

6. BIODIVERSITY

6.1 Introduction

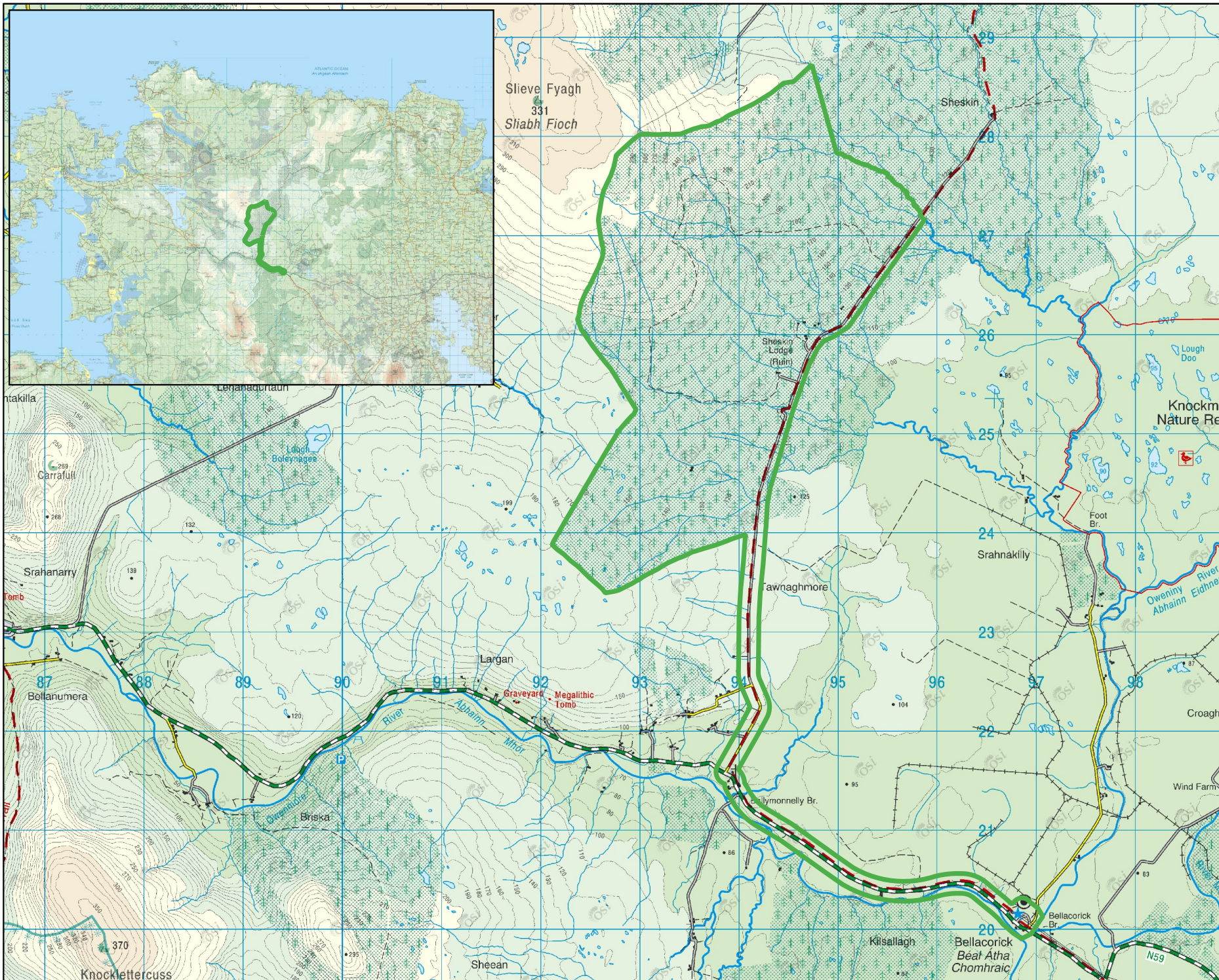
This chapter assesses the likely significant effects (both alone and cumulatively with other plans and projects) that the Proposed Development may have on Biodiversity, Flora and Fauna and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified. 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 1976-2021 as amended and under the EU Habitats Directive 92/43/EEC. Impacts on avian receptors are considered in Appendix 7-1 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, Flora and Fauna.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the Baseline Ecological Conditions and Receptor Evaluation is then provided.
- This is followed by an Assessment of Effects which are described with regard to each phase of the development: construction phase, operational phase and decommissioning phase. Potential Cumulative effects in combination with other plans and projects are fully assessed.
- Proposed mitigation and best practice measures that will be implemented in full to avoid, reduce or offset the identified effects on biodiversity, flora and fauna are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on Biodiversity, Flora and Fauna.

The following defined terms are utilised in this chapter:

- For the purposes of this EIAR, the entire project (wind farm, substation, grid connection and turbine delivery route) is referred to as the 'Proposed Development'.
- For the purpose of this EIAR chapter, the term 'EIAR Site Boundary'/'Site Boundary' refers to the site green line boundary as shown in Figure 6-1.
- The term 'development footprint' is used to describe the lands that will be subject to the proposed infrastructure and associated construction works.
- "Key Ecological Receptor" (KER) is defined as a species or habitat considered to be of ecological significance occurring within the zone of influence of the development upon which likely significant effects are anticipated.
- "Zones of Influence" (ZOI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.



Map Legend

 EIA Site Boundary



Drawing Title	
EIA Site Boundary	
Project Title	
Sheskin South Wind Farm	
Drawn By	Checked By
VA	CM
Project No.	Drawing No.
201119	Figure 6-1
Scale	Date
1:50000	22.02.2023

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Requirements for Ecological Impact Assessment

National Legislation

The Wildlife Act, 1976–2021 as amended, is the principal piece of legislation governing protection of wildlife in Ireland. The Wildlife Act provides strict protection for species of conservation value. The Wildlife Act conserves wildlife (including game) and protects certain wild creatures and flora. These species are therefore considered in this report as ecological receptors.

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife (Amendment) Act 2021. These sites do not form part of the Natura 2000 network of European sites and the AA process, or screening for same, does not apply to NHAs or pNHAs. Proposed Natural Heritage Areas (pNHAs) were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated¹ However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future (NPWS, 2020).

The Flora (Protection) Order 2022 S.I. No. 235 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. 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 (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 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 May 2021).

- 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 site boundary and the ecological assessment process.

European Legislation

The EU Habitats Directive (92/43/EEC) (together with the Birds Directive (79/409/EEC), as subsequently codified by Council Directive 2009/147/EC on the conservation of wild birds) forms the cornerstone of Europe’s nature conservation within the EU. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. The Habitats Directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. 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). The Habitats Directive and Birds Directive, which were transposed into Irish law through Part XAB of the Planning and Development Acts 2000-2022 (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 in both Annex II and Annex IV.

The disturbance of species under Article 12 of the Habitats Directive (and in particular avoidance of deliberate disturbance of Annex IV species, particularly during the period of breeding, rearing, hibernation and migration and avoidance of deterioration or destruction of breeding sites or resting places) has been specifically assessed in this EIAR.

According to Recital 1 of the Birds Directive, Council Directive 79/409/EEC on the conservation of wild birds was substantially amended several times and in the interests of clarity and rationality, the Birds

Directive codifies Council Directive 79/409/EEC. Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3). A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

In summary, the species and habitats provided National and International protection under these legislative and policy documents have been considered in this Ecological Impact Assessment. A detailed assessment of the likelihood of the Proposed 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

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, 2022) and the Transport Infrastructure Ireland (TII)'s *Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2* (TII, 2009a) (referred to hereafter as the TII Ecological Impact Assessment Guidelines). The survey methodology is based on the TII guidelines on *Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes* (TII, 2009b). Although these survey methodologies relate to road schemes, these standard guidelines are recognised survey methodologies that ensure good practice regardless of the development type.

In addition, the following guidelines were adhered to 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).
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002).
- 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).

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:

- Adopted Mayo County Development Plan 2021 – 2027.
- Adopted Natura Impact Report on the Mayo County Development Plan, Mayo County Council, (2020).
- National Biodiversity Action Plan 2017-2021
- The Regional Planning Guidelines for the West 2010-2022

6.3.1 Statement of Authority

This report has been prepared by Inga Reich (B.Sc., Ph.D.) Colin Murphy (B.Sc., M.Sc) and Pat Roberts (B.Sc., MCIEEM). Inga Reich has over 5 years’ postdoctoral experience in ecology and professional ecological consultancy. Colin is an experienced ecologist with over two years professional consulting experience. Both Inga and Colin have previous experience in preparing Biodiversity Chapters for EIARs. Pat has over 15 years’ experience in ecological management and assessment. The ecological surveys were undertaken by Inga Reich and Kevin Mc Elduff (B.Sc.), Tim Murphy (B.Sc.), Keith Costello (B.Sc.), Laura McEntegart (B.Sc.), Cathal Bergin (B.Sc.) and Neil Campbell (B.Sc, M.Sc)). Neil, Cathal and Keith have over 2 years of ecological consultancy experience, specialising in surveying and reporting on bat populations in Ireland. Laura has 2 years’ experience in ecological assessment, also specialising in bat ecology. She has undertaken training courses with CIEEM in Bat Mitigation and Enhancement, with Wildlife Acoustics’ in Kaleidoscope Pro Analysis. Laura has undertaken and assisted in ecological assessment in relation to small and large scale development projects.

6.4 Methodology

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological baseline conditions are those existing in the absence of proposed activities (CIEEM, 2022).

The following sections outline the methodologies utilised to establish the baseline ecological condition of the Proposed Development site.

6.4.1 Desk Study

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

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA (Envision), Water Framework Directive (WFD), Geological Survey of Ireland (GSI) & Inland Fisheries Ireland (IFI).
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.

- Data on potential occurrence of protected bryophytes – as per NPWS online map viewer; Flora Protection Order Map Viewer – Bryophytes².
- IFI Reports.
- Review of specially requested records from the NPWS Rare and Protected Species Database for the hectad in which the Proposed Development is located.
- Review of NPWS Article 17 Metadata and GIS Database Files

6.4.1.1 Zone of Influence

Given the nature and scale of the Proposed Development, the zone of influence for the Proposed Development, in relation to potential for significant impacts on habitats and species, was considered to be the EIAR Site boundary.

In relational to European and Nationally Designated Sites, as well as non-designated sites of national importance, the zone of influence was determined using a source-pathway-receptor model as outlined below: 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 13/01/2022. 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, European and National Sites within a distance of 15km surrounding the development site are shown on Figures 6-3 and 6-4 respectively. Information on these sites according to the site-specific conservation objectives is provided in Table 6-3. Sites that were further away from the Proposed Development were also considered and no potential for impact was identified due to the absence of indirect and direct hydrological connections (e.g. without the Atlantic Ocean as a buffer).
- Table 6-3 provides details of all relevant designated sites as identified in the preceding steps and assesses which are within the likely Zone of Impact. All relevant European Designated Sites are also 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 13/01/2022.

Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and further assessment is required.

6.4.2 Scoping and Consultation

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

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. Although no formal scoping opinion was requested from An Bord Pleanála under s37D of the Planning and Development Act 2000 (as amended), the recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter.

² NPWS, 2020, Online map viewer; Flora Protection Order Map Viewer – Bryophytes. Online, Available at: <http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e>, Accessed: December 2021.

Table 6-1 provides a list of the organisations consulted with regard to biodiversity during the scoping process and their response.

Table 6-1 Organisations consulted with regard to biodiversity

Consultee	Response
Bat Conservation Ireland	The response states that Bat Conservation Ireland does not have the administrative capacity to comment on planning projects.
Development Application Unit Department of Housing, Local Government and Heritage	<p>The scoping response provides a number of recommendations and a summary of the main points is provided below:</p> <ul style="list-style-type: none"> ➤ The EIAR must demonstrate that the proposed wind farm development will not pose any threat to surface waters and associated species (e.g. Salmon). ➤ The impacts of tree felling on wildlife, habitats and surface waters (e.g. water quality) should be assessed fully, including the risk of Phosphate mobilisation from peat soils as a result of tree clearance and ground disturbance. ➤ The EIAR should include a detailed plan to show the location, nature and area of habitat to be reinstated, and provide details of how such areas will be reinstated, managed and improved for habitats and/or species, together with proposals for monitoring and reporting. ➤ The likely impacts of grid connection, particularly for birds, sensitive habitats and surface waters, should be given due consideration at the EIA stage ➤ Impacts of lighting on-site should be assessed ➤ An assessment of the impact of the proposed windfarm on bat species should be carried out noting recent guidance available ➤ Any watercourse or wetland which may be impacted on should be surveyed for the presence of protected species and species listed on Annexes II and IV of the Habitats Directive. ➤ The EIAR should also address the issue of invasive alien plant and animal species such as <i>Rhododendron ponticum</i> and Japanese Knotweed, and detail the methods required to ensure they are not accidentally introduced or spread during survey and/or construction <p>Recommendations for the preparation of a Construction Management Plan were also provided along with guidance on impact and appropriate assessments, ecological surveys, cumulative impacts and post-construction monitoring.</p> <p>Two meetings were held with the DAU in relation to Sheskin South to discuss their scoping response and outline the surveys and assessments that are proposed or have been undertaken.</p>
Inland Fisheries Ireland - Shannon Region & Western Region	<p>The scoping response provides a number of recommendations and in summary, Inland Fisheries Ireland want the following to be addressed:</p> <ul style="list-style-type: none"> ➤ Water quality ➤ Surface water hydrology ➤ Fish spawning and nursing areas ➤ Passage of migratory fish ➤ Areas of natural heritage importance ➤ Biological diversity ➤ Ecosystem structure and functioning ➤ Sport and commercial fishing and angling ➤ Sediment transport
Irish Peatland Conservation Council	The scoping response provides a number of recommendations and a summary of the main points is provided below:

	<ul style="list-style-type: none"> ➤ Properly assess and screen for any adverse impacts on the habitat or species utilising them that may occur during the construction of any infrastructural development such as wind farms. ➤ Have proper plans in place for the habitat regarding after-use rehabilitation/restoration. ➤ Ensure that the project in no way affects the integrity of the habitats and qualifying interests including species of the designated sites. ➤ Account for nitrogen within pre-planning coupled with a nitrogen monitoring agenda which could highlight possible pathways of nutrient enrichment. ➤ Monitor the movement of soils and machinery in and out of construction sites to ensure that best practice in relation to biosecurity is adhered to. ➤ Carry out ornithological surveys within the recommended survey times for breeding Curlew to ascertain as to whether they are present and if they utilise the site for any other purposes such as foraging. ➤ Ensure that the Proposed Development will not adversely impact on the water quality. ➤ Review the location of some of the proposed turbines which are within zones graded to be of a “Moderately High” chance of a landslide event. ➤ Assess the cumulative effects of windfarms, afforestation, peat extraction, drainage, overgrazing on the environment - specifically including the designated sites - and also assess the implications of impacts on annexed species and biodiversity.
Irish Wildlife Trust	The response states that the Irish Wildlife Trust does not have the capacity to consider or respond to all scoping requests.
Mayo County Council	The scoping response provides a number of recommendations, however, the only one related to the Biodiversity Chapter concerns the consideration of the impact of the Proposed Development on downstream waterbodies.

A data request was sent to the National Parks and Wildlife Service, scientific data unit, and a response was received on the 27th of May 2021. The feedback is provided in Section 6.5.1 of the EIAR.

In addition to the above, two meetings were held with the with the National Parks and Wildlife Service to discuss the Ecological and Ornithological aspects of the Proposed Development.

The first meeting with NPWS was held on 24th September 2022 via a MS Teams call with representatives from MKO, SSE and NPWS to introduce the project.

Matters discussed included:

- Site Location and habitat maps
- Surveys – flora and fauna observations on site, habitats, surveys undertaken, surveys ongoing and surveys upcoming
- Main ecological considerations
- Scoping
- Construction Environmental Management Plan (CEMP)

A second meeting was held on 26th January 2022 via a MS Teams call with representatives from MKO, SSE, MWP and NPWS. The meeting commenced with a run-through of the previous meetings by MKO which was held on 24th September 2021 and the follow up items which were issued to NPWS post meeting.

Matters discussed included:

- Bio enhancement plans including bog rehabilitation and species mortality
- Ornithological matters
- The proposed grid connection and the consideration for loss of habitat due to clearfelling

6.4.3 Field Surveys

A comprehensive survey of the biodiversity of the EIAR Site Boundary was undertaken on various dates in 2021 and 2022. 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

Multidisciplinary walkover surveys, in accordance with TII guidelines on *Ecological Surveying Techniques for Protected Flora and Fauna during the planning of National Road Schemes* (TII, 2009b), were undertaken within the EIAR Site Boundary on the following dates:

- 4th August 2021
- 10th August 2021
- 18th August 2021
- 2nd September 2021
- 24th September 2021
- 18th January 2022
- 21st January 2022
- 24th November 2022
- 6th December 2022

All surveys of vegetation were completed within the optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). A comprehensive walkover of the entire EIAR Site Boundary was completed.

The walkover surveys were also designed to detect the presence, or likely presence, of a range of protected species. The survey included a search for badger setts and areas of suitable habitat, potential features likely to be of significance to bats and additional habitat features for the full range of other protected species that are likely to occur in the vicinity of the Proposed 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 entire EIAR Site Boundary for features and locations of ecological significance. Based on the multi-disciplinary walkover survey findings, further detailed targeted surveys were carried out during follow-up species specific survey visits. These are described in detail below. These surveys were carried out in accordance with TII guidelines on *Ecological Surveying Techniques for Protected Flora and Fauna during the planning of National Road Schemes* (TII, 2009b).

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations (Birds and Natural Habitats) 2011 (as amended) (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

Habitats within the site 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. Vegetation was sampled by taking botanical quadrats/relevés within representative habitat areas of the site. This allowed for accurate habitat classification. The location of each of the quadrats and the quadrat data is provided in Appendix 6-1, of the EIAR. The extent of each habitat on site was mapped on site 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.

Habitats, such as peatlands recorded within the site, likely to correspond to EU Habitats Directive Annex I habitat types have been described and assessed in accordance with NPWS guidance from the relevant national Annex I habitat surveys/ Irish Wildlife Manuals. Where applicable, vegetation communities were also classified for habitats, in particular Annex I habitats, according to the Irish Vegetation Classification (IVC) system (Perrin, 2015³).

The habitat assessment surveys described in this report, including EU Habitats Directive Annex I classification and condition assessment, have been in accordance with the following guidelines and interpretation documents:

- Perrin, P.M, Martin, J.R., Barron, J.R., Roche & O’Hanrahan, B. (2014) *Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland*. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service.
- O’Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) *The Irish semi-natural grasslands survey 2007-2012*. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.
- Martin, J.R., O’Neill, F.H. & Daly, O.H. (2018) *The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats*. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- 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
- NPWS (2013), *The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1*. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Commission of the European Communities (2007) *Interpretation manual of European Union habitats*. Eur 27. European Commission DG Environment.

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 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).

