

Appropriate Assessment Screening Report and Natura Impact Statement

Borrisbeg Renewable
Energy Development, Co.
Tipperary.





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Appendix 3 Aquatic Baseline Report

Appendix 4 Construction Environmental Mangement Plan (CEMP)

Appendix 5 List of Projects Considered for Cumulative Assessment

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 Proposed Project. This report has been prepared by MKO on behalf of Buirios Ltd, who intend to apply to An Bord Pleanála for planning permission to construct a renewable energy development which will comprise 9 No. wind turbines, and associated infrastructure approximately 2.5km northeast of the town of Templemore, in Borrisbeg and adjacent townlands, Co. Tipperary. The Proposed Project is being brought forward in response to regional, national and European policy regarding Irelands transition to a low carbon economy and associated climate change policy objectives.

The planning application is accompanied by this report and an EIAR. The following references are used throughout this report and the EIAR.

- > The **‘Proposed Wind Farm’** relates to the 9 no. turbines and supporting infrastructure (detailed description provided in Appendix 1 (Chapter 4, Section 4.3) and it is the subject of this planning application under Section 37E of the Planning and Development Act 2000, as amended.
- > The **‘Proposed Grid Connection’** relates to the on-site 110kV substation and temporary construction compound, underground cabling connection to the existing 110kV Ikerrin to Thurles overhead line (OHL) and 2no. new end mast towers breaking the existing OHL. The Proposed Grid Connection will facilitate the connection of the Proposed Wind Farm to the national electricity grid and will be subject of a separate planning application under Section 182A of the Planning and Development Act 2000, as amended.
- > The **‘Proposed Project’** for the purposes of this report and the EIAR comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Study Boundary (the **‘Site’**) measuring approximately 650 hectares.

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 the 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, the Proposed Project, is not directly connected with, or necessary for, the management of any European Site. Consequently, the Proposed Project has been subject to the Appropriate Assessment Screening process.

This Natura Impact Statement (NIS) has been prepared in accordance with the 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) and Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC (EC, 2018) as well as the Department of the Environment’s Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG, 2010) and the Appropriate Assessment Screening for Development Management, Office of the Planning Regulator, Dublin 7, Ireland OPR (2021).

1.2 Statement of Authority

This report has been prepared by Aran von der Geest Moroney (B.Sc.) and reviewed by John Hynes. (BSc., MSc., MCIEEM).

Aran von der Geest Moroney is an ecologist with MKO having over 3 years’ experience in professional ecological consultancy. Aran holds a first-class honours BSc (Hons) in Ecology and Environmental Biology from University College Cork. Aran has also completed a Level 8 Special Purpose Award in

Digital Mapping and GIS. Aran's areas of expertise are wintering bird surveying and identification, freshwater macroinvertebrate identification and sampling, freshwater pearl mussel surveying, white-clawed crayfish surveying, electric fishing, bat surveys, GIS, habitat mapping, preparation of Stage 1 and Stage 2 Appropriate Assessment reports and Ecological Impact Assessment. Aran has been involved in a range of mixed use, residential, industrial, restoration, public services, wind energy and forestry projects. Aran has carried out a wide range ecological field surveys in accordance with NRA Guidelines, bat surveys, bird surveys, recording vegetation relevés and freshwater quality analysis using bioindicators. Aran has provided supervision as an ecological clerk of works in residential and wastewater infrastructure projects. Aran is trained in carrying out bat surveys, non-volant mammal surveys, bird surveys, freshwater pearl mussel surveys, white-clawed crayfish surveys, electric fishing surveys, river condition assessment surveys and in taking vegetation relevés of vascular plants and has experience in habitat identification and habitat mapping. Aran is responsible for independently carrying out and planning a range of ecological field surveys in accordance with NRA Guidelines and carrying out Appropriate Assessment screenings, Natura Impact Statements, Ecological Impact Assessments, Biodiversity chapters for EIARs, Invasive Species Management Plans and Aquatic reports as part of the ecology team. Aran is a member of CIEEM, holds a current Bat Roost Disturbance licence and holds an IFM Certificate in Electric Fishing.

John is an Ecology Director with MKO with over 10 years of experience in both private practice and local authorities. John holds a B.Sc in Environmental Science and a M.Sc. in Applied Ecology. Prior to taking up his position with MKO in March 2014, John worked as an Ecologist with Ryan Hanley Consulting Ltd. and Galway County Council. John has specialist knowledge in Flora and Fauna field surveys. Geographic Information Systems, data analysis, Appropriate Assessment, Ecological Impact Assessment and Environmental Impact Assessment. John's key strengths and areas of expertise are in project management. GIS and impact assessment. Since joining MKO John has been involved as a Senior Ecologist on a significant range of energy infrastructure, commercial, national roads and private/public development projects. Within MKO John plays a large role in the management of staff and works as part of a large multi-disciplinary team to produce EIAR Reports. John has project managed a range of strategy and development projects across Ireland and holds CIEEM membership.

Surveys

Field assessments were conducted by MKO ecologists Aran von der Geest Moroney (B.Sc.), Rachel Walsh (B.Sc.), Ellen Tuck (B.Sc.), Stephanie Corkery (B.Sc., M.Sc.) and Cillian Burke (B.Sc.).

Rachel has worked as an Ecologist in MKO since June 2020. She currently holds a role as Senior Ecologist and manages a small team within the company. She holds a First-Class Honours BSc. degree in Environmental Science from NUI Galway. Rachel's key strengths are in botanical identification and habitats assessment, mammal surveying and report writing for the purposes of Ecological Impact Assessment and Appropriate Assessment.

Ellen Tuck is an ecologist with MKO having joined the company in May 2022 and has over 2 years' experience in professional ecological consultancy. Ellen holds a second-class honours Bachelor of Science degree in Environmental Science from University of Galway. Since joining MKO, Ellen has gained experience in ecological consultancy and has worked on wind farm projects, large scale residential developments, synchronous condenser projects, county council projects and National Parks and Wildlife Service projects. Ellens key strengths are field surveying, terrestrial mammal surveying, habitat and vegetation surveying, habitat identification and habitat mapping, wintering bird surveying and identification, freshwater pearl mussel surveying, bat surveys, GIS, and the preparation of Appropriate Assessments and Natura Impact Assessments, and Ecological Impact Assessments. Ellen currently holds a Bat Roost Disturbance licence and a mammal and wildlife photography licence through the NPWS.

Stephanie Corkery is an ecologist with MKO having joined in March of 2022. She now has over 1.5 years' experience in professional ecological consultancy. Stephanie holds a BSc. in Ecology and Environmental Biology, an MSc. in Marine Biology, and a HDip in Sustainability in Enterprise, all from University College Cork. Since joining MKO, Stephanie has worked on a wide variety of projects including wind farms, large scale residential developments, and County Council projects. Stephanie's key strengths

include organising and carrying out both terrestrial and marine mammal surveys, as well as general ecological walkover surveys and bat surveys. She is also experienced in GIS, acoustic data analysis for bat species, and in preparing Appropriate Assessment Screening Reports (AASR), Natura Impact Statements (NIS), Ecological Impact Assessments (EcIA), Biodiversity Chapters, and Bat Reports.

Cillian worked as an Ecologist in MKO from February 2022 until May 2023. Cillian holds a BSc. degree in Environmental Science from NUI Galway. Cillian key strengths are in habitats assessment, mammal surveying and report writing for the purposes of Ecological Impact Assessment and Appropriate Assessment.

1.3 Structure and Format of this NIS

- Section 1 provides an introduction, background information and statement of authority for the NIS.
- Section 2 provides a full description of all elements of the Proposed Project.
- In Section 3, the characteristics of the receiving environment are fully described.
- In Section 4, a Stage 1 Screening is undertaken to identify 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 construction, operation and decommissioning of the Proposed Project.
- Section 5 provides a detailed consideration of the Screened In European Sites and identifies the relevant qualifying features and how they may be affected in light of their conservation objectives.
- Section 6 provides an assessment of the potential for adverse effects on the identified European Sites as a result of the Proposed Project and in the absence of mitigation. This section also prescribes mitigation to robustly block any identified pathways for impact for effect.
- Section 7 provides an assessment of residual effects taking into consideration the proposed mitigation.
- In Section 8, the potential in combination effects of the Proposed Project on European Sites, when considered in combination with other plans and projects were assessed.
- A concluding statement is provided in Section 9.

2. DESCRIPTION OF PROPOSED PROJECT

2.1 Site Location

The Site is located approximately 2.5km northeast of the town of Templemore, in Borrisbeg and adjacent townlands Co. Tipperary (Grid Ref.: 613067, 675408). The Proposed Project is served by a number of existing public and agricultural roads and tracks. The River Suir and Eastwood River and several of its tributaries flow through the Site.

A Site location map is included as Figure 2-1. The Proposed Project infrastructure layout is in Figure 2-2.

Current land-use on the Site comprises predominantly agriculture with some coniferous forestry and mixed broadleaf forestry and local roads. Land-use in the wider landscape of the Site comprises a mix of agriculture, peat cutting, quarrying, low density residential, an urban centre (Templemore) and commercial forestry.

2.2 Characteristics of the Proposed Project

The Proposed Project (Wind Farm and Grid Connection) and its component parts are the subject of separate planning applications under Section 37E (Proposed Wind Farm) and Section 182A (Proposed Grid Connection) of the Planning and Development Act 2000, as amended. The current application for planning permission to An Bord Pleanála in accordance with Section 37E of the Planning and Development Act 2000, (as amended) is for the Proposed Wind Farm. The development description for the current planning application as appears in the public notices is as follows:

The proposed development will consist of the provision of the following:

- i. 9 no. wind turbines with an overall turbine tip height of 185 metres; a rotor blade diameter of 163 metres; and hub height of 103.5 metres, and associated foundations and hard-standing areas;*
- ii. A thirty-year operational life of the wind farm from the date of full commissioning of the wind farm and subsequent decommissioning;*
- iii. Underground electrical cabling (33kV) and communications cabling;*
- iv. A temporary construction compound;*
- v. A temporary security cabin;*
- vi. A meteorological mast with a height of 30 metres and associated foundation and hard-standing area;*
- vii. A new gated site entrance on the L3248;*
- viii. Junction accommodation works and a new temporary access road off the L3248, to facilitate turbine delivery to the site;*
- ix. Upgrade of existing site tracks/ roads and provision of new site access roads, junctions and hardstand areas.*
- x. Upgrade of the existing L7039/L70391 junction for secondary site access off the L70391;*
- xi. A borrow pit;*
- xii. Spoil Management;*
- xiii. Tree felling;*
- xiv. Site Drainage;*
- xv. Biodiversity Enhancement Plan (including restoration of a segment of the Eastwood River, and planting of natural woodland and hedgerow);*
- xvi. Operational Stage site signage; and*
- xvii. All ancillary works and apparatus.*

A ten-year planning permission is sought.

