Planning and Environmental Consultants

Appropriate Assessment Screening Report and Natura Impact Statement

Maughanaclea Renewable Energy Development, Co, Cork

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1. INTRODUCTION

1.1 Background

MKO has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Appropriate Assessment of the Maughanaclea Renewable Energy Development (the Proposed Project), Co, Cork.

Screening for Appropriate Assessment is required under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). Where it cannot be excluded that a project or plan, either alone or in combination with other projects or plans, would have a significant effect on a European Site then same shall be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The current project is not directly connected with, or necessary for, the management of any European Site. Consequently, the project has been subject to the Appropriate Assessment Screening process.

This Natura Impact Statement (NIS) has been prepared in accordance with:

- European Commission's Assessment of Plans and Projects Significantly affecting Natura 2000 Sites. Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2021)
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018)
- Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG, 2010)
- Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, Dublin 7, Ireland OPR (2021).

1.2 References to Proposed Project

For the purposes of this NIS:

- The 'Proposed Project' refers to the entirety of the project (the 'Proposed Wind Farm' and the 'Proposed Grid Connection'
- The 'Proposed Wind Farm' refers to the 14 no. turbines and supporting infrastructure as detailed in Chapter 4 of the EIAR, including the proposed onsite 110kV substation.
    - The 'proposed turbines' refers to the 14 no. turbines associated with the Proposed Wind Farm as outlined above
- The 'Proposed Grid Connection' refers to the 110kV underground cabling connection from the proposed 110kV onsite substation to the existing Dunmanway 110kV substation, and all ancillary works and apparatus. The Proposed Grid Connection will facilitate the connection of the Proposed Wind Farm to the national electricity grid;
- The 'Site' refers to the primary study area for this NIS and encompasses an area of approximately 1,175 hectares; and,
- The 'Proposed Wind Farm site' refers to the portion of the Site surrounding the Proposed Wind Farm but excluding the portion of the Site surrounding the Proposed Grid Connection underground cabling route.
- In the context of aquatic surveys, the 'Proposed Wind Farm study area' refers to the survey locations selected along watercourses upstream, downstream and within the Proposed Wind Farm site. The 'Proposed Grid Connection study area' refers to the survey locations selected at points which the Proposed Grid Connection crosses watercourses.

1.3 Statement of Authority

This report has been prepared by Juliane Kohlstruck (B.Sc., M.Sc.). Juliane has over 5 years' experience in ecological consultancy and has worked on Appropriate Assessments and Ecological Impact Assessments for a range of project types, including renewable energy infrastructure. This report has been reviewed by Rachel Walsh (B.Sc., MCIEEM). Rachel is a Senior Ecologist with over 5 years' experience in professional ecological consultancy and is a full member of CIEEM with a First-Class Honours BSc in Environmental Science. Rachel's key strengths are in terrestrial flora and fauna ecology, including Irish Vegetation Classification surveys, Annex I habitat surveys, habitat mapping and mammal surveys. Rachel has extensive experience in writing and review of Appropriate Assessment reporting, Ecological Impact Assessment and EIA inputs. Since joining MKO, Rachel has worked widely on renewable energy infrastructure projects, wastewater infrastructure projects, extractive industry and residential projects, and has acted as lead ecologist on numerous large scale private and public sector contracts. She also manages a team of ecologists within the company.

The baseline terrestrial ecological surveys were undertaken by Rachel Minogue (B.Sc.), Matthew Kieran (B.Sc.), Fiona Kileen (B.Sc.), Colin Murphy (B.Sc., M.Sc.), Tom Peters (B.Sc., M.Sc.), Ciara Lynn Sheehan (B.Sc.), and Niamh Rowan (B.Sc.) of MKO throughout 2024 and 2025.

1.4 Methodology

1.4.1 Appropriate Assessment Process

Screening - The purpose of the screening stage is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, either alone or in combination with other plans or projects, is likely to have significant effects on a European Site in view of the site's conservation objectives.

There is no necessity to establish such an effect; it is merely necessary for the Competent Authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of Appropriate Assessment has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European Site may be excluded. The threshold at this first stage is a very low one and operates as a trigger in order to determine whether Appropriate Assessment of a project is required. Therefore, where significant effects are likely, uncertain or unknown at screening stage, an AA of the project will be required.

Appropriate Assessment - This stage of the process is a focused and detailed examination, analysis and evaluation by the Competent Authority of the implications of the plan or project, either alone or in combination with other plans and projects, on the integrity of a European Site in view of that site's conservation objectives. Case law has established that such an Appropriate Assessment, to be lawfully conducted must:

> (i) identify, in the light of the best scientific knowledge in the field, all aspects of the Proposed Project which may, by itself or in-combination with other plans or projects, affect the conservation objectives of the European Site;
>
> (ii) contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps; and
>
> (iii) may only include a determination that the Proposed Project will not adversely affect the integrity of any relevant European Site where the competent authority decides (on the basis of complete, precise and definitive findings and conclusions) that no reasonable scientific doubt remains as to the absence of potential adverse effects. If adverse impacts can be satisfactorily

avoided or successfully mitigated at this stage, so that no reasonable doubt remains as to the absence of the identified potential effects, then the process is complete. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to stage three (assessment of alternative) and, if necessary, stage four (IROPI[1]).

1.4.2 Desk Study

The desk study undertaken for this assessment included a thorough review of the available ecological data associated with the screened-in European Sites within the Likely Zone of Influence of the Proposed Project. Sources of data included the following:

- Review of NPWS Conservation Objectives supporting documents, site synopsis, standard data forms and supporting documents for European Designated Sites,
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA),
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper,
- Review of NPWS Article 17 metadata and GIS database
- Review of Chapter 6- 'Biodiversity', Chapter 7- 'Ornithology' and Chapter 9- 'Water', of the Environmental Impact Assessment Report (EIAR) submitted as part of this planning application.

1.4.3 Ecological Survey Methodologies

1.4.3.1 Ecological Multidisciplinary Walkover Survey

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological baseline conditions are those existing in the absence of proposed activities (CIEEM 2018[2]).

Multidisciplinary walkover surveys were conducted by MKO ecologists on the following dates:

- 17/07/2024
- 18/07/2024
- 28/08/2024
- 12/09/2024
- 12/05/2025
- 13/05/2025
- 14/05/2025

Multidisciplinary Ecological Walkover Surveys were conducted in line with TII (2009)[3] guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). Habitats were identified in accordance with the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000)[4]. 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). During the surveys, the site was searched for species listed on the Third Schedule of the European Communities (Birds and Natural Habitats)

[1] *IROPI - 'imperative reasons of overriding public interest', the test found in Article 6(4) of the Habitats Directive.*
[2] *(CIEEM 2018)- Guidelines for Ecological Impact Assessment in the UK & Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.3. Available at https://cieem.net/wp-content/uploads/2018/08/EcIA-Guidelines-v1.3-Sept-2024.pdf*
[3] *(TII 2009)-Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. Available at https://www.tii.ie/media/4nthqz3a/ecological-surveying-techniques-for-protected-flora-and-fauna-during-the-planning-of-national-road-schemes.pdf*
[4] *(Fossitt 2000)- A Guide to Habitats in Ireland. Available at https://www.npws.ie/sites/default/files/publications/pdf/A%20Guide%20to%20Habitats%20in%20Ireland%20-%20Fossitt.pdf*

Regulations (S.I. 477 of 2011) and species listed on the First Schedule of the European Union (Invasive Species) Regulations (2024) (S.I. No. 374 of 2024).

1.4.3.2 Aquatic surveys

Field surveys carried out in the vicinity of the Proposed Wind Farm took place on the 10th 12th and 17th July 2024; aquatic surveys in the vicinity of the Proposed Grid Connection took place on 15th and 16th October 2024. Survey locations are shown in Figure 1-1 and Figure 1-2 in the Aquatic Report in Appendix 1. Aquatic Baseline Surveys undertaken in the vicinity of the Proposed Wind Farm include:

- River habitat assessment,
- Fisheries habitat assessment,
- Electrofishing surveys,
- Macroinvertebrate surveys,
- Otter Surveys
- eDNA surveys (at select sites)

Aquatic Baseline Surveys undertaken along the Proposed Grid Connection include:

- River habitat assessment,
- Fisheries habitat assessment,
- Macroinvertebrate surveys,
- Otter Surveys
- eDNA surveys (at select sites)

The results provided in this report focus on Brook Lamprey and Freshwater Pearl Mussels (including salmonids as a host species for Freshwater Pearl Mussels), both of which are Qualifying Interest species of the Bandon River Special Area of Conservation (SAC), the boundary of which extends into the southern parcel of the Proposed Grid Connection.

Full details of the Aquatic Survey Methodologies are provided in **Appendix 1.**

1.4.3.2.1 *Riverine Habitat Assessment*

Aquatic Habitat Assessments/ Appraisals were undertaken in order to determine the riverine habitat types present at each of the survey locations within and in the vicinity of the Proposed Project. The survey design and methodologies were derived from current ecological best practice guidance documents. Habitats were classified in accordance with the national habitat classification system used in Ireland - A Guide to Habitats in Ireland (Fossitt 2000).

Riverine habitat assessments were conducted utilising elements of the following methodologies and literature to characterise the selected sites along the watercourse:

- Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) [5],
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (PE-ENV-01113). (TII, 2008),
- Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000).

The survey was devised to gather ecological baseline information including any habitat features that could potentially support protected Qualifying Interest (QI) species associated with European Designated Sites within the wider area of the Proposed Project i.e., Brook Lamprey, Freshwater Pearl

[5] *EA (2003)- River Habitat Survey in Britain and Ireland Field Survey Guidance Manual. Available at https://assets.publishing.service.gov.uk/media/62dff4138fa8f564a21dcd5e/RHS-manual-2003_2022-reprint-LIT-1758.pdf.*

Mussel and salmonids (as host species for Freshwater Pearl Mussel) population potentially associated with the Bandon River SAC. In addition, the survey had regard to the potential presence of problematic invasive alien species with an emphasis on those species listed on the 'Third Schedule' of Regulations 49 & 50 of the Birds and Natural Habitats Regulations 2011. The assessments have regard to the TII (2020) guidance document- *Management of Invasive Alien Plant Species on National Roads.*[6]

All sites were assessed in terms of the following variables:

- Channel width and depth.
- Bank profiles, including bank height and composition.
- Substrate type, listing substrate fractions in order of dominance.
- Flow type.
- In-stream macrophyte and aquatic bryophytes
- Water clarity and colouration.
- Riparian vegetation composition.

1.4.3.2.2 Fisheries Habitat Assessment

An assessment of the riverine habitats at each survey site was undertaken to determine the potential for watercourses within the Proposed Wind Farm and Proposed Grid Connection study areas to support fish species, including Salmonids, Lamprey spp., and European eel, and others.

Fisheries habitat assessments were conducted utilising elements of the following methodologies and literature to characterise the selected survey sites along the watercourses:

- Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003)
- Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000).
- Channels & Challenges. Enhancing Salmonid Rivers. Irish Freshwater Fisheries Ecology & Management Series (O'Grady, 2006)
- Life Cycle Unit method (Kennedy, 1984; O'Connor & Kennedy, 2002)
- NPWS Irish Wildlife Manuals lamprey surveys (O'Connor, 2004; O'Connor, 2006; and O'Connor, 2007)
- Evaluation of Habitat for Salmon and Trout. Department of Agriculture Fisheries Division. EU Salmonid Enhancement Programme (DOA-NI, 2005)
- Restoration of Riverine salmon habitats (Hendry, K. & Cragg-Hine, D., 1997)
- Ecology of the Atlantic Salmon, Conserving Natura 2000 Rivers (Hendry, K & Cragg-Hine, D., 2003)
- Habitat requirements of Atlantic salmon and brown trout in rivers and streams (Armstrong. J.D. et al., 2003)
- Ecology of the River, Brook, and Sea Lamprey (Maitland, 2003)
- Monitoring the River, Brook and Sea Lamprey, *Lampetra fluviatilis, L. planeri* and *Petromyzon marinus* (Harvey J. & Cowx I. 2003).
- The Eel: Biology and Management of Anguillid Eels (Tesch, F.W., 2007)

1.4.3.2.3 Electro-fishing Surveys

Electro-fishing operations for the purpose of forming baseline fisheries data of the Proposed Wind Farm site were undertaken on the 7th–9th August 2024.

A 5- or 10-minute timed electrofishing survey was undertaken at each of the survey locations, in order to determine the presence/absence of fish species within the Proposed Wind Farm study area while

[6] *TII (2020)- Management of Invasive Alien Species on National Roads- Standard. Available at* https://invasives.ie/app/uploads/2024/03/ManagementofIAPSonNationalRoads_TII_STANDARD_Dec2020_GE-ENV-01104.pdf

adhering to best practice methodology (Electric Fishing in Wadeable Reaches, Central Fisheries Board (CFB, 2008)), as well as European standards for electrofishing (CEN, 2003). Two suitably qualified ecologists conducted electro-fishing operations at the electro-fishing locations as per Fig 1-1 in the Aquatic Report in **Appendix 1**, using an E-fish EF-500B-SYS Electric Fishing Backpack System.

Fish captured during electro-fishing operations at each site were kept in a holding container with oxygenated water. Stress to fish via temperature and low oxygen levels via frequent freshwater changes and monitoring of water temperature within the holding container, ensuring temperatures of 20°C were not surpassed. All fish temporarily captured during the survey were identified to species and measured. All fish temporarily captured were allowed to recover and subsequently returned to the watercourse in the vicinity of where they were collected.

1.4.3.2.4 Macroinvertebrate Surveys

A two-minute kick-sample and stone-wash, as well as a 1 min hand search of larger substrata or organic material (e.g., submerged tree limbs/vegetation) was performed at each of the survey locations, as per methodology used by the Environmental Protection Agency (EPA) as part of the Water Framework Directive (WFD) River Monitoring Programme (Toner et al., 2005). Dislodged fauna were caught in a one metre square standard hand net (250 mm x 250 mm, 300 mm bag depth, 1 mm mesh size) situated downstream of the sampler disturbing the stream/riverbed substrate. The sampler moved upstream and across the channel while performing the kick-sample to ensure micro-habitats presents within the watercourse were surveyed. All material collected in the net was transferred via rinsing to a white heavy duty plastic tray (485 x 335 x 80mm) filled with water for identification of macroinvertebrates in situ. using the FBA Guide to Freshwater Invertebrates (Dobson et al., 2012). Large stones and organic material within the sample such as leaves, twigs, algae or bryophytes were examined for any macroinvertebrates present and subsequently removed from the tray.

The sample was examined until all macroinvertebrates present in the sample were identified to the lowest possible taxonomic level using the FBA Guide to Freshwater Invertebrates (Dobson et al., 2012). The Q-value system assigns macroinvertebrate taxonomic groups to one of five WFD status pollution sensitivity groups (from A, most pollution sensitive to E, most pollution tolerant). The Q-value is calculated based on the relative abundance of Pollution Sensitive Group A and B taxa to Pollution Tolerant Group C, D and E taxa within the sample, and the surveyed stretch of watercourse is assigned an associated pollution status.

The EPA Quality (Q)-Rating System is summarised in

Table 1-1.

Table 1-1. EPA Quality (Q) Rating System.

Biotic Index	Quality Status	Quality Status	Quality Class	Condition
Q5, Q4-5	High	Unpolluted	Class A	Satisfactory
Q4	Good	Unpolluted	Class A	Satisfactory
Q3-4	Moderate	Slightly Polluted	Class B	Unsatisfactory
Q3, Q2-3	Poor	Moderately Polluted	Class C	Unsatisfactory
Q2, Q1-2, Q1	Bad	Seriously Polluted	Class D	Unsatisfactory

1.4.3.2.5 eDNA Surveys

The Proposed Wind Farm is located across the Owvane and Mealagh *Margaritifera* sensitive areas, which are both listed as catchments of extant Freshwater Pearl Mussel populations outside of the SAC

populations listed in S.I. 296 of 2009. Much of the Proposed Grid Connection is located within the Bandon/Caha *Margaritifera* sensitive area, which is listed as a catchment of SAC populations of Freshwater Pearl Mussel listed in S.I. 296 of 2009.

The incidence of Annex II and V species white-clawed crayfish (*Austropotamobius pallipes*) has been recorded by NPWS within the same 10km hectad (W15) as the part of the Proposed Wind Farm study area and Proposed Grid Connection study area.

As such eDNA sampling for both freshwater pearl mussel (FPM) and white-clawed crayfish (WcC) were undertaken in select watercourses within the Proposed Wind Farm and Proposed Grid Connection study areas in July 2024, with eDNA sampling conducted at 12 no. Proposed Wind Farm survey sites and 9 no. Proposed Grid Connection survey sites.

To detect populations of FPM and WcC, or the presence of Crayfish Plague within the Proposed Wind Farm and Proposed Grid Connection study areas, a composite water sample was collected from the watercourse at each of the selected eDNA survey sites (See Figure 1-1 and Figure 1-2 in the Aquatic Report in **Appendix 1**) in July 2024 and analysed for FPM, WcC and Crayfish Plague. eDNA sampling sites were strategically chosen to maximise longitudinal (instream) coverage within the catchment, facilitating the likelihood of species detection.

Each composite (500ml) water sample was collected from each watercourse, with 20 x 25ml samples taken along the watercourse, for a representative geographic spread at the site. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis following return from site.

Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species' presence. Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the sampling point.

1.4.3.3 Ornithological Surveys

Based on the results of the desk study, consultation and reconnaissance visits, the assemblage of bird species in the Study Area and hinterland, and the likely importance of the Study Area for these species were ascertained. A list of 'target species' likely to occur at the Study Area and hinterland was compiled. The list was drawn from:

- Species listed on Annex I of the EU Birds Directive.
- Special Conservation Interests (SCI) of Special Protection Areas (SPA) within the zone of likely significant effects.
- Red listed Birds of Conservation Concern in Ireland (BoCCI).
- Raptors and species that are particularly sensitive to wind farm developments.

With regard to this NIS, the target species identified is Hen Harrier, on a precautionary basis, as the Proposed Wind Farm is located 20km from Mullaghanish to Musheramore Mountains SPA 004162.

Adopting a precautionary approach, a site-specific scope for field surveys was devised. These were specifically designed to survey for the target species.

1.4.3.3.1 *Survey Methodology*

Field surveys were undertaken during the survey period April 2022 – March 2025, consisting of three breeding seasons (April – September) and four winter seasons (October – March). This survey work forms the core dataset for the assessment of impacts on ornithology. The data provided in the field surveys is robust and allows clear, precise and definitive conclusions to be made on the ornithological receptors identified. In the absence of specific national bird survey guidelines, the ornithological surveys were designed and undertaken in full accordance with the guidance document 'Recommended bird

survey methods to inform impact assessment of onshore wind farms' from NatureScot (formerly Scottish Natural Heritage [SNH]) outlined in SNH (2017), which was revised in NatureScot (2025). Surveys remain in accordance with the updated guidance.

The various ornithological surveys undertaken are described in detail below including a description of the area surveyed and its radius from the Study Area, which depended on the methodology and focal species.

1.4.3.3.2 *Vantage Point Surveys*

Vantage point surveys were undertaken in accordance with SNH (2017; revised in NatureScot, 2025) to monitor flight activity. The area surveyed was the Study Area, providing coverage to a 500m radius of the proposed turbine positions. Surveys were conducted from nine fixed point vantage points (VP1-VP9). The vantage point locations were selected by undertaking a viewshed analysis (described below) and confirmed by a reconnaissance visit and initial field surveys to ensure that the proposed turbine layout was sufficiently covered.

Over the course of the surveys, the turbine layout was altered and, because of this, vantage points were ceased or added as necessary to ensure continued coverage of the layout. VP1 and VP6 were surveyed from April 2022 to September 2023 inclusive. VP9 was surveyed from April 2024 to March 2025 inclusive. All other vantage points (VP2, VP3, VP4, VP5, VP7, and VP8) were surveyed between April 2022 to March 2025 inclusive.

Viewsheds were calculated using the Visibility Analysis plugin (Version 1.8) over a raster digital terrain model (DTM) in QGIS (Version 3.28) Note that while the relevance of being able to view as much of the site to ground level is acknowledged, the NatureScot guidance emphasises the importance of visibility of the 'collision risk volume' when the data is to be used to estimate the risk of collision with turbines by birds. Therefore the viewshed analysis aims to identify the most suitable locations to site vantage points such that the airspace of the turbine rotor swept area is in view using the fewest possible number of vantage points. As no specific turbine model was confirmed at the outset of surveys, the viewsheds were based on a notional layer suspended 20m above the ground. The vantage point locations were tested for visibility coverage by creating a point 1.75m in height (to represent the height of the surveyor) on a map using 10m contours terrain data. The relative height of any surrounding landscape features (e.g., trees) and their effects on visibility was also accounted for in the analysis. The software produced 360° viewsheds 20m above ground level up to a 2km radius around the vantage points. These viewsheds were then cropped to a 180° arc representing the area visible to the surveyor. Once the turbine model was confirmed to have a lowest swept height of 36m, the viewsheds were recalculated using a notational layer suspended at 36m. The viewsheds provided adequate coverage of the Proposed Wind Farm site for a collision risk assessment to be undertaken.

Survey methodology followed SNH (2017; revised in NatureScot, 2025). The surveyor collected data on bird observations and flight activity from the scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3 hour watches separated by a minimum 30 minute break (i.e., 6 hours total) per month. Surveys were conducted from April 2022 to March 2025 inclusive, and were scheduled to provide a minimum of 36 hours per winter or breeding season and spread over the full daylight period, including dawn and dusk watches, to coincide with the highest periods of bird activity (Table 1-2).

Table 1-2 Vantage point survey watch duration

Survey Season and Number of Vantage Points	Effort per Vantage Point
Breeding Season 2022 (8 vantage points)	36 hours per vantage point
Winter Season 2022/2023 (8 vantage points)	36 hours per vantage point

Breeding Season 2023 (8 vantage points)	36 hours per vantage point
Winter Season 2023/2024 (6 vantage points)	36 hours per vantage point
Breeding Season 2024 (7 vantage points)	36 hours per vantage point
Winter Season 2024/2025 (7 vantage points)	36 hours per vantage point

Flight activity of target species was mapped and recorded as per defined flight bands, which were chosen in relation to the dimensions of potential turbine models at the outset of surveys. Bands were split into 0-15m, 15-25m, 25-200m and >200m. All flight activity within Band 25-200m is considered to be within the Potential Collision Height (PCH) with regard to the turbine swept area. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

1.4.3.3.3 *Winter Walkover Surveys*

Winter walkover surveys were undertaken to record the presence of bird species within or in proximity to the Study Area. The area surveyed was the Study Area to a 500m radius, including areas between vantage point locations. The methodology was adapted from the breeding walkover methodology outlined in Brown and Shepherd (1993) and Calladine *et al.* (2009), combined with Common Bird Census methods (British Trust for Ornithology, 2021). Transect routes were walked across different habitat complexes within the survey area where access allowed. All target species were recorded and mapped. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

Winter walkover surveys were conducted in daylight hours over four visits between October and March (i.e., four visits in winter 2022/2023, four visits in winter 2023/2024, and four visits in winter 2024/2025).

1.4.3.3.4 *Breeding Walkover Surveys*

Breeding walkover surveys were undertaken to determine possible, probable or confirmed breeding bird activity within or in proximity to the Study Area. The area surveyed was the Study Area to a 500m radius. The methodology was based on Brown and Shepherd (1993) and Calladine *et al.* (2009), combined with Common Bird Census methods (British Trust for Ornithology, 2021) for dense habitat. Transect routes were walked across different habitat complexes within the survey area where access allowed. Using binoculars, the surveyor regularly scanned the surroundings of each transect for target species. All target species were mapped and breeding status was assigned following British Trust for Ornithology (BTO) breeding status codes (https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence). In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

Breeding walkover surveys were conducted in daylight over four visits during the core breeding season months April to July.

1.4.3.3.5 *Waterbird Distribution and Abundance Surveys*

Waterbirds include: swans, geese and ducks; cormorant, shag, divers and grebes; auks and seabirds; gulls, terns and skuas; herons, egrets and crane; rails and crakes; waders; and kingfisher. Due to their strong association with aquatic habitats, dipper were also considered a waterbird for the purpose of these surveys. Wetlands and waterbodies within 1km of the Study Area, as well as Carriganass Bridge (which was just outside this radius) were surveyed for waterbirds. Surveys took place from August to May inclusive during the winter and passage season 2022/2023. Due to very low numbers of waterbirds and limited suitable habitat, surveys took place from October to May inclusive during the winter and passage season 2023/2024 and 2024/2025. Surveys provided information on waterbird distribution in

relation to the Proposed Wind Farm. The area surveyed exceeds the 500m for foraging waterbirds and meets the 1km for roosting waterbirds required in SNH (2017), and follows the recommendations of SNH (2016).

Survey methodology follows Gilbert *et al.* (1998) and the Irish Wetland Bird Survey (BirdWatch Ireland, 2021). Surveys were undertaken during daylight hours from suitable vantage points overlooking wetlands and waterbodies. All target waterbird species were recorded and mapped.

1.4.3.3.6 *Hen Harrier Roost Surveys*

Hen harrier roost surveys were undertaken within a 2km of the Study Area. These surveys aimed to identify active winter hen harrier roosts near or within the Proposed Wind Farm site. Survey methodology followed Gilbert *et al.* (1998) and O'Donoghue (2019). Roost watches of 2-3 hours were conducted at eight hen harrier vantage point locations from dusk until last visible light, during which all hen harrier observations were recorded and mapped.

Each hen harrier vantage point location was surveyed once per month during the winter season between October and March inclusive (winter 2022/2023, winter 2023/2024, and winter 2024/2025).

1.4.3.3.7 *Breeding Raptor Surveys*

Raptors include all harrier, falcon, buzzard, eagle, hawk, owl, kite and osprey species. In breeding season 2024, chough were also included as target species during breeding raptor surveys, as they were observed on other surveys and the desk study showed previous records in this area, and the methodology for both species groups is similar. Breeding raptor and chough surveys were undertaken within 2km of the Study Area to identify occupied territories and monitor their breeding success near or within the Study Area. Survey methodology followed Hardey *et al.* (2013). Watches of 3 hours (supplemented by transects if necessary e.g., if the surveyor investigated potentially interesting activity further) were conducted during daylight at eight breeding raptor survey locations. All raptor species and chough observed were recorded and mapped and breeding status was assigned following BTO breeding status codes. Surveyors did not approach nest sites to avoid disturbance.