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 all used to inform the scope of targeted ecological surveys required. Based on these findings dedicated surveys for bats, otter and badger were undertaken at the times set out below following the methodologies also provided below. During the

³ Perrin, P.M., (2015) *The Irish Vegetation Classification – Technical Progress Report No. 1*, Online, Available at: http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Irish-Vegetation-Classification_Technical-Progress-Report-No.1-1.pdf Accessed January 2022.

multidisciplinary walkover surveys, records of invertebrates including butterflies, damselflies, dragonflies, moths, beetles etc. were recorded. As suitable marsh fritillary habitat was identified following initial site visits and based on records in the wider area following the desk study, dedicated marsh fritillary butterfly surveys were deemed necessary. Following the completion of ecological walkover surveys, no requirement for additional dedicated faunal surveys was identified.

6.4.3.3.1 Badger Survey

Dedicated badger surveys were conducted on the 4th, 10th and 18th August 2021. In addition, records of any badger activity within the site boundary were also recorded during other faunal and habitat surveys of the site. The badger surveys covered the entire development footprint including a 100m buffer around turbine bases. The site was systematically searched for signs of badger, incidental setts, prints, latrines, foraging signs or sightings. If encountered, setts were classified as per the convention set out in TII (2009b) (i.e. main, annexe, subsidiary, outlier) and camera traps were installed at the entrances and left *in situ* for 3 weeks. The badger survey was not constrained by vegetation given the nature of the habitats within the site and the timing of the surveys (TII, 2006).

The badger survey was conducted adhering to best practice guidance (TII, 2009b) and followed the *Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes* (TII, 2006) and following CIEEM *Best practice competencies for species surveys* (CIEEM, 2013).

6.4.3.3.2 Otter Survey

Following a review of the initial site walkover ecological surveys for constraints identification and the results of the multi-disciplinary walkover survey; areas identified as providing potential habitat for otter were subject to specialist targeted survey. The otter survey of watercourses was conducted on the 4th, 10th and 18th August 2021 and on the 18th and 21st January 2022. Additional otter surveys were undertaken during a fisheries assessment of the watercourses both within and downstream of the site boundary in September 2021.

The otter surveys were conducted as per TII (2009b) 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 at crossing points including the grid connection (including a distance of 100m either side of the crossing points) and along the entire length of watercourses where they run parallel to proposed infrastructure. 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 surveys also followed the guidance as set out in TII (2008b) *Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes* and following CIEEM best practice competencies for species surveys (CIEEM, 2013).

6.4.3.3.3 Bats

A detailed bat survey report is provided in Appendix 6-2 of this EIAR. This document provides a detailed description of survey methodologies undertaken at the site during the survey period 2021-2022. Full details of the survey times and dates and the methodologies followed are provided in Appendix 6-2 along with details of all the surveyors.

Bat Suitability Appraisal

Bat walkover surveys were carried out throughout 2021. During these surveys, habitats within the EIAR Study Area were assessed for their suitability to support roosting, foraging and commuting bats. Connectivity with the wider landscape was also considered. Suitability was assessed according to Collins (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 6-2.

Roost Surveys

A search for roosts was undertaken within 200m plus the rotor radius (i.e. 85m) of the Proposed Development footprint (NatureScot, 2021). The aim was to determine the presence of roosting bats and the need for further survey work or mitigation. The site was visited in May, July, September and October 2021. A walkover was carried out and all structures and trees were assessed for their potential to support roosting bats (see Appendix 6-2 for criteria in assessing roosting habitats).

Any potential tree roosts were examined for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other potential roost features (i.e. PRFs) identified by Andrews (2018).

Four potential roosting sites were identified within 340m of the Proposed Development boundary. The closest distance from any of the structures to the nearest turbine is 492m. All structures identified within the site will be avoided as part of the Proposed Development.

Manual transects

Manual activity surveys comprised walked transects at dusk. A series of representative transect routes were selected throughout the Proposed Development site. The aim of these surveys was to identify bat species using the site and gather any information on bat behaviour and important features used by bats. Transect routes were prepared with reference to the proposed layout, desktop and walkover survey results as well as any health and safety considerations and access limitations. As such, transect routes generally followed existing roads and tracks. Transect routes are presented in Figures 3-1 - 3-3 in Appendix 6-2.

Transects were walked by two surveyors, recording bats in real time. Dusk surveys commenced 30 minutes before sunset and were completed for 3 hours after sunset. Surveyors were equipped with active full spectrum bat detectors, the Batlogger M bat detector (Elekon AG, Lucerne, Switzerland), and all bat activity was recorded for subsequent analysis to confirm species identifications. Transect surveys were undertaken in Spring, Summer and Autumn 2021. Table 6-2 summarises survey effort in relation to walked transects.

Table 6-2. Survey Effort- Manual Transects

Date	Surveyors	Sunrise/ Sunset	Type	Weather	Walked (km)
13 th May 2021	Laura McEntegart and Keith Costello	21:30	Dusk	10 ° C, dry, calm/light air, 60% cloud cover	6.3km
27 th July 2021	Laura McEntegart and Tim Murphy	21:45	Dusk	17 ° C, dry, 90% cloud cover, calm	7.5km
23 rd September 2021	Laura McEntegart and Cathal Bergin	19:34	Dusk	15 ° C dry, 80% cloud cover, calm breeze	7.5km
Total Survey Effort					30.1 km

Ground-level Static Surveys

Where developments have more than 10 turbines, NatureScot requires 1 detector per turbine up to 10 plus 1 detector for every 3 additional turbines.

The scope of bat work was designed in 2021, prior to the finalising of the Proposed Development layout (i.e. 21 turbines). The surveys were designed for a potential layout of up to 27 turbines. Given that 27 turbines were initially proposed, 15 detectors were deployed to ensure compliance with SNH

guidance. The extent of the Proposed Development changed through the design process, and the number of turbines reduced by 6. The final layout includes 21 turbines (Figure 3-4 in Appendix 6-2).

Automated bat detectors were deployed at 15 no. locations for at least 10 nights in each of spring (April-May), summer (June-mid August) and autumn (mid-August-October) (NatureScot, 2021). Detector locations were based on indicative turbine locations and differ slightly to the final proposed layout. Detector locations achieved a representative spatial spread in relation to proposed turbines and sampled the range of available habitats. Figure 3-4 (Appendix 6-2) presents static detector locations in relation to the final proposed layout. Static detector locations are described in Table 6-3.

Table 6-3. Ground Static Detector Locations

ID	Location (ITM)	Habitat	Linear Feature within 50m	Corresponding/ Nearest Turbine(s)
D01	493872 825588	Recently felled woodland (WS5) & Conifer plantation treeline	WD4	T19 & T21
D02	493092 825636	Conifer plantation treeline, small stream	WD4	T3 & T619
D03	493287 826950	Conifer plantation	WD4	T74 & T9
D04	493876 826388	Conifer plantation, heather, wet grassland	WD4	T95
D05	495437 826742	Conifer plantation and cleared forestry	WD4	T206
D06	494439 827052	Conifer plantation and cleared forestry	WD4	T1422 & T3
D07	493708 827602	Conifer plantation and cleared forestry	WD4	T8 & T1115
D08	493163 827943	Conifer plantation and cleared forestry	WD4	T811
D09	493679 824003	Conifer plantation	WD4	T123
D10	492945 826542	Conifer plantation and wet grassland	WD4	T710 & T52
D11	492204 824054	Conifer plantation	WD4	T17 & T23
D12	492695 824867	Conifer plantation	WD4	T28 & T416
D13	492961 824164	Conifer plantation and wet grassland	WD4	T16 & T1820
D14	494675 828063	Conifer plantation	WD4	T12 & T157
D15	494060 828265	Conifer plantation and blanket bog	WD4	T13

Full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were employed using settings recommended for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates.

Onsite weather monitoring was undertaken concurrently with static detector deployments. One Vantage Pro 2 (Davis Instruments, CA, UCS) was deployed each season and night-time hourly data was tracked remotely to ensure a sufficient number of nights (i.e. minimum 10 no.) with appropriate weather conditions were captured (i.e. dusk temperatures above 8°C, wind speeds less than 5m/s and no or only very light rainfall). Table 6-4 summarises survey effort achieved in 2021 for each of the 15 no. detector locations.

Table 6-4. Survey Effort - Ground-level Static Surveys

Season	Survey Period	Total Survey Nights per Detector Location	Nights with Appropriate Weather
Spring	13 th May – 28 th May 2021	16	11
Summer	16 th July – 27 th July 2021	12	11
Autumn	23 rd September – 12 th October 2021	18	14
Autumn Redeployment	12 th October – 22 nd October 2021	10	14
Total Survey Effort		46	36

Three detectors (D06, D10 & D14) were redeployed 12th October 2021 following technical difficulties with original SD cards.

Survey design and effort was undertaken in strict accordance with those prescribed in SNH (2021) ‘*Bats and onshore wind turbines: survey, Assessment and mitigation*’. This is in line with standard best practice industry guidelines.

6.4.3.3.4 Marsh fritillary surveys

Following the identification of suitable habitat for marsh fritillary within the site during habitat surveys, targeted surveys for the species were undertaken on 24th September 2021. The survey methodology followed that described in the TII (2009b) best practice guidance document. This involved walked surveys to identify suitable areas of suitable marsh fritillary habitat within or adjacent to the proposed infrastructure footprint. Where suitable habitat did occur, detailed surveys to locate larval webs were undertaken.

6.4.3.3.5 Aquatic surveys

Following initial site visits and based on records in the wider area following a desk study, habitat suitability for protected aquatic species of conservation interest, known or suspected to occur within the site boundary (e.g. fish species, otter etc.), were conducted. Aquatic habitats and species were assessed during the multi-disciplinary walkover surveys and where appropriate dedicated aquatic habitat and fisheries surveys were undertaken. A dedicated fisheries assessment was undertaken at the site for targeted species groups including salmon, trout and lamprey in September 2021. A full description of the survey methodologies is provided in the standalone report available in Appendix 6-3 of the EIAR. An aquatic baseline report has also been prepared for this EIAR and is available in appendix 6-4. Aquatic plant species protected under Flora = (Protection) Order 2022 (SI 235 of 2022)) were searched for during all aquatic surveys.

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).

6.4.4 Methodology for Assessment of Impacts and Effects

6.4.4.1 Identification of Target Receptors and Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following a comprehensive desk study, site visits were undertaken on the dates listed in Section 6.4.3.1 (not including bat surveys and stakeholder consultation), “Target receptors” likely to occur in the zone of influence of the development were identified. The target receptors included habitats and species that were protected under the following legislation:

- Annexes of the EU Habitats Directive
- Qualifying Interests (QI) of Special Areas of Conservation (SAC) (included Candidate SACs) within the likely zone of impact.
- National Heritage Areas (NHA)
- Species protected under the Wildlife Acts 1976-2022 as amended
- Species protected under the Flora (Protection) Order 2022 (SI 235 of 2022)

6.4.4.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the site boundary 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* (TII, 2009a). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

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

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC, including cSACs 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 TII (2009a) 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 ecological effects of impacts resulting from the construction, operation and decommissioning of the Proposed Development are characterised as per the CIEEM ‘Guidelines for Ecological Impact Assessment in the UK and Ireland’ (2022). 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 guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative.** Assessment of whether the Proposed 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 (2022).

For the purpose of Ecological Impact Assessment (EcIA), ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2022).

When determining significance, consideration is given to whether:

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

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*, (TII,

2009a) were also adhered to 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 6-5.

Table 6-5 Criteria for determining significance of effect, based on (EPA, 2022) 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 (2009a) and CIEEM (2022) 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 (TII, 2009a).
- A ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2022).

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 (TII, 2009a). 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 (2022) 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 TII/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 Key Ecological Receptors (KERs) are adequately addressed. Where significant effects on Key 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.

6.4.4.6 Limitations

The information provided in this assessment accurately and comprehensively describes the baseline ecological environment following surveys on numerous dates during all seasons between 2021 and 2022. It provides an accurate prediction of the likely ecological effects of the Proposed Development ; prescribes best practice and mitigation as necessary; and describes the residual ecological impacts.

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

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

6.5 Establishing the Ecological Baseline

6.5.1 Desk Study

The following sections describe the 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 for the ecology of the existing environment. Material reviewed includes the Site Synopses for Designated Sites for their conservation importance compiled by the National Parks and Wildlife Service (NPWS) of the

Department of Culture, Heritage and the Gaeltacht, bird and plant distribution atlases and other research publications.

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

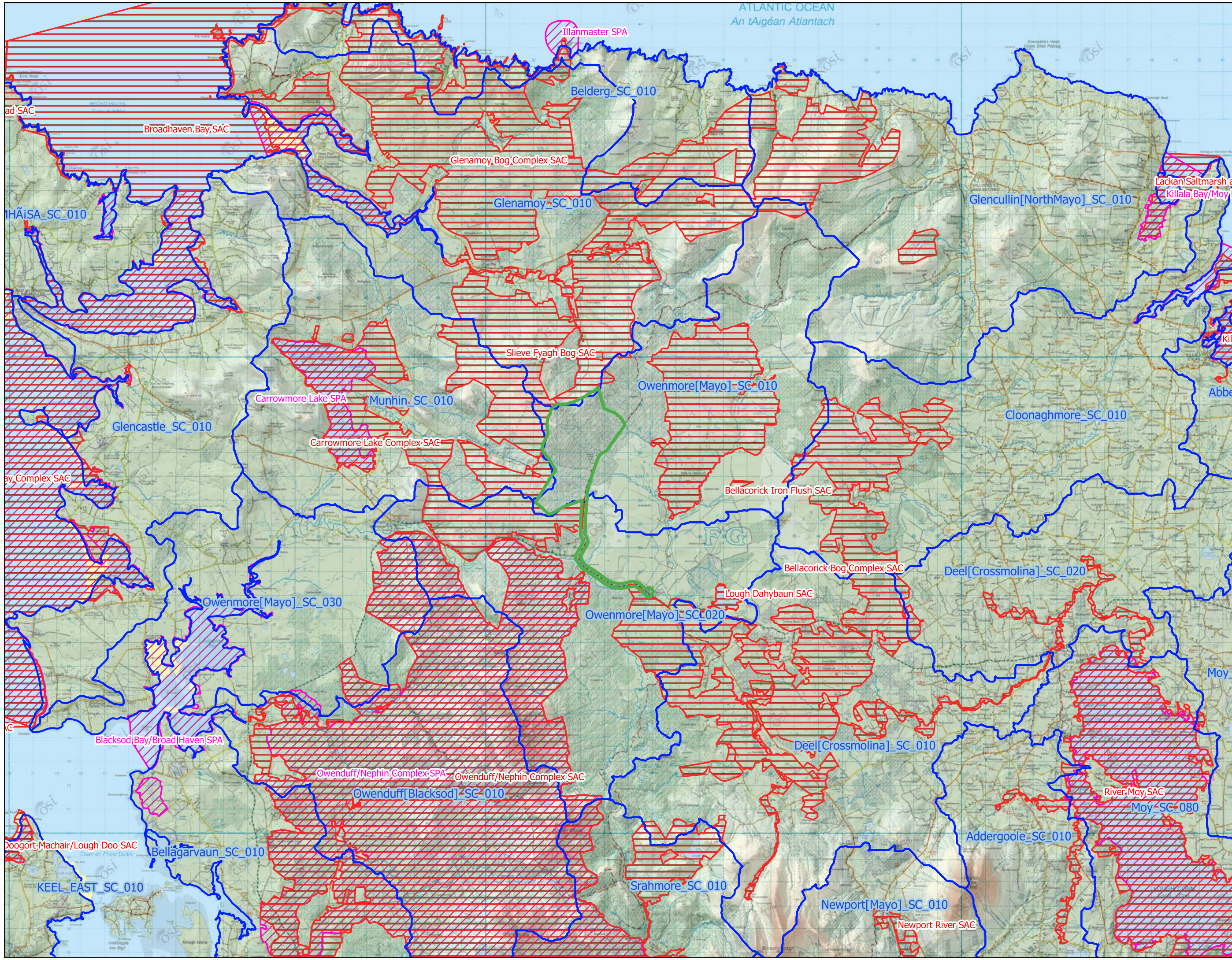
The potential for the Proposed Development to impact on sites that are designated for nature conservation was considered in this Ecological Impact Assessment.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as ‘European Sites’. The potential for significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the AA Screening Report and Natura Impact Statement that accompanies this application. As per EPA Guidance 2022, *“a biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive”*. Section 6.7.5 of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites.

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

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

The Proposed Development site relative to European and Nationally designated sites is shown in Figure 6-2 and Figure 6-3 respectively.