The Proposed Grid Connection, which will be subject to a separate planning application under Section 182A of the Planning and Development Act, 2000 (as amended) is entirely located within the townlands of Strogue and Clonmore, Co. Tipperary, and will consist of the following:

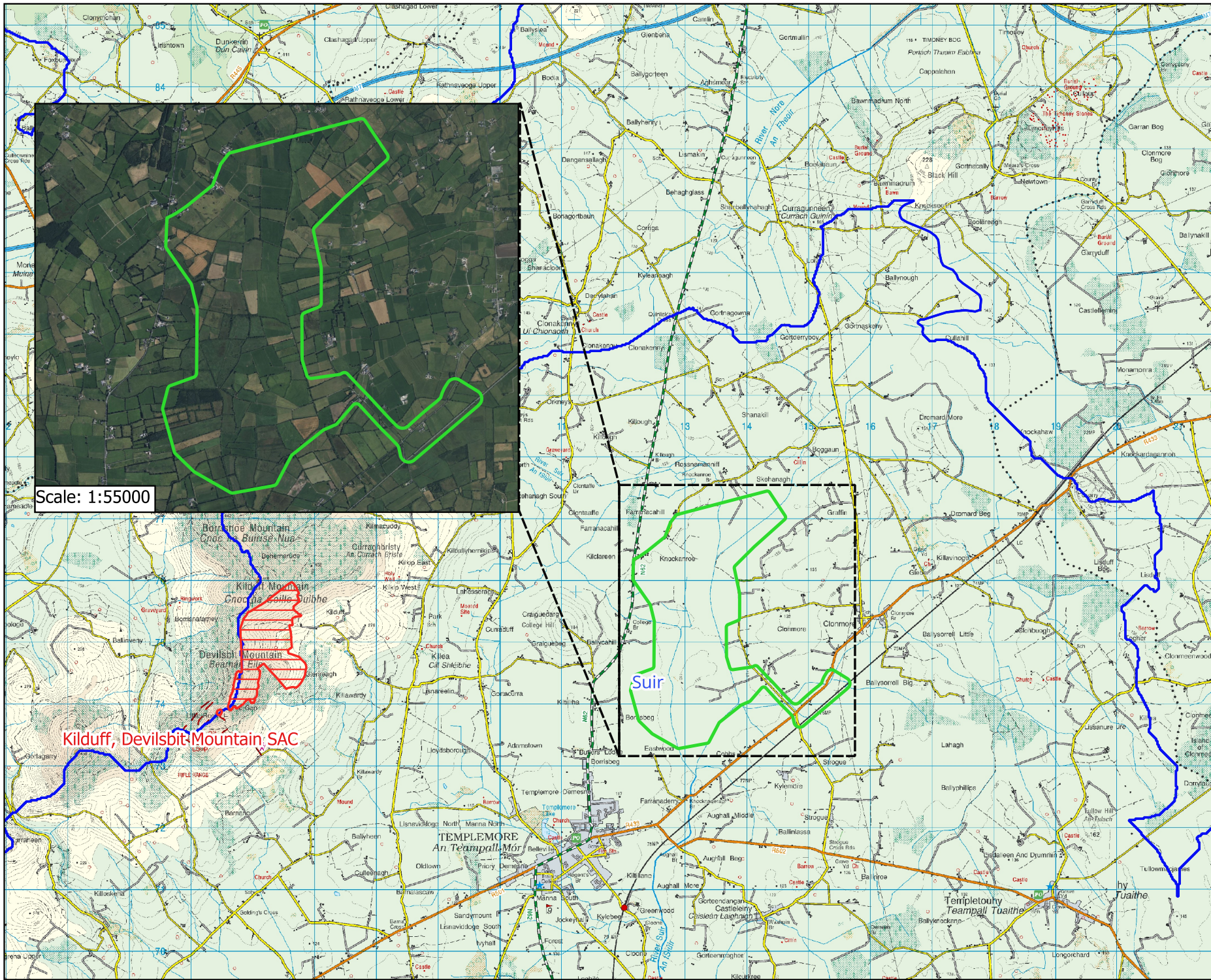
1. *1 no. permanent 110kV substation compound (2 no. control buildings with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, wastewater holding tank, site drainage and all ancillary works);*
2. *a temporary construction compound;*
3. *2km underground 110kV electrical cabling route (including joint bays and watercourse crossings) which will run through the L-7039 road and new track through agricultural land; and*
4. *2 no. new end masts that will break the existing Ikerrin to Thurles 110kV OHL.*

The 2km underground cabling route will connect the permanent 110kV substation to the 2 no. new end masts. If planning consent is granted, construction will be undertaken by a statutory undertaker having a right or interest to provide services in connection with the Proposed Wind Farm.

The ‘Proposed Project’ which entails the Proposed Wind Farm (Section 37E) and Proposed Grid Connection (Section 182A) has been assessed within this report and an accompanying EIAR. The Proposed Project is located within the EIAR Study Boundary or the ‘Site’ and measures approximately 650 hectares.

This application seeks a ten-year planning permission and 30-year operational life from the date of commissioning of the entire wind farm.


Construction methodologies for the Proposed Project can be seen in Appendix 1 of this report (Chapter 4 of the EIAR submitted alongside this report).



Scale: 1:55000

Map Legend

- Eiar Study Boundary
- Special Area of Conservation (SAC)
- WFD Catchments



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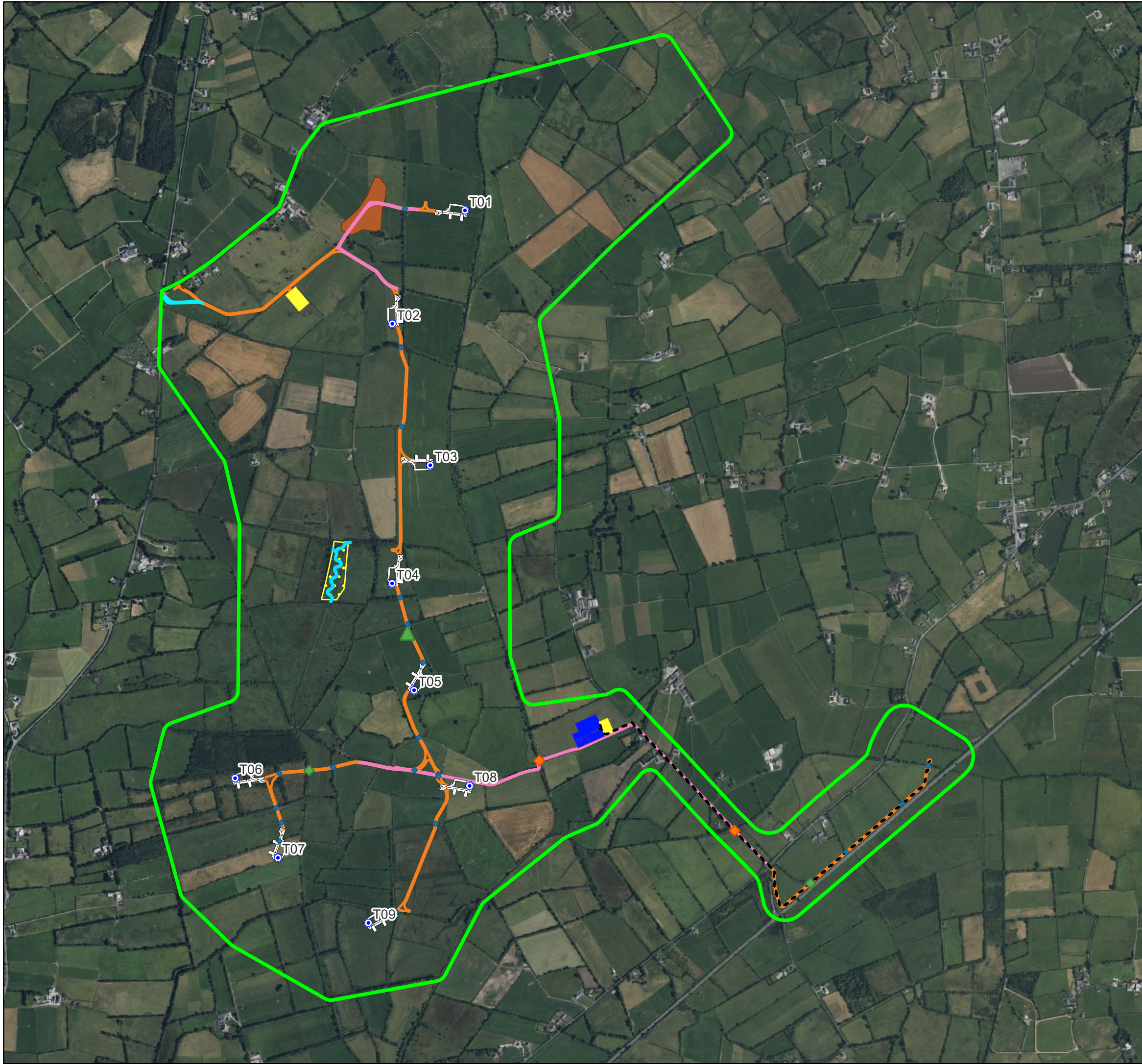
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Drawing Title	
Site Location	
Project Title	
Borrisbeg Renewable Energy Development	
Drawn By	Checked By
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Project No.	Drawing No.
220310	Figure 2-1
Scale	Date
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Map Legend

- ▭ EIAR Study Boundary
- Proposed Turbines
- Proposed Turbine Hardstands
- ▲ Proposed Met Mast
- ▭ Proposed Temporary Compounds
- ▭ Proposed Permanent 110kV Substation
- - - Proposed Grid Connection Cable Route
- ▭ Proposed End Masts
- ▭ Proposed Temporary Borrow Pit
- ▭ Proposed Temporary Security Cabin
- Existing Roads for Upgrade/ Resurface
- Proposed New Roads
- Proposed Temporary Abnormal Entrance
- ◆ Proposed Clear Span Crossing
- ◆ Proposed HDD Crossing
- ◆ Proposed Culverts
- ▭ River Enhancement 1.8ha Natural Woodland
- River Enhancement Segment

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Drawing Title
Proposed Project

Project Title
Borrisbeg Renewable Energy Development

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Project No. 220310	Drawing No. Figure 2-2
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3. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

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, updated 2022).

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

3.1 Desk Study

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

- > Review of NPWS Article 17 maps 2019, 2013 and 2007.
- > Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA (Envision), Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI).
- > Inland Fisheries Ireland (IFI) Reports, where available.
- > Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- > Records from the NPWS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Proposed Project is located.
- > Review of the NISs prepared for other plans and projects occurring in the wider area. Potential for in-combination effects have been considered in Section 4 and Section 8 of this NIS.

3.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of this planning application.

The recommendations of the consultees have informed the NIS preparation process and the contents of this report. The table below provides a list of the organisations consulted with regard to biodiversity during the scoping process. Their comments were fully considered in the preparation of this report.