Each breeding raptor survey location was surveyed once per month during the core breeding season between April and July. In April 2024 the survey area was split into north, south, east and west areas and a 6-hour survey was conducted in each, providing additional coverage across the Study Area and surrounds.

2. DESCRIPTION OF PROPOSED PROJECT

2.1 Site Location

The proposed Project is made up of two distinct elements, the Proposed Wind Farm and the Proposed Grid Connection. The Proposed Wind Farm site is located within a rural setting in west Co. Cork, approximately 2.3km east of the village of Kealkill, 9.5km northeast of the town of Bantry, and 12.2km west of Dunmanway. The Proposed Wind Farm site is made up of two clusters, a northern turbine cluster and a southern turbine cluster. Corine land cover maps describe the site as primarily consisting of peat bogs, with portions of coniferous forestry, and moors and heathland. The southern turbine cluster is accessed via an existing commercial forestry road off the R585. It is proposed to access the northern turbine cluster via a new site entrance road off the R585 in the townland of Maughanaclea.

The Proposed Grid Connection includes for 110kV underground cabling from the proposed 110kV onsite substation, in the townland of Maughanaclea, Co. Cork, to the existing Dunmanway 110V substation in the townland of Ballyhalwick, Co. Cork. The Proposed Grid Connection is approximately 20.5km in length and is located primarily within the curtilage of the public road corridor. A short section of the route (approximately 940m) is located within the southern turbine cluster of the Proposed Wind Farm site, mostly within an existing access road.

The Proposed Project layout is shown in Figure 2-1.

2.2 Characteristics of the Proposed Project

2.2.1 Overall Proposed Project Description

Consultation with An Coimisiún Pleanála confirmed that the Proposed Project will be subject to a single consenting process, with development relating to the Proposed Wind Farm and the Proposed Grid Connection being made to An Coimisiún Pleanála under Section 37E of the Planning and Development Act, 2000, as amended.

The development description for the current planning application as it appears in the public notices is as follows:

The Proposed Project will consist of the provision of the following:

1. *14 no. wind turbines with an overall turbine tip height of 169 metres, a rotor blade diameter of 133 metres, and turbine hub height of 102.5 metres, and a meteorological mast with a height of 30 metres, and subsequent decommissioning of the wind turbines and meteorological mast, following a thirty five-year operational life from the date of full commissioning of the wind turbines;*
2. *Associated wind turbines and meteorological mast foundations and hardstanding areas;*
3. *A 110kV substation compound (Including control buildings (with a combined floor area of 594Sq.m) with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, lightening protection poles, underground wastewater holding tank, site drainage and all ancillary works);*
4. *Underground electrical (110kV) and communications cabling from the proposed 110kV substation to the existing Dunmanway 110kV substation in the townland of Ballyhalwick (including joint bays, communication chambers, earth sheath links, and ancillary works along the underground electrical cabling route). This cabling route is primarily located within the public road corridor;*
5. *Underground electrical (33kV) and communications cabling connecting the wind turbines and meteorological mast to the proposed 110kV substation;*

6. *3 no. temporary construction compounds (including site offices and welfare facilities (with a combined floor area of 585Sq.m);*
7. *2 no. temporary security cabins (with a combined floor area of 28.8Sq.m);*
8. *Junction accommodation works to facilitate turbine delivery and construction access to the site, including the upgrade of an existing site entrance off the R585 regional road, and the construction of a new access road off the R585 regional road, crossing the L8777 Local Road; including new permanent gated site entrances;*
9. *Upgrade of existing site tracks/ roads and provision of new site access roads, junctions and hardstand areas (including upgrade of a short section of the L8777 local road);*
10. *4 no. borrow pits;*
11. *Peat and Spoil Management;*
12. *Site Drainage;*
13. *Tree felling and vegetation removal;*
14. *Biodiversity Enhancement measures (peatland habitat enhancement, Kerry slug habitat enhancement, and native woodland planting);*
15. *Operational stage site signage and;*
16. *All associated site development works and apparatus.*

All elements of the Proposed Project as listed above have been considered as part of this assessment.

This application seeks a ten-year planning permission and a 35-year operational life from the date of commissioning of the entire wind farm.

2.2.2 Proposed Project Components

2.2.2.1 Proposed Wind Farm

2.2.2.1.1 *Wind Turbines*

The turbine model to be installed on the Proposed Wind Farm site will have the following dimensions:

- Turbine tip height of 169 metres;
- Blade rotor diameter of 133 metres; and,
- Hub height of 102.5metres.

2.2.2.1.2 *Turbine Foundations*

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbine foundations with some variation, depending on the requirements of the final turbine supplier, however, a foundation area large enough to accommodate modern turbine models has been assessed in this report, adopting a precautionary approach. The turbine foundation transmits any load on the wind turbine into the ground. The maximum horizontal and vertical extent of the turbine foundation will be 25m and 3.5m respectively.

After the foundation level of each turbine has been formed on competent strata (i.e., bedrock or sublayer of sufficient load bearing capacity), the “Anchor Cage”, which anchors the first section of the turbine tower to the foundation, is levelled and reinforcing steel is then built up around and through the anchor cage. The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to finished surface level.

2.2.2.1.3 Hard Standing Area

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. All crane hardstand areas will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The main body of the crane hardstands (i.e. not including the blade fingers and turbine foundation) will be constructed in a similar manner to the excavated site roads. The main body of the crane hardstand area will measure approximately 35m x 55m.

The proposed hard standing areas are illustrated in the detailed drawings included in Appendix 2 of this report. The extent of the required areas at each turbine location may be optimised on-site depending on topography, position of the Proposed Wind Farm access roads, the proposed turbine position and the turbine supplier's exact requirements. The proposed hard standing areas for each individual turbine are shown as part of the detailed layout drawings included in Appendix 2 and using the precautionary principle, represent the maximum sizes required.

A temporary works area has been identified around each of the proposed turbines hardstand areas; these areas will be utilised during the construction phase to facilitate all works with the construction of the proposed turbines and associated infrastructure. These temporary works areas are shown within the planning drawings included in the appendix.

2.2.2.1.4 Generating Capacity

Modern wind turbine generators currently have a typical generating capacity in the 4 to 7 MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by the turbine manufacturers. Turbines of the exact same make, model and dimensions can have different generating potential depending on the capacity of the electrical generator installed in the turbine nacelle. The exact generating capacity of the installed turbine will be designed to match the wind regime on the Proposed Wind Farm site and will be determined by the selected manufacturer.

Please note, the MW output of the Proposed Wind Farm is considered to be a consequence of turbine design and not a physical attribute on which it is possible to measure or assess the impact of. For the purposes of this EIAR, a rated output of 4.8 MW has been chosen to calculate the potential generating capacity of the proposed 14-turbine renewable energy development, which would result in an estimated installed capacity of 67.2MW.

Assuming an installed capacity of 67.2 MW, the Proposed Wind Farm therefore has the potential to produce approximately 217,800 MWh (megawatt hours) of electricity per year, based on the following calculation:

A x B x C = Megawatt Hours of electricity produced per year

where: A = ... The number of hours in a year: 8,760 hours

B = ... The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 37% is applied here

C = ... Rated output of the Proposed Wind Farm: 67.2 MW

The 217,800 MWh of electricity produced by the Proposed Wind Farm would be sufficient to supply over 51,800 Irish households with electricity per year, based on the average Irish household using 4.2

MWh of electricity (this latest figure is available from the March 2017 CER Review of Typical Consumption Figures Decision Paper).

The 2022 Census of Ireland recorded a total of 127,971 occupied households in Co. Cork. Per annum, based on a capacity factor of 37%, the Proposed Project would therefore produce sufficient electricity for the equivalent of approximately 40% of all households in Co. Cork.

2.2.2.2 Site Roads

To provide access within the Proposed Wind Farm and to connect the wind turbines and associated infrastructure, existing roads and tracks will need to be upgraded, and new access roads will need to be constructed. FTC were appointed to assess the existing ground conditions and specify the type of road required to access all locations onsite. The road construction preliminary design has taken into account the following key factors, as outlined in the Peat and Spoil Management Plan appended to this report.

1. *Buildability considerations*
2. *2 Maximising use of existing infrastructure*
3. *Minimising excavation arisings*
4. *Serviceability requirements for construction and wind turbine delivery and maintenance vehicles*
5. *Requirement to minimise disruption to peat hydrology*

Whilst the above key factors are used to determine the road design, the actual construction technique employed for a particular length of road will be determined on the prevailing ground conditions encountered along that length of road. The Proposed Wind Farm makes use of the existing road network insofar as possible. It is proposed to upgrade approximately 2.1km of existing roads and tracks, and to construct approximately 12.1km of new access road on the Proposed Wind Farm site. Areas such as wide junctions and proposed hardstands will also be used as passing bays throughout the construction phase of the Proposed Wind Farm.

The road construction techniques to be considered are as follows:

- Upgrade of existing access roads or tracks
- Construction of new excavated roads through peat
- Construction of new section of floating road

2.2.2.2.1 *Upgrade of Existing Access Roads or Tracks*

As noted above, approximately 2.1km of existing roads and access tracks will be upgraded as part of the Proposed Wind Farm construction phase. This includes an approximate 0.3km section of local road L8777 which will require minor upgrade works to facilitate the 33kV internal wind farm cabling. The general construction methodology for upgrading of existing sections of access roads or tracks, as presented in FTC's *Peat & Spoil Management Plan* in Appendix 3.

2.2.2.2.2 *Construction of New Wind Farm Access Roads*

As noted above, approximately 12.1km of new roads will be constructed in order to facilitate the Proposed Wind Farm. Due to the ground conditions, new access roads proposed onsite are generally proposed to be founded and located on competent stratum. The excavated access tracks typically consist of an average of 750 mm of selected granular fill.

2.2.2.2.3 Construction of New Section of Floating Road

A new floating road, approximately 85 metres in length, will be constructed in a single area on the Proposed Wind Farm site (to the east of T14) where the peat depth is in excess of 3m and the slope angle is less than a 5 degree slope. The single section of floating road will consist of an up to 1,000 mm of selected granular fill.

The general construction methodologies for the construction of new excavated roads, and the single section of floating road, are summarised in FTC's Peat & Spoil Management Plan in Appendix 3.

2.2.2.3 Watercourse / Culvert Crossings

The Proposed Wind Farm site is extensively drained by a network of natural watercourses and manmade land drains. The majority of watercourses and manmade drains at the Proposed Wind Farm drain into the Owngar River, which flows in an east to west direction between the northern and southern turbine clusters. In addition, several headwater streams rise within the Site and streams flow towards Owngar River, Mealagh River and Gortloughra River.

To facilitate the construction of the Proposed Wind Farm roads, there are a total of 5 no. new watercourse crossing locations over natural watercourses (rivers and streams). The crossing locations are outlined below:

- A new crossing is proposed over the Owngar River along the proposed access road to the northern turbine cluster and to facilitate the 33kV internal wind farm cabling;
- A new crossing on the proposed access road to turbine T4;
- A new crossing on the proposed access road between turbines T11 and T12;
- A new crossing on the proposed access road to turbine T13; and,
- A new crossing on the proposed access road between the proposed 110kV onsite substation and turbine T10.

The above watercourse crossings will all be achieved via new clear span crossings.

In addition to the 5 no. new watercourse crossings to facilitate the construction of the Proposed Wind Farm roads outlined above, there is 1 no. existing watercourse crossing proposed along the R585 between the northern turbine cluster and the southern turbine cluster to facilitate the construction of the 33kV internal wind farm cabling.

Within the Proposed Wind Farm site, there are a total of 3 no. existing watercourse crossings that will require upgrading to facilitate the construction of site roads. The crossing locations are as follows:

- 3 no. existing culverts along the forestry road between the proposed 110kV onsite substation and proposed turbine location T10.

In addition to the natural watercourses, there are manmade agricultural, peat and forestry drains within the Proposed Wind Farm site, which will rerouted around the Proposed Wind Farm infrastructure and/or integrated into the proposed drainage design as required.

2.2.2.3.1 Clear Span Crossing

The watercourse crossings within the Proposed Wind Farm site will comprise clear span watercourse crossings. The construction methodology for these crossings have been designed to eliminate the requirement for in-stream works at these locations. The watercourse crossings will be constructed to the specifications of the Office of Public Work (OPW) bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland (IFI).

Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material. Confirmatory inspections of the proposed new watercourse crossing locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.

2.2.2.3.2 *Culvert Crossing*

All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the relevant drain.

Some culverts may be installed to manage drainage waters from works areas of the Proposed Wind Farm, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base. In all cases, culverts will be oversized to allow mammals to pass through the culvert. Culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.

2.2.2.4 Underground Electrical (33kV) and Communications Cabling

Each turbine will be connected to the proposed 110kV onsite substation via underground 33 kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the meteorological (met) mast to the proposed 110kV onsite substation. The electricity and fibre-optic cabling connecting to the proposed 110kV onsite substation compound will be run in cable ducts approximately 1.2 metres beneath ground level, along the sides of roadways and/or under the roadways. The route of the cable ducts will follow the access track to each turbine location. The exact number and configuration of cable ducting may vary within the cabling trench with two variations of a standard cable trench, one for off-road trenches and one for on-road trenches. The cabling may be placed on either side of the roads, on both sides of the road and/or within the road. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage. Any existing services will be avoided.

Clay plugs (water flow barrier) will be installed at regular intervals of not greater than 50 metres along the length of the trenches where required to prevent the trenches becoming conduits for runoff water. Backfill material will be compacted in layers with approved engineer's specified material, which may be imported onto the Proposed Wind Farm site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure.

2.2.2.5 Meteorological Mast

One metrological (met) mast is proposed as part of the Proposed Wind Farm. The met mast will be equipped with wind monitoring equipment at various heights. The proposed met mast will be located at E 509109, N 555194 (ITM) as shown on the Proposed Wind Farm site layout drawing in Figure 2-1. The mast will be a free-standing slender lattice structure 30 metres in height. The mast will be constructed on a hard standing area sufficient to accommodate the equipment that will be used to erect the mast.

2.2.2.6 Temporary Construction Compounds

There are 3 no. temporary construction compounds proposed as part of the Proposed Wind Farm. A temporary construction compound measuring approximately 2,400m^2 in area will be located in the northern cluster at the approximate coordinates E 510358, N 557722 (ITM). A second temporary construction compound measuring approximately 4,800m^2 in area will be located in the southern cluster at the approximate coordinates E 509024, N 555342 (ITM). There is also a temporary construction compound located adjacent to the eastern boundary of the proposed 110kV onsite substation, measuring approximately 2,108m^2.

The construction compounds will consist of a bunded refuelling and containment area for the storage of lubricants, oils and site generators etc, and full retention oil interceptor, waste storage area, temporary site offices, staff facilities, and car-parking areas for staff and visitors. Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. There will also be a water supply on site for hygiene purposes, by way of a temporary storage tank. The temporary construction compounds will also include a bunded refuelling and containment area for the storage of oil, lubricants and site generators etc, and full retention oil interceptor.

All temporary construction compounds will be removed as part of the post-construction reinstatement works of the Proposed Wind Farm. The concrete foundation of these compounds will be left in situ and will be left to revegetate naturally.

2.2.2.7 Temporary Security Cabins

There will be 2 no. temporary security cabins within the Proposed Wind Farm site, one of which will be located in the Proposed Wind Farm's northern turbine cluster along the proposed site access road, just before the L-8777 Local Road. In the southern cluster, a temporary security cabin will be located just inside the existing site entrance off the R585.

2.2.2.8 Proposed 110kV Onsite Substation

It is proposed to construct a 110 kV onsite substation within the Proposed Wind Farm site. The proposed 110kV onsite substation is located within commercial forestry land and will be accessed via the existing access road to the southern turbine cluster.

The footprint of the proposed 110kV onsite substation compound measures approximately 9,543m^2 in area and will include 2 no. control buildings and the electrical substation components necessary to consolidate the electrical energy generated by each wind turbine, and export that electricity from the proposed 110kV onsite substation to the national grid. The construction and exact layout of electrical equipment in the proposed 110kV onsite substation will be to EirGrid / ESB Networks specifications. The proposed 110kV onsite substation compound will include steel palisade fencing (approximately 2.6 metres high or as otherwise required by ESB), and internal fences will also segregate different areas within the main substation.

The proposed 110kV onsite substation and 110kV underground electrical cabling will remain in place after the operational phase of the Proposed Project as they will be under the ownership and control of the ESB Networks and will form a permanent part of the national electricity grid.

2.2.2.8.1 *Wind Farm Control Buildings*

Two wind farm control buildings will be located within the proposed 110kV onsite substation compound. The Independent Power Producer (IPP) Control Building will measure approximately 18 metres by 7.8 metres and 6 metres in height. It will be located at the western edge of the proposed 110kV onsite substation compound. The EirGrid Control Building will be located towards the centre of the proposed 110kV onsite substation compound and will measure approximately 25 metres by 18 metre and 7 metres in height.

The wind farm control buildings will include staff welfare facilities for the operational phase of the Proposed Project. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. Due to the specific nature of the proposed 110kV onsite substation, there will be a very small water requirement for occasional toilet flushing and hand washing, and therefore a potable water source is not required. It is proposed to either harvest rainwater from the roofs of the buildings or, alternatively, install a groundwater well adjacent to the proposed 110kV onsite substation in accordance with the

Institute of Geologists Ireland, Guide for Drilling Wells for Private Water Supplies (IGI, 2007). The well will be flush to the ground and covered with a standard manhole. A pump house is not required as an in-well pump will direct water to a water tank within the roof space of the control building. Bottled water will be supplied for drinking, if required.

It is not proposed to treat wastewater on site. Wastewater from the staff welfare facilities in the control buildings will be managed by means of a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to a licenced wastewater treatment plant.

Such a proposal for managing the wastewater arising on site has become almost standard practice on wind farm sites, which are often proposed in areas where finding the necessary percolation requirements for on-site treatment would be challenging and has been accepted by numerous Planning Authorities and An Coimisiún Pleanála as an acceptable proposal.

The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system can be submitted to the Planning Authority in advance of any works commencing on-site. The wastewater storage tank alarm will be part of a continuous stream of data from the Proposed Wind Farm turbines, wind measurement devices and proposed 110kV onsite substation that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the proposed 110kV onsite substation underground storage tank.

2.2.2.9 Biodiversity Management and Enhancement Plan

A Biodiversity Management and Enhancement Plan (BMEP) has been prepared for the Proposed Project.

Three different types of enhancement areas within the Proposed Wind Farm site have been selected for biodiversity enhancement measures as part of the Proposed Project and to enhance the Proposed Wind Farm site for species and habitats known to occur within the Proposed Wind Farm site.

2.2.2.9.1 *Kerry slug enhancement areas*

The necessary bat felling buffers for the Proposed Project will be managed as peat and spoil management areas and to enhance Kerry slug habitat, as this species is known to occur within the Proposed Wind Farm site. Enhancement will include the felling of existing conifer plantations within 3 no. felling buffers and leaving the stumps in place and to protrude from the additional peat and spoil deposits, as these provide refuge for this species. These areas combined amount to approx. 3.9 ha. Monitoring of Kerry slug in the areas adjacent to the Proposed Wind Farm site works will be undertaken to provide a before and after impact assessment. This will ensure that populations remain stable post-construction.

2.2.2.9.2 *Native woodland planting*

Coniferous forestry within the Proposed Wind Farm site will be felled and planted with native woodland. Trees will be of native origin and will be of advanced nursery stock where possible. This habitat will connect to a parcel of previously established native woodland and will be located at the boundary of a larger area of conifer plantation. Planting will follow recommendations to establish an oak woodland.

2.2.2.9.3 *Wet Heat Restoration*

As part of the BMEP, it is proposed to restore 5.3 ha of peat habitat. The location of the proposed peatland enhancement area encompasses an area of recently afforested conifer plantation and degraded

wet heath habitat. The selected area for enhancement was recently planted with Sitka spruce. Peat in this area is shallow (<0.5 m), and the understory between the young trees is dominated by *Molinia caerulea* with stands of *Pteridium aquilinum* being locally dominant.

2.2.2.10 Tree Felling and Vegetation Removal

Tree felling will be required within and around the Proposed Wind Farm infrastructure footprint to allow for the construction of the proposed turbines, access roads underground cabling, proposed 110kV onsite substation, and the other ancillary infrastructure.

Approximately 44 hectares of forestry (conifer plantation (WD4)) will be felled to accommodate the Proposed Wind Farm infrastructure and bat buffers inclusive of proposed Turbines T01, T02, T03, T05, T06, T07, T08, T09, T10, T11 and associated infrastructure, and as part of the BMEP.

The Proposed Wind Farm will also require the removal of a small section (23m) of hedgerow (WL1) and 0.6ha of scrub (WS1) to facilitate the construction of an access road.

The forestry felling activities required as part of the Proposed Wind Farm will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. The policy requires that a copy of the planning permission for the Proposed Wind Farm be submitted with the felling licence application; therefore, the felling licence cannot be applied for until such time as planning permission is obtained for the Proposed Project.

2.2.2.11 Borrow Pits

The estimated volume of stone material to be extracted from the borrow pits for the construction of the Proposed Wind Farm is approximately 170,000m3, this figure presented is the anticipated volume; however, the actual volumes will be confirmed at the time of construction and following detailed pre-construction site investigation works. It is intended to obtain the majority of materials for the construction of the Proposed Wind Farm from the 4 no. proposed onsite borrow pits (engineer's specified material may be imported onto the Site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure, to come from local licenced quarries). The borrow pit locations were selected based on the relatively shallow depth to bedrock. Bedrock (sandstone and siltstone) will be excavated and reused across the Proposed Wind Farm site as granular fill for roads and hardstands.

The borrow pits are located adjacent to the proposed new access roads and existing access roads (to be upgraded) and access to the borrow pits will be via these roads. Upon removal of the rock from the borrow pits, it is proposed to reinstate the borrow pits using excavated peat and spoil and then reseed or leave to revegetate naturally. Post-construction, the borrow pit area will be permanently secured. A stock-proof fence will be erected around the borrow pit areas to prevent access to these areas. Appropriate health and safety signage will also be erected on the fencing and at locations around the fenced area.

Material extraction from the borrow pits will take place during the construction phase of the Proposed Project only, and will be a temporary operation conducted over a short period. The topsoil and subsoil will be stripped back and temporarily stockpiled using standard tracked excavators. At certain turbine foundation and hardstand locations, depending on local ground conditions, the extraction of rock may be required in order to obtain a level construction area. Any rock obtained from turbine locations will be used to supply the hardcore materials required for the turbine's hardstand and access road. Hardcore materials will be extracted from the borrow pit (and some turbine locations, if necessary), principally by means of rock breaking. Depending on the hardcore volume, blasting may also be used as a more effective rock extraction method, capable of producing significant volumes of rock in a

matter of milliseconds. Blasting will only be carried out after notifying any potentially sensitive receptors. The processing and crushing of boulders may be required to achieve the grading requirements for use in construction.

Post-construction, any unsafe areas around the borrow pits will be permanently secured, and a stock-proof fence will be erected around each borrow pit area to prevent access. The borrow pits will be backfilled with excavated peat and spoil and then reseeded or left to vegetate naturally. Appropriate health and safety signage will also be erected on this fencing and at locations around the fenced area.

2.2.2.11.1 Rock Breaking

Weathered or brittle rock can be extracted by means of a hydraulic excavator and a ripper attachment. This is a common extraction methodology where fragmented rock is encountered as it can be carefully excavated in layers. In areas where stronger rock is encountered and cannot be removed by means of excavating then a rock breaking methodology may be used. Rock breaking equipment comprises a large hydraulic 360-degree excavator with a rock breaker attachment. Given the power required to break out tight and compact stone at depth, the machines are generally large and in the 40-60 tonne size range. Even where rock might appear weathered or brittle at the surface, the extent of weathering can quickly diminish with depth resulting in strong rock requiring significant force to extract it at depths of only a few metres.

A large rock breaking excavator progressively breaks out the solid rock from the ground in the borrow pit area. A smaller rock breaker, in the 30-40 tonne size range, then breaks the rocks down to a size that can then be fed into a crusher.

The extracted, broken rock is loaded into a mobile crusher using a wheeled loading shovel and crushed down to the necessary size of graded stone required for the on-site civil works. The same wheeled loader takes the stone from the crusher conveyor stockpile and stockpiles it elsewhere within the borrow pit, away from the immediate area of the crusher, until it is required elsewhere within the Site.

2.2.2.11.2 Rock Blasting

Where blasting is used as an extraction method, a mobile drilling rig is used to drill vertical boreholes into the area of rock that is to be blasted. A drilling rig will drill the necessary number of boreholes required for a single blast in approximately 3 to 4 days. The locations, depth and number of boreholes are determined by the blast engineer. This is a specialist role fulfilled by the blasting contractor.

The blast engineer will arrange for the necessary quantity of explosive to be brought to site to undertake a single blast. The management of explosives on-site and the actual blasting operation will be agreed in advance with and supervised by An Gardaí Siochána. The blast engineer sets the explosives in place in the boreholes, sets the charges, and fires the blast.

A properly designed blast should generate rock of a size that can be loaded directly into a mobile crusher, using the same wheeled loader outlined above. The same method is used for processing the rock generated from a blast, as would be used to process rock generated by rock breaking. Generally, the drilling rig will recommence drilling blast holes for the next blast as soon as the previous one has finished. Any blasting will be carried out in accordance with the Guidance on the Safe Use of Explosives in Quarries (Safety and Health Commission for the Mining and Other Extractive Industries, 2002) and the British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise .

2.2.2.11.3 Rock Processing

The blasted rock face will generate various sized rocks, including large boulders. These large boulders will require breaking to enable them to undergo further processing and grading. Rock breaking

typically occurs for 2-4 days post blasting, utilising an excavator with a hydraulic breaker. Rock breaking occurs in close proximity to the Site face to maximise the attenuation offered by the Site face to transmission of the sound. The rock is collected by either a front-end loader or dumper and transported to the semi-mobile crushing/screening unit or loaded directly to the semi mobile crushing/screening unit which follows the operational face within the void. This will break the rock into pre-selected sizes / grades, generating aggregate stockpiles of the graded rock. This will then be transported to other designated stockpile areas of the Site for further screening/processing by articulated dumper or storage until they are required for construction.

Crushed and processed aggregates are stored in graded stockpiles on various parts of the Site and/or used directly in the formation of roads and hardstands.