Map Legend

- EIA Site Boundary
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- EPA hydrological sub-catchments



Drawing Title	
European Designated Sites	
Project Title	
Sheskin South Wind Farm	
Drawn By	Checked By
VA	CM
Project No.	Drawing No.
201119	Figure 6-2
Scale	Date
1:140000	22.02.2023


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Map Legend

- EIAR Site Boundary
- National Heritage Area (NHA)
- Proposed National Heritage Area (pNHA)
- EPA hydrological sub-catchments



North

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Nationally Designated Sites	
Project Title	
Sheskin South Wind Farm	
Drawn By	Checked By
VA	CM
Project No.	Drawing No.
201119	Figure 6-3
Scale	Date
1:141100	22.02.2023
 MKO Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 VV84 +353 (0) 91 735611 email: info@mkofireland.ie Website: www.mkofireland.ie	

Table 6-6 Designated sites in the Zone of Influence

Designated Site	Distance from EIAR site boundary (km)	Likely Zone of Impact Determination
Special Areas of Conservation (SAC)		
Carrowmore Lake Complex SAC [000476]	0km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>While the site boundary includes a watercourse that flows directly into the SAC, the closest works are 200m away and there is no surface water linkage. The site is located within the same groundwater body as this SAC (Belmullet – IE_WE_G-0057). Due to the proximity of the Proposed Development to the designated site and on a precautionary basis, there is potential for indirect effects on this SAC in the form of habitat degradation arising during the construction, operational and decommissioning phases, e.g. drainage or hydrological changes. In addition, there is potential for pollution with dust arising from works along the proposed grid connection route and as such there is potential of deterioration of QI habitats and supporting habitats for QI species within this SAC during the construction phase. The SAC is considered to be within the Likely Zone of Impact and further assessment is required.</p>
Slieve Fyagh Bog SAC [000542]	0km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>There is no surface water connection, and the closest works are 215m away. This site is located within the same groundwater body and this SAC (Bangor- IE_WE_G-0052). Due to the proximity of the Proposed Development to the designated site and on a precautionary basis, there is potential for indirect effects on this SAC in the form of habitat degradation during the construction, operational and decommissioning phases, e.g. drainage or hydrological changes. The SAC is considered to be within the Likely Zone of Impact and further assessment is required.</p>
Glenamoy Bog Complex SAC [000500]	0km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>While the site boundary borders a watercourse that is located within the SAC, the closest proposed works are within a separate catchment over 300m away and no surface water connection exists. However, due to the proximity of the Proposed Development to the designated site and on a precautionary basis, there is potential for indirect effects on this SAC in the form of habitat degradation during the construction, operational and decommissioning phases, e.g. drainage and hydrological changes. The SAC is considered to be within the Likely Zone of Impact and further assessment is required.</p>

Designated Site	Distance from EIAR site boundary (km)	Likely Zone of Impact Determination
Bellacorick Bog Complex SAC [001922]	0km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site. All works required for the grid connection route will be carried out on the opposite side of the Owenmore River and there will be no direct effects.</p> <p>The proposed grid connection route crosses over two tributaries of the Owenmore River, which flows through the very north of the designated site but which is not designated as a QI. In addition, due to the proximity of the SAC to the grid connection route, there is potential for water pollution and pollution with dust arising from the proposed works and as such there is potential of deterioration of QI habitats and supporting habitats for QI species within this SAC during the construction phase. The SAC is considered to be within the Likely Zone of Impact and further assessment is required.</p>
Owenduff/Nephin Complex SAC [000534]	0.1km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>Downstream surface connectivity (approximately 10km surface water distance) with the SAC has been identified via the watercourses that flow from the development site into the Owenmore River and there is potential for deterioration of water quality during the construction, operational and decommissioning phases. Due to the proximity of the SAC to the grid connection route, there is potential for water pollution and pollution with dust arising from the proposed works and as such there is potential of deterioration of QI habitats and supporting habitats for QI species within this SAC during the construction phase. In addition, there is suitable habitat for QI species in other, smaller watercourses within and around the Proposed Development site and the noise from the construction works along the proposed grid connection route may carry into the SAC. As such there is potential for <i>in</i> and <i>ex situ</i> disturbance and displacement of QI species during the construction and decommissioning phases. The SAC is considered to be within the Likely Zone of Impact and further assessment is required.</p>
Lough Dahybaun SAC [002177]	2.4km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>There is no downstream surface water connectivity between the Proposed Development and the Designated Site and no pathway for indirect effects on the QI species was identified. Due to the lack of connectivity and distance between the Proposed Development and the European Site, no complete impact source-pathway-receptor chain exists. The SAC is not within the Likely Zone of Impact and no further assessment is required.</p>
Bellacorick Iron Flush SAC [000466]	5.1km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p>

Designated Site	Distance from EIAR site boundary (km)	Likely Zone of Impact Determination
		<p>No pathway for indirect effects on the terrestrial QI species was identified. Due to the lack of connectivity and distance between the Proposed Development and the European Site, no complete impact source-pathway-receptor chain exists. The SAC is not within the Likely Zone of Impact and no further assessment is required.</p>
River Moy SAC [002298]	5.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>There is no surface water connectivity between the Proposed Development and the Designated Site which is located in a separate catchment and no pathway for indirect effects on any of the QI habitats or species was identified. Due to the lack of connectivity and distance between the Proposed Development and the European Site, no complete impact source-pathway-receptor chain exists. The SAC is not within the Likely Zone of Impact and no further assessment is required.</p>
Broadhaven Bay SAC [000472]	13.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>There is no direct downstream surface water connectivity between the Proposed Development and the Designated Site, which is buffered from the closest outlet of the Owenmore River by more than 50km of the Atlantic Ocean. Due to the nature, scale and location of the proposed works along with the buffering properties of the intervening waterbodies, there is no potential for significant effects. There is no potential for significant effect on this SAC and no further assessment is required.</p>
Special Protection Area (SPA)		
Owenduff/Nephin Complex SPA [004098]	0.1km	<p>There will be no direct effects on supporting habitats as the project footprint is located entirely outside the designated site. However, as the Proposed Development is within the range of both SCI species (SNH 2016), there is potential for injury or mortality due to turbine collision during the operational phase.</p> <p>Due to the proximity of the SPA to the grid connection route, there is potential for water pollution and pollution with dust arising from the proposed works and as such there is potential of deterioration of supporting habitats of the SCIs of this SPA during the construction phase. Following the precautionary principle, due to the close proximity of the Proposed Development to the SPA, there is also potential for <i>in</i> and <i>ex situ</i> disturbance and displacement of SCI species during the construction, operational and decommissioning phases. The SPA is considered to be within the Likely Zone of Impact and further assessment is required.</p>

Designated Site	Distance from EIAR site boundary (km)	Likely Zone of Impact Determination
Carrowmore Lake SPA [004052]	6.9km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>There is no downstream surface water connectivity between the Proposed Development and the Designated Site and no pathway for indirect effects on the supporting habitats of the SCI species was identified. The Proposed Development site offers no suitable habitat for Sandwich tern and there is no potential for significant effect on this species. Due to the lack of connectivity between the Proposed Development and the European Site, no complete impact source-pathway-receptor chain exists and there is no potential for significant effect on this SPA. The SPA is not within the Likely Zone of Impact and no further assessment is required.</p>
Blacksod Bay/ Broadhaven SPA [004037]	9.2km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The closest surface water connectivity (about 30km surface water distance) with the SPA has been identified via the watercourses that flow from the development site into the Owenmore River which flows into Tullaghan Bay. However, due to the nature, scale and location of the Proposed Development along with the attenuation provided by the intervening 30km of river channel there is no potential for significant effect on water quality. The Proposed Development site offers no suitable habitat for any of the SCIs apart from Curlew and Dunlin but is located outside of the maximum range of this species (2km & 3km; SNH 2016) and there is no potential for significant impact any of the SCI species. There is no potential for significant effect on this SPA and no further assessment is required.</p>
Illanmaster SPA [004074]	13.9km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>There is no direct surface water connectivity between the Proposed Development and the Designated Site, which is buffered from the closest outlet of the Owenmore River and by more than 60km of the Atlantic Ocean. Due to the nature, scale and location of the proposed works along with the buffering properties of the intervening waterbodies, there is no potential for significant effects arising from water pollution. The Proposed Development site offers no suitable habitat for Storm Petrel and there is no potential for significant effect on this species. There is no potential for significant effect on this SPA and no further assessment is required.</p>
Natural Heritage Areas (NHA)		
Glenturk More Bog NHA [002419]	5.4km	<p>There will be no direct effects as the project footprint is located entirely outside the designated sites.</p>

Designated Site	Distance from EIAR site boundary (km)	Likely Zone of Impact Determination
Inagh Bog NHA [002391]	6km	<p>There is no downstream surface water connectivity between the Proposed Development and the Designated Sites and no pathway for indirect effects was identified. Due to the lack of connectivity and distance between the Proposed Development and the NHAs, no complete impact source-pathway-receptor chain exists. These NHAs are not within the Zone of Likely Impact and no further assessment is required.</p>
Ummerantary Bog NHA [001570]	7.4km	
Pollatomish Bog NHA [001548]	8.5km	
Ederglen Bog NHA [002446]	8.9km	
Bangor Erris Bog NHA [001473]	9.7km	
Tullaghan Bay and Bog NHA [001567]	10.2km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The closest surface water connectivity (about 30km surface water distance) with the NHA has been identified via the watercourses that flow from the development site into the Owenmore River which flows into Tullaghan Bay. However, due to the nature, scale and location of the Proposed Development along with the attenuation provided by the intervening 30km of river channel there is no potential for significant effect on water quality. There is no potential for significant effect on this NHA and no further assessment is required.</p>
Tristia Bog NHA [001566]	11.5km	<p>There will be no direct effects as the project footprint is located entirely outside the designated sites.</p>
Forrew Bog NHA [002432]	11.7km	<p>There is no downstream surface water connectivity between the Proposed Development and the Designated Sites and no pathway for indirect effects was identified. Due to the lack of connectivity and distance between the Proposed Development and the NHAs, no complete impact source-pathway-receptor chain exists. These NHAs are not within the Zone of Likely Impact and no further assessment is required.</p>
proposed Natural Heritage Areas (pNHA)		

Designated Site	Distance from EIAR site boundary (km)	Likely Zone of Impact Determination
Carrowmore Lake Complex [000476]	0km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>While the site boundary includes a watercourse that flows directly into the pNHA, the closest proposed works are 200m away from this stream and there is no surface water linkage. Due to the proximity of the Proposed Development to the site and on a precautionary basis, there is potential for indirect effects on this pNHA in the form of habitat degradation during the construction, operational and decommissioning phases, e.g. drainage or hydrological changes. In addition, there is potential for pollution with dust arising from works along the proposed grid connection route and as such there is potential of deterioration of habitats within this site during the construction phase. The pNHA is considered to be within the Likely Zone of Impact and further assessment is required.</p>
Slieve Fyagh Bog [000542]	0km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>There is no surface water connection and the closest works are 215m away. Due to the proximity of the Proposed Development to the designated site and on a precautionary basis, there is potential for indirect effects on this pNHA in the form of habitat degradation during the construction, operational and decommissioning phases, e.g. drainage and hydrological changes. The pNHA is considered to be within the Likely Zone of Impact and further assessment is required.</p>
Glenamoy Bog Complex [000500]	0km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>While the site boundary borders a watercourse that is located within the pNHA, the closest proposed works are within a separate catchment over 300m away and no surface water connection exists. However, due to the proximity of the Proposed Development to the designated site and on a precautionary basis, there is potential for indirect effects on this pNHA in the form of habitat degradation during the construction, operational and decommissioning phases, e.g. drainage and hydrological changes. The pNHA is considered to be within the Likely Zone of Impact and further assessment is required.</p>
Bellacorick Bog Complex [001922]	0km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site. All works required for the grid connection route will be carried out on the opposite side of the Owenmore River and there will be no direct effects.</p> <p>The proposed grid connection route crosses over two tributaries of the Owenmore River, which flows through the very north of the pNHA. In addition, due to the proximity of the pNHA to the grid connection route, there is potential for water pollution and pollution with dust arising from</p>

Designated Site	Distance from EIAR site boundary (km)	Likely Zone of Impact Determination
		the proposed works and as such there is potential of habitat deterioration within this pNHA during the construction phase. The pNHA is considered to be within the Likely Zone of Impact and further assessment is required.
Owenduff/Nepin Complex [000534]	0.1km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>Downstream surface water connectivity (about 10km surface water distance) with the pNHA has been identified via the watercourses that flow from the development site into the Owenmore River and there is potential for deterioration of water quality during the construction, operational and decommissioning phases. Due to the proximity of the pNHA to the grid connection route, there is potential for water pollution and pollution with dust arising from the proposed works and as such there is potential of deterioration of habitats within this site during the construction phase. The pNHA is considered to be within the Likely Zone of Impact and further assessment is required.</p>
Bellacorick Iron Flush [000466]	5.1km	<p>There will be no direct effects as the project footprint is located entirely outside the designated sites.</p> <p>There is no downstream surface water connection between the Proposed Development and the pNHAs and no pathway for indirect effects was identified. Due to the lack of connectivity between the Proposed Development and the pNHAs, no complete impact source-pathway-receptor chain exists. These pNHAs are not within the Likely Zone of Impact and no further assessment is required.</p>
Altaconey Bog [000459]	9.2km	
Broadhaven Bay [000472]	13.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>There is no direct downstream surface water connection between the Proposed Development and the Designated Site, which is buffered from the closest outlet of the Owenmore River by more than 50km of the Atlantic Ocean. Due to the nature, scale and location of the proposed works along with the buffering properties of the intervening waterbodies, there is no potential for significant effects. There is no potential for significant effect on this pNHA and no further assessment is required.</p>

Potential for effects on European Sites is summarised in this report and is fully addressed in the Natura Impact Statement submitted as part of the application. Where a nationally designated site (NHA/pNHA) overlaps with the boundary of a European designated site (SAC/SPA), the same pathway for effect exists and effects have been assessed on that basis.

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

- > Carrowmore Lake Complex SAC [000476]
- > Slieve Fyagh Bog SAC [000542]
- > Glenamoy Bog Complex SAC [000500]
- > Bellacorick Bog Complex SAC [001922]
- > Owenduff/Nephin Complex SAC [000534]
- > Owenduff/Nephin Complex SPA [004098]

The following pNHAs are located adjacent or very close to the Proposed Development site or grid connection route and there is potential for the Proposed Development to result in habitat degradation in the form of pollution with dust during the construction phase of the grid connection route or in the form of, e.g. drainage and hydrological changes during the construction, operational and decommissioning phases:

- > Carrowmore Lake Complex
- > Slieve Fyagh Bog
- > Glenamoy Bog Complex
- > Bellacorick Bog Complex
- > Owenduff/Nephin Complex

On a precautionary basis, these sites have been included within the Likely Zone of Impact for further assessment. As these pNHAs have also been designated as SACs and/or SPAs, impacts on these sites are fully considered under the European designation within the NIS. This is further described in Section 6.7.5 of this Chapter.

Surface water connectivity was identified between the Proposed Development and the following pNHA which is located approximately 10km downstream of the Proposed Development :

- > Owenduff/Nephin Complex

As this pNHA has also been designated as an SAC and SPA, impacts on this designated site are fully considered under the European designation within the NIS. This is further described in Section 6.7.5 of this Chapter.

6.5.1.2 NPWS Article 17 Reporting

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

A search of the NPWS Article 17 datasets was undertaken as part of the desk study. Large areas of Active Blanket bog [7130] were mapped within or immediately adjacent to the EIAR boundary, see Figure 6-5. Norther Atlantic wet heaths with *Erica tetralix* [4010] and Alpine and boreal heaths [4060] were mapped immediately to the north of the site and Wet heath was mapped less than 2km to the east. A small area of Transition mires and quaking bogs [7140] was mapped 350m to the north-west and European Dry Heaths [4030] was mapped about 700m south of the site. Following a review of the other datasets, small areas of Wet Grassland (GS4) and Dry-humid Acid Grassland (GS3) were mapped

about 1.5km south of the site and a small area of Oak-ash-hazel woodland (WN2), not conforming to any EU Annex I habitat, occurs about 2km south-west of the site. While Figure 6-4 indicates an overlap between Blanket Bogs [7130] and the existing road within the site boundary which is proposed to be improved, our survey showed that the Annex I habitat did not extend past the road but was restricted to the area to the west. Hence, no Article 17 habitat occurs within the Proposed Development footprint. Where Article 17 habitats occur along the grid connection route, these will not be impacted, as the proposed infrastructure will be located within the existing road infrastructure.

6.5.1.3 Vascular plants

A search was made in the New Atlas of the British and Irish Flora (Preston *et al*, 2002) to investigate whether any rare or unusual plant species listed under Annex I of the EU Habitats Directive, The Irish Red Data Book, 1, Vascular Plants (Curtis, 1988) or the Flora (Protection) Order 2022 (SI 235 of 2022) had been recorded in the relevant 10km squares in which the study site is situated (F92). Each hectad contains 100 whole 1km squares containing terrestrial habitats. Species of conservation concern are given in Table 6-7.

Table 6-7 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad F92

Common Name	Scientific Name	Status
Marsh Saxifrage	<i>Saxifraga hirculus</i>	Annex II, IV; FPO; NT (near threatened)
Pipewort	<i>Eriocaulon aquaticum</i>	NT
Stag’s-horn Clubmoss	<i>Lycopodium clavatum</i>	Annex V; NT
Least Bur-reed	<i>Sparganium natans</i>	NT
Marsh Fern	<i>Thelypteris palustris</i>	NT

6.5.1.4 Bryophytes

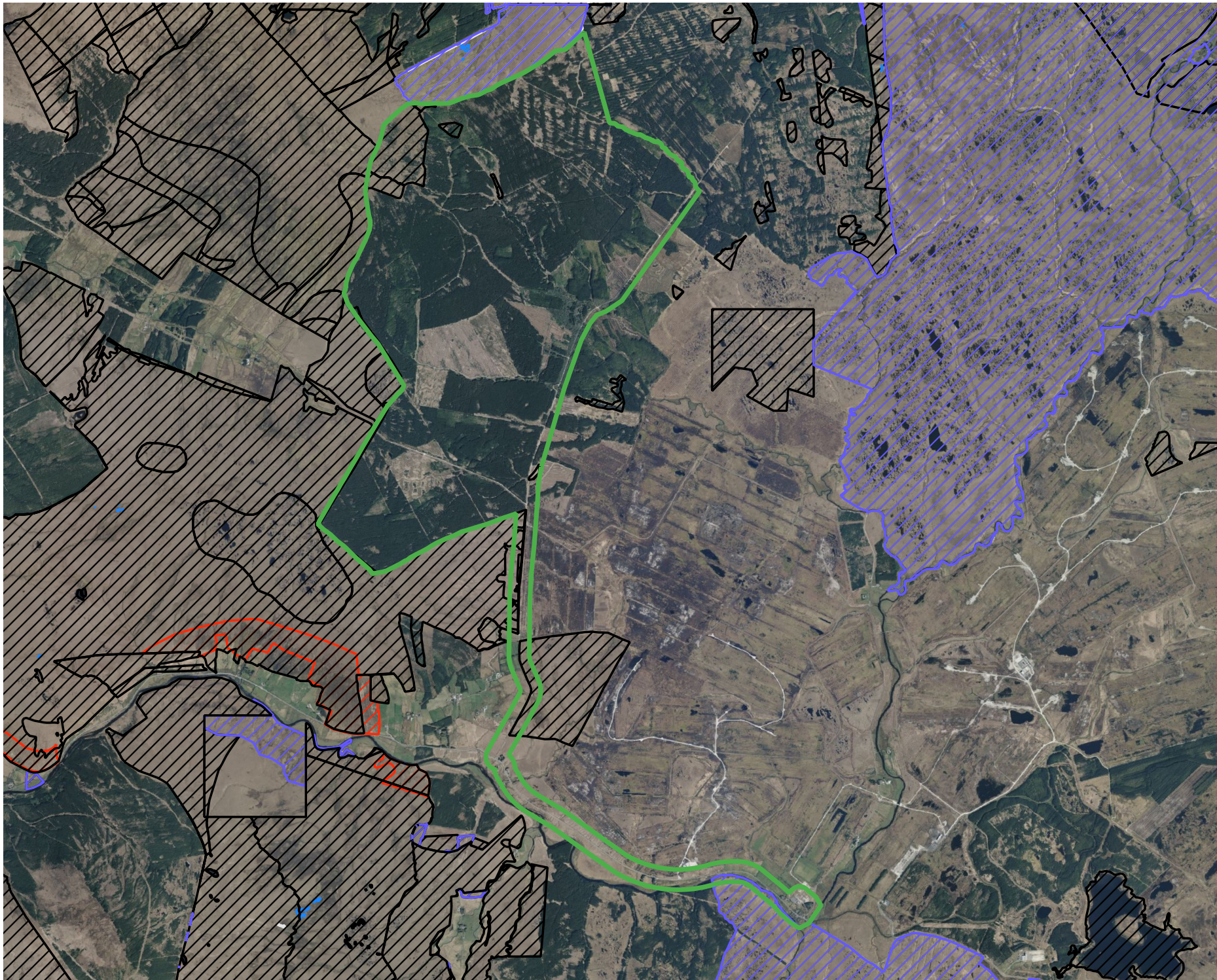
A search of the NPWS online database for bryophytes (non-vascular land plants comprising of mosses, hornworts and liverworts) was also undertaken. No protected bryophytes were recorded within the site boundary however, *Hamatocaulis vernicosus* was recorded from the adjacent Carrowmore Lake Complex SAC and *Meesia triquetra* from the nearby Bellacorrick Iron Flush pNHA (NPWS, 2022).

6.5.1.5 National Biodiversity Data Centre (NBDC) Records

A search of the National Biodiversity Data Centre (NBDC) records for the relevant hectad, F92, provided records on a number of fauna species of conservation concern, excluding marine species and bird species. These are provided in Table 6-8. Records on invasive are also provided and outlined in Table 6-8.