Table 3-1 Organisations consulted with regard to biodiversity

Consultee	Response Yes/No	Response Details	Report Section where Comments are Addressed
An Taisce	Response received 28/10/2022	Unable to respond to every query. If it is a statutory referral to them as per their role as a prescribed body, it will be processed as normal.	N/A
Bat Conservation Ireland	Response received 26/04/2023	Do not have the capacity to comment nor do they provide opinions or comments on developments.	While no detailed comments were outlined; All bat surveys have been carried out according to relevant survey guidelines as detailed in the Bat Report (Appendix 6-2 of the EIAR

			submitted alongside this report)
BirdWatch Ireland	Automatic Reply 28/10/2022	N/A	N/A
Department of Housing, Local Government and Heritage (NPWS)	Response received 26/04/2023	The Department is not in the position to make a comment on this referral at this time. The Department may submit observations/ recommendations at a later stage in the process. Meeting arranged as requested by the Board and held over Teams on the 13 th of June 2023	The Proposed Project was discussed with the NPWS. The NPWS welcomed river enhancement proposals within the Site. Appendix 6-4 of the EIAR submitted alongside this report; Biodiversity Management and Enhancement Plan (BMEP), details river enhancement and other biodiversity enhancement plans for the Proposed Project.
Inland Fisheries Ireland	Automatic Reply 28/10/2022	Meeting requested with IFI on August 8 th 2023 and held over teams on August 9 th 2023 Meeting held at the Site with IFI on October 4 th 2023	Mitigations with regard to protection of water quality and fisheries habitats during construction and operation of the Proposed Project are provided in Section 6.2.1 of this report. River Restoration proposal is discussed in Appendix 6-4 of the EIAR submitted alongside this report; Biodiversity Management and Enhancement Plan
Irish Raptor	No response received to date	N/A	N/A
Irish Wildlife Trust	Response received 27/04/2023	Do not have the staff capacity to respond to the consultation at the time of response but will endeavour to respond if possible.	N/A
The Heritage Council	No response received to date	N/A	N/A

3.2.1 Other Relevant Consultations/ Meetings

Full details of all other consultations can be found in Chapter 2 of the EIAR which accompanies this report. Below is detailed meetings held with the national parks and Wildlife Service and Inland Fisheries Ireland as also detailed in Chapter 2 of the accompanying EIAR.

3.2.1.1 National Parks and Wildlife Service

Upon recommendation by An Bord Pleanála, a meeting was requested and subsequently held with the National Parks and Wildlife Service on the 13th of June 2023 over Teams. In attendance were:

- > Brian Duffy NPWS
- > Aran von der Geest Moroney MKO
- > Laura McEntegart MKO
- > Susan Doyle MKO
- > Roisin Towe MKO
- > Karen Mulryan – MKO
- > Grainne Griffin – MKO
- > William O’Connor – Buirios Limited
- > Niall Galvin – Buirios Limited

Items discussed:

- > Site Location & Project Design
- > Study Site baseline, survey effort and findings to date
 - Mammal survey effort
 - Botanical survey effort
 - Bat survey effort
 - Aquatic Survey effort
 - Bird survey effort
 - Habitat survey effort
- > Main ecological considerations

It was noted by the MKO ecologists that the river water quality at the Site was poor and the NPWS representative welcomed any enhancement proposals to counteract this.

3.2.1.2 Inland Fisheries Ireland

Upon recommendation by An Bord Pleanála, a meeting was requested and subsequently held with the Inland Fisheries Ireland (IFI) on the 9th of August 2023 over Teams. In attendance were:

- > Oliver McGrath IFI
- > Thomas Blackwell MKO
- > Aran von der Geest Moroney MKO
- > Karen Mulryan – MKO
- > Grainne Griffin – MKO
- > William O’Connor – Buirios Limited
- > Niall Galvin – Buirios Limited

Items discussed:

- > Site Location & Project Design
- > Study Site baseline, survey effort and findings to date, particularly the Aquatic Survey findings
- > River Restoration Proposal: MKO ecologists along with the applicant have designed a proposal to restore a segment of the Eastwood River which currently lacks good quality in-stream or riparian habitat. It is proposed to restore appropriate pattern, profile and dimension to the channel with a view to improving stability of the channel and restoring in stream habitat. It is also proposed to establish a natural wooded riparian buffer and to exclude livestock from accessing the restored channel. Please see Appendix 6-4 Biodiversity Management and Enhancement Plan (BMEP) of the EIAR submitted alongside this report for details.

The IFI representative welcomed the proposal and noted it has not been offered by similar projects before and highlighted the local benefit this would have on aquatic habitats and species, water quality and general biodiversity in the area. It was agreed at the meeting that the IFI representative would meet with MKO at the Site to discuss the proposal on the ground and to facilitate further discussion/ideals. This onsite meeting was held on the 4th of October 2023 where the IFI representative welcomed the proposal acknowledging the innovation of the proposal and benefit it will have for local alluvial habitats and terrestrial and aquatic biodiversity.

3.3 Field Survey Methodologies

Comprehensive surveys of the biodiversity of the entire Site were undertaken on various dates during 2022 and 2023 as detailed below. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies, dates of survey and guidance followed.

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

Multidisciplinary walkover surveys were undertaken on the 11th August 2022, 25th August 2022, 18th October 2022, 13th April 2023, 27th April 2023, 11th May 2023 and the 21st September 2023. Excluding the October visit, the habitat surveys of the Site covered the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). A comprehensive walkover of the entire Site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys including for otter, aquatic invertebrate surveys and quadrat surveys.

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

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

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

3.3.2 Dedicated Habitat and Vegetation Composition Surveys

All habitats recorded on site and described in this NIS have been classified in accordance with Fossitt (2000). Botanical surveys of the Site were also undertaken throughout multidisciplinary walkover surveys carried out in 2022 and 2023. Further detail on these surveys can be seen in Appendix 6-1 of the EIAR submitted alongside this report. These surveys provided an understanding of the baseline and informed further survey work following finalisation of the proposed infrastructure layout. The habitat assessment surveys described in this report have been undertaken in accordance with the following guidelines and interpretation documents:

- Commission of the European Communities (2013) *Interpretation manual of European Union habitats*. Eur 27. European Commission DG Environment.
- Foss, P.J. & Crushell, P. 2008, *Guidelines for a National Fen Survey of Ireland, Survey Manual*. Report for the National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.

- NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 1. Version 1.1. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: *Habitat Assessments*. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O’Neill.
- Martin, J.R., O’Neill, F.H. & Daly, O.H. (2018), *The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats*. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- O’Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013), *The Irish semi-natural grasslands survey 2007-2012*. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

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).

3.3.3 Otter Survey

Following a review of the initial Site walkover ecological surveys for constraints identification and the results of the multi-disciplinary walkover survey; areas identified as providing potential habitat for otter were subject to specialist targeted survey. The otter survey of watercourses was conducted on the 11th of August 2022, 25th of August 2022, 18th of October 2022, 13th of April 2023, 27th of April 2023, 11th of May 2023 and the 21st of September 2023. Otter surveys of watercourses downstream of the Site were also carried out in September 2022 as detailed in the Aquatic Baseline Report in Appendix 3.

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

3.3.4 Aquatic surveys

The watercourses that flow through the Site and downstream watercourses, were subject to biological evaluation and assessment through kick sampling, fish stock assessment (electro-fishing) and white-clawed crayfish surveys between the 28th and 29th September 2022. Full details of the results of these surveys are provided in Appendix 3 Aquatic Baseline Report.

The survey included a general habitat assessment and biological water quality assessment at watercourses within, upstream and downstream of the Site. The water quality, as per Q-value (Quality Rating System)¹, is fully described in Appendix 3 Aquatic Baseline Report. Biological water quality was assessed through kick-sampling each of these watercourses. Macro-invertebrate samples were converted to Q-ratings as per Toner et al. (2005). The applied Q ratings followed the EPA water quality classes and Water Framework Directive status categories. All riverine samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a two-minute sample, as per ISO standards for water quality sampling (ISO 10870:2012). Large cobble was also washed at each site where present. The results of the surveys are provided in Aquatic Baseline Report in Appendix 3.

¹ Toner, P., Bowman, J., Clabby, K., Lucey, J., McGarrigle, M., Concannon, C., & MacGarthaigh, M. (2005). *Water quality in Ireland*. Environmental Protection Agency, Co. Wexford, Ireland.

Aquatic plant species protected under Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) were searched for during all aquatic surveys.

3.3.5 Bird Survey

In order to inform the scope of the bird surveys required for the NIS, a review was undertaken of the location of nearby Special Protection Areas and associated SCI species so that the survey design could be focussed towards target SCI species. Full details of all Bird Surveys carried out for this planning application can be seen in Chapter 7 of the EIAR submitted alongside this report. These surveys results were used to identify if any SPAs were in the likely zone of impact as detailed in Table 4-1 however in this occasion none were identified.

3.3.6 Invasive species survey

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

3.4 Results of Baseline Ecological Surveys

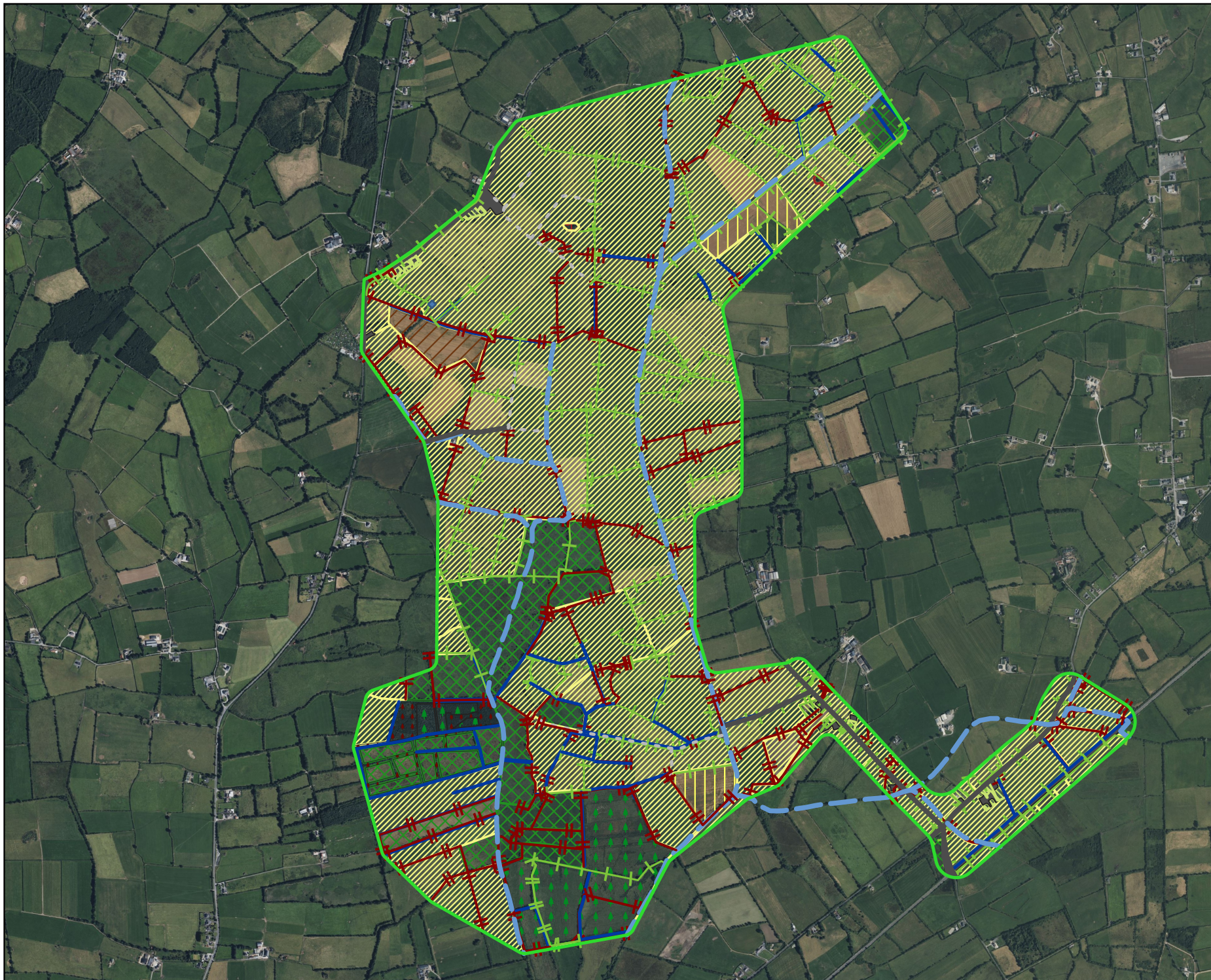
3.4.1 Description of Habitats within EIAR Study Boundary