2.2.2.12 Proposed Grid Connection

2.2.2.12.1 *Underground Electrical Cabling Route*

It is proposed to connect the proposed 110 kV onsite substation within the Proposed Wind Farm site to the existing Dunmanway 110kV substation near Dunmanway, Co Cork via 110 kV underground electrical cabling, as illustrated in Figure 2-2. The Proposed Grid Connection is approximately 20.5km in length and is located primarily within the public road corridor. A short section of the route (approximately 940m) is located within the southern turbine cluster of the Proposed Wind Farm site, mostly within an existing access road.

The Proposed Grid Connection underground electrical cabling route will originate at the proposed 110kV onsite substation and runs southeast for approximately 130m through an existing conifer plantation within the Proposed Wind Farm site. The Proposed Grid Connection will then travel east for approximately 810m through an existing access road within the Proposed Wind Farm site, towards the R585. The Proposed Grid Connection then exists the Proposed Wind Farm southern turbine cluster's site entrance to the east, and travels along the R585 for approximately 7km. The Proposed Grid Connection then turns right and follows the L4909 and L4609 for approximately 3km in a generally southeast direction. The underground cabling route then turns left and is routed along the L4615 in an easterly direction for approximately 5.7km. The underground cabling route then turns right onto the R587 and runs south towards Dunmanway for approximately 3km, before turning left and travelling east on the R586. After 825m the underground electrical cabling route exits the R586 to the south and enters the existing Dunmanway 110kV substation in the townland of Ballyhalwick.

Joint Bays

There are 27 no. joint bays proposed along the Proposed Grid Connection, generally between 700 to 800 apart or as otherwise required by ESB/EirGrid and electrical requirements. These are:

- 1 no. joint bay proposed within the Proposed Wind Farm access roads,
- 9 no. joint bays are proposed along the existing R585,
- 3 no. joint bays are proposed along the L4909 Local Road,
- 1 no. joint bays are proposed along the L4609 Local Road,
- 8 no. joint bays are proposed within the L4615 Local Road,
- 4 no. joint bays are proposed within the R587; and,
- 1 no. joint bay is proposed within the R586.

There are 11 no. identified watercourse crossings along the Proposed Grid Connection. All 11 no. watercourse crossings are referenced on EPA/OSI mapping. An additional watercourse crossing of an EPA mapped watercourse is required within the Proposed Wind Farm site along the R585 to facilitate the 33kV internal wind farm cabling. The construction methodologies for the 11 no. EPA/OSI mapped crossings along the Proposed Grid Connection, and the crossing to facilitate the 33kV internal wind farm cabling, have been designed to eliminate the requirement for in-stream works at these locations.

The various crossing methodologies to be employed along the Proposed Grid Connection include the following:

Type A: Crossing using standard trefoil formation

Type B: Flatbed formation under

Type C: Flatbed Formation over

Type D: Horizontal Directional Drilling

A general description of the construction methods employed at watercourse crossings are described below. An illustration of the proposed crossing methodology at the 11 no. EPA/OSI mapped crossing locations is included within the detailed site layout drawings in Appendix 2.

Construction Methodology

The underground cabling works will consist of the installation of ducts in an excavated trench to accommodate electrical and fibre communications cabling and facilitate the connection between the proposed 110kV onsite substation and the existing Dunmanway 110kV substation. Further details are included in Appendix 4-1 of the EIAR.

The underground cabling will be laid beneath the surface of the Proposed Wind Farm and the public road using the following methodology:

- Before works commence, updated surveying will take place along the proposed cable route, with all existing culverts identified. All relevant bodies i.e. ESB, Cork County Council, etc. will be contacted and all up to date drawings for all existing services sought.
- When the cable is located on public roads, a traffic management plan will be prepared prior to any works commencing. A road opening licence will be obtained where required and all plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator will then proceed to dig out the proposed trench, typically to a depth of c.1300mm, within which the ducts will be laid.
- The cable ducts will be concrete surrounded where they pass under the public road and under drains or culverts.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.
- Once the trench has been excavated, a base-layer will be laid and compacted, comprising Clause 804, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up off of the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.
- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (Clause 804 material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.
- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth,

- The finished surface is to be reinstated, as per original specification. Off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required during the operational phase of the Proposed Project.
- Marker posts will then be placed at regular intervals (generally at joint bays and any change in direction) to denote the location of the underground power cables.

Underground Cabling Installation and Watercourse/Service Crossings

A total of 11 no. existing watercourse crossings will be traversed to cater for the Proposed Grid Connection to the existing Dunmanway 110kV substation. The locations of the watercourse crossings are shown on Figure 2-2. The most appropriate methodology has been selected for each crossing location. Instream works are not required at any watercourse crossing along the route of the Proposed Grid Connection.

Should an alternative methodology option listed below be required for individual crossings during the construction process, this will be agreed with the relevant authorities including Cork County Council prior to works commencing.

Crossing Using Standard Trefoil Formation Over – Option A

Watercourses will not be directly impacted upon since no instream works or bridge/culvert alterations are proposed. Where adequate cover exists above a bridge/culvert , the standard ESB approved trefoil arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert, watercourse, or existing underground service. The cable trench will pass over the culvert in a standard trench.

Flatbed Formation Under – Option B

Where cable ducts are to be installed under an existing watercourse or service crossing where sufficient cover cannot be achieved by installing the ducts in a trefoil arrangement, the ducts will be laid in a deeper trench, the depth of which will be determined by the location of the top of the obstacle or the depth of excavatable material over it. The ducts will be laid in this trench in a flatbed formation under the existing watercourse/service and will be encased in 6mm thick steel galvanized plate with a 35N concrete surround as per ESB Networks specification.

Any addition of a new pavement will be tied back into the existing road pavement at grade. After the crossing under the culvert/service has been achieved, the ducts will resume to the trefoil arrangement within a standard trench.

Flatbed Formation Over – Option C

Where cable ducts are to be installed over an existing watercourse or service crossing where sufficient cover cannot be achieved by installing the ducts in a standard trefoil arrangement, the ducts will be laid in a much shallower trench, the depth of which will be determined by the location of the top of the obstacle or the depth of excavatable material. The ducts will be laid in this trench in a flatbed formation over the watercourse/service and will be encased in 6mm thick steel galvanized plate with a 35N concrete surround as per ESB Networks specification.

Where a bridge/culvert or service has insufficient cover depth to fully accommodate the required trench, the ducts can be laid in a flatbed formation partially within the existing road surface. Where this option is to be employed, the ducts will also be encased in steel with a concrete surround as per EirGrid and/or ESB Networks specifications. In order to achieve cover over these ducts and restore the carriageway of the road, it may be necessary to raise the pavement level locally to fully cover the ducts. The increased road level will be achieved by overlaying the existing pavement with a new wearing course as required. Any addition of a new pavement will be tied back into the existing road pavement

at grade. After the crossing over the culvert has been achieved, the ducts will resume to the trefoil arrangement within a standard trench.

Horizontal Directional Drilling – Option D

The horizontal directional drilling method of duct installation is carried out using Vermeer D36 x 50 Directional Drill (approximately 22 tonnes), or similar plant. The launch and reception pits will be approximately 2.5mm wide, 2.5m long and 2.0m deep. The pits will be excavated with a suitably sized excavator. The drilling rig will be securely anchored to the ground by means of anchor pins which will be attached to the front of the machine. The drill head will then be secured to the first drill rod and the operator will commence to drill into the launch pit to a suitable angle which will enable him to obtain the depths and pitch required to the line and level of the required profile. Drilling of the pilot bore will continue with the addition of 3.0m long drill rods, mechanically loaded and connected into position.

During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length. Depending on the prevalent ground conditions, it may be necessary to repeat the drilling process by incrementally increasing the size of the reamers. When the reamer enters the launch pit, it is removed from the drill rods which are then passed back up the bore to the reception pit and the next size reamer is attached to the drill rods and the process is repeated until the required bore with the allowable tolerance is achieved.

The use of a natural, inert and biodegradable drilling fluid such as Clear Bore™ is intended to negate any adverse impacts arising from the use of other, traditional polymer-based drilling fluids and will be used sparingly as part of the drilling operations. It will be appropriately stored prior to use and deployed in the required amounts to avoid surplus. Should any excess drilling fluid accumulate in the reception or drilling pits, it will be contained and removed from the site in the same manner as other subsoil materials associated with the drilling process to a licensed recovery facility. Backfilling of launch & reception pits will be conducted in accordance with the normal specification for backfilling excavated trenches. The details of methods to be used at each water crossing is shown in the table below. **Please note that WC 11(A) and WC 11(B) relate to the same watercourse crossing. WC 11(A) represents the overflow section of this crossing, which is in place to accommodate floodwater flows. Please note that WC 10 and WC 11 are located within the boundary of Bandon River SAC.**

Table 2-5 Watercourse Crossing Types

Crossing No.	Watercourse Type	Width of Channel (m)	Cover from Road Level to Top of Bridge/ Culvert (m)	Crossing Type Description	Watercourse Crossing Type
WC 1 (EPA Mapped WC)	Stone Arch Bridge	2.7	4.5	Standard Trefoil Formation	Type A
WC 2 (EPA Mapped WC)	Stone Arch Bridge	3.5	2.0	Standard Trefoil Formation	Type A
WC 3 (EPA Mapped WC)*	Stone Arch Bridge	3.9	0.8	HDD	Type D
WC 4 (EPA Mapped WC)	Plastic Pipe	0.6	2.0	Standard Trefoil Formation	Type A
WC 5 (EPA Mapped WC)	Stone Arch Bridge	25.5	0.5	HDD	Type D
WC 6 (EPA Mapped WC)	Concrete Clear-span Bridge	5.4	0.7	HDD	Type D
WC 7 (EPA Mapped WC)	Two-span Stone Culvert	1.85	0.45	HDD	Type D
WC 8 (EPA Mapped WC)	Stone Culvert	0.75	0.9	Flatbed Formation Over	Type C
WC 9 (EPA Mapped WC)	Concrete Clear-span Bridge	2.75	0.55	HDD	Type D
WC 10 (EPA Mapped WC)*	Stone Arch Bridge	65.9	1.15	HDD	Type D
WC 11 (A) (EPA Mapped WC)	Stone Arch Bridge	3.8	1.5	Flatbed Formation Over	Type C
WC 11 (B) (EPA Mapped WC)	Stone Arch Bridge	33.8	0.7	HDD	Type D

*Please note, WC 3 and WC 10 were both originally constructed as stone arch bridges and are indicated as such in the above table. Both were subsequently widened by adding additional concrete crossings immediately adjacent to the original structures.

2.2.2.13 Quantities of Peat, Spoil and Crushed Stone

2.2.2.13.1 *Peat and Spoil Management Plan*

The construction of the Proposed Project will require the excavation of peat and spoil. It is considered that any spoil generated by the proposed cabling trench will be removed and either accommodated within the Spoil Management Areas within the Proposed Wind Farm site or transported to a Materials Recovery Facility (MRF) where necessary. Any road material containing tar will be managed separately.

Tree felling is proposed at various locations across the Proposed Wind Farm site; however, this will not involve the excavation of tree stumps, outside of the Proposed Wind Farm infrastructure footprint, and as such does not affect the excavation volumes.

The total estimated volume of peat and spoil to be managed following excavations during the construction phase of the Proposed Project is approximately 340,820 m3. This comprises 173,420 m3 of peat and 157,400m3 of spoil.

2.2.2.13.2 *Peat and Spoil Usage in Restoration of Borrow Pits*

Once the required volume of rock has been extracted from the borrow pit areas, it is intended to reinstate these areas with any surplus peat and overburden excavated from the works areas of the Proposed Wind Farm.

2.2.2.13.3 *Peat and Spoil Management Areas*

In addition to the reinstatement of the onsite borrow pits, it is proposed to manage any excess overburden generated through construction activities locally within the Site. As identified above, the total estimated volume of peat and spoil to be managed following excavations during the construction phase of the Proposed Project is approximately 340,820m^3. This comprises 173,420m^3 of peat and 167,400m^3 of spoil. It is proposed to manage any excess overburden generated through construction activities locally within the Proposed Wind Farm site by grading the peat and spoil across identified peat and spoil management areas. Excavated peat will be also placed/spread on the upslope side of sections of the Proposed Wind Farm access roads. Linear berms will be placed along access roads and turbine hardstand areas where appropriate.

Some material arising from the construction of the Proposed Grid Connection will be sent to an appropriate licenced facility. The total capacity of the identified peat and spoil management areas within the Site, including the proposed onsite borrow pits, is approximately 368,400m^3 and therefore, there is sufficient capacity to manage the total volume of peat and spoil requiring management for the Proposed Project. The peat and spoil management areas have been selected based on the locations of peat and spoil generation, areas suitable for peat and spoil management, and avoiding environmentally constrained areas. Cross sections of the peat and spoil management areas are shown in the Site Layout Drawings in Appendix 2 and in Appendix 3: Peat and Spoil Management Plan.

2.2.2.13.4 *Crushed Stone*

The quantity of crushed stone required for the construction of the Proposed Project has been calculated at approx. 204,640m^3.

2.2.2.14 Operation

2.2.2.14.1 *Maintenance*

Each turbine will be subject to a routine maintenance programme involving several checks and changing of consumables, including oil changes. In addition, there is often a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. The site roads will also require periodic maintenance.

The proposed 110kV onsite substation will also require periodic maintenance. The substation would be operational 24 hours per day, 7 days a week throughout the year. Substations can be operated remotely and manually. Supervisory operational and monitoring activities will be carried out remotely using a SCADA system, with the aid of computers connected via a telephone modem link. The following maintenance procedures will also be adhered.

1. Periodic service and maintenance works which include some vehicle movement.
2. For operational and inspection purposes, substation access is required.
3. Servicing of the substation equipment will be carried out in accordance with the manufacturer's specifications, which would be expected to entail the following:
    - Six-month service – three-week visit
    - Annual service – six-week visit
    - Weekly visits as required.

Occasional technical problems may require maintenance visits by technical staff. During the six-month and annual service visits, some waste (lubricating and cooling oils, packaging from spare parts or equipment, unused paint, etc.) will arise. This will be recorded and removed from the Site and reused, recycled or disposed of in accordance with the relevant legislation in an authorised facility.

It is estimated that 1-2 daily visits will be made to the Site for authorised persons and vehicles to undertake minor routine maintenance and inspection, if and when required. Although the level of activity required for the maintenance of the both the Proposed Wind Farm and Proposed Grid Connection infrastructure is minimal.

2.2.2.14.2 *Monitoring*

The project includes a programme of monitoring required for the operational phase of the project. A brief summary of the key information is provided below:

- Monthly water sampling and laboratory analysis will be undertaken for the first six months during the operational phase.
- The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.
- Post-construction bird monitoring will be carried out in accordance with the Bird Monitoring Plan.
- Post-construction bat monitoring will be carried out in accordance with the Bat Report recommendations.
- Post-construction monitoring of the biodiversity management and enhancement areas in accordance with the BMEP.
- Monitoring for shadow flicker at sensitive receptors where any exceedance of the shadow flicker limit has been predicted.
- Post turbine commissioning noise monitoring will be commenced within 6 months of commissioning the wind farm.

2.2.2.15 Decommissioning

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

Upon decommissioning of the Proposed Wind Farm site, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine components will be separated and removed offsite. The turbine materials will be transferred to a suitable recycling or recovery facility. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in unnecessary environment emissions such as noise, dust and/or vibration.

The underground electrical cabling connecting the turbines to the proposed 110kV onsite substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

Site roadways could be in use for purposes other than the operation of the Proposed Project by the time the decommissioning of the Proposed Wind Farm site is to be considered, and therefore it may be more appropriate to leave the Site roads in situ for future use. It is envisaged that the roads will serve as agricultural roads for local landowners.

The Proposed Grid Connection and proposed 110kV onsite substation will remain in place as it will be under the ownership and control of the ESB and EirGrid.

A Decommissioning Plan has been prepared (**Appendix 4**) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agree with the competent authority at that time. As noted in the Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the Proposed Project, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore '*best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm'.*

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575000 570000 565000 560000 555000 550000

T01 T02 T03 T04 T05 T06 T07 T08 T09 T10 T11 T12 T13 T14

Microsoft Vantor

Kealkill

Dunmanway

0 5 10 km

Map Legend

- EIAR Site Boundary
- Proposed Turbines Locations
- Existing Dunmanway 110kV Substation
- Proposed Grid Connection
- Proposed Internal 33kV Cabling
- Proposed Turbine Foundations
- Proposed Met Mast Location
- Proposed New Roads
- Exisitng Roads to be Upgraded
- Proposed Peat and Spoil Management Areas
- Proposed Borrow Pits
- Proposed 110kV Onsite Substation

BMEP Enhancement Areas

- Kerry Slug Enhancement Area
- Habitat Restoration Area
- Native Woodland Planting

SITE LOCATION - NOT TO SCALE

Drawing Title: Proposed Project Layout

Project Title: Maughanaclea Renewable Energy Development

Project No.	Drawing No.	Scale
240225	Figure 2-1	1:100,000
Drawn By: SOR	Checked By: RK	Date: 11/03/2026

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

Map Legend

- Site Boundary
- SAC
- Proposed Grid Connection
- Watercourse Crossings

Drawing Title

Proposed Grid Connection

Project Title	Maughanaclea Renewable Energy Development
Drawn By: MK	Checked By: RW
Project No.: 240225	Drawing No.: Figure 2-2
Scale: 1:60,000	Date: 11.03.2026

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3. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

3.1 Desk Study Data

Regionally, the Proposed Wind Farm site is located in the WFD Dunmanus-Bantry-Kenmare Surface Water Catchment within Hydrometric Area No. 21 of the South Western River Basin District.

Locally, the Proposed Wind Farm site is contained within 2 sub-catchments; the Coomhola_SC_010 and the Mealagh_SC_010 where there are 11 no. and 3 no. proposed turbines respectively.

Within the Coomhola_SC_010, the Proposed Wind Farm site drains into the Owvane River catchment with 11 no. proposed turbines located in this catchment (T1 – T9, T12 and T13). The Owvane River drains into Bantry Bay approximately 10km downstream of the Site.

Within the Mealagh_SC_010, the Proposed Wind Farm site drains into the Mealagh River catchment with 3 no. proposed turbines located in this catchment T10, T11 and T14). The Mealagh River also drains into Bantry Bay approximately 10km downstream of the Site.

Within the Owvane River catchment, the northern turbine cluster is located within 2 river sub-basins: the Owvane (Cork)_010 and the Owngar (Cork)_010, while the southern turbine cluster is located only in the Owngar (Cork)_010. Two turbines (T1 and T2) are located in Owvane (Cork)_010 and nine turbines (T3 – T9, T12 and T13) in the Owngar (Cork).

The Owngar River valley separates the northern and southern turbine cluster of the Proposed Wind Farm site. The Owngar River flows into the Owvane River approximately 2km downstream of the Proposed Wind Farm site.

Within the Mealagh River catchment, the southern turbine cluster is located in the Mealagh_010 sub-basin only.

With the exception of 2.9km length at the Proposed Wind Farm site, the Proposed Grid Connection is located mainly in the Bandon River catchment where it passes through the Bandon_SC_010 to Bandon_SC_030 sub-catchments.

The 2.9km length of the Proposed Grid Connection at the Proposed Wind Farm site, including the proposed 110kV onsite substation, is located in the Coomhola_SC_010 which drains locally to the Owngar River (Owngar (Cork)_010).

3.1.1 EPA Water Quality

The EPA Envision map viewer was consulted initially on 6th September 2024 and most recently on 9th January 2026 regarding the water quality status and risk of the rivers which comprise the Proposed Wind Farm and Proposed Grid Connection survey locations.

Table 3-1 presents a summary of the waterbody WFD status for 2013-2018, waterbody WFD status for 2016-2021, waterbody WFD status for 2019-2024 and WFD 3rd Cycle River Waterbodies Risk Projection, as well as details of the corresponding Proposed Wind Farm and Proposed Grid Connection aquatic survey locations. Locations of the Proposed Wind Farm and Proposed Grid Connection aquatic survey locations are provided in Table 1-1 and Table 1-2 and shown in Figure 1-1 and Figure 1-2 of the Aquatic Baseline Report (Appendix 1 of this NIS).

Table 3-1. WFD Status and Risk of surveyed watercourses within the vicinity of the Proposed Wind Farm and Proposed Grid Connection.

Proposed Project survey locations	Watercourse	EPA code	Catchment	Sub Catchment	Waterbody WFD Status for 2013-2018	Waterbody WFD Status for 2016-2021	Waterbody WFD Status for 2019-2024	WFD 3rd Cycle River Waterbodies Risk Projection
Proposed Wind Farm Survey Locations								
WF1	Owvane (Cork)_010	21O07	Dunmanus-Bantry-Kenmare	Coomhola_SC_010	High	High	High	Not at risk
WF 2	Owvane (Cork)_010	21O07						
WF 3	Owvane (Cork)_010	21O07						
WF 4	Owvane (Cork)_010	21O07						
WF 5	Owvane (Cork)_010	21O07						
WF 6	Owvane (Cork)_010	21O07						
WF 7	Owngar (Cork)_010	21O04			High	High	High	Not at risk
WF 8	Owngar (Cork)_010	21O04						
WF 9	Owngar (Cork)_010	21O04						
WF 10	Owngar (Cork)_010	21O04						
WF 11	Owngar (Cork)_010	21O04						
WF 12	Owngar (Cork)_010	21O04						
WF 13	Owngar (Cork)_010	21O04						
WF 14	Owngar (Cork)_010	21O04						
WF 15	Owngar (Cork)_010	21O04						
WF 16	Owvane (Cork)_020	21O07			Good	Good	Poor	Not at risk
WF 17	Owvane (Cork)_020	21O07						

WF 18	Mealagh_010	21M01		Mealagh_ SC_010	High	High	High	Not at risk
WF 19	Mealagh_010	21M01						
WF 20	Mealagh_010	21M01						
WF 21	Mealagh_010	21M01						
WF 22	Mealagh_010	21M01						
WF 23	Mealagh_020	21M01			High	High	High	Not at risk
Proposed Grid Connection Survey Locations								
GC 1	Owngar_(Cork)_010	21O04	Dunmanus-Bantry-Kenmare	Coomhola_SC_010	High	High	High	Not at risk
GC 2	Unmapped watercourse		Bandon-Ilen	Bandon_SC_010	Unmapped watercourse			
GC 3	Bandon_020	20B02			Good	Moderate	Moderate	At risk
GC 4	Bandon_020	20B02						
GC 5	Bandon_010	21O07			Good	Good	Good	Not at risk
GC 6	Bandon_020	20B02			Good	Moderate	Moderate	At risk
GC 7	Bandon_020	20B02						
GC 8	Bandon_020	20B02						
GC 9	Bandon_020	20B02						
GC 10	Bandon_030	20B02		Bandon_SC_020	Moderate	Moderate	Moderate	At risk
GC 11	Bandon_030	20B02		Bandon_SC_030	Moderate	Moderate	Moderate	At risk

The EPA Envision map viewer was consulted on 9th January 2026 regarding the water quality status of watercourses which comprise the Proposed Project survey locations. There were 13 EPA monitoring points within the vicinity of the Proposed Wind Farm and Proposed Grid Connection study areas (Table 3-2).

Table 3-2. EPA Water Quality Data

Watercourse	Sampling Station	Location	Sampling Year	Q-Value & Water Quality Status
Owngar (Cork)_010, downstream of survey site WF 11	Owngar (Cork) - SW of Ballynamought [Station Code: RS21O040200]	E 109403 N 57354.1	2003	Q4-5 - High
Owvane (Cork)_010, downstream of survey site WF 6	Bridge SW of Cappaboy [Station Code: RS21O070200]	E108849.38, N 59017.27	2020	Q4-5 - High
Owngar (Cork)_010, at survey site WF 16	Cahermoanteen Bridge [Station Code: RS21O040400]	E 106461.68, N 56637.04	2020	Q4-5 - High
Owvane (Cork)_020, upstream of survey site WF 17	Bridge NE of Kealkill [Station Code: RS21O070300]	E 104842.5, N 56568.91	2006	Q4 - Good
Owvane (Cork)_020	Owenbeg (Owvane) - Bridge u/s of Owvane River confluence Station Code: RS21O030400]	E 104451, N 56761.2	2003	Q4 - Good
Mealagh_010, upstream of WF 18	Bridge N of Keimeen [Station Code: RS21M010100]	E 111791, N 53311.9	2020	Q4-5 - High
Mealagh_010	Bridge South of Ards More [Station Code: RS21M010200]	E 106502, N 52936.6	2020	Q4-5 - High
Bandon_020, upstream of GC 11	Bandon, Bridge near River View [Station Code: RS20B020200]	E 124173, N 53023.3	1989	Q4 - Good
Bandon_020 River	Ardcahan Bridge [Station Code: RS20B020150]	E 124242.81, N 55701.51	2024	Q 3-4 - Moderate
Bandon_020 River	Bandon - Bridge u/s Ardcahan Br [Station Code: RS20B020100]	E 122739.85, N 56537.78	1989	Q 3-4 - Moderate
Bandon_010 River	Bandon - Bridge East of Keenrath Ho [Station Code: RS20B020050]	E 118718, N 56680.7	2024	Q4-5 - High
Caha_020 River , 0.75km east of Proposed Grid Connection	Caha Bridge- [Station Code: RS20C010700]	E 124332.77, N 56013.32	2024	Q 3-4 - Moderate
Bandon_030 River	Dirty - Bridge u/s Bandon River confluence [Station Code: RS20D010100]	E 123530.149, N 52544.390	2006	Q4 - Good

3.1.2 NPWS Data

3.1.2.1 Freshwater Pearl Mussel

Proposed Wind Farm aquatic survey locations WF 1– WF 17 and GC 1 are located within the Owvane *Margaritifera* sensitive area, and survey locations WF 18– WF 21 are located within the Mealagh *Margaritifera* sensitive area, both of which are listed as catchments of extant Freshwater Pearl Mussel populations outside of the SAC populations listed in S.I. 296 of 2009. See Figure 1-2 of the Aquatic Baseline Report, Appendix 1, for survey site locations.

Survey locations GC 2 – GC 11 are located within the Bandon/Caha *Margaritifera* sensitive area, which is listed as a catchment of SAC populations of Freshwater Pearl Mussel listed in S.I. 296 of 2009. NPWS Point data for Freshwater Pearl Mussel show records of Freshwater Pearl Mussel approx. 160m downstream of survey sites GC 10 and GC 11, approx. 1.7km upstream of survey site GC 5, and approx. 0.23km east of the eastern side of the Proposed Grid Connection (Grid ref: W 24154 55632). Survey sites GC 10 and GC 11 equate to Proposed Grid Connection watercourse crossing points 10 and 11 (Figure 2-2).