Table 6-8 NBDC Records for Species of Conservation Interest in hectad F92

Species	Scientific Name	Red List Status	Habitats Directive
Marsh fritillary	<i>Euphydryas aurinia</i>	VU	Annex II, WA
Common lizard	<i>Zootoca vivipara</i>	LC	WA
Red deer	<i>Cervus elaphus</i>	LC	WA
Irish hare	<i>Lepus timidus subsp. hibernicus</i>	LC	Annex V, WA
Otter	<i>Lutra lutra</i>	LC	Annex II, IV, WA



Map Legend

- EIA Site Boundary
- [7130] Blanket Bog (*Active)
- [4030] Dry Heath
- [4010] Wet Heath

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Drawing Title

Article 17 Habitats

Project Title

Sheskin South Wind Farm

Drawn By

CM

Checked By

CM

Project No.

201119

Drawing No.

Figure 6-4

Scale

1:48700

Date

22.02.2023

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Species	Scientific Name	Red List Status	Habitats Directive
Pine marten	<i>Martes martes</i>	LC	Annex V, WA
Badger	<i>Meles meles</i>	LC	WA
Daubenton's bat	<i>Myotis daubentonii</i>	LC	Annex IV, WA
Leisler's bat	<i>Nyctalus leisleri</i>	NT	Annex IV, WA
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	LC	Annex IV, WA
Brown long-eared bat	<i>Plecotus auritus</i>	LC	Annex IV, WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA - Wildlife Acts – Irish Wildlife Acts (1976 – 2021 as amended), LC – Least concern, NT – Near threatened, VU - Vulnerable.

Table 6-9 NBDC records for Invasive Species in hectad F92

Common Name	Scientific Name
American mink	<i>Mustela vison</i>
Japanese knotweed	<i>Fallopia japonica</i>
Giant rhubarb	<i>Gunnera tinctoria</i>
Rhododendron	<i>Rhododendron ponticum</i>

6.5.1.6 NPWS

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectad F92. An information request was also sent to the NPWS requesting records from the Rare and Protected Species Database. Table 6-10 lists rare and protected species records obtained from NPWS, as received on the 27th of May 2021, as well as those recorded available through the online NPWS map viewer.

Table 6-10 National Parks and Wildlife Service Map Viewer Records for hectad F92

Common name	Scientific name	Red List Status	Flora Protection Order/Red List	Habitats Directive/Birds Directive/Wildlife Act
Cladonia lichen	<i>Cladonia ciliata var. tenuis</i>	-	-	Annex V
Reindeer moss	<i>Cladonia portentosa</i>	-	-	Annex V
Varnished hook-moss	<i>Hamatocaulis vernicosus</i>	NT	FPO	Annex II
Bog orchid	<i>Hammarbya paludosa</i>	NT	FPO	-
Stag's horn Clubmoss	<i>Lycopodium clavatum</i>	NT	-	Annex V
Felted Thyme-moss	<i>Rhizomnium pseudopunctatum</i>	NT	-	-

Common name	Scientific name	Red List Status	Flora Protection Order/Red List	Habitats Directive/Birds Directive/Wildlife Act
Marsh Saxifrage	<i>Saxifraga hirculus</i>	NT	FPO	Annex II, IV
Rigid Bog-moss	<i>Sphagnum teres</i>	NT	-	Annex V
Woolly Feather-moss	<i>Tomentypnum nitens</i>	VU	-	-
Red deer	<i>Cervus elaphus</i>	LC	-	WA
Irish hare	<i>Lepus timidus subsp. hibernicus</i>	LC	-	Annex V, WA
Otter	<i>Lutra lutra</i>	LC	-	Annex II, IV, WA
Badger	<i>Meles meles</i>	LC	-	WA

6.5.1.7 Marsh fritillary (*Euphydryas aurinia*)

Only the 10km grid square was provided for Marsh fritillary. The most recent record was from 2010.

6.5.1.8 Inland Fisheries Ireland (IFI) Data

The ‘Sampling for the Water Framework Directive’ website from Inland Fisheries Ireland (www.wfdfish.ie) was reviewed in February 2022 for reports covering any of the waterbodies downstream of the EIAR Site Boundary. The Proposed Development site is within the Owenmore, Munhin and Glenamoy River catchment. No data for the Munhin/Glencullin River were available and data for the Owenmore was only available upstream of the Proposed Development .

Four fish species including Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), European eel (*Anguilla anguilla*) and flounder (*Platichthys flesus*) were caught with electrofishing on the Glenamoy River more than 6km downstream of the Proposed Development site in 2017 (Matson et al. 2018). In addition, three-spined stickleback (*Gasterosteus aculeatus*) was caught from the Glenamoy in 2012 (Kelly et al. 2013). The ecological status for site sampled in 2012 was classified as ‘good’.

6.5.1.9 Local Hydrology and Hydrogeology

The vast majority of the site is drained by tributaries of the Owenmore River such as the Sheskin stream and several unnamed watercourses. A small area in the south-west portion of the site is drained by an unnamed tributary of the Glencullin River which flows into the Munhin and the Barroosky River and unnamed tributary (which flow into the Glenamoy River) straddle the very north of the Proposed Development site.

The entire site is located within the Blacksod-Broadhaven Catchment. All turbines are located within Owenmore(Mayo)_SC_010, however, felling works around T2 will extend into Munhin_SC_01 to the west of the site. No works are proposed to be carried out within the Glenamoy_SC_010 in the very north of the site.

6.5.1.10 Water Quality

River Basin Management Plans have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. The EPA Envision map viewer was consulted, most recently, on 25th January 2021 regarding the water quality status of the rivers which run within and directly adjacent to the site boundary. The WFD River Waterbody Status 2013 – 2018 for the watercourses which flow through the site have been assessed in Table 6-11.

Table 6-11 Watercourses on site with relevant water quality statuses

Name	Location	Status	Risk
Sheskin stream	The Sheskin stream and many small tributaries of this stream are flowing in a west- east and north-south direction through the majority of the site	High	Not at Risk
Glencullin	The Glencullin originates in the south-west of the site and a tributary runs along parts of the western boundary of the site	Good	Not at risk
Barroosky	The Barroosky and tributaries originate along the north-western site boundary	Good	At risk

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

6.5.2 Conclusions of the Desk Study

The desktop study has provided information about the existing environment in hectad F92, within which the Proposed Development is located. The mammal species recorded within the relevant hectad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009). Bat records within 10km of the Proposed Development site revealed that the wider area has been studied for bats. This suggests that the area offers potential for foraging and commuting bat species.

As part of the desk study, a small area of Habitats Directive Annex I habitats Northern Atlantic wet heaths with *Erica tetralix* [4010] and some Blanket bog [7130] were mapped within the site boundary and further areas of these habitats as well as Alpine and boreal heaths [4060] and Transition mire and quaking bogs [7140] were recorded adjacent to the site boundary. However, no Habitats Directive Annex I habitats have been recorded within or immediately adjacent to the Proposed Development footprint, as per the field surveys undertaken to inform this assessment, the NPWS records consulted, and other ecology survey reports reviewed.

Pathways for effect were identified for the following sites which are further considered in the Natura Impact Statement prepared for the Proposed Development :

- Carrowmore Lake Complex SAC [000476]
- Slieve Fyagh Bog SAC [000542]
- Glenamoy Bog Complex SAC [000500]
- Bellacorick Bog Complex SAC [001922]
- Owenduff/Nephin Complex SAC [000534]
- Owenduff/Nephin Complex SPA [004098]

The pNHAs Carrowmore Lake Complex, Slieve Fyagh Bog, Glenamoy Bog Complex, Bellacorick Bog Complex and Owenduff/Nephin Complex are located adjacent or very close to the Proposed Development site and/or grid connection route. On a precautionary basis, these sites have been

included within the Likely Zone of Impact for further assessment. Surface water connectivity was identified between the Proposed Development and Owenduff/Nephin Complex approximately 10km downstream. This is further described below in Section 6.7.5 of this Chapter.

The desk study identified that a variety of protected faunal species are known to occur within the site boundary, including bats, marsh fritillary, otter, Irish hare, badger and red squirrel. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits. The desk study also provided useful information to inform the ecological surveys undertaken on site as well as the identification of pathways for potential impact on sensitive ecological receptors.

6.6 Description of the Existing Environment

6.6.1 Description of Habitats

The habitat classifications and codes correspond to those described in ‘*A Guide to Habitats in Ireland*’ (Fossitt 2000). A total of 13 habitats were recorded within the EIAR Site Boundary (Table 6-9). Peatland habitats have also been categorised to plant communities from the National Survey of Upland Habitats (Perrin et al. 2014) and the Irish Vegetation Classification. Detailed botanical data from relevés recorded in peatland habitats are provided in Appendix 6-1 of this report. A habitat map of the site is provided in Figure 6-5.

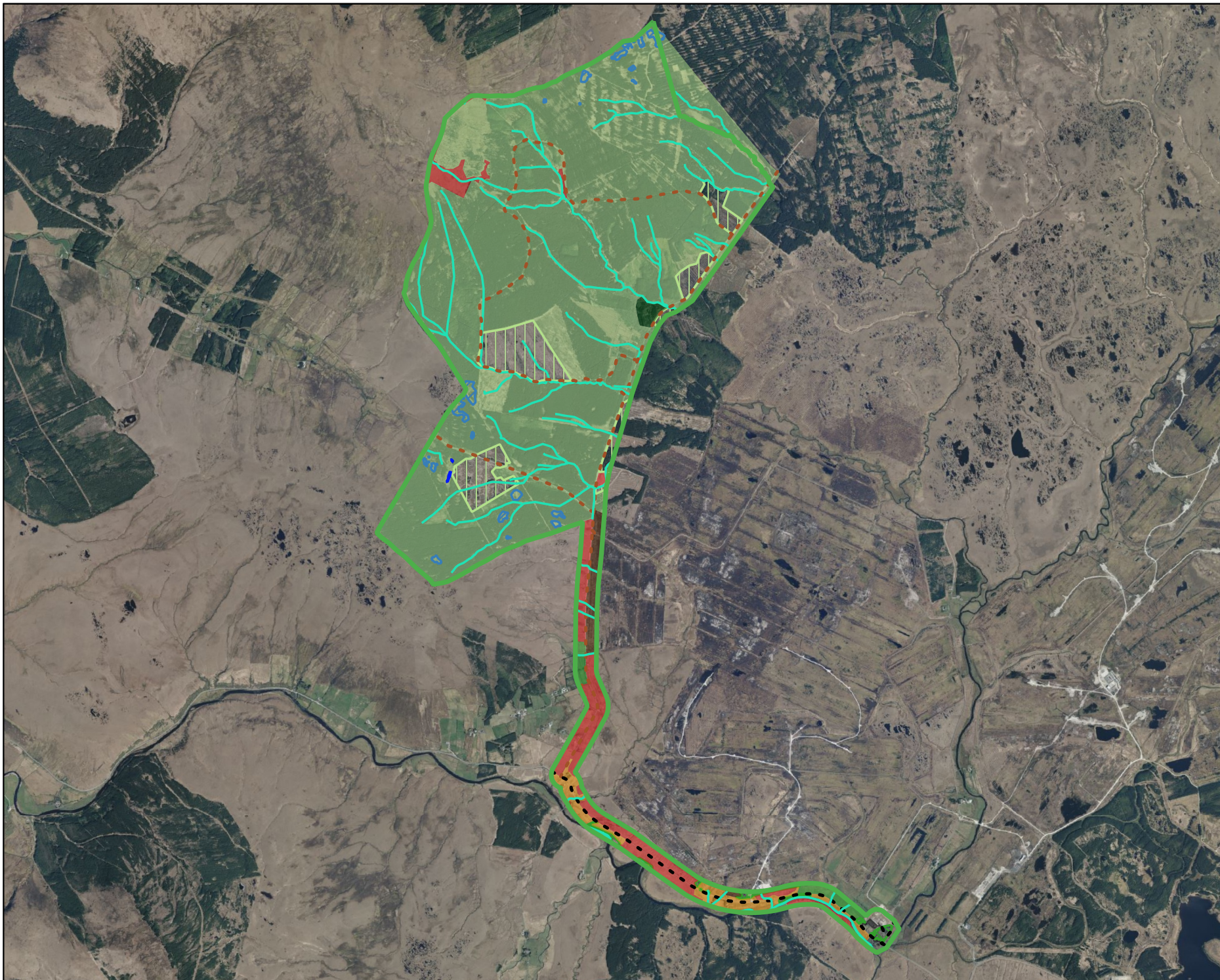
A habitat map is also provided with the Proposed Development footprint overlain in Figure 6-6.


















Table 6-12 Habitats recorded in the EIAR Site Boundary


Habitat Name	Fossitt Code
Conifer plantation	WD4
Recently-felled woodland	WS5
Lowland blanket bog	PB3
Dystrophic lakes	FL1
Eroding/upland rivers	FW1
Spoil and bare ground	ED2
(Mixed) broadleaved woodland	WD1
Agricultural grassland	GA1
Cutover bog	PB4
Buildings and artificial surfaces	BL3
Wet grassland	GS4*
Scrub	WS1*
Drainage ditches	FW4**

* these habitats were only mapped where larger areas were identified along the grid connection route. Smaller, patchy areas exist along watercourses and existing tracks

** this habitat was not mapped as it was ubiquitous throughout the site and largely associated with and covered by forestry



- ### Map Legend
-  EIAR Site Boundary
 -  Spoil and Bare Ground (ED2)
 -  Dystrophic Lake (FL1)
 -  Eroding/Upland Rivers (FW1)
 -  Improved Agricultural Grassland (GA1)
 -  Wet Grassland (GS4)
 -  Lowland Blanket Bog (PB3)
 -  Cutover Bog (PB4)
 -  (Mixed) Broadleaved woodland (WD1)
 -  Conifer Plantation (WD4)
 -  Scrub (WS1)
 -  Wet Grassland (WS5)
 -  Buildings and Artificial Surfaces (BL3)
 -  Bog Pools
 -  Buildings and artificial Surfaces (BL3)
 -  Spoil and Bare Ground (ED2)
 -  Eroding Upland River (FW1)


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Drawing Title

Habitat Map

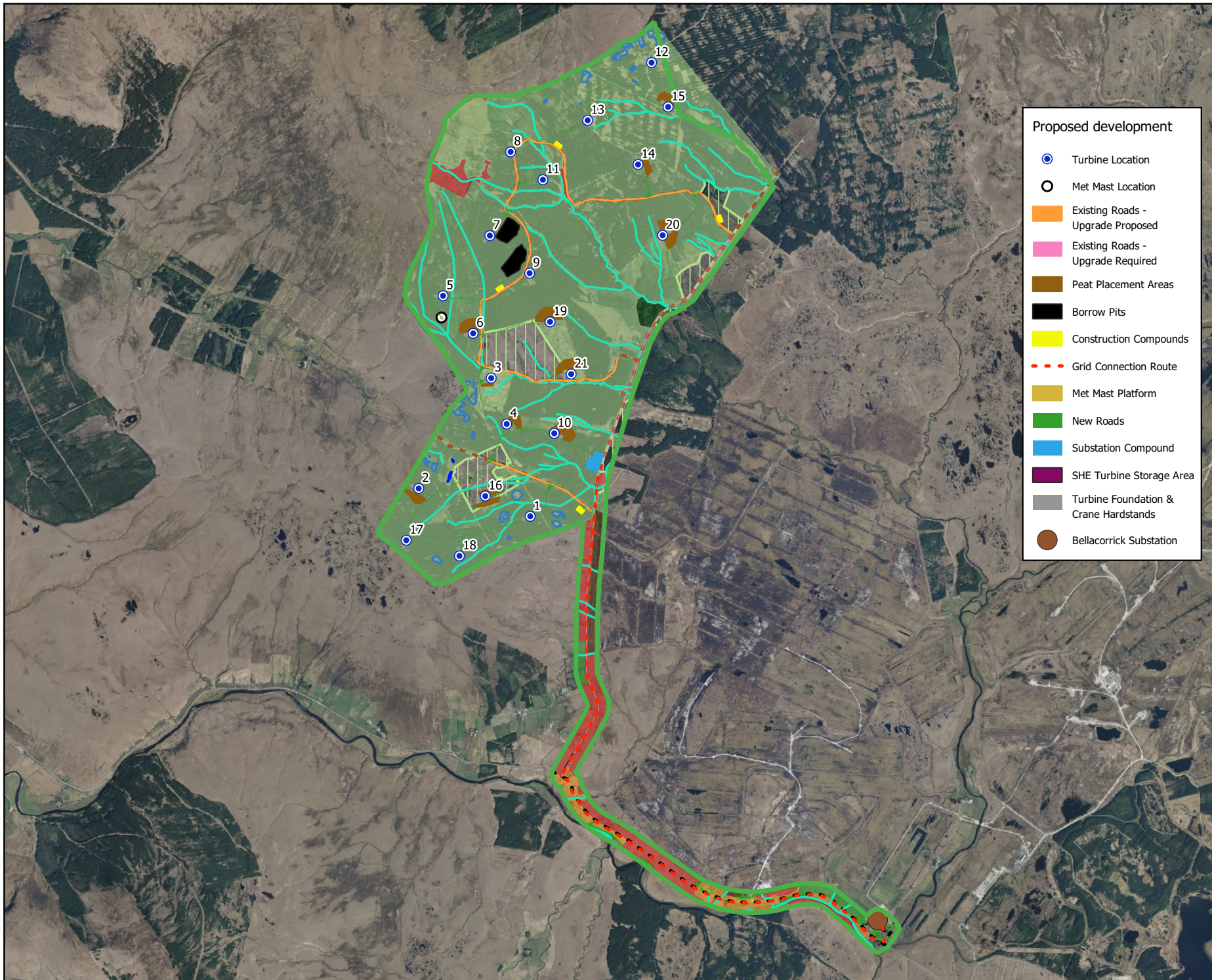
Project Title

Sheskin South Wind Farm

Drawn By	Checked By
VA	CM
Project No.	Drawing No.
201119	Figure 6-5
Scale	Date
1:47000	22.02.2023



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Proposed development

- Turbine Location
- Met Mast Location
- Existing Roads - Upgrade Proposed
- Existing Roads - Upgrade Required
- Peat Placement Areas
- Borrow Pits
- Construction Compounds
- Grid Connection Route
- Met Mast Platform
- New Roads
- Substation Compound
- SHE Turbine Storage Area
- Turbine Foundation & Crane Hardstands
- Bellacorrick Substation

Map Legend

- EIAR Site Boundary
- Spoil and Bare Ground (ED2)
- Dystrophic Lake (FL1)
- Eroding/Upland Rivers (FW1)
- Improved Agricultural Grassland (GA1)
- Wet Grassland (GS4)
- Lowland Blanket Bog (PB3)
- Cutover Bog (PB4)
- (Mixed) Broadleaved woodland (WD1)
- Conifer Plantation (WD4)
- Scrub (WS1)
- Wet Grassland (WS5)
- Buildings and Artificial Surfaces (BL3)
- Bog Pools
- Buildings and artificial Surfaces (BL3)
- Spoil and Bare Ground (ED2)
- Eroding Upland River (FW1)



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Drawing Title
Habitat map with infrastructure overlain

Project Title
Sheskin South Wind Farm

Drawn By VA	Checked By CM
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Scale 1:47000	Date 22.02.2023
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6.6.11 Habitats within the Proposed Development site

The majority of habitats within the EIAR Site Boundary (964 hectares/81%) is dominated by plantation forestry (including clear fells), comprising mainly of Lodgepole pine (*Pinus contorta*) with some Sitka spruce (*Picea sitchensis*) planted on Lowland Blanket Bog (PB3). Remnants of this habitat are still found on the site in degraded form. The site is accessible via the Western Way and a network of existing forestry access tracks and forestry rides.