A total of seventeen habitats were recorded within the Site (see Habitat Map – Figure 3-1), including;

















- > Improved Agricultural Grassland (GA1)
- > Wet Grassland (GS4)
- > Arable Crops (BC1)
- > Tilled Land (BC3)
- > Scrub (WS1)
- > Buildings and Artificial Surfaces (BL3)
- > Amenity Grassland (GA2)
- > Conifer Plantation (WD4)
- > (Mixed) Broadleaved Woodland (WD1)
- > Hedgerow (WL1)
- > Treeline (WL2)
- > Depositing Lowland Rivers (FW2)
- > Drainage Ditches (FW4)
- > Non-calcareous springs (FP2)
- > Dry Meadows and Grassy Verges (GS2)
- > Spoil and Bare Ground (ED2)
- > Recolonising Bare Ground (ED3)

Areas of GS2, ED2 and ED3 are small in area and are mapped part of mosaics with other habitats in the Habitat Map.

Detailed botanical data from botanical surveys and relevés recorded at the development footprint including the locations of the proposed turbines, substation, met mast, end masts, roads, construction compounds, a proposed borrow pit, underground cabling route, spoil management areas and river restoration area are provided in Appendix 6-1 of the EIAR submitted alongside this report.



Map Legend

-  EIA Study Boundary
-  Non-calcareous spring (FP2)
-  Spoil and Bare Ground (ED2)
-  Depositing/ Lowland Rivers (FW2)
-  Drainage Ditches (FW4)
-  Hedgerows (WL1)
-  Treelines (WL2)
-  Arable crops (BC1)
-  Tilled land (BC3)
-  Buildings and artificial surfaces (BL3)
-  Improved agricultural grassland (GA1)
-  Amenity grassland (GA2)
-  Wet grassland (GS4)
-  (Mixed) broadleaved woodland (WD1)
-  Conifer plantation (WD4)
-  Scrub (WS1)



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Drawing Title

Habitat Map

Project Title

Borrisbeg Renewable Energy Development

Drawn By

AvdGM

Checked By

JH

Project No.

220310

Drawing No.

Figure 3-1

Scale



















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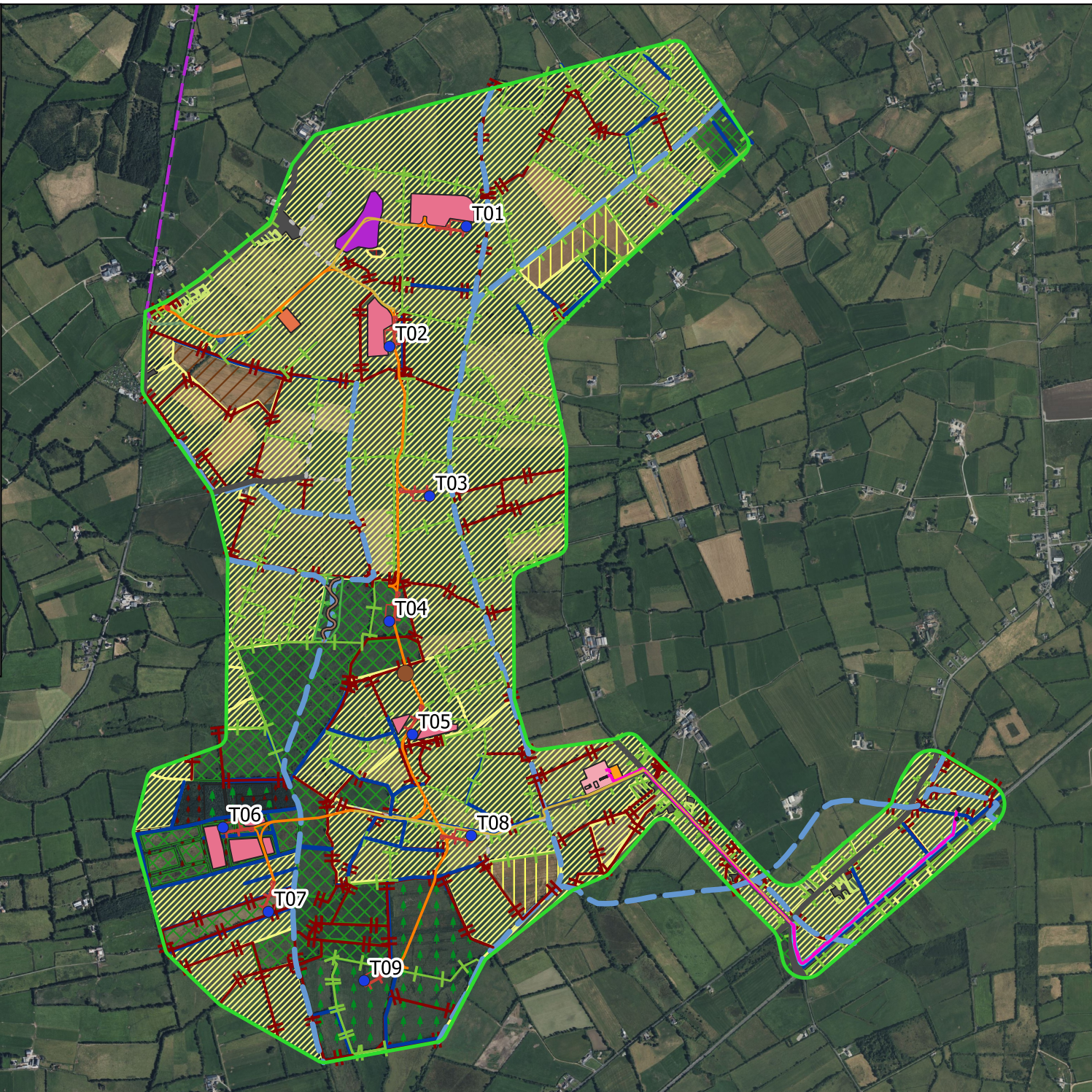
Date

23.11.2023



















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-  Proposed Turbines
-  Proposed Met Mast
-  Proposed Haul Route
-  Proposed Grid Connection Cable Route
-  Existing Roads
-  Proposed New Roads
-  Proposed Turbine Hardstands
-  Proposed New Road for Underground Cable
-  Proposed End Masts
-  Proposed Permanent 110kV Substation
-  Proposed Temporary Security Cabins
-  Proposed Temporary Borrow Pit
-  Proposed Spoil Management Areas
-  Temporary Substation Construction Compound
-  Temporary Wind Farm Construction Compound
-  River Enhancement Stream Concept
-  River Enhancement 5m Riparian Buffer
-  River Enhancement 1.8ha Natural Woodland



Map Legend

-  EIAR Study Boundary
-  Non-calcareous spring (FP2)
-  Spoil and Bare Ground (ED2)
-  Depositing/ Lowland Rivers (FW2)
-  Drainage Ditches (FW4)
-  Hedgerows (WL1)
-  Treelines (WL2)
-  Arable crops (BC1)
-  Tilled land (BC3)
-  Buildings and artificial surfaces (BL3)
-  Improved agricultural grassland (GA1)
-  Amenity grassland (GA2)
-  Wet grassland (GS4)
-  (Mixed) broadleaved woodland (WD1)
-  Conifer plantation (WD4)
-  Scrub (WS1)


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Drawing Title
Habitat Map with Proposed Project overlaid

Project Title
 Borrisbeg Renewable Energy Development

Drawn By AvdGM	Checked By JH
Project No. 220310	Drawing No. Figure 3-2
Scale 1:22,500	Date 23.11.2023


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3.4.2 Proposed Wind Farm

3.4.2.1 Grassland Habitats

3.4.2.1.1 Improved agricultural grasslands (GA1)

The dominant habitat throughout the Site is Improved Agricultural Grassland (GA1) (Plate 3-1). These improved agricultural grasslands are generally species poor consisting predominantly of perennial rye grass (*Lolium perenne*) and other commonly occurring species such as broad-leaved dock (*Rumex obtusifolius*), dandelion (*Taraxacum officinale agg*), creeping buttercup (*Ranunculus repens*) and white clover (*Trifolium repens*). The majority of the Proposed Project infrastructure is located within this habitat including both temporary construction compounds, the permanent 110kV substation, Turbines 1, 2, 3, 5 and 8, spoil management areas around Turbines 1, 2 and 5, met mast, proposed new road for underground cable route, end masts and a large proportion of the proposed internal site access tracks.



Plate 3-1 Example of typical sward of Improved agricultural grassland within the Site.

3.4.2.1.2 Wet Grassland (GS4)

Areas of grasslands within the southwest of the site are classified as wet grasslands (GS4) (Plate 3-2). The majority of the areas of Wet grassland border the Eastwood river (A Depositing Lowland River (FW2)) on both of its banks. These areas tended to be dominated by the following plant species; Soft rush (*Juncus effusus*), Creeping buttercup (*Ranunculus repens*), Broad-leaved dock (*Rumex obtusifolius*), Yorkshire fog (*Holcus lanatus*), Common sorrel (*Rumex acetosa*), Creeping bent grass (*Agrostis stolonifera*), Perennial ryegrass (*Lolium perenne*). Other species also occurring within these grasslands include; White clover (*Trifolium repens*), Marsh thistle (*Cirsium palustre*), Marsh bedstraw (*Galium palustre*), Meadow sweet (*Filipendula ulmaria*), Silverweed (*Argentina anserina*), Lesser celandine (*Ficaria verna*), Creeping thistle (*Cirsium arvense*), Cuckoo flower (*Cardamine pratensis*), Spear thistle (*Cirsium vulgare*), Tansy ragwort (*Jacobaea vulgaris*) and Willow herb (*Epilobium hirsutum*). Site infrastructure located within this habitat includes Turbine 4, 6 and 7, the spoil management areas around Turbine 6 and a small proportion of the internal site access tracks.