3.1.3 Inland Fisheries Ireland Data

Surveys were conducted by IFI as part of water sampling for the Water Framework Directive, in the immediate vicinity of the Proposed Wind Farm Study area and Proposed Grid Connection study area between July 2010-August 2021. Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), sea trout *(Salmo trutta),* european eel (*Anguilla anguilla*), minnow (*Phoxinus phoxinus*), stone loach (*Barbatula barbatula)* and three-spined stickleback (*Gasterosteus aculeatus*) were recorded during surveys.

Sampling of the Bandon River Catchment on the 9th and 12th of September 2019 saw a total of 8 species recorded across 36 survey sites within the catchment. Species recorded included brown trout (0+ and 1+ and older), salmon (0+ and 1+ and older), European eel, minnow, stone loach, three-spined stickleback, lamprey sp. *(Petromyzontiformes spp.)* and pike *(Esox lucius)*, with brown trout being the most abundant species (O'Briain *et al.,* 2019, Sampling Fish in Rivers 2019 – Bandon River Catchment, Factsheet No. 2019/03. National Research Survey Programme. Inland Fisheries Ireland).

3.2 Results of Baseline Ecological Surveys

3.2.1 Habitats Recorded Within the Proposed Wind Farm site

The habitat classifications and codes correspond to those described in 'A Guide to Habitats in Ireland' (Fossitt 2000). A total of twenty-one habitats were recorded within the Site, including:

- Conifer Plantation (WD4)
- Recently Clear-Felled Woodland (WS5)
- Improved Agricultural Grassland (GA1)
- Wet Grassland (GS4)
- Dry Humid Acid Grassland (GS3)
- Dry Meadows and Grassy Verges (GS2)
- Wet Heath (HH3)
- Upland Blanket Bog (PB2)
- Dry Siliceous Heath (HH1)
- Spoil and Bare Ground (ED2)
- Recolonising Bare Ground (ED3)
- Buildings and Artificial Surfaces (BL3)
- Scrub (WS1)
- Dense Bracken (HD1)
- Hedgerow (WL1)
- Drainage Ditch (FW4)
- Riparian Woodland (WN5)
- Eroding Upland River (FW1)
- Depositing Lowland River (FW2)
- Dystrophic Lakes (FL1)
- Treeline (WL2)

3.2.1.1 Conifer Plantation (WD4)/ Recently Felled Woodland (WS5)

Conifer Plantations (WD4) were recorded to the north and south of the Proposed Wind Farm**.** These conifer plantations are dominated by dense, mature Sikta spruce (*Picea sitchensis*). Other species recorded include ling heather (*Calluna vulgaris*), purple moor grass (*Molinia caerulea),* bilberry (*Vaccinium myrtillus*), male fern (*Dryopteris filix-mas*), and hard fern (*Blechnum spicant*). Common bryophyte species recorded within the Conifer Plantations include *Polytrichum commune, Pleurozium schreberi, Hypnum jutlandicum,* and *Thuidium tamariscinum.* Both Conifer Plantations are located on steep, sloping ground on peat soils. Ground conditions varied, with drier grounds covered in needles recorded on higher grounds (upper slopes), and wet ground dominated by carpets of bryophytes and sphagnum recorded on lower grounds (base of slopes).

A large area of recently planted **Conifer Plantation (WD4)** was recorded to the northeast of the Proposed Wind Farm. Species recorded in this area include Sitka spruce saplings, common bent grass (*Agrostis capillaris*), sweet vernal (*Anthoxanthum odoratum*), ling heather, tormentil, Yorkshire fog (*Holcus lanatus*), purple moor-grass, soft rush, Glaucous sedge (*Carex flacca*), grey willow (*Salix cinerea*), alder (*Alnus glutinosa*), gorse, and *Polytrichum commune*. (**Plate 3-2**). This recently planted **Conifer Plantation (WD4)** is located on steeply sloping ground, on peat soils and were dry underfoot. Turbine 6 and associated infrastructure (hardstand and access road) and the Proposed Access Road linking T1 and T2 to T3 and T5 are located to the north of the Proposed Wind Farm within this area. Smaller areas of recently planted **Conifer Plantation (WD4)** were recorded to the centre, and southwest of the Proposed Wind Farm.

Large areas of **Recently Felled Conifer Woodland (WS5)** were recorded to the south of the Proposed Wind Farm. Species recorded include Sitka spruce saplings, tormentil (*Potentilla erecta),* soft rush (*Juncus effusus*), jointed rush (*Juncus articulatus)*, purple moor grass, ling heather, fox glove (*Digitalis purpurea*), gorse (*Ulex europaeus*), bramble (*Rubus fruticosus agg.)* and *Polytrichum commune.* (**Plate 3-3).** One of the Proposed Borrow Pits is partially located within an area of recently felled conifer woodland.

*Plate 3-1 Mature **Conifer Plantation (WD4)** recorded to the north of the Proposed Wind Farm, where T1 and T2 are located.*

*Plate 3-2 Recently planted **Conifer Plantation (WD4)** where the access road linking T1 and T2, to T3 and T5 is located to the north of the Proposed Wind Farm.*

Plate 3-3 ***Recently Felled Conifer plantation (WS5)*** *recorded to the south of the Proposed Wind Farm.*

3.2.1.2 Improved Agricultural Grassland (GA1)

Areas of highly modified/ reclaimed grassland classified as **Improved Agricultural Grassland (GA1)** were recorded throughout the Proposed Wind Farm. These grasslands were intensively managed via grazing by sheep/ cattle or mowing producing a short uniform sward, with little species diversity and limited biodiversity value. These grasslands were dominated by perennial rye grass (*Lolium perenne*). Other species recorded include sweet vernal, common bent, Yorkshire fog, white clover (*Trifolium repens*), creeping buttercup (*Ranunculus repens*), Mouse ear chickweed (*Cerastium fontanum*), cocksfoot (*Dactylis glomerata*), jointed rush, and dandelion (*Taraxacum officinale agg.).*

Turbine 12 and associated infrastructure (hard stands, access roads) are located within areas of Improved Agricultural Grassland, to the southwest of the Proposed Wind Farm **(Plate 3-4). Turbine 13** and hard stand are located to the northwestern parcel of the Proposed Wind Farm, predominantly on an area of reclaimed agricultural grassland, classified as Improved Agricultural Grassland (GA1) (**Plate 3-5)**.

Plate 3-4 ***Improved Agricultural Grassland (GA1)*** *where Turbine 12 and associated infrastructure are proposed to the southwest of the Proposed Wind Farm.*

Plate 3-5 ***Improved Agricultural Grassland (GA1)*** *in the vicinity of T13 and hardstand.*

3.2.1.3 Wet Grassland (GS4)

Areas of **Wet Grassland (GS4)** were recorded throughout the Proposed Wind Farm. These grasslands were intensively managed via grazing by sheep/cattle or mowing, producing a uniform sward, with little species diversity and limited biodiversity value. These areas were dominated by soft rush. Other species recorded include Ragwort (*Jacobaea vulgaris*), Yorkshire fog, white clover, meadow buttercup (*Ranunculus acris),* sweet vernal grass, nettle (*Urtica dioica*), false oat grass (*Arrhenatherum elatius*), jointed rush, tormentil, and gorse.

The **Proposed Access Road linking T11 to T12 and T13** is located on an area of **Wet Grassland (GS4)** (**Plate 3-6**) to the south of the Proposed Wind Farm. Further, new roads are proposed through **Wet Grassland (GS4)** to the centre of the Proposed Wind Farm.

*Plate 3-6 Access Road linking T11 to T12 and T13 located on an area of **Wet Grassland (GS4) in** the south of the Proposed Wind Farm.*

3.2.1.4 Dry Humid Acid Grassland (GS3)/ Wet Grassland (GS4)

Areas of mosaic degraded **Dry Humid Acid Grassland (GS3)/ Wet Grassland (GS4**) were recorded to the north of the Proposed Wind Farm. Species recorded in these areas include common bent grass, Yorkshire fog, soft rush, sweet vernal grass, heath bedstraw (*Galium saxatile*), tormentil, *Rhytidiadelphus loreus* and *Pleurozium schreberi.* These areas were intensively managed by on-going sheep grazing, producing a short uniform sward, with little species diversity and limited biodiversity value.

Turbine 5, and **Turbine 3** and associated infrastructure (hardstands, access roads), the proposed access road from T4, and the northern temporary construction compound are located on a mosaic of degraded **Dry Humid Acid Grassland (GS3)/ Wet Grassland (GS4) (Plates 3-7 and 3-8).**

*Plate 3-7 Mosaic of degraded **Dry Humid Acid Grassland (GS3)/ Wet Grassland (GS4)** where T5 and associated infrastructure is proposed in the north of the Proposed Wind Farm.*

*Plate 3-8 Mosaic of degraded **Dry Humid Acid Grassland (GS3)/ Wet Grassland (GS4)** where T53 and associated infrastructure is proposed in the north of the Proposed Wind Farm.*

3.2.1.5 Dry Meadows and Grassy Verges (GS2)

Dry Meadows and Grassy Verges (GS2) were recorded throughout the Proposed Wind Farm, along existing access road/ public roads and forestry tracks (**Plate 3-9).** Species recorded include Bramble, soft rush, Birds foot trefoil (*Lotus corniculatus*), sweet vernal, nettle, perennial rye grass, common bent, ragwort (*Jacobaea vulgaris*), selfheal (*Prunella vulgaris),* white clover, Yorkshire fog, annual meadow grass (*Poa annua*), and gorse.

Plate 3-9 ***Dry Meadows and Grassy Verges (GS2) recorded*** *along an existing farm access road to the south of the Proposed Wind Farm.*

3.2.1.6 Wet Heath (HH3)

Wet Health (HH3) was recorded throughout the Proposed Wind Farm, on gently sloping peat soils. This habitat type has links to the Annex I habitat '*Northern Atlantic Wet Heaths with Erica tetralix* (4010)'.

Turbine 4 and **Turbine 14**, and associated infrastructure (hardstand and access roads) are located on areas of degraded **Wet Heath (HH3)** not mapped under Article 17. **Turbine 4** and associated infrastructure are located on degraded wet heath, to the north of the Proposed Wind Farm (**Plate 3-10).** Turbine 14 and associated infrastructure are located on degraded wet heath to the southwest of the Proposed Wind Farm (**Plate 3-11)**

Further, the Proposed Temporary Construction Compound to the North of the Proposed Wind Farm is located partially on an area of degraded **Wet Heath (HH3)** and partially on a mosaic of **Dry Humid Acid Grassland (GS3)/ Wet Grassland (GS4).**

Extensive on-going sheep grazing was evident in the vicinity of T4 and T14, and northern temporary construction compound, and as a result the wet heath habitat in these areas was degraded, and uniform in appearance, with little species diversity. These areas were dominated by dense purple moor grass, with a low cover of dwarf shrubs and bryophytes. Cross leaved heath (*Erica tetralix*) and tormentil (*potentilla erecta*) were recorded. The cover of dwarf shrubs was well below the 25% threshold defined for this habitat by Fossitt (2000). Perrin et al. (2014) states that "*dwarf shrub cover as dwarf shrubs may*

be scarce or absent in degraded examples of wet heath characterised by Trichophorum germanicum or Molinia caerulea". Further, the following negative indicator species- Yorkshire fog and common bent grass were recorded in these areas of wet heath (Perrin et al 2014*).* As such, the wet heath habitat in these areas is degraded as a result of the intensive sheep grazing, resulting in a low cover of dwarf shrubs, and poor species diversity, with both areas being dominated by purple moor grass.

Plate 3-10 Degraded ***Wet Heath (HH3)*** *recorded to the north of the Proposed Wind Farm where T4 and associated infrastructure is proposed.*

Plate 3-11 Degraded ***Wet Heath (HH3)*** *recorded to the south of the Proposed Wind Farm where T14 and associated infrastructure is proposed.*

3.2.1.7 *Upland Blanket* Bog (PB2)

Upland Blanket Bog (PB2) was recorded to the northeast and south of the Proposed Wind Farm, on level or gentle sloping ground. The altitudinal division between upland blanket bog (PB2) and lowland blanket bog (PB3) in Fossitt (2000) is the 150m contour, but this is only an approximate guide. Perrin et al (2014) states ', *areas of bogs should be classified primarily on the basis of the vegetation rather than altitude'.* As such, due to the presence and cover of heathers (*Calluna vulgaris, Erica tetralix*), and the absence of Black bog rush (*Schoenus nigricans*), these areas are classified as **Upland Blanket Bog (PB2)** as per Fossitt 2000. Upland Blanket Bog (PB2) often forms intimate mosaics with Wet Heath (HH3). These areas correspond to the Annex I habitat *'Blanket Bogs (if active bog) (7130)*'. A large mosaic habitat of Upland **Blanket Bog (PB2)/ Wet Heath (HH3)** was recorded to the northeast of the Proposed Wind Farm, north of T1 and T2. No Wind Farm infrastructure is proposed in this area.

The floating **Turbine 14 Access Road** runs through an area of **Upland Blanket Bog (PB2)** for approximately 0.2ha. This access road also runs through Wet Heath (HH3), and Dense Bracken (HD1) habitats. There is varying topography in this area, with higher grounds comprised of Wet Heath (HH3)/ Dense Bracken (HD1)(**Plate 3-12**), transitioning into **Upland Blanket Bog (PB2)** on flatter grounds (**Plate 3-13).** Evidence of previous turbary activity **(Plate 3-14**), drainage, and grazing was recorded throughout these habitats, which has resulted in the degradation of this habitat in places. Species recorded include Deer grass (*Trichophorum germanicum*), Bog asphodel (*Narthecium ossifragum*), Carnation sedge (*Carex panicea*), Purple moor grass (*Molinia caerulea*), Cross leaved heath (*Erica tetralix*), Tormentil (*Potentilla erecta*), Common cotton grass (*Eriophorum angustifolium*), Ling Heather (*Calluna vulgaris*), Bell heather (*Erica cinerea*), and Billberry (*Vaccinium myrtillus*). Bryophytes recorded include *Drosera rotundifolia, Rhytidiadelphus loreus, Sphagnum cuspidatum, , and Sphagnum papillosum.*

*Plate 3-12 Overview of transitional/ mosaic habitats of **Upland Blanket Bog (PB2)/ Wet Heath (HH3) and Dense Bracken (HD1)** along the proposed access road from T14.*

Plate 3-13 ***Upland Blanket Bog (PB2)*** *on lower grounds along the proposed access road from T14.*

Plate 3-14 Evidence of previous turbary activity to the west of the proposed access road through ***Upland Blanket Bog (PB2).***

3.2.1.8 Dry Siliceous Heath (HH1)

Dry Siliceous Heath (HH1) was recorded to the northwestern margin of the southern turbine cluster of the Site, on steeply sloping and undulating land. The area was dominated by western gorse (*Ulex gallii*), ling heather, bell heather (*Erica cinerea*), purple moor grass, bracken, glaucous sedge (*Carex flacca*) tormentil, jointed rush, bent grass, and sweet vernal **(Plate 3-15).** This habitat has links to the Annex I habitat '*European dry heaths (4030)'.* No Wind Farm infrastructure is proposed for this area.

Infrastructure associated with T13, including the southern portion of Turbine 13 hardstand and proposed access road are located partially within areas of **fragmented Dry Siliceous Heath (HH1)** to the south of the Proposed Wind Farm **(Plate 3-16**), which occur between areas of reclaimed, intensively managed improved agricultural grassland (GA1) (**Plate 3-16).** The fragmented areas of dry siliceous heath are dominated by western gorse, bilberry, bracken, ling heather, bell heather, St Patrick's cabbage (*Saxifraga spathularis*), and *Polytrichum commune*, and a large proportion of exposed rock/ boulders. This area of dry heath has been fragmented due to intensive land reclamation in the surrounding area, and intensive grassland management. As a result, the cover of dry siliceous heath to the south of T13 is non-continuous and degraded as a result.

*Plate 3-15 **Dry Siliceous Heath (HH1)** recorded to the northwestern margin of the south of the Proposed Wind Farm, on steeply sloping and undulating land. No Wind Farm Infrastructure is proposed for this area of the Site.*

*Plate 3-16 Fragmented **Dry Siliceous Heath (HH1)** recorded to the north of Turbine 13 hardstand and access road, occurring in between areas of reclaimed improved agricultural grassland (GA1).*

3.2.1.9 Spoil and Bare Ground (ED2)

Areas of exposed gravel and stone classified as **Spoil and Bare Ground (ED2)** were recorded throughout the Proposed Wind Farm, often associated with recently felled woodland, forestry/ farm access tracks, and areas of recently excavated grasslands (**Plates 3-17 & 3-18**).

*Plate 3-17 Exposed gravel/ rubble recorded to the south of the Proposed Wind Farm classified as **Spoil and Bare Ground (ED2).***

*Plate 3-18 Recently excavated grassland to the south of the Proposed Wind Farm classified as **Spoil and Bare Ground (ED2).***

3.2.1.10 Recolonising Bare Ground (ED3)

Areas of **Recolonising Bare Ground (ED3)** were recorded throughout the Proposed Wind Farm, often associated with forestry access roads, recently felled woodland, and mounds of spoil/ gravel. Areas of spoil/ gravel to the south of the Proposed Wind Farm have become recolonised with ragwort, foxglove, soft rush, white clover, creeping buttercup, dandelion, sweet vernal, Nettle and Tormentil (*Potentilla erecta*). Former forestry access tracks to the north of the Proposed Wind Farm have become recolonised with common cotton grass, sweet vernal, purple moor grass, tormentil, ling heather, and cross leaved heath **(Plate 3-19).**

*Plate 3-19 Forestry access road classified as **Recolonising Bare Ground (ED3)** recorded to the north of the Proposed Wind Farm.*

3.2.1.11 Buildings and Artificial Surfaces (BL3)

Existing forestry/farm access tracks, and the local road network within the Proposed Wind Farm and along the Proposed Grid Connection were categorised as **Buildings and Artificial Surfaces (BL3)** (**Plate 3-20**) Any private dwellings and/or agricultural buildings within the site were also categorised as Buildings and Artificial Surfaces (BL3).

*Plate 3-20 Public Road located to the centre of the Proposed Wind Farm classified as **Buildings and Artificial Surfaces (BL3).***

3.2.1.12 Scrub (WS1)

Large areas of **Scrub (WS1)** were recorded throughout the Proposed Wind Farm. These areas were dominated by gorse, bramble, bracken (*Pteridium aquilinum*), grey willow (*Salix cinerea*), and eared willow (*Salix aurita*) (**Plates 3-21).** The access road linking T12 to T14 to the south of the Proposed Wind Farm and proposed new roads to the centre of the Proposed Wind Farm runs through areas of **Scrub (WS1).**

*Plate 3-21 Large area of **Scrub (WS1)** recorded to the centre of the Proposed Wind Farm.*

3.2.1.13 Dense Bracken (HD1)

Areas dominated by dense, continuous bracken classified as **Dense Bracken (HD1)** were recorded throughout the Proposed Wind Farm. Areas of dense bracken were often recorded on mounds/ hills, in association with areas of Wet Heath (HH3)/ Dry Heath (HH1). Dense bracken was recorded along the Proposed Access Road from T3 and T14 (**Plates 3-22).**

*Plate 3-22 **Dense Bracken (HD1)** recorded along the access road from T14 to the south of the Proposed Wind Farm.*

3.2.1.14 Hedgerow (WL1)

Linear **Hedgerow (WL1)** features were recorded throughout the Proposed Wind Farm, along road margins and forming agricultural field boundaries. Species recorded within the hedgerows include hawthorn (*Crataegus monogyna),* gorse, fuchsia (*Fuchsia magellanica*), bracken, bramble, ivy (*Hedera hibernica*) (**Plate 3-23**).

*Plate 3-23 Linear **Hedgerows (WL1)** forming agricultural field boundaries/ road margins recorded to the centre of the Proposed Wind Farm.*

3.2.1.15 Drainage Ditch (FW4)

Drainage Ditches (FW4) were recorded throughout the Proposed Wind Farm, mainly associated with areas of coniferous forestry, grasslands, and along the margins of forestry/ farm access roads/ public roads. The drainage ditches were predominantly man-made, and as such were linear in nature, generally 1-1.5m wide. Flow types varied, with dry drains with no flow or stagnant water, and drains with fast flowing water recorded throughout the Proposed Wind Farm. Further, some drains were heavily vegetated, while others had little to no vegetation recorded. Common species recorded along the drain margins include soft rush, Yorkshire fog, purple moor grass, sweet vernal, tormentil, ling heather and *Polytrichum commune.* Emerging aquatic vegetation recorded includes lesser spearwort (*Ranunculus flammula*), pondweed (*Potamogeton polygonifolius*) and water forget me not (*Myosotis scorpioides*) (**Plates 3-24 & 3-25**).

*Plate 3-24 Heavily vegetated **Drainage Ditch (FW4)** recorded within an area of Wet Grassland (GS4) to the south of the Proposed Wind Farm.*

*Plate 3-25 **Drainage Ditch (FW4)** with fast flowing water recorded within the southern Conifer Plantation (WD4).*

3.2.1.16 Riparian Treeline/ Woodland (WN5).

Riparian treelines and vegetation classified as **Riparian Woodland (WN5)** were recorded along the banks of the Owengar (Cork) River (and tributaries). The riparian vegetation was dominated by grey willow, goat willow, basket willow (*Salix viminalis*), gorse, bracken, meadowsweet (*Filipendula ulmaria*), hawthorn and nettle (**Plate 3-26).** No Wind Farm infrastructure is Proposed for this area of the Site.

*Plate 3-26 Riparian vegetation classified as **Riparian Woodland (WN5**) recorded along the banks of the Owengar (Cork) River to the north of the Proposed Wind Farm. No Wind Farm is proposed for this area of the Site.*

3.2.1.17 Eroding Upland River (FW1)/ Depositing Lowland River (FW2)

Various EPA mapped river waterbodies flow through the Site, namely the Owngar (Cork) River (**Plate 3-27**), Mealagh River (**Plate 3-28**) and Bandon River and associated tributaries. These EPA mapped watercourses were classified as **Eroding Upland Rivers (FW1)** and **Depositing Lowland Rivers (FW2).**

To facilitate the construction of the Proposed Wind Farm roads, there are 5 no. new watercourse crossings that will be required. One in the northern turbine cluster (along the access road to T4), and three in the southern turbine cluster: 1 no. on the new road southwest of the proposed 110kv onsite substation, 1 no. on the access road to T13, and 1 no. on access road between T11 and T12 all classified as classified as **Eroding Upland River (FW1).** There are also 3 no. existing watercourse crossings that require upgrading as part of the Proposed Wind Farm: all 3 no. are located on the existing forestry road southwest of the proposed 110kV onsite substation. The proposed new site entrance road to the Proposed Wind Farm's northern turbine cluster also crosses the Owngar River. The watercourse crossings within the Proposed Wind Farm site will comprise clear span watercourse crossings.

Plate 3-27 Section of the Owengar (Cork) River to the centre of the Wind Farm where a new road is proposed, classified as an ***Eroding upland River (FW1).***

Plate 3-28 Access Road linking T11 to T12 proposed across the Mealagh River to the south of the Proposed Wind Farm, classified as ***Eroding/ Upland River (FW1).***

3.2.1.18 Dystrophic Lakes (FL1)

Two lakes classified as **Dystrophic Lakes (FL1)** were recorded within the Proposed Wind Farm: one to the north of the Proposed Wind Farm, north of T2 (**Plate 3-29**) and the second to the south of the Proposed Wind Farm, southwest of T13 (**Plate 3-30**). These lake habitats have links to the Annex I habitat '*Natural Dystrophic lakes and ponds (3160)*'. The margins of these lakes were characterised by peaty substrate, with the water humic in colour due to high levels of peat. No Wind Farm infrastructure is proposed within 200m of these lake habitats. Yellow water lily (*Nuphar lutea*) was recorded growing on both lakes. The following species were recorded along the margins of the lakes, including cuckoo flower (*Cardamine pratensis*), purple moor grass, common cottongrass, soft rush, bracken, and common sedge (*Carex nigra*).

*Plate 3-29 **Dystrophic Lake (FL1**) recorded to the north of T2, to the north of the Proposed Wind Farm.*

*Plate 3-30 **Dystrophic Lake (FL1**) recorded to the southwest of T13, to the south of the Proposed Wind Farm.*

3.2.1.19 Immature Woodland (WS2)

An area of **immature woodland (WS2)** was recorded to the east of the **proposed 110kV onsite substation**. A mix of native woodland species was planted in an area of recently felled woodland. Deer proof fencing was erected around this area. The fencing with the replanted area is shown in **Plate 3-31.**

Plate 3-31 Immature Woodland (WS2) recorded to the east of the Proposed substation.

3.2.2 Habitats Recorded Along the Proposed Grid Connection

It is proposed to connect the proposed 110 kV onsite substation within the Proposed Wind Farm site to the existing Dunmanway 110kV substation near Dunmanway, Co. Cork via 110 kV underground electrical cabling. The underground cabling route is approximately 20.5km in length and is located primarily within the public road corridor, a short section of the route (approximately 940m) is located within the southern turbine cluster of the Proposed Wind Farm site, mostly within an existing access road.

The Proposed Grid Connection underground electrical cabling route will originate at the proposed 110kV onsite substation and runs southeast for approximately 130m through an existing conifer plantation within the Proposed Wind Farm site. The Proposed Grid Connection will then travel east for approximately 810m through an existing access road within the Proposed Wind Farm site, towards the R585. The Proposed Grid Connection then exists the Proposed Wind Farm southern turbine cluster's site entrance to the east, and travels along the R585 for approximately 7km. The Proposed Grid Connection then turns right and follows the L4909 and L4609 for approximately 3km in a generally southeast direction. The underground cabling route then turns left and is routed along the L4615 in an easterly direction for approximately 5.7km. The underground cabling route then turns right onto the R587 and runs south towards Dunmanway for approximately 3km, before turning left and travelling east on the R586. After 825m the underground electrical cabling route exits the R586 to the south and enters the existing Dunmanway 110kV substation in the townland of Ballyhalwick.