Waterbodies within the Proposed Development site including drainage ditches and small streams classified as upland eroding rivers provide hydrological connectivity with downstream designated sites and are further described in this section. Watercourses within the Site Boundary are mapped on Figure 3-1 of the Screening for Appropriate Assessment, indicating hydrological connectivity with downstream EU Sites.

Conifer plantation (WD4) and Recently felled woodland (WS5)

In total, approximately 964 hectares/81% of the site comprises of coniferous plantation forestry (Plate 6-1 and Plate 6-2). This includes forestry (WD4) of various ages (including clear-felled areas, semi-mature and mature stands, along with immature pre-thicket areas of both first and second rotation. Lodgepole pine (*Pinus contorta*) is the dominant species with Sitka spruce (*Picea sitchensis*) only occurring in pockets of the site. Mature conifer plantation is interspersed with immature stands. The understorey is typically species-poor in forestry plantations and covered with needles. Vegetation is usually restricted to a few bryophytes and ferns which include hard fern (*Blechnum spicant*), bracken (*Pteridium aquilinum*), *Sphagnum* spp. and *Thuidium tamariscum* (Plate 6-3). Occasionally, lesser twayblade (*Listera cordata*) was found growing within the plantation.

As the forestry was originally planted on peatland habitats, forestry rides or small clearings within the forestry trees failed to grow can be dominated by purple moor-grass (*Molinia caerulea*), ling heather (*Calluna vulgaris*) and *Sphagnum* spp. These areas are usually small and only make up a fraction of the overall forestry plantation – however, a cluster of them can be found in the north, west and south-west of the site which frequently contain bog pools or soaks (Plate 6-4, 6-5). Areas with a large clusters of bog pools and soaks or large single bog pools are overlain on the habitat map and referred to as ‘bog pools’.



One relevé (see Relevé 1 data, Appendix 6-1) was taken in one of the large ‘bog pool’ areas in the north of the site (Plate 6-4). Dominant species included purple moor grass, ling heather, *C. portentosa*, *R. lanuginosum*, *S. cuspidatum* and *S. capillifolium* but common cottongrass (*Eriophorum angustifolium*), tormentil and round-leaved sundew (*Drosera rotundifolia*) were also present; the ground was wet and frequently quaking.

Forestry largely failed to grow in the north-west corner of the site resulting in extremely patchy tree cover. Where aerial photography indicates the presence of planting ridges, habitat has been classified as conifer plantation, the vegetation in open areas between trees is very similar to that of the surrounding blanket bog, which is described in more detail below.

All of the proposed wind farm infrastructure is located within conifer plantation (WD4) or recently-felled woodland (WS5) habitat (Figure 6-7). None of the Proposed Development is located within significant open areas classified as conifer plantation with remnant peatland vegetation (e.g. those indicated as ‘bog pools’).



Map Legend

-  EIA Site Boundary
-  Rhododendron ponticum distribution

Microsoft product screen shots reprinted with permission from Microsoft Corporation



Drawing Title
Rhododendron distribution throughout EIA Site

Project Title
Sheskin South Wind Farm

Drawn By VA	Checked By CM
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Project No. 201119	Drawing No. Figure 6-7
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Scale 1:45000	Date 22.02.2023
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Plate 6-1: Example of Conifer plantation (WD4) in the north-east of the site where Lodgepole pine is interplanted with Sitka spruce.



Plate 6-2: Example of recently felled (WS5) and replanted (WD4, background) Conifer plantation within the site boundary.



Plate 6-3: Typical ground cover inside a semi-mature lodgepole pine plantation area



Plate 6-4: Open area where forestry failed to grow due to wet ground conditions, indicated by Sphagnum covered soaks and small pools in the north of the site



Plate 6-5: Large bog pool within the conifer plantation in the south of the site

Lowland Blanket Bog (PB3)

The Proposed Development site is surrounded by Lowland Blanket Bog (PB3) to the north, west and south. Within the EIAR Site Boundary, this habitat is confined to the north-western corner of the site, and another small area is found on sloping ground between a watercourse and one of the existing roads.

The area in the north-west is connected to extensive peatlands of the Slieve Fyagh Bog SAC and bordered by straggling forestry plantation. While this contains many open areas with vegetation similar to that described below, only areas that were free of planting ridges are shown as Lowland Blanket Bog in Figures 6-6 and 6-7.

Vegetation is dominated by ling heather, purple moor grass, deer grass (*Trichophorum cespitosum*), *Cladonia portentosa* and *unicalis*, *Racomitrium lanuginosum* and *Sphagnum capillifolium* and *S. papillosum* (Plate 4-6; for details on vegetation see Relevé 2 data, Appendix 6-1). Bog pools and soaks were occasionally present. The habitat was classified as *Erica tetralix – Molinia caerulea – Cladonia portentosa* Bog/Heath⁴ using the Irish Vegetation Classification (IVC) following analysis with ERICA⁴. This is predominantly a community of lower mountain slopes and boglands, occasionally higher up (mean altitude = 219 m), occurring on wet, acidic and infertile peats. It may form part of blanket bog or wet heath vegetation. Due to the depth of the peat (>1m), this habitat was categorised as Lowland Blanket Bog (PB3). Signs of degradation are evident in the form of encroachment of conifers as well as patches of bare and eroding ground, but this habitat nevertheless qualifies as Annex I Blanket bog [7130].

The Proposed Development footprint is located well outside this area. Peatland restoration (e.g. conifer removal, re-wetting) is proposed in this area (see Appendix 6-6).

⁴ Engine for Relevés to Irish Communities Assignment (ERICA)



Plate 6-6: Lowland Blanket Bog (PB3) in the north-west of the site.

The vegetation alongside the existing road within the site (Plate 6-7) was dominated by purple moor grass, ling heather and *Hylocomium splendens* and ground conditions were dry (for details on vegetation see Relevé 3 data, Appendix 6-1). It was classified as ‘*Calluna vulgaris* – *Molinia caerulea* – *Erica cinerea* Heath’ using the IVC. This is described as a community of the lower to middle slopes of hills and mountains (mean altitude = 227 m), primarily wet heathland where soils are rather poorly drained, acidic and infertile. As the peat depths in this area were well in excess of 50cm, the habitat was categorised as degraded Lowland Blanket Bog (PB3) with low *Sphagnum* cover (< 20%). This habitat qualifies as Annex I Blanket bog [7130].

None of this habitat will be lost to the development, however, upgrades are proposed to the existing road adjacent to the area described above.



Plate 6-7: Lowland Blanket Bog (PB3) adjacent to an existing road where upgrades are proposed

Dystrophic lakes (FL1)

Three Dystrophic lakes (FL1) can be found in the south-west of the site. Vegetation in and on the margins of the lakes and ponds included bog bean (*Menyanthes trifoliata*), *Sphagnum cuspidatum*, bulbous rush (*Juncus bulbosus*), lesser bladderwort (*Utricularia minor*) and alternate leaved milfoil (*Myriophyllum alterniflorum*). Margins of the lakes and ponds were usually quaking and they were surrounded by open areas with peatland vegetation. Due to the presence of planting ridges in these areas, they are classified as conifer plantation (WD4).

None of this habitat will be lost to the development.

Spoil and bare ground (ED2)

Unbound forestry tracks throughout the site were categorised as Spoil and bare ground (ED2) (Plate 6-8). The verges across much of the site contained small areas of scrub (WS1) as well as species typical of wet grassland (GS4) or surrounding peatland habitats (PB3) which were not mapped due to their small size and mosaic-like occurrence. Species recorded comprised purple moor grass, ling heather, sweet vernal grass (*Anthoxanthum odoratum*), soft rush, self heal (*Prunella vulgaris*), rough hawksbit (*Leontodon hispidus*), *Carex* ssp, bracken, hard fern, common butterwort (*Pinguicula vulgaris*), ribwort plantain (*Plantago lanceolata*) and *P. commune*.

Upgrading of existing forestry tracks is proposed across the site, as shown in Figure 6-7.



Plate 6-8: Example of existing unbound forestry tracks categorised as Spoil and bare ground (ED2)

Eroding/upland rivers (FW1)

The Sheskin stream and a number of unnamed watercourses drain the windfarm site, nearly all of which flow in an easterly direction into the Owenmore River. The Glencullin stream flows in the opposite direction towards Carrowmore Lough in the south-western corner of the site but no infrastructure is proposed in the vicinity of this stream. The streams within the windfarm site were generally small, up to a metre wide, fast flowing and shallow with a rocky substrate (Plate 6-9). Some of them, including the Sheskin stream were completely overgrown with rushes and grassy vegetation, at least in parts (Plate 6-10). Most of the streams were surrounded by forestry and did not contain submerged vegetation, however, water-starwort (*Callitriche stagnalis*) and bog pondweed (*Potamogeton polygonifolius*) was found occasionally growing in the water where forestry cover was absent.

Where they were not located within conifer plantation, watercourses were bordered by scrub (WS1) or vegetation typical of wet grassland (GS4) or surrounding peatland habitats such as ling heather, soft rush, daisy (*Bellis perennis*), Yorkshire fog, *P. commune* and occasional yellow iris (*Iris pseudacoris*) or bracken. Due to their small size and patchy occurrence, these habitats were not mapped.



Plate 6-9: Unnamed stream flowing through the approximate centre of the site.



Plate 6-10: The Sheskin stream in the vicinity of T8 in the north-west of the site

Drainage ditches (FW4)

Drainage ditches are frequently present along the existing road (Plate 6-11) and within the forestry. Some carry water while others were dry at the time of visit and are frequently overgrown or filled with *Sphagnum*. These ditches form part of the drainage system for the site and ultimately connect with the Owenmore River. This habitat was not mapped as it was ubiquitous throughout the site and largely associated with and covered by forestry.



Plate 6-11: *Sphagnum* filled drain alongside the existing road

6.6.1.2 Habitats on the Grid Connection and Site Access Routes

The proposed grid connection route has an approximate length of 6.5 km. It will leave the on-site substation and travel south, following existing forestry tracks (ED2) to the east of the conifer plantation (WD4). Vegetation alongside the track consists largely of soft rush, purple moorgrass, knapweed (*Centaurea nigra*) and gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus*) scrub (WS1). A small area of blanket bog (PB3) is found opposite of the substation. This is in poor condition adjacent to the road due to disturbed ground and turf cutting but qualifies as Annex I Blanket bog [7130] approximately 15m past the verge. *Sphagnum* cover is > 50% and the vegetation comprises, amongst others, of purple moor grass, black bog rush (*Schoenus nigricans*), ling heather, bog asphodel (*Narthecium ossifragum*), *R. lanuginosum* and bog myrtle (*Myrica gale*). Small bog pools with *S. cuspidatum* are found in this area as well. There will be no loss of this Annex I habitat as the cable will be laid into the existing track (ED2).

After leaving the conifer plantation (WD4), habitats adjacent to the existing road (BL3; Plate 6-12) include cutover bog (PB4) in early stages of revegetation dominated by swards of *E. angustifolium*, lowland blanket bog (PB3) in different stages of degradation, agricultural grassland (GA1) and areas of soft rush-dominated vegetation (GS4) on former blanket bog. After approximately 3km, the track meets the N59 national road categorised as buildings and artificial surfaces (BL3) which it follows for another 3.5km until the Bellacorrick substation (BL3). Vegetation either side can be classified as degraded lowland blanket bog (PB3), wet grassland (GS4), scrub (WS1) or agricultural grassland (GA1) and the Owenmore River (FW1) is flowing to the south of the road.

Several watercourses (FW1) draining from the site are crossed. These are flowing through concrete pipe or box culverts (Plate 6-13). There will be a total of 9 culvert and 3 bridge crossings for the underground cable. Two of the bridge crossings will require Horizontal Directional Drilling (see Section 9 of Appendix 4-5 of the EIAR for detail) due to the insufficient deck cover within the bridge, while sufficient clearance exists within the third bridge structure and therefore the bridge can be

crossed utilising the ducts in a flat formation method in the bridge deck. The locations of the bridges and culverts are shown on the site layout drawings included in Appendix 4-6 of the EIAR. The schedule of culvert crossing methodologies is shown in Appendix A of Appendix 4-5 of the EIAR. The proposed culvert crossing methods are shown Appendix 4-5 (Appendix A) of the EIAR.

The site access route is the same as the grid connection route but continues further north along the east of the site. Habitats that are located adjacent to the road are generally those described above but also include recently-felled woodland (WS5) and a small area of (mixed) broadleaved woodland (WD1) consisting of oak, sycamore, alder, willow and Scots pine that is located on private land and is infested with Rhododendron, as is much of the track verge. Clear-span watercourse crossings will be constructed along the wind farm access roads at 4 no. locations using a bottomless box culvert. The locations of these crossings are shown on the layout drawings included in Appendix 4-1 of the EIAR. The clearspan watercourse crossing methodologies presented below in Section 6.7.2 will ensure that no instream works are necessary.



Plate 6-12: Existing road (BL3) into which the cable is going to be laid



Plate 6-13 Example of an existing concrete box culvert crossing along the proposed access route

6.6.1.3 Habitats at the site of the Met Mast

The proposed met mast is located within the EIAR Site Boundary within Conifer plantation forestry (WD4) south of T5. The area is dominated by lodgepole pine mixed with small open areas of purple moor grass and ling heather (Plate 6-16) and is of low ecological significance.



Plate 6-14 Habitat around the met mast

6.6.1.4 Habitats recorded within road widening areas

In order to accommodate the delivery of turbine components and other abnormal loads between the N59 and the main site entrance, road widening works will be required along the L52926 local road in the townlands of Sheskin and Tawghnamore. The road widening works will extend slightly into the grassland habitat adjacent to the east side of the L52926 local road. Species recorded in this location include soft rush, purple moorgrass and bramble.

Road widening works are also required at the junction between the N17 and N5 National Primary Roads in the townland of Ballyglass East, Co. Mayo. The location and extent of these widening works are shown in Figure 4-18c and Drawing No. 348276-110A1.1 in Appendix 14-1 of this EIAR. Habitats recorded here included Dry meadows and grassy verges (GS2) with Scrub (WS1) dominated by Willow, bramble and Gorse. See Plate 6-16.



Plate 6-15. Bramble scrub and grassland habitat located within area of proposed road widening works at the junction between the N59 and the main site entrance.



Plate 6-16. GS2 and WS1 Recorded at proposed road widening area at the N5 and N17 junction

6.6.2 Invasive species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. *Rhododendron ponticum* was recorded from various areas within the site particularly along the access road and along the road and adjacent watercourse leading to Turbine 21 (Figure 6-7). Given the extent of the species within the

site, best practice invasive species management measures have been incorporated into the Proposed Development, see Section 6.7.3.3. The implementation of these measures will ensure that there is no potential for the spread of the species.

No additional species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded during the survey.

6.6.3 Protected Flora

No botanical species listed under the Flora (Protection) Order 2022 (SI 235 of 2022)), listed in the EU Habitats Directive (92/43/EEC) or listed in the Irish Red Data Books were recorded on the EIAR Study Area. All species recorded are common in the Irish landscape. No rare and protected plant species recorded in the desk study, including those obtained from NPWS data request (see Table 6-1010), were recorded within the EIAR Study Area.

6.6.4 Fauna in the Existing Environment

Dedicated faunal walkover surveys were undertaken at the site on the following dates:

- > 4th August 2021
- > 10th August 2021
- > 18th August 2021
- > 2nd September 2021
- > 24th September 2021
- > 18th January 2022
- > 21st January 2022

In addition to the above targeted surveys, additional faunal signs/sightings were also recorded during other surveys including habitat assessments, bat surveys and bird surveys. The site was also visited on numerous additional occasions during the undertaking of bat surveys throughout 2021 and 2022.

The walkover survey was designed to detect the presence, or likely presence, of a range of protected species, including bats, otter and badger. Potential suitable habitats were investigated for signs of animal presence. The following subsections provide a breakdown of the species recorded within the Proposed Development boundary during the site visit and assessment.

6.6.4.1 Badger

Dedicated surveys for this species were undertaken on the 4th, 10th and 18th August 2021 in addition to incidental records recorded during other species-specific surveys. During dedicated badger surveys of the site, signs of badger (i.e. badger foraging signs, latrines etc.) were searched for. Several signs of badger were recorded throughout the EIAR Site Boundary including snuffle holes and paths. The highest badger activity, along with several overgrown entrances to outlier setts were recorded in the south of the site. As two of these were located in proximity to a proposed new road between T17 and T18, camera traps were left in place during August, but no badger activity was recorded and they were inactive at the time of the survey. The locations of the badger sett entrances are shown in Confidential Appendix 6-5⁵ of this EIAR.

6.6.4.2 Otter

Potential otter trails (depressed grass) were recorded along several of the watercourses, however, no spraints, slides or other signs were recorded within the site boundary despite dedicated surveys. Habitat suitability for otter within the EIAR Site Boundary was typically poor given the small, high-energy, upland nature of most watercourses surveyed but otter has been recorded from downstream locations along the Oweniny and Owenmore Rivers (NPWS, NBDC).

⁵ Following standard best practice, the location of breeding or resting places of protected species should be provided as a confidential appendix for review by the competent authority and not made available to the public in order to avoid potential for persecution.

6.6.4.3 Bats Survey Results

The results of the bat survey effort are fully described in section 4.4 of the Bat Survey report available in appendix 6-2 and are not repeated in full here. The results are summarized below.

Roost Surveys

Four structures containing potential suitable bat roost features were identified (a derelict hunting lodge and associated outbuildings, a storage shed, derelict lodge and a derelict cottage) within the EIAR Study Area but outside 200m plus the rotor radius (85m) of the Proposed Development footprint. The nearest turbine is approximately 500m from any structures.

All four structures were subject to an emergence survey. The surveys were carried out in May, July, September and October 2021. No bats or evidence of bats were identified within the structures and no bats were observed emerging or re-entering the structures during the dedicated surveys. Bats were observed to be commuting from an area north of the Hunting Lodge that comprised deciduous trees, a stream and an old stone building. The structures have been avoided and will not be impacted by the Proposed Development.

Manual Transects

Manual transects were undertaken in Spring, Summer and Autumn 2021. Bat activity was recorded on all surveys. A total of 111 bat passes were recorded. In general, soprano pipistrelle (n=89) was recorded most frequently, followed by Myotis spp. (n=13), Leisler's bat (n=6) and the common pipistrelle (n=3).

Ground level transects

In total, 5,959 bat passes were recorded across all deployments. In general, soprano pipistrelle (n=3,946) occurred most frequently, followed by Myotis spp. (n=956), Leisler's bat (n=487) and the common pipistrelle (n=408). Instances of Brown long-eared bat (n=162) were significantly less.