Plate 3-2 Example of typical sward of Wet grassland within the Site.

3.4.2.1.3 Dry meadows and grassy verges (GS2)

Small areas of Dry meadows and grassy verges (GS2) were recorded at various locations along existing tracks and throughout the Site (Plate 3-3). These areas were mostly dominated by the following plant species, yorkshire fog (*Holcus lanatus*), perennial rye grass (*Lolium perenne*), cleavers (*Galium aparine*), nettles (*Urtica dioica*), silverweed (*Potentilla anserina*), white and red clover (*Trifolium repens, pratense*), hogweed (*Heracleum sphondylium*), Common Knapweed (*Centaurea nigra*), creeping buttercup (*Ranunculus repens*), and Bush Vetch (*Vicia sepium*).



Plate 3-3-3 Example of Dry meadows and grassy verges located at the northwest of the Site.

3.4.2.1.4 Amenity Grassland (GA2)

Small areas of Amenity grassland (GA2) were recorded adjacent to the Site and in private dwelling gardens mapped within the Site, outside the proposed development footprint. These areas were predominantly made up of managed lawns, and managed hedgerows of cherry laurel (*Prunus laurocerasus*), portuguese laurel (*Prunus lusitanica*), and fuchsia (*Fuchsia magellanica*).

3.4.2.2 Woodland Habitats

3.4.2.2.1 (Mixed) Broadleaved woodland (WD1)

This habitat is found within the south-western area of the Site surrounding Turbine 6 (Plate 3-4). The area surrounding Turbine 6 occurs as linear strips of woodland that define the boundaries of wet grassland (GS4) fields. This woodland has originated as hedgerows/ treelines established on both sides of drains merged and expanded outwards into neighbouring fields. This has resulted in thin layers of woodland forming between the areas of wet grassland (GS4). The species found within this habitat area dominated by hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), common hazel (*Corylus avellana*), and ash (*Fraxinus excelsior*), and also contain spindle (*Euonymus europaeus*), dog rose (*Rosa canina*), willow spp, bramble (*Rubus fruticosus agg.*), common gorse (*Ulex europaeus*), holly (*Ilex aquifolium*), primrose (*Primula vulgaris*), ivy (*Hedera helix*) barren strawberry (*Potentilla sterilis*), Wood sedge (*Carex sylvatica*), common dog violet (*Viola riviniana*), pig nut (*Conopodium majus*), wood sanicle (*Sanicula europaea*), male fern (*Dryopteris filix-mas*), cleavers (*Galium aparine*), harts-tongue fern (*Asplenium scolopendrium*), dandelion (*Taraxacum officinale agg*), and lesser celandine (*Ficaria verna*). A portion of this habitat is found within the Turbine 6 hardstand footprint (Plate 3-5). This habitat also occurs north of Turbine 6 alongside areas of Conifer plantation (WD4) and is classified as a commercial ash plantation (Plate 3-6).



Plate 3-4 Example of (Mixed) broadleaved woodland within the Site North of Turbine 6, representative of habitat to be lost within the Bat Buffer surrounding Turbine 6.



Plate 3-5 Drain and field boundary within the Turbine 6 hardstand footprint .



Plate 3-6 Commercial ash Plantation classified as a (mixed) broadleaved woodland (WD1) north of Turbine 6

3.4.2.2.2 Conifer plantation (WD4)

Areas within the Site comprise of different stages of coniferous plantation forestry including recent clear-fell, immature, and semi-mature to mature forestry. The species mainly comprises of Sitka spruce (*Picea sitchensis*). Semi-mature and mature stands of conifer plantation with an ash buffer occur north of Turbine 6 (Plate 3-7). Given the nature of such densely planted coniferous plantations, few other woody plant species occur. Turbine 9 and the associated access road occurs entirely within newly planted immature conifer plantation habitat (Plate 3-9).



Plate 3-7 Example of plantation forestry with ash buffer (WD4) north of Turbine 6.



Plate 3-8 Example of recently planted immature plantation forestry (WD4) occurring at Turbine 9.

3.4.2.3 Aquatic habitats

Watercourses within the Site generally flow in a southerly, south westerly and south easterly direction, are generally straightened and silted. River depths below represent seasonal low flows. Throughout surveys of the Site, river levels fluctuated with the season. A detailed study of the watercourses and fisheries value in the vicinity and within the Site was also conducted and can be found in Appendix 3 Aquatic Baseline Report. A number of watercourses are identified within the Site and correspond to Depositing/lowland rivers (FW2) and are discussed below.

3.4.2.3.1 Depositing/lowland river (FW2)

Shanakill River

The Shanakill River flows through the northeastern portion of the Site and averages 2-2.5m in width and between 0.2 and 0.3m in depth. The riverbed substrate consists of compacted cobble and small boulder with areas of interstitial mixed gravels however large portions of the watercourse are heavily silted. Much of the channel is heavily tunnelled with species including hawthorn (*Crataegus monogyna*), great willowherb (*Epilobium hirsutum*), dog rose (*Rosa canina*), bramble (*Rubus fruticosus agg.*), willow (*Salix spp.*) and elder (*Sambucus nigra*). Habitats found alongside the banks of the Shanakill river are dominated by improved agricultural grassland and hedgerows. Instream vegetation within the Shanakill River consists largely of foals watercress (*Apium nodiflorum*), common reed (*Phragmites australis*) and water mint (*Mentha aquatica*) with filamentous algae observed throughout.

Suir River

The Suir River flows north to south through the Site. Within the Site, it averages 4-6m in width and has been straightened and deepened. It has steep banks up to 2.5m in height. The riverbed substrate consists of large areas of sand and silt with gravels cobbles and small boulder confined to faster flowing sections. Areas of compacted clay are also present along the watercourse. Poaching is evident at multiple locations along the riverbank within the Site and the riverbed is heavily silted in many areas, with siltation evident throughout. Habitats found alongside the banks of the Suir river are dominated by improved agricultural grassland, treelines and hedgerows as well as an area of recently planted conifer plantation at the southern end of the Site. Instream and marginal vegetation within the river include foals watercress (*Apium nodiflorum*), water mint (*Mentha aquatica*), water crowfoot (*Ranunculus spp.*) and reed canary grass (*Phalaris arundinaceae*) with filamentous algae observed in areas throughout the river channel.

Farranacahill River

The Farranacahill River flows through the western portion of the Site in a southerly direction. It is approx. 2.5m in width and has experienced extensive straightening and deepening. The substrate consists almost exclusively of deep fine sediments up to 0.3m deep and bank heights of up to 2m. The watercourse is heavily vegetated throughout with abundant fool's watercress, duckweed (*Lemna. Spp.*), water mint, branched burreed (*Sparganium erectum*) and water starwort (*Callitriche sp.*). Habitats found alongside the banks of the Farranacahill river are dominated by improved agricultural grassland, treelines and hedgerows.

Eastwood River

The Eastwood River flows into the Site from the west before turning south down through the western side of the Site. The river averages 3m in width and between 0.2 and 0.7m in depth. The riverbed substrate consists of heavily silted clay dominated sediment with small boulders and cobbles heavily bedded in silt. Segments of the river are heavily shaded with hawthorn, blackthorn (*Prunus spinosa*), willow (*Salix. spp*) and bramble among other shrubs and tree species while other areas of the river flow through grassland habitats with very sparse shading. Habitats found alongside the banks of the river are dominated by improved agricultural grassland, wet grassland, hedgerows, treelines and areas of mixed broadleaved woodland and conifer plantation. Instream vegetation within the river is sparse through large sections and consists largely of foals watercress (*Apium nodiflorum*), water mint (*Mentha aquatica*), brooklime (*Veronica beccabunga*) and small areas of water crowfoot.

Clonmore River

The Clonmore River and its tributaries flow through the eastern side of the Site, under several bridges and culverts, in a westerly direction and flows into the Suir River in the southeast of the Site. The river is bordered by grassland, hedgerows and treelines. It averages 4-5m in width and 0.2-0.3m deep. Banks are

generally up to 3m in height and the watercourse shows evidence of historical straightening and deepening. Siltation is heavy throughout.

Unnamed stream

An unnamed stream flows through an area of the western portion of the Site in a south easterly direction and merges with the Farranahill River. The unnamed stream averages 1-1.5m in width and between 0.2 and 0.3m in depth. The riverbed substrate consists almost entirely of deep sediments up to 0.3m deep and is heavily vegetated with foals water cress and branched bur-reed. Habitats found alongside the banks of the unnamed stream are dominated by improved agricultural grassland and hedgerows.



Plate 3-9 River Suir in the north of the Site.



Plate 3-10 River Suir within the south of the Site with evidence of heavy poaching.



Plate 3-11 Representative image of the Eastwood River in high flow within the south of the Site.



Plate 3-12 The Eastwood River in flood within the area proposed for river restoration.

3.4.2.3.2 Drainage Ditches (FW4)

There are numerous drainage ditches throughout the Site associated with agricultural field boundaries, hedgerows, and treelines. Drainage ditches also occurred between conifer plantation boundaries.

Many of the drainage ditches associated with agricultural grassland areas (Plate 3-13) have very little to no instream vegetation. Species include water horsetail (*Equisetum fluviatile*), perennial rye grass (*Lolium perenne*), yorkshire fog (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*), *Sphagnum* spp., Sorrel (*Rumex acetosa*), common dandelion (*Taraxacum officinale*), common ragwort (*Jacobaea vulgaris*), common gorse (*Ulex europaeus*), silverweed (*Argentina anserina*), and white clover (*Trifolium repens*).

Drainage ditches found bordering the conifer plantations and broad-leaved woodlands tended to be flooded in parts, with bare soil dominating much of the drain bed. (Plate 3-14). The species found here mainly consist of ivy (*Hedera Hibernica*), common sorrel (*Remex acetose*), foxglove (*Digitalis purpurea*), *Sphagnum* spp., bramble (*Rubus fruticosus*), nettle (*Urtica dioica*), common dandelion (*Taraxacum officinale*), cuckoo-pint (*Arum maculatum*), Pendulous sedge (*Carex pendula*), cleavers (*Galium aparine*), and bracken (*Pteridium aquilinum*).