The Proposed Grid Connection will be installed predominantly within the existing road network, classified as **Buildings and Artificial Surfaces (BL3)** The following marginal habitats were recorded adjacent to the existing road network along the extent of the Proposed Grid Connection, outside of the works footprint.

Hedgerow (WL1) and **Treeline (WL2**).were recorded along the extent of the Proposed Grid Connection. Species recorded in hedgerows include hazel (*Corylus avellana*), hawthorn, blackthorn (*Prunus Spinosa*), rowan (*Sorbus aucuparia*), bramble, ivy, bracken, downy birch (*Betula pubescens*), goat willow, and beech (*Fagus sylvatica*). Species recorded in treelines include sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), silver birch (*Betula pendula*), sessile oak (*Quercus petraea*), holly, grey willow, and horse chestnut (*Aesculus hippocastanum*).

Dry meadows and grassy verges (GS2) were recorded along the extent of the Proposed Grid Connection, often in association with the understorey of hedgerows (WL1) and treelines (WL2). Species recorded include sweet vernal, Yorkshire fog, daisy, dandelion, ribwort plantain (*Plantago lanceolata*), curly dock (*Rumex crispus ssp. Crispus*), false oat grass (*Arrhenatherum elatius*), cocksfoot (*Dactylis glomerata*), perennial rye grass, and yarrow (*Achillea millefolium*).

Scrub (WS1) was recorded along the extent of the Proposed Grid Connection. Species recorded include gorse, bramble, grey willow, goat willow, bracken, ribwort plantain, and fuchsia.

The Proposed Grid Connection will be located within the footprint of the public road. Water crossings include the Owngar (Cork) River and tributaries and the Bandon River and tributaries classified as Eroding/ Upland Rivers (FW1) and Depositing/ Lowland Rivers (FW2). There are 11 no. EPA mapped watercourse crossings along the Proposed Grid Connection 110kV cabling. There are two watercourse crossings associated with the 33kV internal cabling within the Proposed Wind Farm site.

1 no. existing watercourse crossing along the R585 will be traversed to cater for the internal 33kV IPP cabling within the Proposed Wind Farm. This crossing comprises an existing stone arch bridge. The approximate coordinates for this crossing are E 510541, N 556626 (ITM), with the location of the watercourse crossing and a drawing of the crossing methodology at this location also shown on the detailed layout drawings in Appendix 2.

Instream works are not required at any watercourse crossing along the proposed 33kV IPP cabling route or Proposed Grid Connection.

Two of these water crossings points (10 and 11) are located within the boundary of Bandon River SAC (Figure 2-2). Watercourse 10 and watercourse 11b (main Bandon River) will be crossed via Horizontal Directional Drilling (HDD). Watercourse 11a comprises an overflow for floodwater flows which is typically has no flow. Crossing 11a will be crossed via flatbed formation over the watercourse.

3.2.3 Habitats Along the Turbine Delivery Route

It is proposed that large wind turbine components will be delivered to the Proposed Wind Farm site from Ringaskiddy Port. The proposed Turbine Delivery Route (TDR) leaves Ringaskiddy on Ringaskiddy Rd (N28), following the N28 right onto Carr's Hill, merging onto the Cork South Ring Rd (N40), continuing on the N22 until turning southwest onto the R585 Regional Road. The TDR continues on the R585 before reaching the site in the townland of Maughanaclea where it will turn left up the existing commercial forestry track to reach the southern turbine cluster or turn right up the new proposed site entrance to reach the northern turbine cluster.

Works such as road widening are sometimes required along proposed TDRs to accommodate the large turbine components and associated vehicles seeking to access wind farm sites. The proposed TDR for the Proposed Project has been the subject of a route assessment to determine if any works are required along its length. The proposed TDR will require no accommodation works that will require removal of habitats.

Limited areas of vegetation along the road corridor, along the roadside edges of treelines (WL2) and hedgerows (WL1), may need to be trimmed to accommodate irregular loads, however this comprises temporary reduction in cover and vegetation will not be felled/removed in these habitats.

3.2.4 Aquatic Survey Results

The aquatic surveys carried out by MKO are summarised in this section, with a focus on the potential for the watercourses within the Site to support lamprey, freshwater pearl mussel and salmonid fish (as the host species of freshwater pearl mussel glochidia). The results provided in this NIS report focus on habitat suitability assessment for lamprey spp and freshwater pearl mussel, given that Brook Lamprey and Freshwater Pearl Mussel are aquatic Qualifying Interest species of the River Bandon SAC. The southern boundary of the Proposed Grid Connection extends into and crosses the boundary of this SAC. It should be noted that no instream works are proposed as part of the Proposed Grid Connection.

The aquatic baseline assessments for both the Proposed Wind Farm survey locations and Proposed Grid Connection identified predominantly **Eroding/Upland Rivers (FW1)** with limited fisheries potential as a result of steep gradients, predominantly bedrock channel bed substrate, and barriers to fish migration in the form of cascade-pool-step and fall features at survey locations at survey locations WF 1 – WF 3, WF 7, WF 9 and GC 1 – GC 4. Survey locations WF 5, WF 6 and GC 9 – GC 11 were located along sections of **Depositing/Lowland Rivers (FW2).** Select survey sites (e.g., WF 5, WF 6, WF 17, GC 4 and GC 10) provided good quality fisheries value, exhibiting habitats suitable for a range of fish species, as well overall good suitable habitat for other aquatic species such as otter.

There were no positive results for freshwater pearl mussel eDNA at any of the Proposed Wind Farm survey locations. There were positive freshwater pearl mussel eDNA results at three survey locations along the Proposed Grid Connection (GC 5 (12/12 replicates), GC 6 (4/12 replicates) and GC 11 (1/12 replicates).

No otter holts or couches were identified at the survey sites in the vicinity of the Proposed Wind Farm aquatic survey locations or along the Proposed Grid Connection.

Survey locations WF 1 – WF 4 and WF 9 exhibited limited fisheries potential as a result of their upland gradient, torrential flows and headwater, often bedrock-dominant, channel morphology, which acted as natural barriers to migratory fish species. Survey sites WF 8, WF 10, WF 20 and WF 21 offered localised moderate-good fisheries habitat for juvenile brown trout. However, overall fisheries potential for a range of fish species and age classes was limited by inaccessibility as a result of the headwater location and bedrock cascade-pool-step features within the wider riverine landscape. The upland, narrow and laterally confined nature of the peat stream at WF 7 again limited fisheries potential for all species other than juvenile brown trout, while high degrees of modification at WF 13 and WF 19 likely

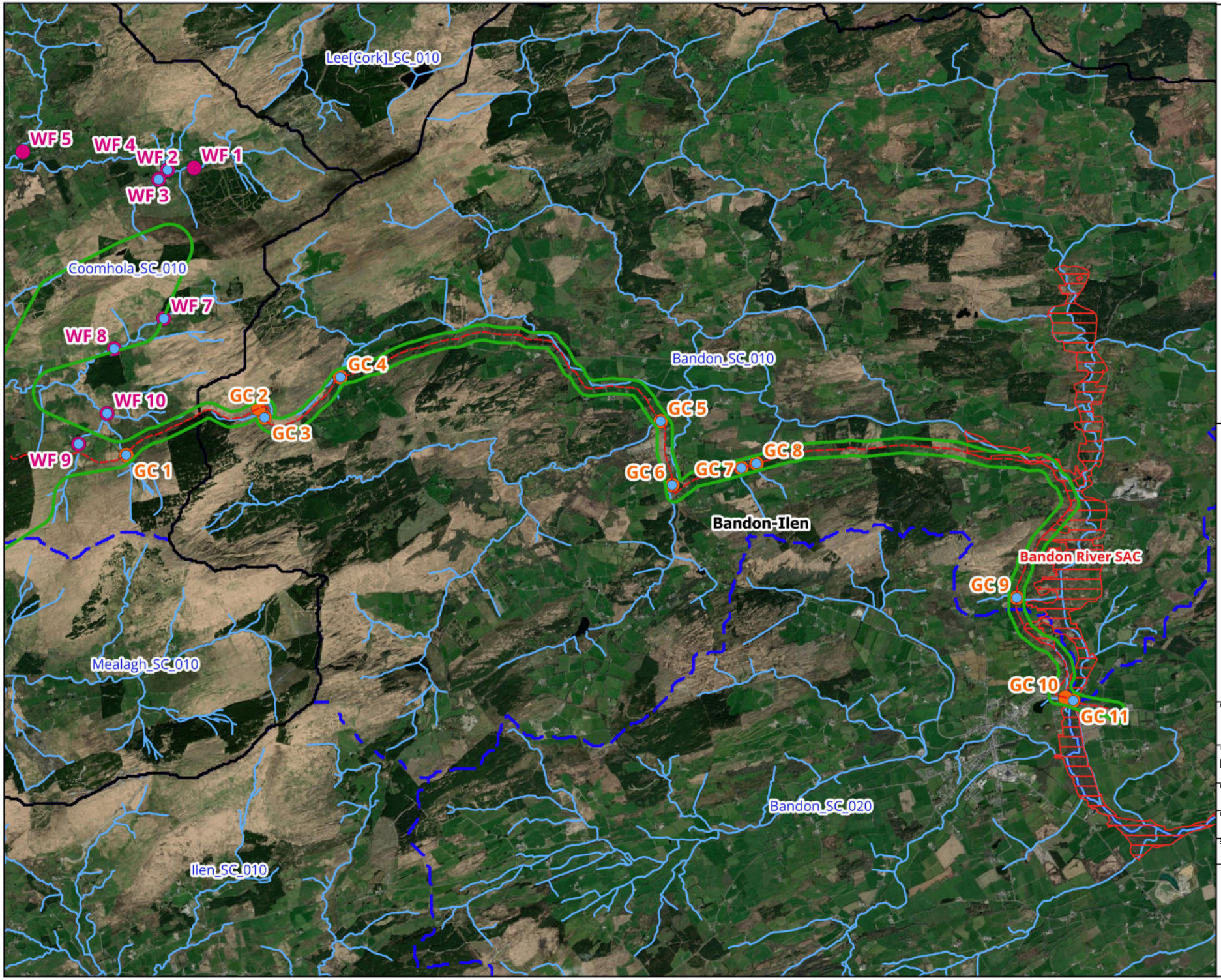
precluded migratory fish access to these survey sites. The presence of an instream rock ramp spanning the channel, in combination with downstream bedrock steps, cascades and falls, may make survey site WF 11 inaccessible to fish species. Survey locations WF 5, WF 6 and WF 17 provided the highest quality overall fisheries potential, with a range of instream habitat, diverse flow patterns and marginal refugia and shelter which provided fisheries habitat for several fish species.

Overall, while the some of the upland watercourses exhibited limited fisheries value due to natural morphological constraints and steep gradients, select reaches provided ecologically important habitat for salmonids, European eel and otter.

Survey sites GC 1 – GC 4 and GC 8 were characterised by steep gradient, bedrock and boulder dominant watercourses, with poor accessibility for migratory fish species. Both survey site GC 2 and GC 4 exhibited signs of historic modification, which limited any significant supporting habitat for fish species.

Survey locations GC 5 and GC 11 provided the best fisheries habitat, with suitable gravel beds for spawning habitat, instream refuge for juvenile salmonids in the form of submerged vegetation coverage, substrate variability and associated flow pattern diversity across the channel, and suitable adult salmonid holding habitat, with deep pool and glide, particularly at the river margins adjacent to riparian treelines. Areas of slower flow, in conjunction with complex submerged features such as exposed root structures, also provided suitable European eel habitat. Ranunculus sp. coverage at survey sites GC 5 and GC 11, the latter of which is located within the Bandon River SAC, are associated with the Annex I habitat '3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation'.

Full details on the Aquatic Survey Results are provided in **Appendix 1.**



Map Legend

- Proposed Wind Farm Survey Sites
- Proposed Grid Connection Survey Sites
- eDNA Survey Sites
- Special Area of Conservation (SAC)
- WFD River Waterbodies
- WFD FHydrological Catchments
- WFD FHydrological Subcatchments
- EIAR Site Boundary
- Proposed Grid Connection Route

Drawing ntie

Proposed Grid Connection Survey Locations

Project Title	
Maughanaclea Renewable Energy Development	
Drawn By: NR	checked By: JH
Project No.: 240225	Drawing No.: Figure 3-1
seale: 1:65,000	Date: 26.01.2026

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3.2.5 Hen Harrier Survey Results

3.2.5.1 Vantage Point Surveys

There were 19 observations of hen harrier during vantage point surveys, or on average every 56 hours of surveys. Of these records, ten were within 500m of the proposed turbine locations. All of the observations were of a single bird. The bird was mainly flying, hunting or foraging.

In September 2022, a juvenile bird was observed foraging on the Proposed Wind Farm site. Given the time of year, this bird may have been dispersing from its natal site, and its origin is unknown, as no hen harrier breeding territories were identified during surveys. In January 2024 there was an observation of a 'half-hearted skydance' by a male hen harrier on the Proposed Wind Farm site. However, this was during mid-winter, and there was no female bird present, and no other observations of breeding behaviour or juveniles later that year, suggesting that this bird could have been practicing display rather than initiating a territory.

3.2.5.2 Winter Walkover Survey

There were 3 observations of hen harrier on 3 of the 62 survey dates (5%) of winter walkover survey. Observations were of individual birds hunting, flying and chasing hooded crows. None of the observations were within the Proposed Wind Farm site.

3.2.5.3 Breeding Walkover Surveys

There was a single observation of hen harrier during breeding walkover surveys. A ringtail was observed flying in proximity to the Proposed Wind Farm site boundary.

3.2.5.4 Hen Harrier Roost Surveys

There were five observations of hen harrier on 4 of the 110 survey dates (4%) of the hen harrier roost survey. Observations were all of a single bird, flying or soaring, outside the Proposed Wind Farm site. There was no evidence of roosting behaviour.

3.2.5.5 Incidental Records

There were five incidental records of hen harrier: three during chough roost surveys, one during a waterbird distribution survey, and one during a habitat survey. Of these, only one was within the Proposed Wind Farm site; in January 2024 a ringtail was observed soaring. In November 2023, a male and a ringtail were observed together before dusk. The male perched on a fence post for over 25 minutes before flying away close to the ground, possibly to roost, but this was not confirmed. The flight was outside the Proposed Wind Farm site and approximately 850m from the nearest proposed turbine at its closest point.

3.2.5.6 Summary of Hen Harrier Activity

Based on the latest National Survey of Breeding Hen Harrier in Ireland (Ruddock *et al.*, 2024), the Republic of Ireland national breeding population of hen harrier is in the range of 85 – 106 pairs. Therefore, a single breeding pair is considered to be of National Importance, as per TII/ NRA (2009b) criteria. The estimated national wintering population of hen harrier in Ireland is 311-435, therefore 1% of the Republic of Ireland national wintering population is 3-4 birds. Thus, a regularly occurring wintering population of 3-4 hen harrier is required for classification as National Importance.

There were 33 observations of hen harrier over 3 years of surveys at the Proposed Wind Farm site. All but one of the observations were of a single bird, however males, ringtails and females were recorded suggesting there could be a minimum of three individuals. There was no evidence of breeding on the Proposed Wind Farm site. There were observations of ringtails or juveniles in the late and post-breeding season (July and September), suggesting that there could be breeding in the wider surroundings or that dispersing young were foraging in the area. During passage months and winter 2022/2023, there were observations of a male, a ringtail and a juvenile (it is possible the ringtail and juvenile may have been the same bird). Two separate birds were observed on one occasion on the same day. During winter 2023/2024, there were only observations of ringtails and males. Finally, during passage months and winter 2024/2025, a male, ringtail and female were observed (again, it is possible the ringtail and female may have been the same bird). The majority of records were in winter months, between August and March, with a single observation in the late breeding season in July. Taken together, these records suggest that the Proposed Wind Farm site was being used infrequently in the winter months by two birds for foraging. Thus, they are considered to be a population of County Importance.

The Mullaghanish to Musheramore Mountains SPA is approximately 20km north-east of the Proposed Wind Farm site. As described above, hen harrier were not regularly recorded during their breeding season, with a single observation of a ringtail in the late-breeding season (July) and a single record of a juvenile in the post-breeding season (September). Furthermore, the separation distance between the SPA and the Proposed Wind Farm site greatly exceeds the maximum foraging range for breeding hen harrier (10km; SNH [2016]). As such, the breeding population of hen harrier in the SPA is not using the Proposed Wind Farm site for breeding or provisioning.

During the post-breeding period (August and September), hen harrier disperse from their breeding area into lowland areas to overwinter where there is greater resource availability. Juvenile birds have typically left the nest and are dispersing from their natal areas at this time (Hardey *et al.,* 2013). A study of juvenile hen harrier dispersal using satellite tags showed that dispersal can be variable, but typically involves a sudden, long-distance (>25km) initial movement away from the natal area, followed by shorter exploratory movements and the use of temporary settlement areas (McCarthy, 2022). During field surveys, hen harrier were recorded utilising the Proposed Wind Farm site during the post-breeding period: there were individual records of an adult male, an adult female and a juvenile hunting during August and September.

In addition, hen harrier were recorded utilising the Proposed Wind Farm site throughout the winter season (October to March). There were individual records of an adult male, an adult female and a possible juvenile bird. It is reasonable to conclude that these were the same individuals observed during the post-breeding period, and that they remained in the vicinity of the Proposed Wind Farm to overwinter. During field surveys, birds were recorded hunting within the Proposed Wind Farm site. Two birds were also recorded possibly roosting together outside the Proposed Wind Farm site on one occasion, approximately 540m from the Proposed Wind Farm site boundary and 1.03km from the nearest proposed works and infrastructure (a turbine foundation edge).

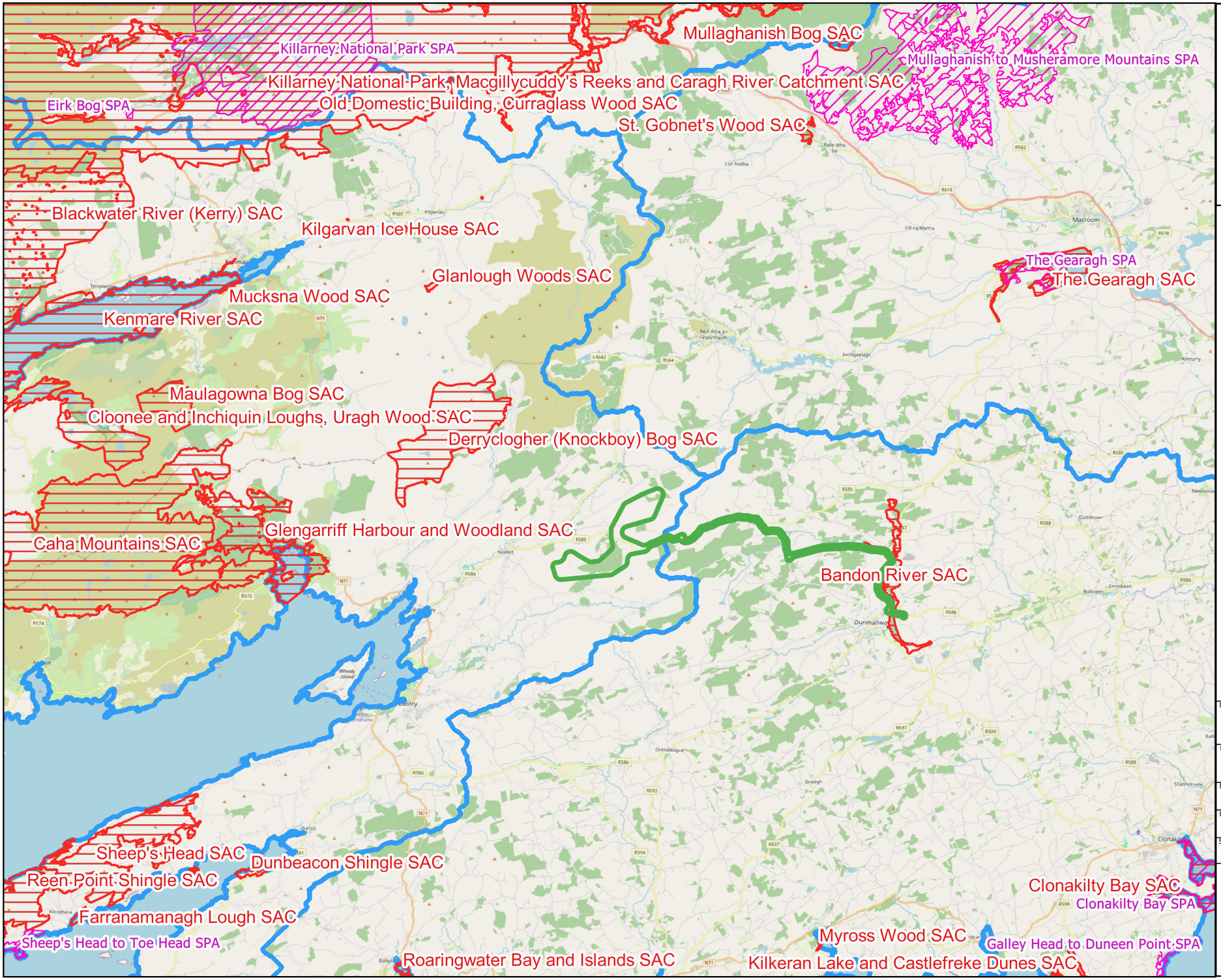
It cannot be known where these birds originated from or bred using observational data alone - it is possible that they originated from the Mullaghanish to Musheramore Mountains SPA or a non-designated area. Therefore, taking a precautionary approach, the likely effects on birds originating from Mullaghanish to Musheramore Mountains SPA will be considered further.

4. STAGE 1 - APPROPRIATE ASSESSMENT SCREENING

4.1 Identification of Relevant European Sites

The following methodology was used to establish any European Sites upon which there is a potential for a likely significant effect to occur either individually or in combination with other plans and projects as a result of the Proposed Project:

- Initially the most up to date GIS spatial datasets for European designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie).
- All European Sites that could potentially be affected were identified using a source-pathway - receptor model. To provide context for the assessment, European Sites surrounding the Proposed Project are shown on Figure 4-1. Information on these sites according to the site-specific conservation objectives is provided in Table 4-1. Sites that were further away from the Proposed Project were also considered and no complete source-pathway-receptor chain for significant effect was identified for any other European Site.
- The catchment mapping was used to establish or discount potential hydrological connectivity between the site of the Proposed Project and any European Sites. The hydrological catchments are also shown in Figure 4-1.
- In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, '*Assessing Connectivity with Special Protection Areas* (SPA)' (2016) was consulted. This document provides guidance in relation to the identification of connectivity between Proposed Project and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.
- Table 4-1 provides details of all relevant European Sites as identified in the preceding steps and assesses the potential for likely significant effects on each.
- The assessment considers any likely direct or indirect impacts of the Proposed Project, both alone and in combination with other plans and projects, on European Sites by virtue of criteria including the following: size and scale, land-take, distance from the European Site or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of construction, operation and decommissioning were considered in this assessment.
- The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report.
- Where potential pathways for Likely Significant Effect are identified, the site is included within the Likely Zone of Influence and further assessment is required within the NIS.
- The potential for the Proposed Project to result in cumulative impacts on any European Sites in combination with other plans and projects was considered in the assessment that is presented in Table 4-1. Plans and projects considered include those that are listed in Appendix 5.



