwest)	SID app	ABP Conditional (03/06/2014)	No
Cushaling /Cloncant	PL19.306924	Cloncant Renewable Energy Limited	18/03/2020	10-year planning permission with a 30-year operational life. The development will consist of up to 8 (eight) wind turbines. An Environmental Impact Assessment Report (EIAR) and A Natura Impact Statement (NIS) has been prepared in respect of the application	Ballykilleen Shean Kilcumber Cloncant & Cushaling, Edenderry, Co Offaly (24.1km South)	Refuse 21/02/2020 Offaly County Council	Grant 23/09/2020 ABP	Under Construction
Cloncreen	PA19.PA0047	Bord Na Móna Powergen Ltd	27/10/2016	Proposed Cloncreen Wind Farm comprising up to 21 no. Wind Turbines and all associated works	Esker More, Clongarret, Cloncreen, Ballykilleen, Ballynakill, Ballinrath, Rathvilla or Rathclonbrackan, Ballina and Ballingar, County Offaly (24.5km South)	SID Application	Grant 03/05/2017 ABP	Yes
Proposed Windfarms within 25km of subject site in pre-planning or early stage consultation								
Miltown Pass	N/A	Statkraft	N/A	Proposed 7 no. turbines and underground connection to Clonfad Substation (via public consultation website https://miltownpasswindfarm.ie/ accessed on 2023.02.23)	Miltown Pass, Co. Westmeath (c. 17 km southwest)	N/A	N/A	N/A

Permitted Windfarms within 25km from subject site								
Knockanarragh	N/A	Statkraft	N/A	Up to 8 no Turbines – via. public consultation https://knockanarraghwindfarm.ie/ accessed on 2023.02.23	Newtown, Carnybrogan, Cavestown and Rosmead Co. Meath and Co. Westmeath. (c. 10km northwest)	N/A	N/A	N/A
Ballydermot	ABP 310143-21	Bord na Móna Powergen Ltd.	N/A	Construction of a wind energy development comprising approximately 50-55 no. wind turbines.	Ballydermot and other townlands, Co. Offaly and Lullybeg and other townlands, Co. Kildare.	Pre-application consultation	N/A	N/A

The planning applications and associated environmental documentation for the planning applications in the table above were reviewed. No potential pathways for significant negative cumulative impacts on biodiversity when considered in combination with the current proposal were identified.

7.1.2 Applications within the Vicinity of the Wind Farm

Planning applications within the vicinity of the Proposed Development were collated following a review of the Meath and Westmeath County Council planning portals. Records of An Bord Pleanála and the Department of Agriculture, Forestry and the Marine websites were also searched for other relevant planning applications and licences.

Applications within the vicinity of the proposed wind farm are predominately for the development of the following:

- Quarrying,
- Agriculture,
- Forestry,
- Renewable energy (including the permitted Bracklyn Wind Farm),
- Private turbary
- One off housing

A list of applications within the wider area is included in Appendix 2-4 of the EIAR.

The planning applications and associated environmental documentation for the planning applications in the table above were reviewed. No potential pathways for significant negative cumulative impacts on biodiversity when considered in combination with the current proposal were identified.

7.1.3 Assessment of Cumulative Effects

The residual construction, operational and decommissioning impacts of the Proposed Development are considered cumulatively with other plans and projects as described above. Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed Development and those that could be potentially affected via downstream surface water.

The Proposed Development will result in a loss of approximately 1.03ha of highly degraded uncut raised bog, equivalent to 0.3% of the total area of this habitat, and 32.8ha of cutover peatland habitats including poor fen and dry heath communities and colonising woodland/scrub, equivalent to 1.9% of these habitats, recorded within the Proposed Development Site. The loss of these habitats is a very small percentage of the overall quantum of habitats within the site of the Proposed. This does not represent a significant loss of peatland or woodland. In addition, the Proposed Development includes mitigation in the form of habitat management and rehabilitation that will protect and enhance a far greater area than that which will be lost. This is fully described in Appendix 6-5, Habitat Management and Enhancement Plan. As such, there is no potential for the Proposed Development to contribute to any significant cumulative habitat loss in this regard when considered in combination with any other plans and projects.

There will also be loss of approximately 0.28ha of oak-ash-hazel woodland and approximately 375m in total of linear hedgerow and treeline habitat within the Proposed Development Site (Windfarm Site Boundary and haul route land take areas) as a result of the proposed development. This will be fully compensated for by the planting of approximately 8ha of native woodland within the Proposed Development Site as outlined in the Habitat Management and Enhancement Plan in Appendix 6-5. The implementation of woodland planting will ensure that there is no potential for significant cumulative effects on woodland, treeline and hedgerow habitat, when the Proposed Development is considered on its own or in combination with other plans or projects.

The potential for the Proposed Development to contribute to a cumulative effect on water quality in the Boyne catchment was considered in this chapter and also in Chapter 9 of this EIAR. The Proposed Development includes a range of mitigation measures that are in place to minimise any water pollution or hydrological effects outside the development footprint. The implementation of these measures ensures that there is no potential for significant cumulative effects on any downstream receptors, whether the Proposed Development is considered on its own or in combination with other plans or projects.

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

The Proposed Development 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 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 Development.

7.2

Conclusion

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

The potential for effects on the European Designated Sites are fully described in the Appropriate Assessment Screening report and Natura Impact Statement that accompanies this application. The NIS concludes that in view of best scientific knowledge and on the basis of objective information, the Proposed Development either individually or in combination with other plans or projects, is not likely to have significant effects on the European Sites that were assessed as part Appropriate Assessment process. Following the implementation of mitigation, no potential for significant effects on Nationally designated sites downstream, of the site were identified.

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