Drainage ditches found along treelines and hedgerows within agricultural grassland and wet grasslands tended to be heavily vegetated and flooded in parts. (Plate 3-15). The species found here mainly consist of common sorrel (*Remex acetose*), *Sphagnum* spp., bramble (*Rubus fruticosus*), nettle (*Urtica dioica*), meadow sweet (*Filipendula ulmaria*), lesser celandine (*Ficaria verna*), timothy (*Phleum pratense*), cow parsley (*Anthriscus sylvestris*), water mint (*Mentha aquatica*), hairy willowherb (*Epilobium hirsutum*), lesser water parsnip (*Berula erecta*), (creeping buttercup (*Ranunculus repens*), ribwort plantain (*Plantago lanceolata*), cleavers (*Galium aparine*), and primrose (*Primula vulgaris*).



Plate 3-13 An example of drainage ditch (FW4) that is located south of turbine 7 within an agricultural grassland (GA1) within the Site.



Plate 3-14 An example of a drainage ditch (FW4) located at the north of turbine 6 in between the existing conifer plantation (WD4) and mixed broadleaved woodland (WD1).



Plate 3-15 An example of drainage ditches (FW4) found along treelines (WL2) and hedgerows (WL1) south of turbine 7 within agricultural grasslands (GA1) and wet grasslands (GS4) within the Site.

3.4.2.3.3 Non-calcareous springs (FP2)

A non-calcareous spring was identified approximately 11m southeast of a proposed access road at the north of the Site (Plate 3-16). This spring is located within an agricultural grassland and water flows southeast toward an unnamed stream at the southeast border of the field. The spring is heavily vegetated with species such as Marsh Pennywort (*Hydrocotyle vulgaris*), nettle (*Urtica dioica*), creeping buttercup (*Ranunculus repens*), *Sphagnum spp.*, yorkshire fog (*Holcus lanatus*), hairy willowherb (*Epilobium hirsutum*), common plantain (*Plantago major*), yellow flag iris (*Iris pseudacorus*), soft rush (*Juncus*

effusus), lesser water parsnip (*Berula erecta*), water mint (*Mentha aquatica*), broad leaved doc (*Rumex obtusifolius*), and cuckoo flower (*Cardamine pratensis*).



Plate 3-16 Non-calcareous spring (FP2) located west of turbine 2 at the north of the Site.

3.4.2.4 Other Habitats

3.4.2.4.1 Scrub (WS1)

Large areas of scrub and linear periods of scrub are present at various locations throughout the Site including field boundaries, (Plate 3-17) along drainage ditches, treelines, edges of woodland and waterways. Species predominantly comprise gorse (*Ulex europaeus*), willow (*Salix cspp.*), Hazel (*Corylus avellana*), birch (*Betula spp.*), bramble (*Rubus fruticosus agg.*), bracken (*Pteridium aquilinum*) and nettle (*Urtica dioica*), dog rose (*Rosa canina*), blackthorn (*Prunus spinosa*), (Plate 3-18) and hawthorn (*Crataegus monogyna*).



Plate 3-17 Example of Scrub (WS1) habitat made up of bramble, willow, and blackthorn bordering a wet grassland located to the west of turbine 6.



Plate 3-18 Example of Scrub (WS1) habitat made up of blackthorn, encroaching on an agricultural grassland (GA1) located north of turbine 5.

3.4.2.4.2 Hedgerows (WL1) and Treelines (WL2)

Hedgerow and Treeline habitats border various grasslands, farm tracks, waterways, and drainage ditches throughout the development footprint. Species found in the treeline habitats are predominantly hawthorn (*Crataegus monogyna*), hazel (*Corylus avellana*), ash (*Fraxinus excelsior*), and blackthorn (*Prunus spinosa*). (Plate 3-19). The understory comprises bramble (*Rubus fruticosus*), nettle (*Urtica dioica*), ivy (*Hedera hibernica*), and dog rose (*Rosa canina*).

Species found in the hedgerow habitats are predominantly hawthorn (*Crataegus monogyna*), *Fuchsia* (*Fuchsia magellanica*), blackthorn (*Prunus spinosa*), bramble (*Rubus fruticosus*), nettle (*Urtica dioica*),

common ivy (*Hedera hibernica*), dog rose (*Rosa canina*), willow (*Salix spp.*), elder (*Sambucus nigra*), cleavers (*Galium aparine*), common gorse (*Ulex europaeus*), and holly (*Ilex aquifolium*) (Plate 3-20).



Plate 3-19 An example of a treeline (WL2) located in a wet grassland (GS4) in between turbine 6 and 7 at the south of the Site.



Plate 3-20 Example of a hedgerow (WL1) located at the southeast of the site within an agricultural grassland (GA1) within the Site

3.4.2.4.3 Buildings and artificial surfaces (BL3)

Buildings and artificial habitats within the Site mainly consist of agricultural sheds and farmyards, dwelling houses and existing roadways, excluding minor farm access tracks. Species associated with this habitat predominantly comprises bracken (*Pteridium aquilinum*), bramble (*Rubus fruticosus agg.*), yorkshire fog (*Holcus lanatus*), common nettle (*Urtica dioica*), common ivy (*Hedera hibernica*), perennial ryegrass (*Lolium perenne*), and elder (*Sambucus nigra*).



Plate 3-21 Example farm shed categorised under the buildings and artificial surfaces (BL3) within the Site.

3.4.2.4.4 **Recolonising bare ground (ED3) and Spoil and bare ground (ED2)**

Farm tracks and other areas of disturbed land are located within the Site. These tracks are made up of loose stone chippings and compacted dirt with small amounts of plant species colonising parts of the centre of the track. A number of areas where ground disturbance has been undertaken in the recent past have begun to recolonise (Plate 3-22).



Plate 3-22 Example of a farm track that runs through the northern end of the Site for land access and categorised as Spoil and bare ground (ED2).

3.4.2.4.5 Tilled land (BC3) and Arable Crops (BC1)

A number of fields located within the Site are considered under these habitat classifications. A number of fields at the north of the Site west of Turbine 2 are categorised as Tilled Land (BC3). At the time of the walkover (27th April 2023), these fields were prepared for planting (evident by recent soil rotation), but the crop type could not be established (Plate 3-23). A number of fields at the north of the site east of Turbine 1 and at the south of the site southeast of Turbine 8 are categorised as Arable Crops (BC1).



Plate 3-23 Example of Tilled land (BC3) located at the north of the Site, west of turbine 2.

3.4.2.5 Habitats within the turbine hardstand footprint

Turbines 1, 2, 3, 5 and 8 are located on Improved agricultural grassland (GA1) habitat as described in Section 3.4.2.1.1. Turbines 4, 6 and 7 are located on wet grassland (GS4) as described in Section 3.4.2.1.2 with an area of the Turbine 6 hardstand overlapping with a thin strip of mixed broadleaved woodland (WD1). Turbine 9 is located within conifer plantation (WD4) as described in Section 3.4.2.2.2. Details of the relevés undertaken within the footprint of the turbine bases are provided in Appendix 6-1 of the EIAR submitted alongside this report.

3.4.2.6 Habitat within the Temporary Construction Compound

The habitat within the proposed temporary construction compound consists entirely of Improved agricultural grassland (GA1). Relevés within the footprint of the temporary construction compound are provided in Appendix 6-1 of the EIAR submitted alongside this report.

3.4.2.7 Habitats within the temporary Borrow Pit

The temporary borrow pit is located within an area of improved agricultural grassland (GA1) present on either side of a gravel and dirt farm access track classified as Spoil and bare ground (ED2). Species present within the grassland include Perennial ryegrass (*Lolium perenne*), Germander Speedwell (*Veronica chamaedrys*), Nettle (*Urtica dioica*), Yorkshire fog (*Holcus lanatus*) and Cocks foot (*Dactylis glomerata*). A relevé within the footprint of this area is provided in Appendix 6-1 of the EIAR submitted alongside this report.

3.4.2.8 Habitats at the Proposed Met Mast

The habitat within the proposed met mast consists entirely of Improved agricultural grassland (GA1). Relevés undertaken at its footprint are provided in Appendix 6-1 of the EIAR submitted alongside this report.

3.4.2.9 Internal Road Water-crossing Structures

A proposed internal road which leads to Turbine 6 and Turbine 7 will cross the Eastwood River in the southwest of the Site. This road will cross the river and pass through treeline that is located east of Turbine 6. The treeline here consists of hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), ash (*Fraxinus excelsior*), holly (*Ilex aquifolium*), gorse (*Ulex europaeus*), and elder (*Sambucus nigra*). This road will allow access to the proposed Turbine 6 and Turbine 7 locations within the Site (Plate 3-24). The internal site road continues east toward T8 and from this location the proposed substation location is accessed along an existing road (L-70391) which crosses over the Suir River at an existing bridge (Plate 3-25).



Plate 3-24 Proposed crossing location on the Eastwood River east of turbine 6.



Plate 3-25 View of existing crossing at the Suir River located at the southeast of the Site leading the proposed substation location from turbine 8.

3.4.2.10 Habitats at the Proposed River Restoration Area

As part of the Proposed Wind Farm design, it is proposed to restore a portion of the Eastwood River by improving the channel stability and instream habitat and establishing a natural wooded riparian buffer either side of the channel in the form of a 1.8ha plantation of natural woodland species.

The existing habitats within the proposed river restoration area consist predominantly of a highly modified depositing/ lowland river (FW2) (Eastwood River) which flows through a wet grassland (GS4). Species found within the wet grassland habitat found on both sides of the Eastwood River include meadowsweet (*Filipendula ulmaria*), ribwort plantain (*Plantago lanceolata*), creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), ragwort (*Jacobea vulgaris*), areas of yellow flag iris (*Iris pseudoacorus*), curly dock (*Rumex crispus*), broad leaved dock (*Rumex obtusifolius*), silver weed (*Potentilla anserina*), spear thistle (*Cirsium vulgare*), selfheal (*Prunella vulgaris*), small areas of bramble (*Rubus fruticosus agg.*) near the river's edge, nettle (*Urtica dioica*), occasional willow species (*Salix spp.*) on the banks of the watercourse, Yorkshire fog (*Holcus lanatus*), occasional hawthorn (*Crataegus monogyna*) on the banks of the watercourse, cocks foot (*Dactylis glomerata*), knapweed (*Centaurea nigra*), chickweed (*Stellaria media*), clover (*Trifolium spp.*), creeping thistle (*Cirsium arvense*), daisy (*Belis perennis*) and hard rush (*Juncus inflexus*). A hedgerow and some willow (*Salix spp.*) scrub is located on the western boundary of the proposed river restoration/ biodiversity enhancement area. Species within the hedgerow include marsh woundwort (*Stachys palustris*), nettle (*Urtica dioica*), willow (*Salix spp.*), bramble (*Rubus fruticosus agg.*), hedge bindweed (*Calstegia sepium*), hawthorn (*Crataegus monogyna*), and blackthorn (*Prunus spinosa*). The hedgerow along the western boundary of the river will not be altered by the restoration. A description of the Eastwood River within the Site is detailed in Section 3.4.2.3.1.

At the time of survey the river restoration area of the Eastwood River was in high flow (near flood) with the width of the river (in this area) between 4 and 7 metres (Plate 3-26). The river bed was heavily silted with no course material visible and the water depth was approximately 1.2m in depth. There is very little instream vegetation however marginal vegetation consists of watercress (*Nasturtium officinale*) and water forget me not (*Myosotis scorpioides*) in patches along the watercourse. Areas of the river banks as well as the surrounding grassland have been heavily poached.