Map Legend

- EIAR Site Boundary
- WFD Hydrological Catchments
- SAC
- SPA

Drawing Title

European Designated Sites

Project Title

Maughanaclea Renewable Energy Development

Drawn By	Checked By
KJ	RW
Project No.	Drawing No.
240225	Figure 4-1
Scale	Date
1:250,000	11.03.2026

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Table 4-1 Identification of European Sites within the Likely Zone of Influence

European Sites and distance from Proposed Project	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie[7])	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Special Areas of Conservation (SAC)				
Bandon River SAC [002171] **Distance:** **11.7km from Proposed Wind Farm** **The Proposed Grid Connection crosses the Bandon River and it's tributary at two points within the boundary of this SAC at proposed crossing points 10 and 11**	› [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*) › [1096] Brook Lamprey (*Lampetra planeri*) › [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation › [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*)	Detailed conservation objectives for this site (Version 1, August 2019) were reviewed as part of the assessment and are available at www.npws.ie[8]	The Proposed Wind Farm site is located completely outside of the SAC, over 11km away, and within a separate hydrological catchment. Therefore, there is no potential for direct effect on the SAC as a result of the Proposed Wind Farm. The Proposed Grid Connection crosses the Bandon River and its tributary at crossings 10 and 11, located within the SAC boundary, for approx 160m via a road bridge along the R586 east of Dunmanway. However, there are no instream works proposed and the works will be restricted to the road deck. Therefore, there is no potential for direct effect on the SAC. The Proposed Grid Connection also crosses a number of water crossings within the public road upstream of the SAC. A potential for indirect likely significant effect on the SAC via water quality deterioration as a result of construction of the Proposed Grid Connection was identified. **A complete source pathway receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Project to result in likely significant effects on this European Site. The European Site is considered to**	**Y**

[7] *Accessed at <https://www.npws.ie/protected-sites/conservation-management-planning/conservation-objectives>*
[8] *NPWS (2019) Conservation Objectives: Bandon River SAC 002171. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002171.pdf*

European Sites and distance from Proposed Project	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie[7])	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			be within the Likely Zone of Influence of the Proposed Project and further assessment is required.	
Derryclogher (Knockbog) Bog SAC [001873] **Distance:** **7.6km from Proposed Wind Farm** **9km from Proposed Grid Connection**	› [7130] Blanket bogs (* if active bog)	Detailed conservation objectives for this site (Version 1, May 2017) were reviewed as part of the assessment and are available at www.npws.ie[9]	There will be no direct effects as the Proposed Project is located entirely outside of this designated site. The potential for indirect effects was also considered. Given the distance between the Proposed Project and the SAC and the terrestrial nature of the single associated QI habitat, no potential for significant indirect effects on this SAC were identified. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Project. Therefore, it is not considered further in this assessment.**	**N**
Glengarriff Harbour and Woodland SAC [000090] **Distance:**	› [1024] Kerry Slug (*Geomalacus maculosus*) › [1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*) › [1355] Otter (*Lutra lutra*) › [1365] Common Seal (*Phoca vitulina*)	Detailed conservation objectives for this site (Version 1, May 2015) were reviewed as part of the assessment and are	There will be no direct effects as the Proposed Project is located entirely outside of this designated site. There is no surface water connectivity between the Proposed Project and this SAC. The Proposed Project is also located in a separate sub-catchment to this SAC. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. Given the distance from the Proposed Project	**N**

[9] *NPWS (2017) Conservation Objectives: Derryclogher (Knockboy) Bog SAC 001873. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001873.pdf*

European Sites and distance from Proposed Project	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie[7])	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
11.4km from Proposed Wind Farmt **15.5km from Proposed Grid Connection**	› [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles › [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)	available at www.npws.ie[10]	effects on the SAC population of Kerry slug can be precluded due to the limited mobility of the species. Additionally, the Proposed Project is located outside the core foraging range (2.5 km) of the SAC populations of lesser horseshoe bat (NPWS, 2013) and therefore, there is no potential for significant effect on this species associated with this SAC. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Project. Therefore, it is not considered further in this assessment.**	
Caha Mountains SAC [000093] **Distance:** **14km from Proposed Wind Farm**	› [1024] Kerry Slug (*Geomalacus maculosus)* › [1421] Killarney Fern (*Trichomanes speciosum*) › [3110] Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) › [3160] Natural dystrophic lakes and ponds › [4010] Northern Atlantic wet heaths with *Erica tetralix*	Detailed conservation objectives for this site (Version 1, August 2016) were reviewed as part of the assessment and are available at www.npws.ie[11]	There will be no direct effects as the Proposed Project is located entirely outside of this designated site. There is no surface water connectivity between the Proposed Project and this SAC. The Proposed Project is also located in a separate sub-catchment to this SAC. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. Given the distance from the Proposed Project effects on the SAC population of Kerry slug can be precluded due to the limited mobility of the species.	**N**

[10] *NPWS (2015) Conservation Objectives: Glengarriff Harbour and Woodland SAC 000090. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000090.pdf*
[11] *NPWS (2016) Conservation Objectives: Caha Mountains SAC 000093. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000093.pdf*

European Sites and distance from Proposed Project	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie[7])	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
16km from Proposed Grid Connection	› [4030] European dry heaths › [4060] Alpine and Boreal heaths › [6230] Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) › [7130] Blanket bogs (* if active bog) › [8110] Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) › [8210] Calcareous rocky slopes with chasmophytic vegetation › [8220] Siliceous rocky slopes with chasmophytic vegetation		**No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Project. Therefore, it is not considered further in this assessment.**	
Glanlough Wood SAC [002315] **Distance:**	› [1303] Lesser Horseshoe Bat *(Rhinolophus hipposideros*)	Detailed conservation objectives for this site (Version 1, September 2018) were reviewed as part of the assessment and are available at www.npws.ie[12]	There will be no direct effects as the Proposed Project is located entirely outside of this designated site. The Proposed Project is located outside the core foraging range (2.5 km) of the SAC populations of lesser horseshoe bat (NPWS, 2013) and therefore,	**N**

[12] *NPWS (2018) Conservation Objectives: Glanlough Woods SAC 002315. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002315.pdf*

European Sites and distance from Proposed Project	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie[7])	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
14.6km from Proposed Wind Farm **15.5km from Proposed Grid Connection**			there is no potential for significant effect on this species associated with this SAC. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Project. Therefore, it is not considered further in this assessment.**	
The Gearagh SAC [000108] **Distance:** **19km from the Proposed Wind Farm** **12.8km from Proposed Grid Connection**	› [1355] Otter (*Lutra lutra*) › [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation › [3270] Rivers with muddy banks with *Chenopodion rubri p.p.* and *Bidention p.p.* vegetation › [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles › [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus*	Detailed conservation objectives for this site (Version 1, September 2016) were reviewed as part of the assessment and are available at www.npws.ie[13]	There will be no direct effects on this SAC. The Proposed Wind Farm is located approximately 19km southwest of this SAC, while the Proposed Grid Connection is located 12.8km from the SAC. There is no surface water connectivity between the Proposed Project and this SAC. The Proposed Project is also located in a separate sub-catchment than this SAC. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Project. Therefore, it is not considered further in this assessment.**	**N**

[13] *NPWS (2016) Conservation Objectives: The Gearagh SAC 000108. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000108.pdf*

European Sites and distance from Proposed Project	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie[7])	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	excelsior (Alno-Padion, Alnion incanae, Salicion albae)			
Special Protection Area (SPA)				
The Gearagh SPA [004109] **Distance:** **23km from Proposed Wind Farm** **14.6km from Proposed Grid Connection**	› [A050] Wigeon (*Anas Penelope)* › [A052] Teal (*Anas crecca*) › [A053] Mallard (*Anas platyrhynchos*) › [A125] Coot (*Fulica atra*) › [A999] Wetlands	Detailed conservation objectives for this site (Version 1, April 2025) were reviewed as part of the assessment and are available at www.npws.ie[14]	The Proposed Wind Farm is located 23km southwest from this designated site. There will be no direct effects as the Proposed Project is located entirely outside of this Designated Site. There is no surface water connectivity between the Proposed Project and this SPA. The Proposed Project is also located in a separate sub-catchment to this SPA. As such, indirect effects in the form of deterioration of water quality can be ruled out. Potential for ex-situ disturbance, displacement and habitat loss to SCI species was also considered. The mean flight distance between roost site to feeding site according to Johnson *et al.* (2014) are 0.5 to 1.3 km for mallard, 2.5 to 2.8 km for wigeon, 0.8 to 8.4 km for teal. The foraging distance for coot is in line with species occupying a similar ecological niche such as the species listed above. Therefore, no potential for likely significant effect on the listed SCI species as been identified. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely**	**N**

[14] *NPWS (2025) Conservation Objectives: The Gearagh SPA 004109. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004109.pdf*

European Sites and distance from Proposed Project	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie[7])	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			Zone of Influence of the Proposed Project. Therefore, it is not considered further in this assessment.	
Mullaghanish to Musheramore Mountains SPA [004162] **Distance:** **20km from Proposed Wind Farm** **19km from Proposed Grid Connection**	› [A082] Hen Harrier *(Circus cyaneus)*	Detailed conservation objectives for this site (Version 1, September 2022)[15] were reviewed as part of the assessment and are available at www.npws.ie	The Proposed Wind Farm is located 20km south of this designated site. This distance is outside the core foraging range of 2 km and the maximum foraging range of 10 km for breeding hen harrier[16], for which this SPA is designated. Furthermore, no hen harrier breeding activity was recorded within the Proposed Wind Farm during the ornithological surveys. However, hen harrier activity was recorded during the post-breeding and winter period. It cannot be known where these birds originated from or bred using observational data alone - it is possible that they originated from the Mullaghanish to Musheramore Mountains SPA or a non-designated area. Therefore, taking a precautionary approach, the potential for Likely Significant Effect on birds which may use this SPA for breeding requires further consideration. **A complete source pathway receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Project to result in likely significant effects on this European Site. The European Site is considered to be within the Likely Zone of Influence of the Proposed Project and further assessment is required.**	**Y**

[15] *NPWS (2022) Conservation Objectives: Mullaghanish to Musheramore Mountains SPA 004162. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004162.pdf*
[16] *Scottish Natural Heritage (2016). Available at Assessing connectivity with special protection areas.pdf*

4.2 Appropriate Assessment Screening Conclusion

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

- Bandon River SAC [002171]
- Mullaghanish to Musheramore Mountains SPA [004162]

As a result, an Appropriate Assessment (AA) of the Proposed Project is required. Information to enable the competent authority to carry out an AA of the Proposed Project is presented in Sections 5 – 9 of this report.

5. STAGE 2 - INFORMATION TO INFORM APPROPRIATE ASSESSMENT

The potential for likely significant effects on the following European Sites in the absence of any mitigation, individually or cumulatively with other plans or projects, was identified in the preceding section:

- Bandon River SAC [002171]
- Mullaghanish to Musheramore Mountains SPA [004162]

The following sections consider each European Site individually to:

1. Determine which individual qualifying features have the potential to be adversely affected by the Proposed Project.
2. Provide information with regard to the Conservation Objectives and site-specific pressures and threats for those qualifying features that have the potential to be adversely affected.

5.1 Identification of relevant Qualifying Features and Desk Study

5.1.1 Bandon River SAC [002171]

The potential for impacts on this SAC were identified in **Section 4.1** above. The Proposed Wind Farm is located within the Dunmanus-Bantry-Kenmare catchment. This is a different hydrological catchment from the 'Bandon-Ilen' catchment that this designated site lies within. Therefore, there is no hydrological connectivity between the Proposed Wind Farm and the SAC. There is therefore no potential for adverse effect on the SAC as a result of the Proposed Wind Farm.

The identified pathways for effect include the following:

- Taking a precautionary approach, a potential pathway for indirect effects on aquatic QI species and habitats was identified in the form of deterioration of water and habitat quality in the River Bandon due to earth works associated with the construction of the Proposed Grid Connection. Potential impacts include the migration of the host salmonid fish and lamprey species through the River Bandon, indirectly impacting the successful completion of the aquatic QI species life cycles, impacting the population of the aquatic QIs, impacting the species composition of the QI habitat floating river vegetation, and impacting the habitat extent of the QI habitat alluvial woodland.

Table 5-1 below lists the qualifying features of this European Site and determines, in the light of their Conservation Objectives, whether there is any complete source-pathway-receptor chain, by which adverse effects may occur.

5.1.1.1 Identification of Individual Qualifying Features with the Potential to be Affected

Table 5-1 Assessment of Qualifying features of the Bandon River SAC potentially affected

Qualifying feature	Conservation Objective (NPWS, Version 1, August, 2019)	Rationale	Potential for Adverse Effects Yes/No
[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)	To restore the favourable conservation condition of Freshwater Pearl Mussel *(Margaritifera margaritifera)* in Bandon River SAC	According to the Site-Specific Conservation Document (NPWS 2019) for the River Bandon SAC, the conservation objectives for this aquatic QI species: Freshwater Pearl Mussel applies to the Bandon population, which is widespread in the Bandon catchment. However, full baseline distribution and abundance mapping has not been completed in the Bandon catchment. Only part of the population and habitat is within the SAC. As a result, the objective	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version 1, August, 2019)	Rationale	Potential for Adverse Effects Yes/No
		is restricted to the portion of the population and habitat in the Caha and main channel Bandon within the SAC. The population within the SAC is estimated to be at least 50,000, noting that this was likely to be conservative. Further, the Conservation Objective Document details that '*Salmonid fish are host to the larval stage of the freshwater pearl mussel and essential to completion of the life cycle'.* Further, *'Mussel and fish habitat availability is determined by flow and substratum and is highly sensitive to hydro morphological, sedimentation and enrichment pressures from throughout the catchment'.* The Proposed Wind Farm is located within the Dunmanus-Bantry-Kenmare catchment. This is a different hydrological catchment to the 'Bandon-Ilen' catchment that this SAC lies within. Therefore, there is no hydrological connectivity between the Proposed Wind Farm and the SAC. The Proposed Grid Connection crosses the Bandon River within the public road within this SAC (the R586 road bridge east of Dunmanway). The Proposed Grid Connection also consists of a number of water crossings upstream of the SAC. There are no instream works proposed as part of the Proposed Grid Connection. Therefore, there is no potential for direct effect on the freshwater pearl mussel population. Two of these water crossings points (10 and 11) are located within the boundary of Bandon River SAC. Watercourse 10 and watercourse 11b (main Bandon River) will be crossed via Horizontal Directional Drilling (HDD). Watercourse 11a comprises an overflow for floodwater flows which typically has no flow. Crossing 11a will be crossed via flatbed formation over the watercourse. A potential for indirect adverse effect was identified via deterioration in water quality during construction of the Proposed Grid Connection, resulting in degradation of habitat of freshwater pearl mussel as well as salmonid host species. Such effects could occur as a result of run-off or impacts associated with drilling.	

Qualifying feature	Conservation Objective (NPWS, Version 1, August, 2019)	Rationale	Potential for Adverse Effects Yes/No
		A complete source-pathway-receptor chain for adverse effects on this aquatic species was identified, and it is assessed further in this NIS.	
[1096] Brook Lamprey (*Lampetra planeri*)	To maintain the favourable conservation condition of Brook Lamprey *(Lampetra planeri)* in Bandon River SAC	According to the Site-Specific Conservation Document (NPWS 2019) for the River Bandon SAC, the aquatic QI species Brook Lamprey in a juvenile state burrow in areas of fine sediment in still water, and spawn in clean gravels. The distribution of this mobile aquatic QI species is not mapped within the SSCO document. As stated by Inland Fisheries Ireland (IFI)[17], the QI Species Brook Lamprey, live and spawn exclusively in freshwater, in small and large rivers. Once hatched, the larval lamprey (ammocoetes) drift downstream to find suitable silty substrate, to burrow into and live as filter feeders for up to 5 years. Adult lamprey migrate upstream to find suitable gravel areas for spawning (NBDC).[18] The Proposed Wind Farm is located within the Dunmanus-Bantry-Kenmare catchment. This is a different hydrological catchment from the 'Bandon-Ilen' catchment that this designated site lies within. Therefore, there is no hydrological connectivity between the Proposed Wind Farm and the SAC. The Proposed Grid Connection crosses the Bandon River within the public road within this SAC (the R586 road bridge east of Dunmanway). The Proposed Grid Connection also consists of a number of water crossings upstream of the SAC. There are no instream works proposed as part of the Proposed Grid Connection. Therefore, there is no potential for direct effect on the brook lamprey population. The Proposed Grid Connection will be constructed within the public road deck. A potential for indirect adverse effect was identified via deterioration in water quality during construction of the Proposed Grid Connection, resulting in degradation of habitat of brook lamprey. Such effects could occur as a result of run-off or impacts associated with drilling.	**Y**

[17] *Inland Fisheries Ireland (IFI)- Brook Lamprey.* https://www.fisheriesireland.ie/fish-species/brook-lamprey-lampetra-planeri
[18] *National Biodiversity Data Centre (NBDC) Brook Lamprey.* https://species.biodiversityireland.ie/profile.php?taxonId=108642

Qualifying feature	Conservation Objective (NPWS, Version 1, August, 2019)	Rationale	Potential for Adverse Effects Yes/No
		A complete source-pathway-receptor chain for adverse effects on this mobile aquatic species was identified, and it is assessed further in this NIS.	
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	To restore the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in Bandon River SAC.	According to the Site-Specific Conservation Document (NPWS 2019) for the River Bandon SAC, the QI habitat floating river vegetation is found along the length of the River Bandon. The Proposed Wind Farm is located within the Dunmanus-Bantry-Kenmare catchment. This is a different hydrological catchment from the 'Bandon-Ilen' catchment that this designated site lies within. Therefore, there is no hydrological connectivity between the Proposed Wind Farm and the SAC. The Proposed Grid Connection crosses the Bandon River within the public road within this SAC (the R586 road bridge east of Dunmanway). The Proposed Grid Connection also consists of a number of water crossings upstream of the SAC. There are no instream works proposed as part of the Proposed Grid Connection. Therefore, there is no potential for direct effect on this QI habitat. The Proposed Grid Connection will be constructed within the public road deck. A potential for indirect adverse effect was identified via deterioration in water quality during construction of the Proposed Grid Connection, resulting in degradation of *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. Such effects could occur as a result of run-off or impacts associated with drilling. **A complete source- pathway- receptor chain for adverse effects on this habitat as a result of the Proposed Project was identified. It is assessed further in this NIS.**	Y
[91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)	To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* in Bandon River SAC	According to the Site-Specific Conservation Document (NPWS 2019) for the River Bandon SAC, the QI habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* occur in an area of braided river channels and islands downstream of the R586 bridge east of Dunmanway in the Bandon River SAC. Two water crossings occur directly upstream of the mapped extent of this habitat type. The Proposed Wind Farm is located within the Dunmanus-Bantry-Kenmare catchment. This is a different	Y

Qualifying feature	Conservation Objective (NPWS, Version 1, August, 2019)	Rationale	Potential for Adverse Effects Yes/No
		hydrological catchment from the 'Bandon-Ilen' catchment that this designated site lies within. Therefore, there is no hydrological connectivity between the Proposed Wind Farm and the SAC. The Proposed Grid Connection crosses the Bandon River within the public road within this SAC (the R586 road bridge east of Dunmanway). The Proposed Grid Connection also consists of a number of water crossings upstream of the SAC. There are no instream works proposed as part of the Proposed Grid Connection. There is no potential for direct effect on alluvial woodlands. The Proposed Grid Connection will be constructed within the public road deck. A potential for indirect adverse effect was identified via deterioration in water quality during construction of the Proposed Grid Connection, resulting in degradation of alluvial forests. Such effects could occur as a result of run-off or impacts associated with drilling. **A complete source- pathway- receptor chain for adverse effects on this habitat as a result of the Proposed Project was identified. It is assessed further in this NIS.**	

5.1.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form[19], the site-specific threats, pressures and activities with potential to impact on the European Site were reviewed and considered in relation to the Proposed Grid Connection. These are provided in **Table 5-2**. **None of the listed threats and pressures associated with this SAC were identified as being relevant to the Proposed Project.**

Table 5-2 Site-specific threats, pressures and activities for the River Bandon SAC [002171]

Rank	Threats and Pressures
High	Discharges
	Flooding Modifications
Medium	Sand and Gravel Quarries
Low	Electricity and Phone Lines
	Forest and Plantation Management & Use
	Leisure Fishing
	Other outdoor sports and leisure activities

5.1.1.3 QI Specific Information

5.1.1.3.1 *Freshwater Pearl Mussel*

According to the Site-Specific Conservation Document (NPWS 2019) for the River Bandon SAC, the conservation objectives for this aquatic QI species: Freshwater Pearl Mussel applies to the Bandon population, which is widespread in the Bandon catchment. However, full baseline distribution and abundance mapping has not been completed in the Bandon catchment. Only part of the population and habitat is within the SAC. As a result, the objective is restricted to the portion of the population and habitat in the Caha and main channel Bandon within the SAC. The population within the SAC is estimated to be at least 50,000, noting that this was likely to be conservative. The braided channels downstream of the R586 bridge east of Dunmanway are unique in Ireland having high mussel density in a wet woodland. The Article 17 Report (2025) states that the pressures impacting on the species come from a wide variety of sources (e.g. forestry, farming, pollution from urban wastewater, and development activities), often quite removed from the habitat of the species. The species also suffers direct impacts from in-stream works such as channelisation, bridge repairs/construction and recreational fishery structures. Flow changes, caused by activities such as land drainage, have been highlighted as an important contributor to the species' demise. The overall conservation status of this species is "Bad" with a deteriorating trend.

[19] https://biodiversity.europa.eu/sites/natura2000/IE0002171

Targets and Attributes

Table 5-3 Targets and Attributes

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
Distribution	Restore distribution to 12.2km. See map 3.	**Yes -** There is no potential for direct effect on the freshwater pearl mussel population distribution, size or structure as the works associated with the Proposed Grid Connection are restricted to the public road and there will be no instream works. However, a potential for indirect adverse effect on the freshwater pearl mussel population was identified as a result of water quality deterioration and habitat degradation associated with construction of the Proposed Grid Connection.
Population size: adult mussels	Restore population to at least 50,000 adult mussels	
Population structure: recruitment	Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	
Population structure: adult mortality	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	
Habitat extent	Maintain habitat extent at 12.2km in the Bandon system (see map 3) and any additional stretches necessary for salmonid spawning	**Yes -** There is no potential for direct effect on the freshwater pearl mussel population distribution, size or structure as the works associated with the Proposed Grid Connection are restricted to the public road and there will be no instream works. However, a potential for indirect adverse effect on the freshwater pearl mussel population was identified as a result of water quality deterioration and habitat degradation associated with construction of the Proposed Grid Connection.
Habitat condition	Restore condition of suitable habitat	
Water quality: Macroinvertebrates and phytobenthos (diatoms)	Restore water quality- macroinvertebrates: EQR greater than 0.90 (Q4-5 or Q5); phytobenthos: EQR greater than 0.93	**Yes-** deterioration in water quality and habitat degradation resulting in a decline of macroinvertebrate and phytobenthos.
Substratum quality: Filamentous algae (macroalgae), macrophytes (rooted higher plants	Restore substratum quality- filamentous algae: absent or trace (less than 5%); macrophytes: absent or trace (less than 5%)	**Yes-** pollution caused by construction activities for the Proposed Grid Connection could cause siltation which could artificially elevate the levels of fine sediments and prevent survival of juvenile mussels and provide a rooting medium for macrophytes.
Substratum quality: sediment	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	

Substratum quality: oxygen availability	Restore to no more than 20% decline from water column to 5cm depth in substrate	**No** -There is no potential for impact on oxygen availability as a result of the Proposed Project.
Hydrological regime: flow variability	Restore appropriate hydrological regime	**No-** construction activities for the Proposed Grid Connection will not include instream works and will not cause changes in the flow regime
Host fish	Maintain sufficient juvenile salmonids to host glochidial larvae	**Yes-** deterioration in water quality and habitat degradation of the SAC could impact numbers of juvenile salmonid host fish
Fringing habitat: area and condition	Restore the area and condition of fringing habitats necessary to support the population	**No** - The Proposed Grid Connection will be restricted to the existing public road and there is no potential for impact on fringing habitats of the Bandon River.

5.1.1.3.2 *Brook Lamprey*

Artificial barriers can lead to genetic isolation for brook lamprey (*Lampetra planeri*), a non-migratory form,. Juveniles burrow in areas of fine sediment in still water, and spawn in clean gravels. Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid, and newly created habitat can be rapidly colonised.

According to the Article 17 reporting (NPWS, 2025), the brook lamprey is non-migratory as an adult, living its entire life in freshwater. Adults spawn in spring. After hatching, the larvae ('ammocoetes') drift or swim downstream to areas of riverbed or margins with fine silt deposits. They burrow into this substrate and live as filter feeders over a period of years before transforming into young adult fish. The young adults overwinter before migrating short distances upstream to gravelled areas where they spawn. For brook lamprey in Ireland there are extensive areas of suitable habitat and no significant pressures impacting this species. The Overall Status is therefore assessed as Favourable.

Targets and Attributes

Table 5-4 Targets and Attributes for the Brook lamprey (Lampetra planeri)

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
Distribution	Access to all water courses down to first order streams	**No-** Proposed Project will not result in any barriers to movement
Population structure of juveniles	At least three age/size groups present	**Yes-** deterioration in water quality and habitat quality could result in a decline in distribution and population structure and juvenile densities
Juvenile density in fine sediment	Mean catchment juvenile density at least 5/m²	
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	**Yes** - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Availability of juvenile habitat	More than 50% of sample sites positive	

5.1.1.3.3 *Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation*

Description from SSCO document

Conservation objectives concentrate on the high conservation value sub-types of the habitat. Selection of Bandon River SAC used a broad interpretation and the habitat's full distribution and sub-types are not yet documented, but bryophyte assemblages are known to occur. Ranunculus sp. is excessively abundant in the Bandon and Caha, and indicative of hydromorphological and water quality impacts. Note: rooted macrophytes should be absent or trace.

According to the Article 17 reporting (NPWS, 2025) many Irish rivers have been heavily modified, particularly through arterial drainage and channelisation. These activities have changed channel morphology and introduced larger amounts of fine sediment. Such fines provide a rooting medium for plants and, as a result, Stream Water-crowfoot (*Ranunculus penicillatus*) has increased in abundance. In consequence, the habitat has, erroneously, become synonymous with water-crowfoots in Ireland. Crowfoot-dominated reaches frequently have low diversity and are of low conservation value, and an abundance of the species generally indicates poor condition and damage. The main problems for river habitats in Ireland are damage through hydrological and morphological change, eutrophication and other water pollution. The Overall Status of the habitat is Inadequate and deteriorating.

Targets and Attributes

Table 5-5 Targets and Attributes for Watercourses of plain to montane levels with the Ranunculion fluitants and Callitricho-Batrachion vegetation

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
Habitat area	Area stable or increasing, subject to natural processes	**Yes -** There are no instream works proposed within the SAC and there is therefore no potential for direct effect via decrease in habitat area and distribution. However, a potential for indirect adverse effect was identified as a result of water quality deterioration and habitat degradation associated with construction of the Proposed Grid Connection.
Habitat distribution	No decline, subject to natural processes	
Hydrological regime: river flow	Maintain/restore appropriate hydrological regimes	**No-** construction activities for the Proposed Grid Connection will not include instream works and will not cause changes in the hydrological regime
Hydrological regime: groundwater discharge	Maintain appropriate hydrological regime	**No-** construction activities for the Proposed Grid Connection will not affect groundwater discharge in the SAC.
Substratum composition: particle size range	Maintain/restore appropriate substratum particle size range, quantity and quality, subject to natural process	**Yes-** pollution caused by construction activities for the Proposed Grid Connection could cause siltation which could artificially elevate the levels of fine sediments and provide a rooting medium for macrophytes which favours specific subtypes of the community

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
Water quality	Restore appropriate water quality to support the natural structure and functioning of the habitat	**Yes-** There are no instream works proposed within the SAC and there is therefore no potential for direct effect via decrease in habitat area and distribution. However, a potential for indirect adverse effect was identified as a result of water quality deterioration and habitat degradation associated with construction of the Proposed Grid Connection. Deterioration in water quality and habitat degradation have the potential to result in changes in the species assemblage.
Typical species	Typical species of the relevant habitat sub-type should be present and in good condition	
Floodplain connectivity: area	The area of active floodplain at and upstream of the habitat should be maintained/restored	**No-** Proposed Project will not disrupt the river connectivity with the floodplain
Riparian habitat: area and condition	Restore the area and condition of fringing habitats necessary to support the habitat and its sub-types	**No-** Proposed Project will not result in adverse impacts on fringing habitats

5.1.1.3.4 *Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*

Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* occur in an area of braided river channels and islands downstream of the R586 bridge east of Dunmanway in Bandon River SAC. The minimum area of alluvial forest in the SAC is estimated to be 27.7ha. It is important to note that further unsurveyed areas may be present within the SAC. Periodic flooding is essential to maintain alluvial woodlands along river and lake floodplains such as this site.

According to the Article 17 reporting (NPWS, 2025) two classes of this habitat exist in Ireland, both occurring on heavy soils that are periodically inundated by the rise of water levels. The more common type is that of the riparian forests of Ash (*Fraxinus excelsior*) and Alder (*Alnus glutinosa*) (Alno-Padion) of temperate and Boreal Europe lowland and hill watercourses. The other type is the gallery forests of tall willows (*Salix* spp.) (*Salicion albae*) that occur alongside lowland river channels and occasionally on river islands, where the tree roots are almost continuously submerged. These distinctive woodlands are dominated by archaeophyte willows, such as White Willow (Salix alba), Osier (*S. viminalis*) and Almond Willow (*S. triandra*), sometimes accompanied by the native Grey Willow (*S. cinerea*), but Alder should be rare.