6.6.4.4 Reptiles and Amphibians

Common frog (*Rana temporaria*) was recorded in the north of the site and is likely to breed in wet habitats within the site boundary. One common lizard (*Zootoca vivipara*) was observed along the road verge in the east of the site. Smooth newt (*Lissotriton vulgaris*), while not recorded during the site visits, is likely to occur within the site.

The Proposed Development will not result in a significant loss of suitable habitat for reptiles and amphibians. It is considered that suitable habitat is extremely widespread in the site and beyond.

6.6.4.5 Fisheries and Aquatic Fauna

In order to collate baseline fisheries information, Triturus Environmental Ltd. were contracted by MKO to undertake catchment-wide surveys of aquatic habitats in relation to fisheries potential, freshwater pearl mussel (eDNA only), macro-invertebrates (biological water quality), macrophytes and aquatic bryophytes, aquatic invasive species, and fish of conservation value. A detailed *Aquatic and fisheries assessment* has been prepared for the project and is provided in Appendix 6-3 of the EIAR. A total number of n=23 sites were surveyed across the Baroosky and Glencullin River, the Sheskin stream and numerous unnamed tributaries and including three dystrophic lakes in September 2021. Electrofishing was carried out at n=20 locations and eDNA samples for freshwater pearl mussel were collected from the Baroosky River, Glencullen River and Sheskin Stream (n=3). Water samples were also collected from n=3 lakes and analysed for brown trout, European eel and smooth newt. Biological water quality was analysed (via Q-sampling) at n=20 sites (Plate 6-15). The location of all survey sites

referred to in the below subsections is provided in Figure 2.1 of the *Aquatic and fisheries assessment*, Appendix 6-3 of the EIAR.

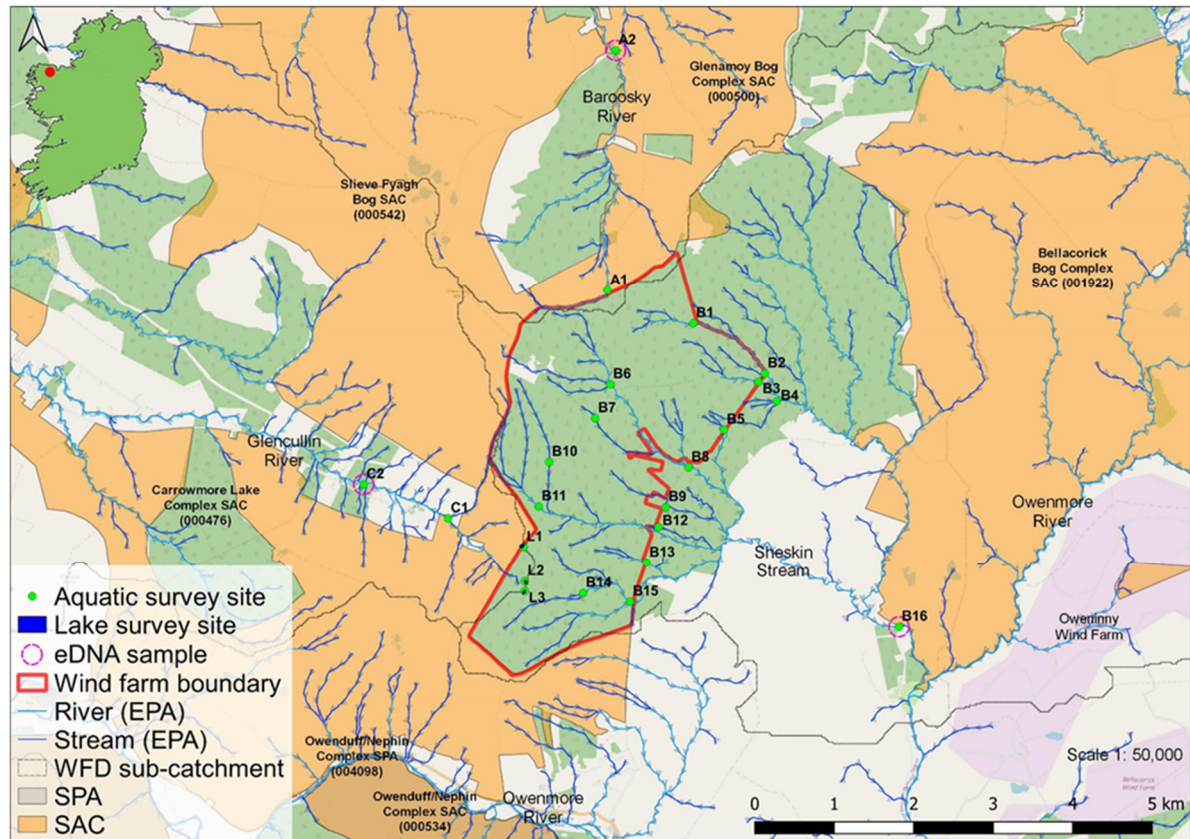


Plate 6-17 Sites surveyed for the fisheries assessment (from Appendix 6-3)

In general, the Sheskin survey sites were small, upland eroding spate channels located in the upper reaches of the respective catchments. Many were located in high-gradient areas and so sub-optimal for successful juvenile salmonid recruitment and population persistence. Atlantic salmon were recorded from a total of 7 no. sites. These were located on the larger watercourses surveyed, namely the Baroosky River (A1 & A2), Sheskin Stream (B8 & B16), B12 (unnamed stream) and the Glencullin River (sites C1 and C2), all of which were located outside of the site boundary. Brown trout were recorded from a total of 14 no. sites (A1, A2, B2, B3, B6, B8, B9, B10, B11, B12 & B15, B16, C1 & C2). With the exception of sites B9 and B10, all sites containing trout supported mixed cohort populations (i.e. juveniles and adults). However, many of the watercourses surveyed supported small brown trout populations only (low abundances) given their narrow, shallow and high-gradient, upland nature.

Whilst suitability was largely absent throughout the survey sites given the upland, eroding nature of the watercourses, a low density (0.8 per m²) of *Lampetra* sp. ammocoetes were recorded from a single site on the lower Sheskin Stream (B16), which is located well outside the site boundary. This site also featured the best-quality lamprey spawning habitat within the survey area.

European eel were only recorded (in low densities) from sites A1 and A2 (Baroosky River) and C2 (Glencullin River), i.e. larger, deeper watercourses that are located outside the site boundary. Here, the presence of larger, deeper pools and a greater complexity of refugia (e.g. boulder, macrophyte beds etc.) provided superior eel habitat compared to the smaller, higher-gradient, upland stream sites where there was a paucity of suitable refugia or deeper pool areas favoured by the species (Laffaille et al., 2003). Nonetheless, even smaller channels with poor or little overall fisheries value offer value as potential European eel migratory pathways, provided they maintain downstream connectivity to larger channels. (e.g. adult migration seawards, usually from September/October onwards).

The riverine survey sites were typically unsuitable for freshwater pearl mussel given that many were located in the upper extent of river catchments, in addition to sub-optimal substrata and siltation pressures (primarily from peat escapement). Analysis of water samples collected from the Baroosky River, Sheskin Stream and Glencullin River did not detect pearl mussel eDNA and there are no known records of the species within the footprint of the proposed wind farm.

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from n=20 riverine sites. With the exception of sites B15 and C1 (Q3-4, moderate status), sites B9 and B5 (Q3, poor status) and B4 (Q1/0, bad status), all survey sites achieved \geq Q4 (good status) water quality and, thus, met the good status (\geq Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC). Sites B2 and B6 achieved Q4-5 (high status)

6.6.4.6 Marsh Fritillary

The desk study identified that marsh fritillary is known to occur in the wider area surrounding the Proposed Development.

Dedicated surveys were undertaken within the site boundary to identify areas of suitable marsh fritillary habitat. However, suitable habitat was only recorded in small areas along the tracks where stone material has been brought into the site. During dedicated larval web surveys of these areas in September 2021, no marsh fritillary larval webs were recorded. While the potentially suitable marsh fritillary habitat may be temporarily affected by road widening works, no evidence of the endangered species was found and Devil's bit scabious will likely re-establish itself along the roads after the works are finished.

6.6.4.7 Other species

Irish hare (*Lepus timidus ssp. hibernicus*) was observed on occasion within the site boundary. A camera trap installed at a badger sett entrance recorded pine marten (*Martes martes*), fox (*Vulpes vulpes*) and pygmy shrew (*Sorex minutus*). Mustelid scats were recorded within the forestry and are likely to be pine marten and the scats of fox were also recorded in a number of areas within the site. Numerous deer droppings and wallows were found throughout the site.

No significant areas of suitable habitat for other taxa, species listed in Annex II or IV of the EU Habitats Directive, or other species of conservation concern was identified within the boundaries of the Proposed Development site.

6.6.5 Importance of Ecological Receptors

Table 6-133 lists all identified receptors and assigns them an ecological importance in accordance with the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (TII, 2009a). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors. These ecological receptors are 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 the features.

Table 6-13 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 Nationally designated sites have been identified as being within the likely Zone of Impact:</p> <ul style="list-style-type: none"> ➤ Carrowmore Lake Complex [000476] ➤ Slieve Fyagh Bog [000542] ➤ Glenamoy Bog Complex [000500] ➤ Bellacorick Bog Complex [001922] ➤ Owenduff/Nephin Complex [000534] <p>These sites are assigned National Importance and included as a KER as there is potential for indirect effects on them via habitat degradation and water pollution.</p>	Yes
	<p>European Designated Sites</p> <p>The following Special Areas of Conservation are identified in the AA Screening as being within the Likely Zone of Impact and are assessed fully in the NIS that accompanies this application:</p> <ul style="list-style-type: none"> ➤ Carrowmore Lake Complex SAC [000476] ➤ Slieve Fyagh Bog SAC [000542] ➤ Glenamoy Bog Complex SAC [000500] ➤ Bellacorick Bog Complex SAC [001922] ➤ Owenduff/Nephin Complex SAC [000534] ➤ Owenduff/Nephin Complex SPA [004098] <p>These sites are assigned International Importance and included as a KER as there is potential for indirect effects on them via habitat degradation, water pollution and disturbance of QI/SCI species.</p> <p>Note: SPAs within the Likely Zone of Impact are considered in Chapter 7, Ornithology and in the NIS.</p>	Yes
Aquatic Habitats and related species	<p>Eroding/upland rivers (FW1)</p> <p>A number of natural watercourses were located within or adjacent to the site boundary. These watercourses include:</p> <ul style="list-style-type: none"> ➤ Sheskin stream with several unnamed tributaries ➤ Barroosky and tributary ➤ Glencullin and tributaries <p>Th majority of these streams have been assigned Local Importance (Higher Value) as they are of high biodiversity value and connect to downstream waterbodies in the local area. Two watercourses were assigned Local</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	<p>Importance (Lower Value) due to their small size and poor ecological value (see Appendix 6-3 for details). The watercourses also provide a conduit to downstream designated sites of international and national importance.</p>	
	<p>Aquatic and Fisheries Species</p> <p>The aquatic species that are associated with the rivers that are located within and surrounding the site assigned Local Importance (Higher Value) in that they have a high biodiversity value in the local context. The downstream watercourses and fauna within them have been assigned as of Local Importance (Higher Value) due to the known populations of salmon, trout and lamprey species along with otter. Some of the downstream watercourses and the associated fauna have also been assigned International Importance due to them being located within SACs. There is potential for indirect effect on these features as a result of impacts on water quality. These species include salmonid, trout, lamprey species, white clawed crayfish, European eel and other aquatic species. Fish and other aquatic species are therefore included as a KER for further assessment along with Upland eroding rivers.</p>	Yes
Conifer plantation (WD4)	<p>The majority of the proposed windfarm infrastructure is located within Conifer Plantation (WD4). This is a highly modified habitat with a low biodiversity value. This is classified as Local Importance (Lower Value). For these reasons, this habitat has not been identified as a KER.</p>	No
Recently-felled woodland (WS5)	<p>This is a highly modified habitat with a low biodiversity value and is classified as Local Importance (Lower Value). For these reasons, this habitat has not been identified as a KER.</p>	No
Peatlands and associated habitats	<p>Lowland Blanket Bog (PB3)</p> <p>This habitat is assigned County Importance as, although the habitat occurring within and adjacent to the site has been degraded as a result of forestry and turbary activities, the areas of lowland blanket bog conform to EU Habitats Directive Annex I habitat Blanket Bog [7130] and are of high biodiversity value.</p> <p>As such, the footprint of the Proposed Development has the potential to result indirect effects on the receptors and they are included as a KER for further assessment.</p>	Yes
	<p>Dystrophic lakes (FL1)</p> <p>The site of the Proposed Development includes three dystrophic lakes (FL1). These have been assigned County Importance as they conform to EU Habitats Directive habitats that are of high biodiversity, although small</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	<p>in scale. One of the lakes is partially located within the Carrowmore Lake Complex SAC and is hence assigned International Importance.</p> <p>Cutover bog (PB4)</p> <p>This habitat has been assessed as Local Importance (Lower Value) as it consists largely of bare peat with swards of common cotton grass and ling heather and as it is considered to be of low biodiversity value due to the encroachment of gorse scrub and emergent conifers. This habitat will not be affected by the Proposed Development and is not included as KER.</p>	No
Spoil and bare ground (ED2)	This is a highly modified habitat with a low biodiversity value and is classified as Local Importance (Lower Value) . For these reasons, this habitat has not been identified as a KER.	No
Buildings and artificial surfaces (BL3)	This is a highly modified habitat with a low biodiversity value and is classified as Local Importance (Lower Value) . For these reasons, this habitat has not been identified as a KER.	No
Wet grassland (GS4)	This habitat has been assessed as of Local Importance (Lower Value) as where it occurs along watercourses and existing roads within the Proposed Development footprint, it is of small size and low biodiversity value primarily due to fragmentation and scrub encroachment associated with the surrounding afforestation of the landscape. For this reason, it has not been identified for further assessment and is not a KER.	No
Scrub (WS1)	This habitat is of some local importance to local wildlife (TII, 2009a). However, where it occurs along watercourses and existing roads within the Proposed Development footprint, it is of small size and it is common and widespread in the wider area. As such, the habitat has been assessed as of Local Importance (Lower Value) and has not been identified for further assessment and is not a KER.	No
(Mixed) broadleaved woodland (WD1)	This small woodland consists of some mature native and non-native broadleaves as well as native Scots Pine and has been assessed as of Local Importance (higher value) despite it becoming overgrown with Rhododendron. This habitat will not be affected by the Proposed Development and is not included as KER.	No
(Improved) Agricultural Grassland (GA1)	This is a highly modified habitat with a low biodiversity value and is classified as Local Importance (Lower Value) . This habitat will not be affected by the Proposed Development and is not included as KER.	No
Badger	Badger as an ecological receptor has been assigned Local Importance (Higher value) m . Direct impacts on badger are not anticipated as location of sett entrances in the vicinity of any infrastructure is known. However, there will be loss of foraging habitat and the Proposed Development has the potential to result in indirect effects on the receptor as a result of disturbance during construction and operation. Badger is therefore included as a KER and requires further assessment.	Yes
Otter	Apart from potential trails, no evidence of otter was recorded within or adjacent to the red line boundary. Based on the absence of confirmed otter signs and the low habitat suitability for the species within the site boundary otter has been assessed as of Local Importance (Higher Value) . No evidence of an ecologically important population was recorded during any of the site surveys undertaken. However, the Proposed Development has the potential to result in indirect effects on the receptor (as a result of	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	deterioration in habitat or disturbance during construction/ decommissioning) and it is therefore included as a KER and requires further assessment.	
Marsh fritillary	Based on the desk study, marsh fritillary has been recorded from this hectad, last in 2010. However, although small areas of suitable habitat for the species occur along existing roads within the site boundary, no evidence of the species was recorded during a dedicated survey undertaken in 2021. In addition, the Proposed Development footprint avoids areas identified as potentially suitable for the species and as such, no potential for impact on the species is predicted. For this reason, the species has not been considered for further assessment in this report.	No
Bats	The habitats within and surrounding the Proposed Development site are likely to be utilised by a bat population of Local Importance (higher value). All bat species in Ireland are protected under both national legislation – (Wildlife Act, 1976 -2021 as amended) and European legislation – (Habitats Directive (92/43/EEC). Bats are likely to forage and commute within the vicinity of the Proposed Development. No potential bat roosting features were identified within or adjacent to the development footprint. The Proposed Development has the potential to result in direct and indirect effects on the receptor. Therefore, bats are included as a KER for further assessment.	Yes
Reptiles and Amphibians	It is considered that the Proposed Development will not result in a significant loss of suitable habitat for reptiles and amphibians. No evidence of populations of reptiles and amphibians being significant at more than a local level was recorded. No likely significant effects on these species are anticipated and therefore further survey/ assessment was not deemed necessary. Based on the low number of reptile and amphibian records for the site and the highly afforested nature of the site, reptiles and amphibians have not been included as KERs.	No
Invasive species	Rhododendron was recorded from several areas within the site and along the access route. Therefore, invasive species are included as a KER for further assessment.	Yes
Additional protected fauna (e.g. red squirrel, Irish hare, pine marten, fox etc).	The recorded evidence suggests that the site is not utilised by populations of higher than local significance and no potential for significantly effects have been identified at the population level. Due to the small footprint and nature of the Proposed Development, they are unlikely to be significantly affected by the Proposed Development. For this reason, other faunal species are not considered further in this EIAR. Significant effects are not anticipated.	No

6.7 Ecological Impact Assessment

6.7.1 Do-Nothing Effect

If the Proposed Development were not to proceed, the majority of the lands within the site would continue to be managed as commercial forestry. This would continue to involve the harvesting of timber as it matures, followed by the coniferous forestry replanting. The other habitats identified within the EIAR Site Boundary including peatlands and associated habitats, would likely remain in a similar condition. In some drier areas of the peatland habitat, scrub is likely to develop and in time, this may undergo succession to small areas of woodland. The general biodiversity on the site, as described in this chapter, would likely remain similar to its current state as activity levels and land use would not change significantly.

6.7.2 Likely Significant Effects During Construction Phase

6.7.2.1 Effects on Habitats During Construction

Table 6-14 below provides details of the extent of the recorded habitats on the site, the extent of the habitat that will be lost to facilitate the Proposed Development and the percentage of the total area of that habitat in the EIAR Site Boundary that it represents.

Table 6-14 Extent of habitat lost to the Proposed Development and the percentage of the total area of that habitat on site

Habitat	Total area on the site	Area to be lost to development footprint	Percentage of total to be lost
Conifer plantation (WD4)	964 (ha)	106.1 (ha)	11.9%
Recently-felled woodland (WS5)	25.3 (ha)	11.4 (ha)	45%
Total	989.3 (ha)	117.5 (ha)	55.9%

The Proposed Development will result in the loss of areas of habitat that are of Local Importance (Lower Value) and are not identified as KERs. This mainly involves the loss of coniferous plantation forestry (WD4) and recently-felled woodland (WS5) which has been assessed as being of low ecological value. Other habitats assessed as of Local Importance (Lower Value) include Wet grassland (GS4), Scrub (WS1) and Spoil and bare ground (ED2). While small amounts of these habitats may be lost along the road verges, this will be negligible and was not quantified. Any direct or indirect impacts on these habitats are not significant.