Plate 3-26 Eastwood River within the river restoration area bordered by wet grassland (GS4) on both banks.

3.4.2.11 Habitats at the Turbine Delivery Accommodation Works Area

As detailed in Section 4.5.21 of Appendix 1:

‘To facilitate the transportation of turbine components off the M7 and onto the N62 which runs along the western boundary of the Site, minor accommodating works are required at junction 22 off the M7 which involves the temporary stoning up of the verges. All works are minor, temporary and contained within the road carriage. Once the abnormal loads have been delivered, these areas will be reseeded.

The swept path analysis undertaken for this junction indicates that as the abnormal load vehicle turns left off the M7, in order to minimise the impact on the eastern corner of the M7 / slip road junction, the blade tip will be required to over-sail into the eastbound carriageway of the M7. This will require to be managed in consultation with TII and will require a short-term closure of the eastbound arm of the motorway during the delivery of the turbine blades. It should be noted that the delivery of the abnormal loads will take place under Garda escort and at night to minimise traffic disruptions. Please see Chapter section 15.1 of this EIAR for further details.’

Junction 22 (M7 Motorway and N62 national road).

Junction 22 located approx. 9.4km north of the Site, connects the M7 to the N62 which runs along the western boundary of the Site. This area comprises buildings and artificial surfaces (BL3) as well as built up earth banks (BL2) now colonised and considered to have dry meadows and grassy verges (GS2) on top. Species composition of the dry meadows and grassy verges (GS2) habitat included dandelion, creeping buttercup, clover, ragwort (*Jacobaea vulgaris*), red fescue (*Festuca rubra* agg.) and perennial rye grass. A portion of the turbine oversail area overlaps part of a short and immature mixed broadleaf and conifer treeline (WL2). This treeline has been planted atop the earth bank island present at the junction 22 exit from the M7. The trees within the treeline are not considered to have any potential roosting suitability for bats.



Plate 3-27 Dry Meadows and Grassy verges (GS2) habitat with the land take and mixed conifer and broadleaf treeline in the oversail area.



Plate 3-28 M7 junction merging with the N62 classified as Buildings and artificial surfaces (BL3) and adjacent dry meadows and grassy verges (GS2) within turbine delivery route accommodation area.

No other areas of accommodation works are proposed for the Haul Route. Habitats adjacent to junction 22 and the N62 leading towards the Site entrance consist of habitats common and widespread within the surrounding area such as buildings and artificial surfaces (BL3), hedgerow (WL1), improved agricultural grassland (GA2) and dry meadows and grassy verges (GS2). To facilitate the delivery of turbines into the Site, a temporary abnormal load entrance and access track is required. This temporary entrance is located to the west of the permanent proposed Site entrance and is located within improved agricultural grassland (GA1) and fractured immature hedgerow (WL1).

3.4.3 Proposed Grid Connection

3.4.3.1 Habitats at the Proposed Grid Connection

It is proposed to construct a 110kV onsite electrical substation in the townland of Clonmore which will be connected by means of an underground grid connection cable route and 2 no. lattice tower end masts to the existing 110kV Ikerrin to Thurles overhead line located in the townlands of Strogue, Co. Tipperary. The proposed underground electrical cabling route is approximately 2km long and runs through a mix of local road (L7039 for 870m) and other habitats. Please see Appendix 4-5 section and plan detail of the EIAR submitted alongside this report.

Habitats present at and surrounding the Proposed Grid Connection footprint include the following:

- Improved agricultural grassland (GA1)
- Buildings and artificial surfaces (BL3)
- Treelines (WL2)
- Hedgerows (WL1)
- Wet grassland (GS4)
- Amenity grassland (GA2)
- Dry meadows and grassy verges (GS2)

The proposed 110kV substation and its associated temporary construction compound are located within an area of Agricultural grassland (GA1) adjacent to local road L-70391 within the east of the Site. The proposed underground grid connection cable route continues east from the substation through the Agricultural grassland (GA1) habitat before exiting on to the L7039 local road classified as Buildings and artificial Surfaces (BL3), where it turn south and runs along the road, crossing the R433 and L7038 for a total of 870m. Habitats adjacent to these roads include Amenity grassland (GA2), Buildings and artificial surfaces, Hedgerow (WL1) and Treeline (WL2).

The proposed underground grid connection cable route crosses the Clonmore (Stream) classified as a depositing/ lowland river (FW2), (Plate 3-29; Plate 3-30). This watercourse crossing is referred to as grid route watercourse crossing no. 1 (WC1). At WC1 located in the L7039 road, it is proposed to cross the Clonmore watercourse via the Directional Drilling (DD) method. This method comprises this drilling under obstacles such as bridges, culverts, railways, water courses, etc. to install cable ducts under the obstacle. The road at this river crossing is lined by a managed hedgerow with species including hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) and scattered trees including alder (*Alnus glutinosa*), hawthorn (*Crataegus monogyna*), and ash (*Fraxinus excelsior*). Full details of WC1 directional drilling can be found in section 4.9.8.6.1 of Appendix 1.

From the L7038, the proposed underground grid connection cable route enters agricultural grassland (GA1), running parallel to the L7038 for approx 175m before turning in a northeastern direction. The underground grid connection cable route crosses a tributary of the Clonmore (Stream), the Strogue Stream, which is classified as a Depositing/ lowland River (FW2) and is located within an agricultural grassland and bordered by a treeline (WL2) that consists of hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) and scattered trees including ash (*Fraxinus excelsior*) (Plate 3-31). This new proposed crossing is referred to as watercourse crossing no. 2 (WC2). At WC2, it is proposed to construct a clear-span watercourse crossing.

The underground grid connection cable route continues to run through agricultural grassland (GA1) and several treelines and field drains before terminating at proposed end masts approx. 2km from the 110kV substation. The end masts will be located on either side of a Treeline delineating two improved agricultural grasslands and a portion of this treeline will need to be lost to facilitate a cable track to connect to the second end mast.

The proposed end masts are also to be located in an area of agricultural grassland (GA1). This grassland is bordered by hedgerow (WL1) to the east and west, drainage ditches (FW4) to the north, east, and south, and treelines (WL2), to the northeast and south.

The species found in this grassland consisted of perennial rye grass (*Lolium perenne*), dandelion (*Taraxacum officinale agg.*), daisy (*Bellis perennis*), yorkshire fog (*Holcus lanatus*), white clover (*Trifolium repens*), broad leaved doc (*Rumex obtusifolius*), and ribwort plantain (*Plantago lanceolata*).

The species found within the treelines bordering this grassland are hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*), elder (*Sambucus nigra*), blackthorn (*Prunus spinosa*), and holly (*Ilex aquifolium*).

The hedgerow at the borders of the grassland was mainly made up of blackthorn (*Prunus spinosa*) and bramble (*Rubus fruticosus*).



Plate 3-29 Route for grid connection underground cabling on road crossing at Clonmore river bridge located at the south east of the Site.



Plate 3-30 Bridge at Clonmore river where grid connection will pass underneath (HDD) within the road, southeast of the Site.



Plate 3-31 View of the proposed clearspan bridge location with an existing culvert under the railway located at the southeast of the Site near where the proposed grid connection underground cabling access road will pass by.



Plate 3-32 Drainage ditch (FW4) and treeline (WL2) located between fields for the proposed end masts.

3.4.3.1.1 Watercourse crossings

The 2 water crossings identified along the underground grid connection cable route during the walkover survey have been assigned reference numbers: WC1 and WC2 as in Table 3-2 below. Locations of water crossings are shown on Figure 2-2. All crossings are EPA-mapped rivers. Description and pictures of the 2 water crossings can be seen in section 3.4.3.1 above. In addition to the two river crossings, three field drains will need to be crossed. Please see Appendix 1: Chapter 4 Description of the Proposed Development for construction methodologies of the two crossing types.

Table 3-2 Watercourse crossings

Crossing ID	Location (Irish Grid Ref.)	Culvert type	Crossing option	Channel Works	EPA watercourse reference
WC 1	S 14639 74022	Stone Arch	Directional Drilling	None. No instream works required.	Clonmore (Stream) [Suir]
WC2	S 14972 73791	N/A	Construction of new clearspan watercourse crossing	None. No instream works required.	Strogue Stream

3.4.4 Invasive species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. No Third Schedule invasive species were recorded within the Site or within turbine delivery accommodation works areas.

3.4.5 Otter Surveys

An Otter was sighted on the 21/09/2022, in the Eastwood River, southeast of Turbine 6 and northeast of Turbine 7. The otter was seen commuting south along the Eastwood riverbank. The Aquatic Baseline Report states that despite some good suitability at numerous survey locations, otter signs were only recorded within the Site on the Shanakill River and the River Suir. Otter signs include a small number

of regular spraint sites and old spraint sites as well as prints. No breeding (holt) or couch (resting) places were identified within or 150 downstream of the Site. Watercourses were assessed as providing potentially suitable commuting and foraging habitat for the species and otter may occur within the Site, at least on occasion.

3.4.6 Fisheries and Aquatic Fauna

The watercourses that flow through the Site, and downstream watercourses, were subject to biological evaluation and assessment through kick sampling, fish stock assessment (electro-fishing) and white-clawed crayfish surveys on the 28th and 29th of September 2022. Full details of the results of these surveys are provided in Appendix 3 Aquatic Baseline Report.

The survey included a general habitat assessment and biological water quality assessment at watercourses within or downstream of the Site. The water quality, as per Q-value (Quality Rating System)², is fully described in Appendix 3. All sampled sites failed to meet the target good status ($\geq Q4$) requirements of the Water Framework Directive. The biological water quality of the survey area was generally poor - moderate with the majority of watercourses significantly impacted via siltation and or historical modifications (hydromorphology).

The aquatic baseline report summarises the results as follows:

*None of the 13 no. aquatic survey sites in the vicinity of the proposed Borrisbeg wind farm project were evaluated as of greater than **local importance (higher value)** in terms of their aquatic ecology. Poor hydromorphology due to drainage pressures (deepening and straightening) had impacted the flow profiles and exacerbated sedimentation. These pressures evidently reduced the fisheries value of the riverine sites and also created conditions inimical to support Annex I floating river vegetation that was not recorded during the surveys. Apart from two sites on the Farranacahill Stream and unnamed tributary (see below) that achieved **local importance (lower value)**, the remaining 11 survey sites were evaluated as **local importance (higher value)** in terms of their aquatic ecology. Primarily this evaluation was due to the presence of salmonids (n=9 sites), lamprey (*Lampetra* sp.) (n=8 sites) and or otter (n=4 sites). Sites B5 on the River Suir and D1 on the Clonmore Stream also supported other aquatic species of high conservation value, such as Red-listed European eel.*

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from n=13 riverine sites in September 2022.