The main pressures are invasive plant species, notably Himalayan Balsam (*Impatiens glandulifera*), overgrazing by deer, the fungal disease Ash dieback, and hydrological pressures such as drainage and modification of hydrological flow. The Overall Status assessment is Bad with a deteriorating trend.

Targets and Attributes

Table 5-6 Targets and Attributes for Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
Habitat area	Area stable or increasing, subject to natural processes, at least 27.7ha for the sub-site	**Yes-** There are no instream works or vegetation removal proposed within the SAC and there is therefore no potential

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
	(Milleenanannig, NSNW site code 1306) surveyed.	for direct effect via decrease in habitat area and distribution. However, a potential for indirect adverse effect was identified as a result of water quality deterioration and habitat degradation associated with construction of the Proposed Grid Connection.
Habitat distribution	No decline, subject to natural processes.	
Woodland size	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	**No-** Proposed Project will not result in a decrease in the habitat area
Woodland structure: cover and height	Total canopy cover at least 30%; median canopy height at least 7m; native shrub layer cover 10-75%; native herb/dwarf shrub layer cover at least 20% and height at least 20cm; bryophyte cover at least 4%	**No-** Proposed Project will not affect woodland structure
Woodland structure: community diversity and extent	Maintain diversity and extent of community types	**No-** Proposed Project will not affect woodland structure
Woodland structure: natural regeneration	Seedlings, saplings and pole age-classes of target species for 91E0* woodlands and other native tree species occur in adequate proportions to ensure survival of woodland canopy	**No-** Proposed Project will not affect woodland structure
Hydrological regime: flooding depth/height of water table	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	**No-** construction activities for the Proposed Grid Connection will not include instream works and will not cause changes in the hydrological regime
Woodland structure: dead wood	At least 19 stems/ha of dead wood of at least 20cm diameter	**No-** Proposed Project will not affect woodland structure
Woodland structure: veteran trees	No decline	**No-** Proposed Project will not affect woodland structure
Woodland structure: indicators of local distinctiveness	No decline	**No-** Proposed Project will not affect woodland structure
Woodland structure: indicators of overgrazing	All five indicators of overgrazing absent	**No-** Proposed Project will not result in overgrazing

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
Vegetation composition: native tree cover	No decline. Native tree cover at least 90% of canopy; target species cover at least 50% of canopy	**No-** Proposed Project will not affect vegetation composition
Vegetation composition: typical species	At least 1 target species for 91E0* woodlands present; at least 6 positive indicator species for 91E0* woodlands present	**No-** Proposed Project will not affect vegetation composition
Vegetation composition: negative indicator species	Negative indicator species cover not greater than 10%; regeneration of negative indicator species absent	**No-** construction activities for the Proposed Grid Connection will be limited to a working corridor along the existing public road
Vegetation composition: problematic native species	Cover of common nettle (Urtica dioica) less than 75%	**No-** Proposed Project will not affect vegetation composition

5.1.2 Mullaghanish to Musheramore Mountains SPA 004162

The potential for impacts on this SPA were identified in **Section 4.1** above.

The Proposed Wind Farm is located 20km south of this designated site. This distance is outside the core foraging range of 2 km and the maximum foraging range of 10 km for breeding hen harrier, for which this SPA is designated. Furthermore, no hen harrier breeding activity was recorded within the Proposed Wind Farm during the ornithological surveys. However, hen harrier activity was recorded during the post-breeding and winter period. It cannot be known where these birds originated from or bred using observational data alone - it is possible that they originated from the Mullaghanish to Musheramore Mountains SPA or a non-designated area. Therefore, taking a precautionary approach, the potential for adverse effects on birds which may use this SPA for breeding requires further consideration. Details of ornithological survey results are provided in Section 1.4.3.3.

The identified pathways for effect include the following:

- This species was recorded within the Proposed Wind Farm site. Potential for ex-situ habitat loss cannot be excluded.
- Birds were recorded within 500m of the proposed turbine layout. Potential for ex-situ disturbance/displacement cannot be excluded.

There were no birds recorded flying at Potential Collision Height (PCH) within 500m of the proposed turbine locations during vantage point surveys. This limits the potential for adverse collision risk for this species.

Table 5-7 below lists the qualifying features of this European Site and determines, in the light of their Conservation Objectives, whether there is any complete source-pathway-receptor chain, by which adverse effects may occur.

5.1.2.1 Identification of Individual Special Conservation Interest with the Potential to be Affected

Table 5-7 Assessment of Special Conservation Interests of the Mullaghanish to Musheramore Mountains SPA 004162 potentially affected

Qualifying feature	Conservation Objective (NPWS, Version 1, September 2022)	Rationale	Potential for Adverse Effects Yes/No
A082 Hen Harrier *Circus cyaneus*	To restore the favourable conservation condition of hen harrier in Mullaghanish to Musheramore Mountains SPA	The Proposed Wind Farm is located 20km south of this designated site. This distance is outside the core foraging range of 2 km and the maximum foraging range of 10 km for breeding hen harrier, for which this SPA is designated. Furthermore, as detailed in Section 1.4.3.3, during the ornithological surveys carried out, no hen harrier breeding activity was recorded within the Proposed Wind Farm site. However, hen harrier activity was recorded during the post-breeding and winter period. It cannot be known where these birds originated from or bred using observational data alone - it is possible that they originated from the Mullaghanish to Musheramore Mountains SPA or a non-designated area. Therefore, taking a precautionary approach, the potential for adverse effects on birds which may use this SPA for breeding requires further consideration. Potential for ex-situ habitat loss cannot be excluded. Birds were recorded within 500m of the proposed turbine layout. Potential for disturbance/displacement cannot be excluded. There were no birds recorded flying at Potential Collision Height (PCH) within 500m of the proposed turbine locations during vantage point surveys. Therefore there is no potential for adverse effect via collision risk for this species. There is no potential for adverse effect on the species as a result of the Proposed Grid Connection. The Proposed Grid Connection is 19km from the SPA, and will be constructed in-road. Given the scale and nature of works associated with the Proposed Grid Connection, there is no potential for adverse effect via habitat loss, disturbance, displacement or any other effect. As such, further assessment is required with respect of the potential for adverse effect to the species via ex-situ habitat loss and disturbance/displacement as a result of the Proposed Wind Farm.	**Yes**

5.1.2.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form[20], the site-specific threats, pressures and activities with potential to impact on the European Site were reviewed and considered in relation to the Proposed Grid Connection. These are provided in the table below. **None of the listed threats and pressures associated with this SPA were identified as being relevant to the Proposed Project.**

Table 5-8 Site-specific threats, pressures and activities for the Mullaghanish to Musheramore Mountains SPA

Rank	Code	Threat/Pressure	Occurence
High	B	Sylviculture, forestry	Inside
High	B	Sylviculture, forestry	Outside
Low	D01.01	paths, tracks, cycling tracks	Inside
Low	D01.02	roads, motorways	Inside
Low	E01.03	dispersed habitation	Inside
Medium	A04	grazing	Outside
Medium	A04	grazing	Inside
Medium	C01.03	Peat extraction	Inside

5.1.2.3 SCI Specific Information

5.1.2.3.1 *Hen Harrier (Circus cyaneus)*

The conservation objective for this species within the SPA is *To restore the favourable conservation condition of hen harrier in Mullaghanish to Musheramore Mountains SPA.* The targets and attributes for this conservation objective are assessed in light of the Proposed Project below.

Targets and Attributes

Table 5-9 Targets and Attributes for Hen Harrier

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
Population size	Maintain numbers at or above 3 confirmed breeding pairs	**Yes –** Taking a precautionary approach, it is considered that there is potential for birds which use the SPA for breeding to use the Proposed Wind Farm site during the post-breeding or winter season. The potential for ex-situ habitat loss,

[20] *https://natura2000.eea.europa.eu/Natura2000/sdf/#/sdf?site=IE0004162&release=62*

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target in the Absence of Mitigation
		disturbance or displacement to the birds outside of breeding season, which has potential to undermine this target during the breeding season, requires further assessment.
Productivity rate	Maintain at least 1.0–1.4 fledged young per confirmed pair	**Yes -** Taking a precautionary approach, it is considered that there is potential for birds which use the SPA for breeding to use the Proposed Wind Farm site during the post-breeding or winter season. The potential for ex-situ habitat loss, disturbance or displacement to the birds outside of breeding season, indirectly affecting productivity rate, requires further assessment.
Spatial utilisation by breeding pairs	Restore the spatial utilisation of the SPA by breeding pairs to 100%	**No –** The Proposed Wind Farm is located over 20km away from the SPA, therefore there is no potential to undermine this target.
Extent and condition of heath and bog and associated habitats	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation	**No –** The Proposed Wind Farm is located over 20km away from the SPA, therefore there is no potential to undermine this target.
Extent and condition of low intensity managed grasslands and associated habitats	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation	**No –** The Proposed Wind Farm is located over 20km away from the SPA, therefore there is no potential to undermine this target.
Extent and condition of hedgerows	Maintain at least the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation	**No –** The Proposed Wind Farm is located over 20km away from the SPA, therefore there is no potential to undermine this target.
Age structure of forest estate	Achieve an even and consistent distribution of age-classes across the forest estate	**No –** The Proposed Wind Farm is located over 20km away from the SPA, therefore there is no potential to undermine this target.
Disturbance to breeding sites	Disturbance occurs at levels that does not significantly impact upon breeding hen harrier	**No –** The Proposed Wind Farm is located over 20km away from the SPA, therefore there is no potential to undermine this target.

6. ASSESSMENT OF POTENTIAL EFFECTS & ASSOCIATED MITIGATION

This section of the NIS assesses the potential effects of the Proposed Project on the identified relevant Qualifying Interests. This assessment is undertaken in the absence of any mitigation and in respect of the conservation objectives of the European Site. The Conservation Objectives each of the European Sites assessed were reviewed on the 11th of March 2026. The Conservation Objectives for these sites are available at the following locations:

- NPWS (2019) Conservation Objectives: Bandon River SAC 002171. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage, and the Gaeltacht. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002171.pdf
- NPWS (2022) Conservation Objectives: Mullaghanish to Musheramore Mountains SPA 004162. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004162.pdf

Following the initial impact assessment, mitigation is prescribed where necessary to avoid adverse effects on the Conservation Objectives of the relevant QIs/SCIs. A Schedule of Mitigation is provided in Appendix 6 of this NIS.

6.1 Potential for Direct Effects on the European Sites

6.1.1 River Bandon SAC

The Proposed Wind Farm is located completely outside of the SAC, over 11km away, and within a separate hydrological subcatchment. Therefore, there is no potential for direct effect on the SAC as a result of the Proposed Wind Farm.

The Proposed Grid Connection crosses the Bandon River and its tributary, located within the SAC boundary, for approximately 160m via a road bridge along the R586 east of Dunmanway. However, there are no instream works proposed and the works will be restricted to the road deck. Therefore, there is no potential for direct effect on the SAC.

Two of the water crossings points (10 and 11) are located within the boundary of Bandon River SAC. Watercourse 10 and watercourse 11b (main Bandon River) will be crossed via Horizontal Directional Drilling (HDD). Watercourse 11a comprises an overflow for floodwater flows which is typically has no flow. Crossing 11a will be crossed via flatbed formation over the watercourse.

The installation of the Proposed Grid Connection is located within the public road corridor throughout the River Bandon SAC. There are no instream works required, therefore, there is no potential for direct effects on this European Site.

6.1.2 Mullaghanish to Musheramore Mountains SPA

The Proposed Grid Connection is located completely outside of the SPA, over 19km away. Therefore, there is no potential for direct effect on the SPA as a result of the Proposed Grid Connection. The Proposed Wind Farm is located over 20km away from the SPA. However, the potential for direct effect on hen harrier as a result of collision risk was considered.

As discussed in Section 3.2.5.6, there is no evidence to suggest that hen harrier breeding within the SPA utilise the Proposed Wind Farm site to support breeding activity. There is therefore no potential for adverse effect on hen harrier using the SPA during breeding season. However taking a precautionary approach, the potential for adverse effect to hen harrier during the post-breeding and wintering season is considered. Hen harrier were not recorded flying at potential collision height (PCH) during the extensive vantage point survey work undertaken (Section 3.2.5). Hen harrier typically fly low to the ground: in a study of hen harrier flight behaviour, the WINDHARRIER project (Wilson *et al.,* 2015), found that hen harrier spend a proportionally low amount of their flight time in wind farms at rotor sweep height (12%), demonstrating that hen harriers are at low risk of collision with wind turbines. Based on the data collected, there is no potential for adverse effects on hen harrier using the site via collision risk.

6.2 Potential for Indirect Effects on the European Sites

6.2.1 River Bandon SAC

Given that there is no hydrological connectivity between the Proposed Wind Farm and the SAC, there is no potential for indirect adverse effect on the SAC as a result of the Proposed Wind Farm.

However, the Proposed Grid Connection crosses the Bandon River and its tributary, located within the SAC boundary, for approximately 160m via a road bridge along the R586 east of Dunmanway. The Proposed Grid Connection also crosses a number of water crossings within the public road upstream of the SAC. A potential for indirect adverse effect on the SAC via water quality deterioration as a result of construction of the Proposed Grid Connection was identified. There is a potential for indirect effects on the following QIs of the SAC:

- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1096] Brook Lamprey (*Lampetra planeri*)
- [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
- [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*)

6.2.1.1 Hydrological Impacts

6.2.1.1.1 *Construction*

The Proposed Grid Connection will be emplaced primarily along the road carriageway, therefore, no instream works will occur, and no bridge/ culvert alterations are proposed. However, there is potential for the activities associated with the installation of the Proposed Grid Connection to result in the runoff of silt and other pollutants such as hydrocarbons and cementitious material in the absence of mitigation. Surface water quality effects on local watercourses may occur during drilling and groundworks associated with standard trefoil arrangement formation (Option A), flatbed formation under culverts/ services (option C), flatbed formation over bridges/ culverts/ services (option C) or horizontal directional drilling (HDD) (option D) watercourse crossings. Detailed drawings of the methodology used for each water crossing are shown in Appendix 2. There is a risk of indirect impacts from sediment laden runoff during trenching and during the launch pit and reception pit excavation works.

There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid.

Changes in water quality are considered to negatively impact the population of lamprey and changes in river sediment cause damages to the ammocoete habitat (Kurz & Costello 1999).

Freshwater pearl mussel is extremely vulnerable to environmental changes due to its complex life cycle and its sensitive habitat. Sedimentation settling in the habitat can deprive the young freshwater pearl mussles of oxygen and prevent juveniles for moving into the substratum. As filterfeeders, this species is also particularly sensitive to suspended solids in the waterbody due to pollution events or sedimentation. As salmonids form part of the life cycle of freshwater pearl mussel changes in salmonid populations directly affect the freshwater pearl mussel population (Moorkens 1999). Increased sedimentation can alter the species composition of floating river vegetation and favour rooted macrophytes. Rooted macrophytes should be absent or trace (<5%) in freshwater pearl mussel habitat. (NPWS (2019).

Two of the water crossings points (10 and 11) along the Proposed Grid Connection are located within the boundary of Bandon River SAC (Figure 2-2). Watercourse 10 and watercourse 11b (main Bandon River) will be crossed via Horizontal Directional Drilling (HDD). Watercourse 11a comprises an overflow for floodwater flows which is typically has no flow. Crossing 11a will be crossed via flatbed formation over the watercourse.

A stone wall is present along both sides of the R586 road which crosses through the SAC boundary and over these watercourses, which will act as a barrier in case of potential run-off. However, the following measures will additionally be in place due to the presence of storm drains in the vicinity of required road excavation works within the SAC boundary. In addition, there will be no storage of excavation of construction materials within the boundary of the SAC. Excavated materials for re-use will be segregated and temporarily stored, completely outside of the SAC boundary and as far away from water courses as possible, but a minimum distance of 20m from watercourses.

Mitigations to be applied for works throughout the Proposed Grid Connection

Pre-commencement Temporary Drainage Works:

Prior to the commencement of substation, cable trenching, access road or end mast works the following key temporary drainage measures shall be installed:

- All existing roadside drains (where present) that intercept the proposed works area shall be temporarily blocked down-gradient of the works using check dams/silt traps;
- Culverts, manholes and other drainage inlets (where present) shall also be temporarily blocked;
- A double silt fence perimeter shall be placed along the road verge on the down-slope side of works areas that are located inside the watercourse 50m buffer zone.

The following mitigation measures are proposed for the underground cabling watercourse crossing works:

- No stock-piling of construction materials shall take place along the grid route;
- No refuelling of machinery or overnight parking of machinery shall be permitted in this area;
- No concrete truck chute cleaning shall be permitted in this area;
- Works shall not take place at periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast;
- Local road drainage, culverts and manholes shall be temporarily blocked during the works;

- Machinery deliveries shall be arranged using existing structures along the public road;
- All machinery operations shall take place away from the stream and ditch banks, apart from where crossings occur. Although no instream works are proposed or shall occur;
- Any excess construction material shall be immediately removed from the area and sent to a licenced waste facility;
- No stockpiling of materials shall be permitted in the constraint zones;
- Spill kits shall be available in each item of plant required to complete the stream crossing; and,
- Silt fencing shall be erected on ground sloping towards watercourses at the stream crossings if required.

Fracture Blow-out (Frac-out) Prevention and Contingency Plan:

- The drilling fluid/bentonite shall be non-toxic and naturally biodegradable (i.e. Clear Bore Drilling Fluid or similar shall be used);
- The area around the drilling fluid batching, pumping and recycling plants shall be bunded using terram and/or sandbags to contain any potential spillage;
- One or more lines of silt fencing shall be placed between the works area and the adjacent river;
- Spills of drilling fluid shall be cleaned up immediately and transported off-site for disposal at a licensed facility;
- Adequately sized skips shall be used where temporary storage of arisings are required;
- The drilling process / pressure shall be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This shall be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling shall be immediately stopped;
- Any frac-out material shall be contained and removed off-site;
- The drilling location shall be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and,
- If the risk of further frac-out is high, a new drilling alignment shall be sought at the crossing location.

6.2.1.1.2 *Operation*

The Proposed Grid Connection will remain in situ throughout the operation of the Proposed Wind Farm. There is no maintenance work envisaged for the lifetime of the Proposed Project. Should the need for works along the Proposed Grid Connection arise, any works will be undertaken in line with the mitigation outlined for the construction phase of the Proposed Grid Connection. Maintenance works would be limited to joint bays, none of which are located within the SAC boundary.

Therefore, there is no potential for adverse effects on this European Site during the operational phase of the Proposed Project.

6.2.2 Mullaghanish to Musheramore Mountains SPA

6.2.2.1 Indirect Effects on Hen Harrier

As described in earlier sections and re-iterated here, the Mullaghanish to Musheramore Mountains SPA is approximately 20km north-east of the Proposed Wind Farm site. The separation distance between the SPA and the Proposed Wind Farm site exceeds the maximum foraging range for breeding hen harrier (10km; SNH [2016]), therefore it is unlikely that hen harrier breeding within the SPA are utilising the Proposed Wind Farm site to support breeding activity. The data collected during field surveys supports this: hen harrier were not recorded during the early- and mid-breeding season (April, May and June) when peak nest building, egg laying, incubating and hatching occurs (Hardey et al., 2013). In July, there was a single observation of a bird flying outside the Proposed Wind Farm site boundary. There were no records of breeding behaviour such as territory defence or nest provisioning during these months. As such, there is no evidence to suggest that hen harrier breeding within the SPA utilise the Proposed Wind Farm site to support breeding activity.

During the post-breeding period (August and September), hen harrier disperse from their breeding area into lowland areas to overwinter where there is greater resource availability. Juvenile birds have typically left the nest and are dispersing from their natal areas at this time (Hardey et al., 2013). A study of juvenile hen harrier dispersal using satellite tags showed that dispersal can be variable, but typically involves a sudden, long-distance (>25km) initial movement away from the natal area, followed by shorter exploratory movements and the use of temporary settlement areas (McCarthy, 2022). During field surveys, hen harrier were recorded utilising the Proposed Wind Farm site during the post-breeding period: there were individual records of an adult male, an adult female and a juvenile hunting during August and September. In addition, hen harrier were recorded utilising the Proposed Wind Farm site throughout the winter season (October to March). It cannot be determined where these birds originated from or bred using observational data alone and there is potential that they originated from the Mullaghanish to Musheramore Mountains SPA or a non-designated area. As such, taking a precautionary approach, the potential for ex-situ, indirect adverse effects on SCI birds is considered further.

6.2.2.1.1 *Ex-situ Habitat Loss, Disturbance and Displacement*

During wind farm construction, displacement has been suggested to potentially occur up to 500m around construction works, with some disruption up to 1km, depending on lines of visibility (Madders, 2004, cited in Bright et al., 2006). Therefore, it is assumed that some temporary disturbance to hunting hen harrier will occur during construction. During wind farm operation, Pearce-Higgins et al. (2009) found significant avoidance of turbines by hen harrier within 250m, and reduced flight activity (52%) by hen harrier within 500m of turbines at operating wind farms. Goodship and Furness (2022) also found that disturbance may occur between 500-750m.

As described above, hen harrier recorded during the post-breeding and winter season were using the Proposed Wind Farm site and surrounds for hunting. The footprint of the development accounts for a small proportion of the Proposed Wind Farm site (31.61ha or 4% of 791.41ha) and a large area of suitable hunting habitat will remain available after construction, after assuming 250m avoidance of turbines (265.32ha within 250m of turbines or 33.5% of 791.41ha). Two birds were recorded possibly roosting together approximately 1.03km from the nearest proposed works and infrastructure, which is greater than the disturbance distance for this species. Furthermore, the habitats utilised by hen harrier are not unique to the Proposed Wind Farm site and are abundant in the wider surroundings. This is supported by observations of hen harrier hunting outside the Proposed Wind Farm site during field surveys.

Given the extent of suitable hunting habitat that will remain in the Proposed Wind Farm site and surroundings, and the distance of proposed works and infrastructure from the SPA, suitable habitat will remain available to overwintering hen harrier to continue to utilise the area for hunting and roosting.

No potential for adverse effects on the likelihood of overwintering hen harrier returning to the Mullaghanish to Musheramore Mountains SPA and no potential for adverse effects on juveniles dispersing from the Mullaghanish to Musheramore Mountains SPA as a result of the Proposed Project was identified.

Therefore, there is no potential for adverse effect on the Mullaghanish to Musheramore Mountains SPA as a result of the Proposed Project.

6.2.3 Decommissioning Phase

The Proposed Grid Connection and the proposed 110kV onsite substation will remain in place as it will be under the ownership and control of the ESBN and EirGrid. There is no potential for adverse effects on the River Bandon SAC nor the Mullaghanish to Musheramore Mountains SPA during the decommissioning of the Proposed Grid Connection.

Furthermore, there is no potential for adverse effect during the decommissioning of the Proposed Wind Farm, given that there is no potential for additional pathways via disturbance/displacement, habitat loss, or water quality deterioration that would affect any European Site. Details on the decommissioning of the Proposed Project are outlined in the Decommissioning Plan in **Appendix 4**.

7. ASSESSMENT OF RESIDUAL ADVERSE EFFECTS

The potential for residual adverse effects on each of the individual relevant Qualifying Features of the Screened In European Sites following the implementation of mitigation, is assessed in this section of the report.

Based on the above, in view of best scientific knowledge, on the basis of objective information, there is no potential for adverse effect on the identified QIs/SCIs and their associated targets and attributes, or on any European Site Potential pathways for effect have been robustly blocked through measures to avoid impacts and the incorporation of best practice/mitigation measures into the project design.

Taking cognisance of measures to avoid impacts and best practice/mitigation measures incorporated into the project design which are considered in the preceding section, the Proposed Project will not have an adverse effect on the integrity of any European Site.

The Proposed Project will not prevent the QIs/SCIs of European Sites from achieving/maintaining favourable conservation status in the future as defined in Article 1 of the EU Habitats Directive.

A definition of Favourable Conservation Status for habitats is provided below:

'conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species within the territory referred to in Article 2; The conservation status of a natural habitat will be taken as 'favourable' when:

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

A definition of Favourable Conservation Status for species is as follows:

'conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2; The conservation status will be taken as '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, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.'

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the Proposed Project will not adversely affect the Qualifying Interests/Special Conservation Interests associated with any European Site.

8. ASSESSMENT OF CUMULATIVE EFFECTS

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on European Sites was conducted. This assessment focuses on the potential for cumulative in-combination effects on the European Sites where potential for adverse effects was identified. This included a review of online Planning Registers, Development Plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects. A list of the plans and projects considered is provided in **Appendix 5**.

8.1 Plans

The following Development Plans have been reviewed and taken into consideration as part of this assessment:

- Cork County Development Plan 2022-2028
- Regional Spatial and Economic Strategy for the Southern Region, Project Ireland 2040
- Ireland's 4th National Biodiversity Action Plan 2023-2030

A review of the objectives of the Plans relating to European Designated Sites has been carried out and is provided in **Appendix 5**. No potential for cumulative effects when considered in-combination with the Proposed Project has been identified, and the Proposed Project is in compliance with the relevant objectives of the Plan.

In addition, the Appropriate Assessment carried out for these Plans have been reviewed. The relevant Natura Impact Report (NIR) is found on the Cork County Council website at the following link:

- Cork County Development Plan 2022-2028: https://www.corkcity.ie/en/proposed-cork-city-development-plan-2022-2028/draft-plan-documents/phase-2-draft-development-plan-2022-2028/natura-impact-report-for-appropriate-assessment/

The Appropriate Assessment carried out for the Development Plan has concluded that there is no potential for Residual Adverse Effect as a result of implementation of the Plan. There is no potential for cumulative effect as a result of the Proposed Project in-combination with the Plan.

8.2 Projects

Assessment material for this cumulative assessment was compiled on the relevant developments within the vicinity of the Proposed Project. The material was gathered through a search of relevant online Planning Registers, reviews of relevant documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. All relevant projects were considered in relation to the potential for in-combination effects. All relevant data was reviewed (e.g. individual EISs/EIARs, NISs, layouts, drawings etc.) for all relevant projects where available.