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

6.7.2.1.1 Assessment of Potential Effects on Rivers and Streams, Open Waterbodies and Sensitive Aquatic Faunal Species

Table 6-15 Construction phase impact assessment for rivers, streams, open waterbodies and sensitive aquatic species

Description of Effect	The footprint of the Proposed Development has been specifically designed to avoid the large waterbodies and watercourses within the site boundary, see Section 4.7 of the EIAR. The proposed new watercourse crossings will be clear-span bridges or bottomless box culverts, see Section 4.9.4 of the EIAR, thereby minimising potential for impact on the receiving environment. However, the proposed internal road network and proposed grid connection route cross a number of watercourses. In some locations, site access tracks will utilise existing bridges with no instream works proposed. As no instream works are proposed, there will be no direct effects on these habitats or the
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	<p>species that are associated with them. There is no potential for the Proposed Development to result in any barrier to the movement of aquatic species.</p> <p>There is potential for the construction activity to result in the run off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into these watercourses. This could result from the removal of scrub and conifer plantation, movement of peat or the use of concrete and other construction materials. The Proposed Development will cross a number of small drainage ditches, which are not themselves ecologically sensitive but do provide connectivity to the larger watercourses that surround the site.</p> <p>The construction phase of the proposed watercourse crossings represents a potential indirect effect on the identified aquatic receptors in the form of habitat degradation through water pollution.</p> <p>These effects on water quality are fully described in Chapter 9 ‘Water’ 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, lamprey, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. 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 is as a result of water pollution and this is discussed in this section in relation to habitats and species.</p>
<p>Characterisation of unmitigated effect</p>	<p>In the absence of mitigation, the indirect effect of water pollution on aquatic receptors during construction has the potential be a short-term reversible impact on watercourses which act as a conduit to downstream habitats. The magnitude of any such impact is likely to be at worst moderate, given that all major infrastructure such as turbine bases, site compound etc. are located over 50 metres from any significant watercourse.</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 pollution during the construction phase of the Proposed Development.</p>
<p>Mitigation</p>	<p>A detailed drainage maintenance plan for the Proposed Development is provided in Appendix 4-4 (Surface Water Management Plan) of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Development. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: ‘Water’ of this EIAR. The Construction Environmental Management Plan (CEMP) that is provided as Appendix 4-3 of the EIAR, provides the details of exactly how the measures will be implemented during construction.</p> <p>In relation to new watercourse crossings, Inland Fisheries Ireland (IFI) will be consulted a minimum of four weeks in advance of the installation of pre-cast concrete bottomless box culverts. The Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters; and the Scottish Natural Heritage (SNH) Good Practice During Wind Farm Construction (SNH, 2019, 4th Edition) will also be adhered to. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI).</p>
<p>Residual Effect following Mitigation</p>	<p>Following the implementation of mitigation, there will be no significant residual effect on aquatic habitats or species as a result of the Proposed Development.</p>

6.7.2.1.2 Assessment of Potential Effects on Peatlands and Associated Habitats

Table 6-16 Construction phase impact assessment for peatlands and associated habitats

<p>Description of Effect</p>	<p>The construction of the Proposed Development and associated infrastructure will not result in the loss of any Lowland blanket bog (PB3) or Dystrophic lakes (FL1).</p> <p>The Proposed Development is bordered by three Special Area of Conservations (SAC) that are designated for peatland habitats (Slieve Fyagh Bog SAC, Carrowmore Lake Complex SAC, Glenamoy Bog Complex SAC). The layout of the windfarm has been designed to keep all infrastructure away from the adjoining SACs. As part of this EIAR, a Peat Stability Report has been prepared and is available in Appendix 8-1. The report concluded that the Sheskin south site is considered low risk of peat failure and is suitable for wind farm development. As such, there is no potential for impacts on SACs bordered the Proposed Development.</p> <p>On a highly precautionary basis, the potential for habitat deterioration in the from pollution from dust arising from the construction phase was identified in a number of SACs (Slieve Fyagh Bog SAC, Carrowmore Lake Complex SAC, Glenamoy Bog Complex SAC). Dust emissions arising from the Proposed Development been fully considered in Chapter 10: ‘Air and Climate’, with mitigation provided in section 10.2.4.3.2 of Chapter 10 and Section 3.6 of the CEMP.</p> <p>There is also the potential to result in indirect effects on two small areas of blanket bog (PB3) that are located adjacent to sections of road (east of Turbine 11 and to the south-east of the proposed substation that will be upgraded (see Figure 6-5 for detail) and there is potential for habitat degradation in the form of pollution with dust.</p>
<p>Characterisation of unmitigated effect</p>	<p>This is a reversible impact on habitats of County Importance. The magnitude of this impact is slight as it only affects a small percentage of the overall habitat type, which is widespread in the surrounding landscape.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>The degradation of Lowland blanket bog (PB3) habitats has been assessed as a reversible slight negative effect on a very small area of a receptor of County importance, in the absence of mitigation and is not significant at any geographic level. This impact is restricted to a small percentage of the overall habitat within the site. In addition, the proposed infrastructure layout has been designed to deliberately avoid any areas of Lowland blanket bog (PB3) within the site boundary.</p>
<p>Mitigation</p>	<p>The Proposed Development has been deliberately designed to not to result in the loss of Lowland blanket bog (PB3) or Dystrophic lakes (FL1).</p> <p>On a highly precautionary basis, the potential for habitat deterioration in the from pollution from dust arising from the construction phase was identified. This has been fully considered in Chapter 10: ‘Air and Climate’, with mitigation provided in section 10.2.4.3.2 of Chapter 10 and section 3.6 of the CEMP.</p> <p>In addition, an area of peatland will be enhanced in the northwest section of the site in, covering an area of 24.1 hectares, through drain blocking and the removal of encroaching conifers (establishing as a result of natural seed dispersal). This is fully described in the site-specific Biodiversity Management Plan (BMP), provided in Appendix 6-6 of the EIAR.</p>
<p>Residual Effect following Mitigation</p>	<p>Following the implementation of the mitigation as described above, the impact on peatlands will be permanent, slight and positive.</p>

6.7.2.2 Effects on Protected 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, see Table 6-10. Given the

extensive area of habitat that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat (peatlands, watercourses), no significant effects on non-KER faunal biodiversity is anticipated as a result of the Proposed Development. Therefore, these species were excluded from further assessment.

The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.7.3.1.1 above and is not repeated below.

6.7.2.2.1 Assessment of Potential Effects on Badger

Table 6-17 Construction phase impact assessment for badger

<p>Description of Effect</p>	<p>Whilst badger setts and foraging activity were recorded within the site boundary, the sett entrances were overgrown and camera traps installed at the two entrances which were identified close to a proposed new road in August 2021 showed no activity. However, badger are clearly present within the site and there is some potential for small scale loss of foraging habitat to facilitate the construction footprint and potential of disturbance and displacement during the construction and decommissioning phases.</p>
<p>Characterisation of unmitigated effect</p>	<p>Given the small scale of the development footprint in comparison to the size of the site, the loss of foraging habitat to the footprint of the Proposed Development constitutes a Permanent Negligible Negative Effect. This would not be reversible as it is within the construction footprint. 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. Disturbance to badger is classified as short-term, significant and negative.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>There is no potential for significant loss of badger habitat as a result of the Proposed Development at any geographic scale.</p> <p>In the absence of mitigation, there is potential for significant disturbance/displacement on the local badger population as a result of the Proposed Development.</p> <p>There is no potential for significant effects at a county, national or international scale.</p>
<p>Mitigation</p>	<p>The following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and will be implemented during the construction phase of the Proposed Development.</p> <ul style="list-style-type: none"> ➤ A pre-construction badger survey will be undertaken at the location of the identified sett by a qualified ecologist prior to the commencement of any works to determine if the setts are in use and to identify any additional sett entrances that may have been excavated in the intervening period. ➤ The sett will be monitored for 2 weeks prior to construction using a camera trap to determine if it is in use. ➤ If the sett is found to be in use exclusion measures will be put in place prior to construction in line with NRA Guidelines⁶ 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 nor blasting or pile driving within 150m of active setts. ➤ 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

⁶ National Roads Authority (2006) Guidelines for the treatment of badgers prior to the construction of National Road Schemes.

	<p>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>
<p>Residual Effect following Mitigation</p>	<p>Following the implementation of the mitigation as described above, there is no potential for any significant negative effect on badger at any geographic scale.</p>

6.7.2.2.2 Assessment of Potential Effects on Otter

Table 6-18 Construction phase impact assessment for otter

<p>Description of Effect</p>	<p>As described above in relation to aquatic habitats and species, the Proposed Development has been deliberately designed such that all major infrastructure, i.e. turbine bases and hardstands, avoid significant watercourses and wetland habitats (including the dystrophic lakes). No instream works are proposed. Apart from potential trails, no evidence of otter was recorded during the survey of water crossings or along watercourses where they run parallel to proposed infrastructure. Based on the absence of confirmed otter signs and the low habitat suitability for the species within the site boundary, there is no potential for direct effect on otter.</p> <p>Infrastructure such as internal roads will require a number of watercourse crossings. The construction of these watercourse crossings has the potential for indirect effects in the form of disturbance to otter.</p> <p>The Proposed Development also has the potential to result in indirect effects on otter habitat in the form of water pollution resulting from construction activity as described in Section 6.7.2.1.1 above.</p>
<p>Characterisation of unmitigated effect</p>	<p>Whilst a comprehensive otter survey was undertaken and no potential for significant effects was identified, following the precautionary principle, a pre-commencement survey will be undertaken and in the unlikely event that otter are recorded, there is potential for effect. Given that the site is at present in active afforestation of different ages and all major proposed infrastructure is located over 50 metres from any significant watercourse, any potential disturbance to otter will be a short-term, slight negative effect associated with the installation of the proposed watercourse crossings.</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 reversible impact. The magnitude of any such impact is likely to be at worst moderate, given that all major infrastructure such as turbine bases and construction compounds are located over 50 metres from any significant watercourse.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>Given the distance of all major infrastructure from any watercourse within the site, the potential for the construction phase of the Proposed Development to result in disturbance, displacement or habitat fragmentation for otter is not considered to be significant.</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 at a local geographic scale in the form of habitat deterioration resulting from pollution.</p>
<p>Mitigation</p>	<p>A detailed drainage maintenance plan for the Proposed Development is provided in Section 4.7 of this ELAR. This plan provides details of how water quality will be protected during the construction of the Proposed Development. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: 'Water' of this ELAR. In addition, the Construction Environmental Management Plan (CEMP) that is provided as Appendix 4-4 of the ELAR provides the details of exactly how the measures will be implemented during construction.</p>

	<p>Whilst no otter were recorded during the surveys undertaken, it is noted that this is a mobile species and could potential migrate into the site. As such, prior to the commencement of construction works associated with the installation of watercourse crossings, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2008b):</p> <ul style="list-style-type: none"> ➤ From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works. <p>Should the surveys identify the presence of an otter holt, the following measures will be undertaken a National Parks and Wildlife Service and a derogation licence will be applied for (although compliance with such a licence has not been relied on in this assessment).</p> <ul style="list-style-type: none"> ➤ No works will be undertaken within 150m of any holts at which breeding females or cubs are present. ➤ No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence (TII, 2008b). <p>All of the above works will be undertaken or supervised by an appropriately qualified ecologist.</p>
<p>Residual Effect following Mitigation</p>	<p>Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the Proposed Development.</p>

6.7.2.2.3 Assessment of Potential Effects on Bats

Table 6-19 Construction phase impact assessment on bats

<p>Description of Effect</p>	<p>Whilst the study area was utilised by foraging and commuting bats, the Proposed Development will not result in any significant reduction or loss of the available habitat on the site given the size of the site and nature and small scale of the habitats that will be lost.</p> <p>No bat roosts were identified in close proximity to the construction footprint of the Proposed Development and there is no potential for significant bat roosts to be disturbed by increased human presence and increased noise during construction. No built structures within the site were identified as being, within 200m of a turbine location, or as providing roosting bat features and thus further surveys were not deemed necessary.</p> <p>The potential for bats to be killed during removal of trees or structures was considered in this assessment. However, no buildings or other structures with the potential to support bat roosts will be demolished to facilitate the Proposed Development . In addition, the trees occurring within the development footprint were assessed as not providing suitable cavities to support any significant bat roosts. The coniferous woodland does not provide suitable cavities due to the nature and age of the species recorded.</p>
<p>Characterisation of unmitigated effect</p>	<p>The construction of the Proposed Development has the potential to result in Short-Term Imperceptible Negative effects on the local bat populations in the form of habitat loss, disturbance or direct mortality.</p>

<p>Assessment of Significance prior to mitigation</p>	<p>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 as no roosts were recorded close to the infrastructure, habitat loss and disturbance are only likely to result in imperceptible effects on the local population. The bat survey report, which is included in Appendix 6-2 provides further detail and analysis with regard to the effects on bat species.</p>
<p>Mitigation</p>	<p>Whilst no significant effects on bat species have been identified, the following potential positive effects are noted. The felling of forestry will have a positive effect by opening up large areas of former closed canopy commercial forestry i.e. there will be more linear forestry edge habitat created. This will have a positive impact on bats as it will provide more commuting and foraging opportunities. Overall, the proposed works will retain areas of linear forestry edge habitats. A full description of the mitigation measures proposed during construction are described in section 6.1 of the Bat report, available in appendix 6-2. These measures are summarised below.</p> <ul style="list-style-type: none"> ➤ 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 (SI 359/1996). ➤ Exterior lighting, during construction, will be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Development, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site boundary to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.
<p>Residual Effect following Mitigation</p>	<p>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. There will be no significant effect on the conservation status of any bat species as defined in ‘<i>The Status of Protected Habitats and Species in Ireland</i>’ (NPWS, 2019)</p>

6.7.2.3 Potential Introduction or Spread of Invasive Alien Plant Species

6.7.2.3.1 Pre-Mitigation Impacts

The Third Schedule invasive species *Rhododendron ponticum* was recorded within several areas of the site and along the proposed site access and grid connection route. This species can form very dense thickets and out-compete native plants for space and resources, especially for sunlight. *Rhododendron* can also prevent access to sites due to the mass of plant material blocking paths. The plant spreads via seeds or suckering. The stands of *Rhododendron* recorded during the survey of the site are shown in Figure 6-8. From a precautionary perspective, a pre-construction invasive species survey will be undertaken as part of the proposed project. This will provide updated data in advance of any construction given the intervention time period between the original survey work and any future grant of permission/construction. In addition, there is the possibility of introducing other invasive plants by the means of working machinery.

6.7.2.3.2 Mitigation Measures

- The treatment of *Rhododendron* is fully described in Section 2.2 of the Biodiversity Management and Enhancement Plan (BMEP), available in Appendix 6-6.
- Previously identified infested areas will be resurveyed prior to the commencement of the treatment procedures. The purpose of this is to identify if the *Rhododendron* has spread outside of previously mapped areas.
- Prior to the commencement of treatment, all areas identified for treatment will be marked with barrier tape.
- All staff will be fully trained and competent in the use of herbicides
- *Rhododendron* will be cut to a height of between 2 and 4cm above the ground and immediately sprayed with a 20% solution of glyphosate mixed with a dye.
- The application of herbicide will adhere to legislation and best practice protocols on all aspects including: the storage and application of herbicides, PPE, record keeping.
- All herbicide mixtures will be prepared off-site or in a designated area on the forest road network.
- Alternatively eco-plugs may be used. <https://www.forestresearch.gov.uk/research/the-use-of-ecoplugs-for-woody-weed-control/>
- Treated area will be monitored annually for three years, following the initial treatment. Further cutting and herbicide treatment will be carried out if required
- Good construction site hygiene will be employed to prevent the spread and introduction of problematic invasive alien plant species (e.g. Japanese knotweed, *Rhododendron*, Giant Rhubarb etc.) 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.

6.7.2.3.3 Residual Impact

With the above mitigation in place there will be no significant residual effect with regard to Third Schedule invasive species as a result of the proposed works.

6.7.3 Likely Significant Effects During Operational Phase

6.7.3.1 Effects on Habitats during Operation

The operation of the Proposed Development will not result in any additional land take or loss of habitats and as such there is no potential for any significant effects in this regard. 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 areas through habitat rehabilitation management (as described in the Biodiversity Management and Enhancement Plan) that will be implemented during the construction phase of the Proposed Development and maintained during the operational phase. Details of the management that will be undertaken are provided in the Biodiversity Management and Enhancement Plan in Appendix 6.6.

There is no potential for significant negative effects on terrestrial fauna such as otter that was identified as a KER during the construction phase of the development.

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

6.7.3.1.1 Effects on Rivers and Streams, open waterbodies and sensitive aquatic faunal species.

Table 6-20 Operational phase impact assessment for rivers, streams, open waterbodies and sensitive aquatic faunal species

<p>Description of Effect</p>	<p>The increased amount of hard standing associated with the windfarm infrastructure has the potential to result in faster run-off of water from the site to the surrounding watercourses. This may have the indirect effect of causing erosion, which could lead to deterioration of surface water and supporting habitat quality. Additionally, there is the potential for the faster run-off of any pollutants that may be associated with vehicular usage on the site.</p> <p>These impacts on water quality are fully described in Chapter 9: ‘Water’ of this EIAR and are described here in relation specifically to biodiversity.</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, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. 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 is as a result of water pollution and this is discussed in this section in relation to both habitats and species.</p>
<p>Characterisation of unmitigated effect</p>	<p>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 (those mapped by the EPA⁷ and downloaded to GIS) and the footprint of the Proposed Development will be minimal when compared to the overall size of the site. The closest turbine to an EPA mapped watercourse is Turbine no. 20, located approx. 80 metres to the east of the watercourse.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>Significant effects on water quality are not anticipated at any geographic scale during the operation of the Proposed Development..</p>
<p>Mitigation</p>	<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</p>

⁷ EPA, 2020, Online Map viewer. Available at: <https://gis.epa.ie/EPAMaps/>

	<p>mitigated through appropriate design and mitigation as fully described in Section 9.5.3 of Chapter 9: ‘Water’ and Section 3.2 of the CEMP.</p> <p>In Section 9.5.3 of Chapter 9 ‘Water’, the assessment concludes that with the implementation of mitigation, ‘<i>no significant effects on the surface water quality will occur</i>’ during the operational phase. The detailed mitigation measures are not repeated here to reduce repetition throughout the document, but are described in Section 9.5.3, Chapter 9; the measures used to mitigate the risk of release of hydrocarbons and other pollutants and for sediment control during the construction phase will also be employed as required during the operational phase. Drainage management measures employed during the construction phase will ensure that runoff from the operational development will be effectively mitigated.</p>
<p>Residual Effect following Mitigation</p>	<p>Following the implementation of the mitigation measures outlined above, no potential for significant effect has been identified at any geographic scale as a result of the Proposed Development.</p>

6.7.3.2 Effects on Fauna during Operation

The operation of the Proposed Development will not result in any additional habitat loss or deterioration, nor will it result in a significant increase in anthropogenic activity.

There is no potential for significant negative effects in terms of disturbance on non-volant terrestrial fauna including badger and otter that were identified as KERs during the operational phase of the development. The potential for significant effects on otter is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.7.4.1.1 above and is not repeated below.

It should be noted that no significant habitat for salmonids, lamprey, white-clawed crayfish, European eel, aquatic invertebrates or other aquatic species was recorded within the site boundary and all major infrastructure such as turbine bases are located over 50 metres from the watercourses and wetlands within the site. The potential for significant effects on the above aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.7.4.1.1 and is not repeated below.

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

6.7.3.2.1 Assessment of Potential Effects on Bats during operation

Table 6-21 Operational phase impact assessment on bats

<p>Description of Effect</p>	<p>There is no potential for loss or fragmentation of foraging or roosting habitat for bat species during the operational phase of the proposed windfarm as there will be no additional loss of any habitats following construction.</p> <p>The bat survey report that is provided in Appendix 6-2, found bat species composition and abundance to be typical of the geographic location and largely afforested upland nature of the site.</p>
<p>Characterisation of unmitigated effect</p>	<p>Collision Risk</p> <p>Activity levels for low-risk species at the site including Myotis species and brown long eared bat (lesser horseshoe bat were not recorded during dedicated bat surveys) were low. As per SNH guidance, these species are not identified as being particularly vulnerable to collision mortality. Given the low levels of activity recorded, no significant effects on these species are anticipated.</p> <p>The following high-risk species were recorded during the dedicated surveys:</p>

	<p>? Leisler’s bat ? Common pipistrelle ? Soprano pipistrelle</p> <p>Overall Risk for each high risk species was determined, in accordance with Table 3b of NatureScot guidance (Tables 5-2 – 5-4, ‘Bat Report’, Appendix 6-2), by a cross-tabulation of the site risk level (i.e., Medium) and Ecobat bat activity outputs for each species (see Section 5.1.2 of Appendix 6.2 - Bat Report). Overall risk levels for these high collision risk bat species was assigned as Medium, with High seasonal peaks recorded for some species.</p> <p>The operation of the proposed wind farm has the potential to result in a long-term effect on Pipistrelle and Leisler’s bat species as a result of mortality due to collision. The magnitude of this effect in the absence of mitigation is moderate on the basis that no significant roosts were identified in the immediate vicinity of the turbines and the median level of activity is considered moderate (on a precautionary basis).</p> <p>It is noted in the SNH (2019) guidelines that bat activity on windfarm sites is highly liable to change following construction of a wind farm due to the changes in habitat that occur to facilitate construction. Therefore, continued monitoring of operational wind farms for three years’ post construction is recommended in the guidelines and will be undertaken at this site, to determine the actual, post construction effects on the local bat populations.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>Death may occur through collision with turbine blades or as a result of barotrauma. Fatalities may negatively affect local bat populations. Significant effects are not anticipated at the county or national scale.</p> <p>To date, no studies have conclusively linked pre-construction activity surveys to post-construction fatality rates (Hein et al. 2013). However, there is a strong positive correlation between post-construction activity and fatality at wind farms (Kunz et al. 2007, Baerwald and Barclay 2009, Amorim et al. 2012, Korner-Nievergelt et al. 2013).</p> <p>The magnitude of this effect, in respect of local bat populations, in the absence of mitigation is Moderate at the local scale.</p>
<p>Mitigation</p>	<p>In order to reduce the value of the habitat for bat species in the areas surrounding the turbines, a buffer of at least 50m between the tip of the blade and any trees or other tall vegetation that could provide high quality foraging habitat for bat species will be implemented. A full description of the mitigation measures proposed during operational phase are described in section 6.1 of the Bat report. Details of this mitigation and how it is calculated is provided in Appendix 6-2.</p> <p>Blade Feathering</p> <p>On a precautionary basis, and in addition to buffers applied to habitat features, it is proposed that 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>Bat Mitigation and Monitoring Plan</p> <p>Full details of the proposed operational bat monitoring programme for the Proposed Development are provided in Section 6.2.1 of the Bat Report (Appendix 6-2)</p> <ul style="list-style-type: none"> ➤ The post-construction surveys will be carried out as per the pre-construction survey effort. Post-construction monitoring will include static detector surveys, walked survey transects

	<p>and corpse searching to record any bat fatalities resulting from collision.</p> <ul style="list-style-type: none"> ➤ Static monitoring shall take place at each turbine during the bat activity season (between April and October) (NatureScot, 2021, NIEA, 2021). ➤ Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with NIEA Guidance. This shall include searcher efficiency trials and an assessment of scavenger removal rates to determine the appropriate correction factor to be applied in relation to determining an accurate estimate of collision mortality. ➤ Monitoring surveys shall continue in Year 2 and 3, and where a curtailment requirement has been identified, the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s).
<p>Residual Effect following Mitigation</p>	<p>Following the implementation of the monitoring and mitigation described above, there is no potential for significant residual effects on bat species.</p>

6.7.4 Likely Significant Effects During Decommissioning phase

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. The Decommissioning Plan is included as Appendix 4-7 of the EIAR. The CEMP for the project provides the details of the mitigation and best practice that will be employed to avoid any potential for significant residual effects on biodiversity during decommissioning of the proposed wind farm. In addition, the measures incorporated into the construction phase including specific mitigation provided in relation to water quality in Chapter 9: 'Water', will be implemented during decommissioning.

6.7.5 Effects on Designated Sites

None of the development footprint is located within the boundaries of any Nationally or European designated sites. There will be no direct effects on any designated site as a result of the construction, operation and decommissioning the wind farm project including the grid connection.

Five nationally designated sites were identified as being within the Likely Zone of Impact and as KERs. These are listed below:

- Carrowmore Lake Complex pNHA
- Slieve Fyagh Bog pNHA
- Glenamoy Bog Complex pNHA
- Bellacorick Bog Complex pNHA [001922]
- Owenduff/Nepin Complex pNHA [000534]

All of these pNHAs are also designated as European Sites and have been assessed as those designations within the Appropriate Assessment Screening Report and NIS, with the relevant conclusions are recorded and referenced in this chapter.

The pNHAs Carrowmore Lake Complex, Slieve Fyagh Bog, Glenamoy Bog Complex, Bellacorick Bog Complex and Owenduff/Nepin Complex are located adjacent or very close to the Proposed Development site and/or grid connection route and there is potential for the Proposed Development to result in habitat degradation in the form of pollution with dust during the construction phase of the grid connection route or in the form of, e.g. drainage and hydrological changes during the construction, operational and decommissioning phases. All pathways that would allow for the deterioration of habitats to occur will be robustly blocked by the mitigation measures referred to in Sections 6.7.2.1.2 and 6.7.3.1.1 above.

Surface water connectivity was identified between the Proposed Development and Owenduff/Nepin Complex approximately 10km downstream. The pathways that would allow for the deterioration of water quality to occur will be robustly blocked by the mitigation measures referred to in Sections 6.7.2.1.1 and 6.7.3.1.1 above.

Following the implementation of mitigation, there will be no significant residual effect 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 it should refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive”. This section provides a summary of the key assessment findings with regard to 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:

- Carrowmore Lake Complex SAC [000476]
- Slieve Fyagh Bog SAC [000542]
- Glenamoy Bog Complex SAC [000500]
- Bellacorick Bog Complex SAC [001922]
- Owenduff/Nephin Complex SAC [000534]
- Owenduff/Nephin Complex SPA [004098]

As a result, it is respectfully submitted that 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, ‘in the light of the best scientific knowledge in the field, all aspects of the Proposed Development which, by itself, or in combination with other plans or projects, which may affect the relevant European Sites have been considered. The NIS contains information which the competent authority, may consider in making its own complete, precise and definitive findings and conclusions and upon which it is capable of determining that all reasonable scientific doubt has been removed as to the effects of the Proposed Development, by itself, or in combination with other plans or projects, on the integrity of the relevant Natura 2000 sites on the integrity of the relevant Natura 2000 sites’.

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 6.6.5 of this report, including European Sites and Nationally designated sites. This included a review of online Planning Registers and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects considered are listed in Chapter 2: Background of the Proposed Development.

6.8.1 Assessment of Plans

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

- Adopted Mayo County Development Plan 2022 – 2028

- National Biodiversity Action Plan 2017-2021
- The Regional Planning Guidelines for the West 2010-2022
- Northern & Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032 (RSES)

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, particularly where the policies relate to the preservation of surface water quality. An overview of the search results with regard to plans is provided in Table 6-22.

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

Table 6-22 Assessment of Plans

Plans	Key Policies and Objectives directly related to Designated Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
<p>Adopted Mayo County Development Plan 2022-2028</p>	<p><u>Peatlands</u></p> <p>Objective 15: As part of the implementation of Climate Ready Mayo, Climate Adaption Strategy, to develop and implement a Peatland Management Strategy for County Mayo that will: (a) Identify damaged Peatlands in the county and those at risk from climate change and becoming carbon emitters. (b) Initiate conservation and management of Mayo’s peatlands, particularly those sites nominated for designation as Special Areas of Conservation and Natural Heritage Areas, to preserve the habitat and their unique ecosystems, managing flood risk and other environmental benefits.</p> <p>Objective 16: To actively increase public awareness of the importance of peatlands as carbon sinks to combat climate change.</p> <p><u>Biodiversity, Designated and Non-Designated Sites</u></p> <p>Objective 1: To support the protection, conservation and enhancement of the natural heritage of County Mayo, including the protection of the integrity of European sites, that form part of the Natura 2000 network, the protection of Natural Heritage Areas, proposed Natural Heritage Areas Ramsar Sites, Nature Reserves and Wild Fowl Sanctuaries (and other designated sites including any future designations)</p> <p>Objective 4: To protect and enhance biodiversity and ecological connectivity in County Mayo, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, stonewalls, geological and geo-morphological systems, other landscape features and associated wildlife, where these form part of the ecological network.</p> <p>Objective 6: To protect surface waters, aquatic and wetland habitats and freshwater and water dependent species through the implementation of all appropriate and relevant Directives and transposed legislation and seek to protect and conserve the quality, character and features of inland waterways by controlling developments close to navigable and non-navigable waterways.</p> <p>Objective 8: To maintain, protect and where possible enhance bogs, fens and turloughs, where appropriate, in County Mayo.</p>	<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>The Proposed Development has been designed in order to avoid peatland habitats and the Biodiversity Management Plan includes for the improvement of existing and the creation of new peatland habitat.</p> <p>The Proposed Development is located outside of any Designated sites, as described in Section 6.5.1.</p> <p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified.</p> <p>No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Development.</p>

Plans	Key Policies and Objectives directly related to Designated Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>Objective 11: To ensure that the impact of development within or adjacent to national designated sites, Natural Heritage Areas, Ramsar Sites and Nature Reserves likely to result in significant adverse effects on the designated site is assessed by requiring the submission of an Ecological Impact Assessment prepared by a suitably qualified professional, which should accompany planning applications.</p>	
<p>National Biodiversity Action Plan 2017-2021</p>	<p>Objective 4: Conserve and restore biodiversity and ecosystem services in the wider countryside</p> <ul style="list-style-type: none"> Action 4.2.1. Continue to protect, enhance and monitor the ecological status of water during the second cycle of the Water Framework Directive (2015- 2021) including reducing risks to water quality and utilising ecological expertise in decision-making, and in analysis of cumulative effects <p>Objective 6: Expand and improve management of protected areas and species</p> <ul style="list-style-type: none"> Target 6.2: Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020. 	<p>The National Biodiversity Action 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 deterioration of water quality as a result of the Proposed Development.</p> <p>The Proposed Development has been designed in order to avoid any potential fragmentation of habitats or commuting corridors.</p> <p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified.</p>
<p>The Regional Planning Guidelines for the West 2010-2022</p>	<p>EAP13: To support the protection of Natural Heritage Areas, Special Protection Areas, Special Areas of Conservation, Nature Reserves, Ramsar Sites (Wetlands), Wildfowl Sanctuaries, National Parks, Nature Reserves and the biodiversity designated under the Habitats Directive, Birds Directive, Wildlife Act, Flora Protection Order and other designated or future designated sites.</p> <p>EAO18: Support the achievement of favourable conservation status of Annex I habitats, Annex II species, Annex I bird species and other regularly occurring migratory bird species and their habitats in the region.</p>	<p>The Proposed Development will not result in significant effects on habitat and features of ecological importance.</p> <p>The Proposed Development has been designed to avoid and minimise impacts on sensitive habitats and species.</p> <p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified</p>

Plans	Key Policies and Objectives directly related to Designated Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
<p>Northern & Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032 (RSES)</p>	<p>RPO 5.4 Encourage the prioritisation of Site-Specific Conservation Objectives (SSCO) for all sites of Conservation Value, designated in EU Directive (i.e. SACs, SPAs) to integrate with the development objectives of this Strategy.</p>	<p>There will be no adverse effects on peatlands or on QI's/SCI's/SSCO's as a result of the Proposed Development and no cumulative impacts in this regard.</p> <p>The Proposed Development has been designed to avoid any effects on water quality and/or designated Natura 2000 sites outside the site as set out in Section 3 of the accompanying NIS.</p> <p>The Proposed Development has been subject to a full environmental assessment i.e. EIA and AA.</p>
	<p>RPO 5.5 Ensure efficient and sustainable use of all our natural resources, including inland waterways, peatlands, and forests in a manner which ensures a healthy society a clean environment and there is no net contribution to biodiversity loss arising from development supported in this strategy. Conserve and protect designated areas and natural heritage areas. Conserve and protect European sites and their integrity.</p>	
	<p>RPO 5.7 Ensure that all plans, projects and activities requiring consent arising from the RSES are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate.</p>	

6.8.2 Assessment of Projects

As described in Section 2.8 of the EIAR, relevant projects have been assessed in-combination with the Permitted Development and include planning applications in the vicinity of the site, within the zone of influence of all habitats and species considered in this report, and other wind energy applications within the wider area.

For the purposes of this cumulative assessment, wind farms within a 20-kilometre radius of the Proposed Development area were considered in further detail and are listed in Table 6.23 below.

Table 6-23. Wind Energy Applications Within 20km of Application Boundary

Pl. Ref	Description	Decision
Sheskin Wind Farm (ABO Wind Ireland Ltd.)		
15825	8 Wind turbines with associated hardstanding, construction of new internal access tracks, upgrading existing access tracks, underground cabling, permanent meteorological mast and associated hardstanding, electrical substation, recreational walking trail, site compound and associated works, each wind turbine will have an overall max height of 150 metres, comprising a tower 95-105m high, to which three blades of 45-55 m length will be attached	10 year permission Granted by MCC 07/12/2016 subject to 46 conditions
19457	Amendments to existing planning permission p15/825 for 8 turbines with an overall max height of 150m, amendments to include - an increase in the overall maximum height of the turbines from 150m to 176m (turbines 1-3) and from 150m to 165m (turbines 4-8) comprising a tower 95-120m high to which three blades of 55-70m length will be attached. an increase in the maximum height of the permanent met mast from 100m to 120m. an increase in the diameter of the foundation base from 22m to 26m. an amendment to condition no 46 to revise the community benefit payment to 2 euro//mwh to be consistent with government guidance set out under the renewable electricity support scheme. the red line boundary and all other aspects of the permitted development will remain unchanged	Granted by MCC 06/11/2019 subject to 52 conditions
Sheskin Wind Farm Grid Connection		
20834 (ABP 311157)	10-year permission to develop an electricity service, entailing the laying of	Refused by MCC on 19/07/2021

Pl. Ref	Description	Decision
	approximately 10.4 kilometres of 38kv underground cable from the granted Sheskin wind farm to connect the wind farm to the national grid at the existing Bellacorick 110kv ESB station. the proposed grid connection will be installed along existing private tracks, the public roadway and a short section of private agricultural land	Granted by ABP 31/08/2022
Oweninny Wind Farm		
ABP: PA0029	Proposed Oweninny Wind Farm and associated works, Bellacorick,	Granted by ABP 02/06/2016 subject to 20 conditions
ABP: 307261	Section 146B Planning application for amendments to ABP case reference PA0029 for Oweninny Wind Farm	Alter decision - Not a material Alteration (No EIS) (27/07/2020)
ABP: 309375	Pre-App Consultation - Oweninny Wind Farm Phase 3. Between 10 and 20 wind turbines (including tower sections, nacelle, hub, rotor blades) with an approximate capacity of 90 MW and a maximum blade tip height of 200 metres.	Determined it is an SID – 04/04/2022
Dooleg More Single Turbine		
20467	Single wind turbine generator and 20kV grid connection to Bellacorick 110kV substation	Granted by MCC 25/03/2021 subject to 15 conditions
Bunnahowen Wind Farm		
18873	Permission to modify the existing permission, p08/1997, to erect three (3) 1mw turbines, control house and ancillary associated works	Granted by MCC 10/03/2019 subject to 6 conditions
Corvoderry Wind Farm		
11838	Erect an electricity generating wind farm consisting of 10 wind turbines each with an overall height of up to 100 metres, hardstandings, an electrical compound and substation building, 4 car park spaces, associated site roads, drainage and site works	Granted by MCC 10/09/2012 subject to 42 conditions. The permission expired on 14/10/2022

Pl. Ref	Description	Decision
Bellacorick Wind Farm		
ABP: 311157	10 Year permission to develop an electricity service, entailing the laying of approximately 10.4km of 38KV underground cable from the granted Sheskin Wind Farm to connect the wind farm to the national grid at the existing Bellacorick 110KV ESB Station. A Natura Impact Statement was lodged with the planning application.	Granted by ABP 31/08/2022 subject to 7 conditions.
Glenora Wind Farm		
ABP: 310528	Wind energy development and associated works and services.	Pre-Application Consultation has yet to be concluded

6.8.3 Existing Habitats and Land Uses

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

The wind farm is primarily located in forestry habitats, which generally provide low value habitats for faunal species. In addition, due to the nature of the plantation forestry, this habitat is of low biodiversity value locally. The proposed development will not result in any loss of valuable habitats, e.g. Lowland blanket bog. There will be biodiversity net gain through habitat enhancement and restoration proposed as part of this development. The windfarm will not contribute to any overall loss of high value habitat, it has been deliberately designed to be located on habitats of low value for faunal species. .

6.8.4 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 in Sections 6.8.1 & 6.8.2. Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed Development and those that could be potentially affected via downstream surface water.

Following the detailed surveys undertaken and impact assessment provided in Section 6.7, it is concluded that there will be no significant residual habitat loss, disturbance, deterioration of water quality etc., associated with the wind farm project and therefore it cannot contribute to any cumulative effect when considered in combination with other plans and projects. The other wind farms in the area were considered (among other projects) but the Proposed Development has been deliberately designed to minimise the effects on biodiversity through the siting of the wind farm on habitats of low ecological value (conifer plantation). The project also includes a biodiversity management plan, which further minimises / offsets any potential for individual or cumulative negative effects on biodiversity.

No significant effects as a result of the Proposed Development in relation to disturbance, displacement or mortality of faunal species has been identified and, following a review of the plans and projects listed above, no potential for the Proposed Development to contribute to any cumulative effect in this regard was identified.

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

6.9 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 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 any European Sites. Following the implementation of mitigation, no potential for significant effects on Nationally designated sites downstream of the site were identified.

The mitigation described in this chapter will be implemented in full and it is therefore predicted that there will be no significant individual or cumulative effects on ecology at the international, national or county scales or on any of the identified KERs.