- The Proposed Wind Farm has no hydrological connectivity with any European Site. As such there is no potential for cumulative effect via hydrological pathways on any European site as a result of the Proposed Wind Farm.
- The potential for cumulative effects on Mullaghanish to Musheramore Mountains SPA as a result of the Proposed Wind Farm in-combination with other projects requires further assessment.

- The Proposed Grid Connection passes through the boundary of Bandon River SAC. A hydrological pathway for effect on the SAC was identified and as such the potential for cumulative effects in-combination with other projects within the hydrological catchment requires further assessment.

8.2.1 Other Wind Farm Projects

8.2.1.1 Wind Farm projects within the boundary of Mullaghanish to Musheramore Mountains SPA

One existing wind farm was identified within the boundary of the SPA, Bawnmore Wind Farm (PL references - 04.232274, EOD-08/6149, 074102, 088770), which is a 25MW wind farm with 11 no. turbines. Bawnmore is over 28km from the Proposed Wind Farm. Given the distance between the Proposed Wind Farm infrastructure and the SPA, which is completely outside the maximum foraging range for hen harrier within breeding season, and given the extent of suitable hunting and over-wintering habitat that will remain in the Proposed Wind Farm site itself and surrounding areas around the SPA, no potential for adverse cumulative effect was identified as a result of the Proposed Project.

8.2.1.2 Wind Farm projects within 25km of Mullaghanish to Musheramore Mountains SPA

Table 8-1 lists 15 no. existing wind farm projects and 1 no. decommissioned wind farm project identified within 25km of the SPA. No potential for cumulative adverse effect in combination with the WEDcross single turbine (Cork Co. Council planning ref 06/12438) was identified due to the small scale and industrial location of this turbine.

Table 8-2 lists 11 no. proposed or permitted (as well as refused) wind farm projects within 25km of the SPA. Following a review of the listed existing and decommissioned wind farms in Table 8-1, and the listed proposed/permitted/refused wind farms in

Table 8-2, no potential for cumulative effect in combination with the Proposed Project was identified. Given the distance between the Proposed Wind Farm infrastructure and the SPA, which is completely outside the maximum foraging range for hen harrier within breeding season, and given the extent of suitable hunting and over-wintering habitat that will remain in the Proposed Wind Farm site itself and surrounding areas around the SPA, no potential for adverse cumulative effect was identified as a result of the Proposed Project.

Table 8-1 Existing Wind Farms within 25km of Mullaghanish to Musheramore Mountains SPA

Project Name	Project Capacity (MW)	Status	Planning Authority	Final Planning Reference Number	Distance from Proposed Wind Farm (km)
Kealkill	8.5	Decommissioned by 2018	Cork County Council	PL04.127297	3
Carrigdangan	54.3	Operational	Cork County Council	ABP-313261-22	4
Grousemount	114.2	Operational	An Comisiún Pleanála	PA08.PA0044	11
Cleanrath	42.64	Operational	An Comisiún Pleanála	SU04.307939	12
Midas	29.8	Operational	Kerry County Council	02719	16
Coomagearlaghy	81	Operational	Kerry County Council	032306	17

Clydaghroe	<5	Operational	Kerry County Council	06/1680	23
Boggeragh	122.7	Operational	Cork County Council	PL04.130546	38
Caherdowney	10	Operational	Cork County Council	033079	26
Carrigcannon	20	Operational	Cork County Council	EOD-104119	40
Coomacheo	59.8	Operational	Cork County Council	03/1997	27
Esk	23.35	Operational	Cork County Council	PL04.245196	44
Garranereagh	8.75	Operational	Cork County Council	105711	22
Gneeves	9.35	Operational	Cork County Council	EOD-134566	27
Scartaglen	39.25	Operational	Kerry County Council	13/725	41
Knockacummer	100	Operational	Cork County Council	EOD-105211	50

Table 8-2 Proposed Wind Farms within 25km of Mullaghanish to Musheramore Mountains SPA

Project Name	Planning Authority	Planning Reference Number	Development Description	Application Status
Ballinagree	Cork County Council	PA04.312606	Wind farm development of 20 turbines with 110kV electrical substation and all related site works and ancillary development	Permitted
Barnadivane	Cork County Council	14/6760, 05/5907, 03/2365, 11/6605	6 no. wind turbines.	Permitted
Cummeenabuddoge	Kerry County Council	321029	17 no. wind turbines and related works	Pre-application
Curraglass	Cork	25/6398 PL88.500665	3 no. wind turbines and related works	In Planning
Derragh	Cork	12/5270	6 no. wind turbines and related works	Operational
Derryreag/ Inchamore	Kerry	23646 PL08.317889	Development of 5 no. turbine wind farm	Refused
Gortloughra	Cork	PC04.311299	Construction of 8 wind turbines of approximately 6 megawatts each with a combined output of approximately 54 megawatts	Proposed
Gortyrahilly	Cork	PA04.314602	Wind farm development of 14 turbines with 110kV electrical substation and all related site works and ancillary development.	Permitted

Kilgarvan	Kerry	319741	Proposed Windfarm repowering Application of the existing Kilgarvan Wind Farm	Permitted
Toreengarrive	Kerry	17/300	Proposed wind farm. Reanasup, Lisheen, Knocknageehqa, Reaboy, Barna, Ballyahulla,	Refused

8.2.1.3 Wind Farm projects within 10km of the Proposed Wind Farm

For the purposes of this cumulative assessment, Wind Farms within a 10-kilometre radius of the Proposed Project area are listed below in Table 8-3 below. In total, 8 no. applications relating to wind energy were identified within 10km of the Proposed Wind Farm site. Each project is considered in further detail in the sections below. Given the small scale and limited impact of single / domestic turbines, no potential for adverse cumulative effect is predicted in relation to such developments.

Table 8-3 Wind Farm Projects Within 10km of the Proposed Project

County	Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)
Cork	Gortloughra Wind Farm	Proposed	8	1.9km
Cork	Shehy More Wind Farm	Existing	11	2.6km
Cork	Dereenacreenig West Wind Farm	Proposed	3	3.6km
Cork	Curaglass Wind Farm	Proposed	3	4km
Cork	Milane Hill Wind Farm	Existing	9	8.7km
Cork	Carrigarierk Wind Farm	Existing	5	8.9km
Cork	Carrigarierk Extension Wind Farm	Permitted	3	9.4km
Kerry	Grousemount Wind Farm	Existing	38	10km

Gortloughra Wind Farm

Gortloughra Wind Farm is a wind farm consisting of 8 no. turbines and is approx. 1.9km from the Site. The Gortloughra wind farm has already been refused by Cork County Council and is currently under appeal with ACP. The NIS for the Gortloughra Wind Farm project were reviewed as part of this assessment. These reports identified potential for effects on downstream water aquatic receptors (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system).

As such, the potential for in-combination effects with the Proposed Project specifically in relation to aquatic receptors and designated sites were initially identified (construction related impacts on water

quality). However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for the Gortloughra Wind Farm, no potential for adverse cumulative effects were identified.

Shehy More Wind Farm

Shehy More Wind Farm is an existing wind farm consisting of 11 no. turbines and is approx. 2.6 km from the Site. The NIS for the Shehy More Wind Farm project were reviewed as part of this assessment. A potential pathway for significant effects on downstream watercourses during construction was identified. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for the Shehy More Wind Farm, no potential for significant cumulative effects were identified. Additionally, the Shehy More Wind Farm has already been constructed and as such there is no potential for cumulative effects with the Proposed Project in terms of construction.

Dereenacreenig West Wind Farm

Dereenacreenig West Wind Farm is a proposed wind farm seeking 3 no. turbines and is approx. 3.6 km from the Site. The wind farm is partially constructed with the following permission lapsed/expired:

Development to comprise of seven (7) electricity generating wind turbines with a hub height of 55 metres and a rotor diameter of 52 metres, an Electrical Compound, Sub-Station Building, Four Car Parking Spaces, associated site roads and site works; it is proposed to source stone from an on site borrow pit.

The site of this wind farm is subject to a planning application for a 3 no. turbine, 119.3m tip height wind farm development submitted to Cork County Council in September 2025 (Cork CC Ref. 25/6052)

Curraglass Wind Farm

Curraglass Wind Farm is a Proposed Wind Farm consisting of 3 no. turbines and is approx. 3.6km from the Site. The NIS for the Curraglass Wind Farm project were reviewed as part of this assessment. The report identified potential for significant effects on downstream water aquatic receptors (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system).

However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for the Curraglass Wind Farm, no potential for adverse cumulative effects were identified.

Milane Hill Wind Farm

Millane Hill Wind Farm is an existing wind farm consisting of 9 no. turbines and is approx. 8.7 km from the Site. As per the assessment of residual effects from the proposed Millane Hill Wind Farm , there is no potential for significant effects, in the absence of mitigation, on downstream watercourses during construction. Further, Millane Hill Wind Farm is located predominantly on areas of grassland habitat. Additionally, the Millane Hill Wind Farm has already been constructed. As such there is no potential for adverse cumulative effects with the Proposed Project.

Carrigarierk Wind Farm

Carrigarierk Wind Farm is an existing wind farm consisting of 5 no. turbines and is approx. 8.9 km from the Site. The NIS for Carrigarierk Wind Farm was reviewed as part of this assessment. The majority of the Carrigarierk Wind Farm was constructed on conifer plantation. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined

within the NIS for Carrigarierk Wind Farm, including to protect water quality etc, no potential for adverse cumulative effects were identified. Additionally, the Carrigarierk Wind Farm has already been constructed and as such there is no potential for cumulative effects with the Proposed Project in this regard.

Carrigarierk Extension Wind Farm

Carrigarierk Extension Wind Farm is a permitted wind farm consisting of 3 no. turbines and is approx. 9.4 km from the Site. The NIS for the Carrigarierk Extension Wind Farm was reviewed as part of this assessment. The NIS identifies the potential for significant effects on downstream water aquatic receptors (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for the Carrigarierk Extension Wind Farm, no potential for significant cumulative effects were identified.

Grousemount Wind Farm

Grousemount Wind Farm is an existing wind farm consisting of 38 no. turbines and is and is approx. 10km from the Site. As per the assessment of residual effects from the proposed Grousemount Wind Farm, there is no potential for significant effects on downstream watercourses during construction (in the absence of mitigation). Additionally, The Grousemount wind farm has already been constructed. As such there is no potential for adverse cumulative effects with the Proposed Project. No potential for adverse cumulative operational effects exists either.

8.2.2 Other Projects in the Vicinity of the Proposed Grid Connection

With the exception of a 2.9km length at the Proposed Wind Farm site, the Proposed Grid Connection is located in the Bandon River catchment (17.6km). The Proposed Grid Connection is along existing roads (private and public) with no instream works proposed. Thirty-one projects were identified within this area and consisted predominantly of the construction of individual private dwellings, extensions to existing dwellings, agricultural shed and infrastructure projects.

A number of projects pertaining to overhead electrical powerline grid connections were considered, including planning references 21/902 and 23/654.

Planning references 23/74 for permission for facilitating works for the provision of access to existing hill-walking routes at Shehy Mountain, including carparking spaces and ancillary works, was also considered.

Planning reference 24/224 lodged by Uisce Éireann was also reviewed. This application is for proposed upgrade works to the existing wastewater network, including the decommissioning of sewers which will include river crossings, and upgrades to pump station infrastructure.

Given the small scale of the projects identified within 250m of the Proposed Grid Connection, and given the lack of adverse residual effects predicted as a result of the Proposed Grid Connection there is no potential for likely adverse cumulative effect when considered in-combination with these projects. The works along the Proposed Grid Connection are minor and transient, similar to roadworks being completed across the country and have no potential for cumulative adverse effects on any European Site.

8.2.2.1 Knockeenboy Wind Farm Grid Connection (planning ref: 21902)

A development consisting of a 20 kilovolt (kV) electrical powerline grid connection, approximately 10,117 metres in overall length (made up of approximately 9,983 metres of underground cable and approximately 134 metres of Over Head Line with three wooden support single poles), connecting the approved electrical substation at Knockeenboy Wind Farm (Planning Register Reference No. 11/00059 & An Bord Pleanala Ref. PL88.240070) to the existing Dunmanway 110kV ESB Networks substation at Ballyhalwick; together with all ancillary works and apparatus.

The NIS for Knockeenboy Wind Farm Grid Connection[21] was reviewed which has mitigation in place to prevent impacts via deterioration in water quality. No potential for adverse cumulative effects on European Designated Sites were identified during neither the construction phase nor operational maintenance works.

8.2.3 Other Developments

Dunmanway Waste Water Network Upgrade

Upgrade works to the existing wastewater network and all associated site development works: 1. Decommissioning of 485 linear meters of sewers along the north bank of the Sally (Dirty) River, in addition to the upstream river crossing, and 648 linear meters of sewer from the Quarry Road Pumping Station to the Clonakilty Road (R-599) via Brookpark including 2 no. existing river crossings of the Sally (Dirty) River and Brewery River. The existing sewers and manholes will be removed where the new pipeline coincides with the existing pipeline (approximately 305m of pipeline in total). All other sections of pipeline will be left in situ when decommissioned. 2. Upgrading and replacement of foul sewer consisting of the laying of c.1,267 linear metres of new underground pipework and associated manholes across public roads (L-4620, L-8691, L-8680, R-599) and private lands, including provision of 3 no. watercourse crossings at the Sally (Dirty) River and Brewery River. 3. Upgrades to Quarry Road Pumping Station consisting of the provision of 2 no. additional storm tanks, inlet screen, 3 no. new storm pumps, rising main diversions, interconnecting pipework and chambers, odour and electrical control infrastructure, overhead cabling, relocation of existing pole-mounted transformer, photovoltaic panels with associated controls / interfaces, provision of new control kiosks and adjustments to perimeter fencing. 4. Upgrades to Longbridge Pumping Station consisting of 1 no. additional storm overflow tank, inlet screen, 3 no. new storm pumps, replacement of existing foul pumps and macerator with 2 no. submersible electric pumps, interconnecting pipework and chambers, replacement outfall pipe, rising main diversions, odour and electrical control infrastructure, overhead cabling, photovoltaic panels with associated controls / interfaces, relocation of existing terminal pole and the existing control kiosk, provision of new control kiosks, and adjustments to perimeter fencing. 5. Tree removal and replacement planting, landscaping, and all associated site development and reinstatement works including ancillaries and excavation works above and below ground for the proposed works. The project will be constructed in the Dunmanway Agglomeration area licenced under the Waste Water Discharge (Authorisation) (WWDA) Regulations 2007 (Licence D0160-01 A).

The NIS for the Dunmanway Waste Water Network Upgrade was reviewed as part of this assessment.

With the mitigation measures outlined within the NIS for Dunmanway Waste Water Network Upgrade, no potential for adverse cumulative effects on European Designated Sites were identified.

[21] *https://planning.corkcoco.ie/ePlan/AppFileRefDetails/21902/0*

Bandon - Dunmanway 110kV Line Uprate Project

An upgrade (refurbishment) of the existing Bandon to Dunmanway 110kv OHL, which consists of the : (i) replacement ("restringing") of the existing OHL conductor wires with a new higher capacity conductor including installation of a new fibre optic communication connection; (ii) replacement of 12 no. of the 13 no. existing steel towers including 11 no. angle masts (AM) and 1 no. end mast (EM) and their foundations with similar structures and member replacement and new bolts at 1 no. EM. Any replacement AMs will be constructed at, or immediately adjacent to the existing structures that they will replace, with a height difference of between 0.5-1.5m; (iii) Replacement of 16 no. of the 127 no. existing intermediate pole sets (IMPs); with similar structures. Any replacement IMPs will be constructed in situ, with the exception of IMP128 which will be replaced at an offset of 10m. The height differences of the replacements will be 1m, with the exception of IMP113 and IMP115 which will be a 2m and 3m increase in height respectively, (iv) Carrying out of civil works for tower foundation strengthening at 1 no. location; (v) Replacement of hardware and fittings at all locations, including insulators, clamps, anti-climb guards, vibration dampers, and installation of new jumper arrangements, suspension weights, plump poles, pole bolts and anti-climb guards; (vi) replacement of a crossarm at 1 no. location; (vii) all associated works within the existing Dunmanway Substation to accommodate the uprated 110 kV OHL and all associated site development works including above and below the ground works to gain access to the existing structures including timber cutting and vegetation clearance, painting, renumbering of replacement.

The NIS for the Bandon - Dunmanway 110kV Line Uprate Project was reviewed as part of this assessment.

With the mitigation measures outlined within the NIS for Bandon - Dunmanway 110kV Line Upgrade Project, no potential for adverse cumulative effects on European Designated Sites were identified.

8.3 Conclusion of Assessment of Cumulative Effects

Following the detailed assessment provided in the preceding sections, it is concluded that, the proposed development will not result in any residual adverse effects on any of the European Sites, their integrity or their conservation objectives when considered on its own.

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

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site.

9. CONCLUDING STATEMENT

This NIS has provided an assessment of all potential direct or indirect adverse effects on European Sites. It has also assessed the potential for in-combination effects on European Site with other plans and projects.

Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the Proposed Project does not adversely affect the integrity of European Sites.

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

BIBLIOGRAPHY

Atherton, I.,Bosanquet, S., & Lawley, M. (Eds.). (2010). *Mosses and liverworts of Britain and Ireland: a field guide* (p. 848). Plymouth: British Bryological Society.

BirdWatch Ireland (2021) I-WEBS Counter Manual. BirdWatch Ireland, Kilcoole, Ireland. Available at: https://birdwatchireland.ie/publications/i-webs-counter-manual/

Bright, J.A., Langston, R.H.W., Bullman, R., Evans, R.J., Gardner, S., Pearce-Higgins, J. & Wilson, E. (2006). Bird sensitivity map to provide locational guidance for onshore wind farms in Scotland. RSPB Research Report 20.

British Trust for Ornithology (2021). Breeding Bird Survey. British Trust for Ornithology, Thetford, UK. Available at: https://www.bto.org/our-science/projects/bbs

Brown, A. F., & Shepherd, K. B. (1993). A method for censusing upland breeding waders. Bird study, 40(3), 189-195. https://doi.org/10.1080/00063659309477182

Calladine, J., Garner, G., Wernham, C., & Thiel, A. (2009). The influence of survey frequency on population estimates of moorland breeding birds. Bird Study, 56(3), 381-388. https://doi.org/10.1080/00063650902984604

CEN (2003). Water Quality – Sampling of Fish with Electricity. CEN EN 14011 8. European Committee for Standardisation, Brussels 18 pp.

CFB (2008). Electric Fishing in Wadeable reaches. Unpublished report, Central Fisheries Board.#

Dobson, M., Pawley, S., Fletcher, M. and Powell, A., 2012. Guide to Freshwater Invertebrates, *Freshwater Biological Association,* The Ferry Landing, Cumbria, UK

DoEHLG (2010). Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Revision, February, 2010. Department of the Environment, Heritage and Local Government.

EA (2003)- River Habitat Survey in Britain and Ireland Field Survey Guidance Manual. Available at https://assets.publishing.service.gov.uk/media/62dff4138fa8f564a21dcd5e/RHS-manual-2003_2022-reprint-LIT-1758.pdf.

European Commission (2011).European Commission (2021). Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC.

European Commission (2018). Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2002). Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.Fossitt, J. A. (2000). A Guide to Habitats in Ireland. Dublin: The Heritage Council.

Fernández-Bellon, D., Irwin, S., Wilson, M.W. and O'Halloran, J. 2015. Reproductive output of Hen Harriers *Circus cyaneus* in relation to wind turbine proximity. *Irish Birds*, 10: 145-150.

Gilbert, G., Gibbons, D.W. and Evans, J. (1998) Bird monitoring methods. Bedfordshire, England: Pelagic Publishing, Royal Society for the protection of Birds.

Goodship, N.M. & Furness, R.W. (2022). Disturbance distances review: an updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283, NatureScot, Inverness, Scotland.

Hardey, J., Crick, H.Q.P., Wernham, C.V., Riley, H., Etheridge, B. & Thompson, D.B.A. (2013). Raptors: a field guide for surveys and monitoring [3rd Edition]. The Stationary Office, Edinburgh.

Hendry K & Cragg-Hine D (2003). Ecology of the Atlantic Salmon.

IFI (2010). Biosecurity Protocol for Field Survey Work. Available online at: http://www.fisheriesireland.ie/InvasiveSpecies/biosecurity-protocol-for-field-survey-work.html

Inland Fisheries Ireland. Water Framework Directive Rivers Fish Ecological Status 2008-2022.

Johnson, W.P., Schmidt, P. M. & Taylor, D. P. (2014) Foraging flight distances of wintering ducks and geese: a review. Avian Conservation and Ecology 9(2): 2. Available at https://www.researchgate.net/profile/William_Johnson17/publication/266023568_Foraging_flight_distances_of_wintering_ducks_and_geese_A_review/links/54a85f580cf256bf8bb7e299/Foraging-flight-distances-of-wintering-ducks-and-geese-A-review.pdf

Kelly-Quinn, M. & Regan, E.C. (2012) Ireland Red List No. 7: Mayflies (Ephemeroptera). National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Kennedy, G.J.A. (1984). Evaluation of techniques for classifying habitats for juvenile salmon (*Salmo salar L.*). *Proceedings of the Atlantic Salmon trust workshop on stock enhancement*. 23 pp

Kurz, I. And Costello, M. J. (1999) An Outline of the Biology, Distribution and Conservation of Lampreys in Ireland. Irish Wildlife Manuals, No. 5.

Madders, M. (2004). The ecology of Hen harriers in Scotland in relation to windfarms. Report on Penbreck and Carmacoup proposed windfarm.

Maitland, P.S. (2003) Ecology of the River, Brook and Sea Lamprey. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough

McCarthy, A. 2022. Seasonal ecology and the conservation of hen harriers (Circus cyaneus) in Ireland. PhD Thesis, University College Cork

Moorkens, E. A., (1999) Conservation Management of the Freshwater Pearl Mussel *Margaritifera margaritifera*. Part 1: Biology of the species and its present situation in Ireland. Irish Wildlife Manuals, No. 8.

NatureScot (2025). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms

NPWS (2013). Site Synopsis. River Bandon SAC.

NPWS (2015). Conservation Objectives: Glengarriff Harbour and Woodland SAC 000090. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000090.pdf

NPWS (2016). Conservation Objectives: Caha Mountains SAC 000093. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000093.pdf

NPWS (2016). Conservation Objectives: The Gearagh SAC 000108. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000108.pdf

NPWS (2017). Conservation Objectives: Derryclogher (Knockboy) Bog SAC 001873. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001873.pdf

NPWS (2018). Conservation Objectives: Glanlough Woods SAC 002315. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002315.pdf

NPWS (2018) Conservation objectives supporting document – lesser horseshoe bat (*Rhinolophus hipposideros*) Version 1.

NPWS (2019). Conservation Objectives: Bandon River SAC 002171. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002171.pdf

NPWS (2022). Conservation Objectives: Mullaghanish to Musheramore Mountains SPA 004162. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004162.pdf

NPWS (2025). Conservation Objectives: The Gearagh SPA 004109. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004109.pdf

NPWS (2025). The Status of EU Protected Habitats and Species in Ireland 2025.

O'Briain, R., Matson, R., Gordon, P., Lopez, S., Cierpal, D., Connor, L., Corcoran, W., Coyne, J., Gavin, A., McLoone, P., Twomey, C. and Kelly, F.L. (2019) Sampling Fish in Rivers 2019 – Bandon River Catchment, Factsheet No. 2019/03. National Research Survey Programme. Inland Fisheries Ireland.

O'Connor, L. & Kennedy, R.J. (2002). A comparison of catchment-based salmon habitat survey techniques on three rivers in N. Ireland. *Fisheries Management and Ecology*, 9, 149-161.

O'Connor, W. (2004). A survey of juvenile lamprey populations in the Moy catchment. Irish Wildlife Manuals, No. 15. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland 6-85.

O'Connor W. (2006) A survey of juvenile lamprey populations in the Boyne Catchment. Irish Wildlife Manuals, No. 24 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

O'Connor, W. (2007) A survey of juvenile lamprey populations in the Corrib and Suir catchments. Irish Wildlife Manuals No. 26. National Parks and Wildlife Service.

O'Grady, M.F. (2006) Channels & Challenges. Enhancing Salmonid Rivers. Irish Freshwater Fisheries Ecology & Management Series: No 4. Central Fisheries Board, Dublin, Ireland. https://www.fisheriesireland.ie/sites/default/files/migrated/docman/Channels%20%26%20challenges-enhancing%20salmonid%20rivers%2072secure.pdf

Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. & Bullman, R. (2009) The distribution of breeding birds around upland wind farms. Journal of Applied Ecology, 46(6): 1323-1331. https://doi.org/10.1111/j.1365-2664.2009.01715.x

Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014). Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service, Dublin.

Ruddock, M., Wilson-Parr, R., Lusby, J., Connolly, F., J. Bailey, & O'Toole, L. (2024). The 2022 National Survey of breeding Hen Harrier in Ireland. Report prepared by Irish Raptor Study Group (IRSG), BirdWatch Ireland (BWI), Golden Eagle Trust (GET) for National Parks & Wildlife Service (NPWS). Irish Wildlife Manuals, No. 147. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Scottish Natural Heritage (2016). Assessing Connectivity with Special Protection Areas (SPAs).

Smith et al., (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council

Stace, C (2010). New Flora of the British Isles. 3rd edn. Cambridge University Press, Cambridge, UK.

Tesch, E.W. (1977, updated 2007). The Eel: Biological and management of anguillid eels.

TII/NRA (2009a). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes.

TII/NRA (2009b) Guidelines for Assessment of Ecological Impacts of National Roads Schemes.

TII/NRA (2020). Management of Invasive Alien Species on National Roads- Standard. Available at https://invasives.ie/app/uploads/2024/03/ManagementofIAPSonNationalRoads_TII_STANDARD_Dec2020_GE-ENV-01104.pdf

Toner, J. Bowman, K. Clabby, J. Lucey, M. McGarrigle, C. Concannon, C. Clenaghan, P. Cunningham, J. Delaney, S. O'Boyle, M. MacCárthaigh, M. Craig, R. Quinn (2005). *Water Quality in Ireland 2001-2003.* Environmental Protection Agency.

Water status data available on http://www.epa.ie and http://www.wfdireland.ie

Wilson, M.W., Fernández-Bellon, D., Irwin, S. and O'Halloran, J. 2016. Hen Harrier *Circus cyaneus* population trends in relation to wind farms. *Bird Study*, 64:20-29.