No freshwater pearl mussel eDNA was detected in the River Suir (sites B3 & B5) or Eastwood River (C4) samples collected in September 2022 (0 positive qPCR replicates out of 12, respectively). Suitability was poor or absent throughout the survey sites (heavy siltation, enrichment, historical modifications, compaction of substrata etc.) and these results were in keeping with the known distribution of this species within the wider Suir catchment, i.e. the only extant population is located on the Clodiagh River (Ross, 2006).

Similarly, no white-clawed crayfish eDNA was detected within the survey area, supporting the absence of available records within much of the Suir_010 river sub-catchment.

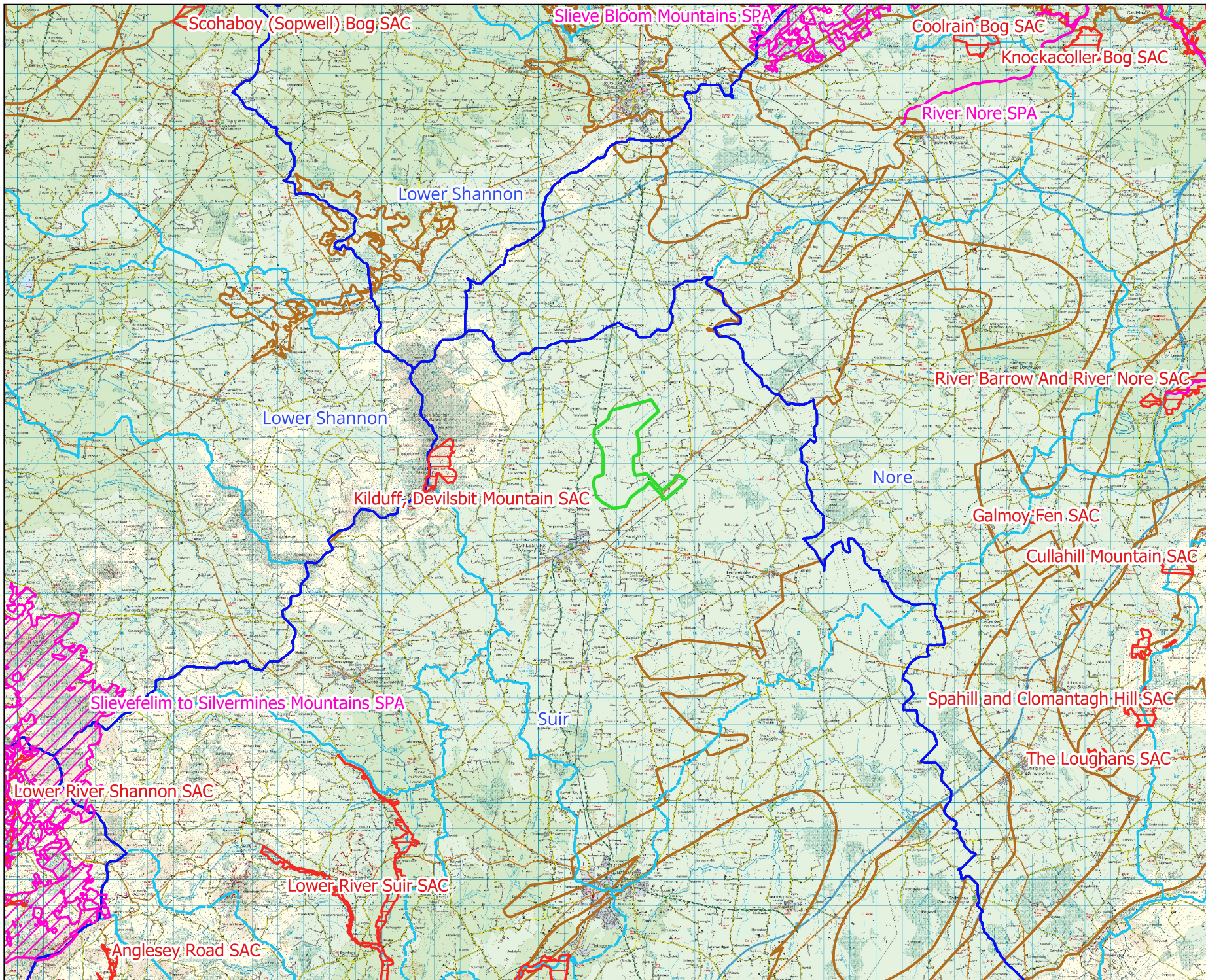
² Toner, P., Bowman, J., Clabby, K., Lucey, J., McGarrigle, M., Concannon, C., & MacGarthaigh, M. (2005). Water quality in Ireland. Environmental Protection Agency, Co. Wexford, Ireland.

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) on the 19/10/2023.
- 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 4-3. Sites that were further away from the Proposed Project were also considered and in this case connectivity with one European Designated Site that was further downstream was identified, the River Barrow and River Nore SAC (002162). However, given the nature, scale and location of the Proposed Project and the attenuating properties of the intervening waterbodies, no potential pathway for significant effects was identified.
- 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 the 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 19/10/2023.
- Where potential pathways for Likely Significant Effect are identified, the site is included within the Likely Zone of Impact 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. Projects and/or plans considered include those that are listed in Appendix 5.



Map Legend

- EIAR Study Boundary
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- WFD Catchments
- WFD Subcatchments
- WFD Groundwater Bodies



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Drawing Title
European Designated Sites within the Likely Zone of Impact

Project Title
Borrisbeg Renewable Energy Development

Drawn By AvdGM	Checked By JH
Project No. 220310	Drawing No. Figure 4-1
Scale 1:190,000	Date 23.11.2023

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Table 4-1 European Sites within the Likely Zone of Impact

European Sites and distance from the EIAR Study Boundary	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 19/10/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain
Special Areas of Conservation (SAC)			
<p>Kilduff, Devilsbit Mountain SAC [000934]</p> <p>Distance: 5.3km</p>	<ul style="list-style-type: none"> > [4030] European dry heaths > [6230] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) 	<p>Detailed conservation objectives for this site, (Version 1, July 2018⁴), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects as the Proposed Project is located entirely outside the SAC.</p> <p>Due to the intervening distance between the Site and the SAC, and the terrestrial nature of the habitats for which the SAC is designated, no potential pathway for likely significant indirect effect was identified.</p> <p>No pathway for likely significant effect on this SAC was identified, when considered in the absence of any mitigation, individually or cumulatively with other projects and/or plans. The SAC is not within the Likely Zone of Impact and is not considered further in this assessment.</p>
<p>Galmoy Fen SAC [001858]</p> <p>Distance: 13.2km</p>	<ul style="list-style-type: none"> > [7230] Alkaline fens 	<p>Detailed conservation objectives for this site, (Version 1, July 2019⁵), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects as the Proposed Project is located entirely outside the SAC.</p> <p>The Site is within a separate hydrological catchment and groundwater body to the SAC and there is therefore no potential surface water or groundwater connectivity between the Proposed Project and the SAC.</p>

⁴NPWS (2018) Conservation Objectives: Kilduff, Devilsbit Mountain SAC 000934. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

⁵NPWS (2019) Conservation Objectives: Galmoy Fen SAC 001858. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

European Sites and distance from the EIAR Study Boundary	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 19/10/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain
			<p>No pathway for indirect effects on the aquatic QIs of the SAC was identified.</p> <p>No pathway for likely significant effect on this SAC was identified, when considered in the absence of any mitigation, individually or cumulatively with other projects and/or plans. The SAC is not within the Likely Zone of Impact and is not considered further in this assessment.</p>
<p>Lower River Suir SAC [002137]</p> <p>Distance: 13.2km</p> <p>23.1km downstream of the EIAR Study Boundary</p>	<ul style="list-style-type: none"> ➤ [1029] Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> ➤ [1092] White-clawed Crayfish <i>Austropotamobius pallipes</i> ➤ [1095] Sea Lamprey <i>Petromyzon marinus</i> ➤ [1096] Brook Lamprey <i>Lampetra planeri</i> ➤ [1099] River Lamprey <i>Lampetra fluviatilis</i> ➤ [1103] Twaite Shad <i>Alosa fallax fallax</i> ➤ [1106] Salmon <i>Salmo salar</i> ➤ [1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) ➤ [1355] Otter <i>Lutra lutra</i> 	<p>Detailed conservation objectives for this site, (Version 1, March 2017⁶), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects as the Proposed Project is located entirely outside the SAC.</p> <p>The Site is located approximately 23.1km upstream of the Lower River Suir SAC via the River Suir, which flows through the Site. Taking a precautionary approach, a potential for likely significant effect was identified via deterioration of water quality associated with the Proposed Project.</p> <p>Additionally, the potential for a significant effect in the form of ex-situ disturbance to the QI species Otter was identified during the construction phase.</p> <p>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 SAC. Therefore, the SAC is</p>

⁶NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

European Sites and distance from the EIAR Study Boundary	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 19/10/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain
	<ul style="list-style-type: none"> ➤ [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) ➤ [3260] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation ➤ [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels ➤ [91A0] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) ➤ [91J0] <i>Taxus baccata</i> woods of the British Isles* 		<p>located within the Likely Zone of Impact and is considered further in this assessment.</p>
Special Protection Area (SPA)			
Slieve Bloom Mountains SPA [004160]	<ul style="list-style-type: none"> ➤ [A082] Hen Harrier <i>Circus cyaneus</i> 	Detailed conservation objectives for this site, (Version 1, September 2022 ⁷), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project is located entirely outside the SPA.

⁷NPWS (2022) Conservation Objectives: Slieve Bloom Mountains SPA 004160. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

European Sites and distance from the EIAR Study Boundary	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 19/10/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain
<p>Distance: 13.4km</p>			<p>The Site is located 13.4km from the SPA. The Site is outside the core foraging distance of hen harrier (Core range of 2km, with maximum range of 10km) as per Scottish Natural Heritage Guidelines (SNH, 2016). According to the Site-specific Conservation Objectives for this SPA, the core area used by breeding pairs is within 5km of nest sites.</p> <p>No pathway for likely significant effect on this SPA was identified, when considered in the absence of any mitigation, individually or cumulatively with other projects and/or plans. The SPA is not within the Likely Zone of Impact and is not considered further in this assessment.</p>
<p>River Nore SPA [004233]</p> <p>Distance: 14.3km</p>	<p>➤ [A229] Kingfisher <i>Alcedo atthis</i></p>	<p>Detailed First Order Site-specific conservation objectives for this site (Version 1, October 2022⁸), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects as the Proposed Project is located entirely outside the SPA.</p> <p>There is no direct hydrological connectivity with the SPA and no pathway for indirect effects on its aquatic SCI species has been identified. The SPA is located within a separate sub catchment, therefore there will be no indirect effects on the SPA via surface or groundwater deterioration.</p> <p>According to TII guidance (TII/NRA 2009) the core foraging range for Kingfisher is 1km along a watercourse. As the Proposed Project is located over 14.3km from the SPA and within a separate sub catchment</p>

⁸NPWS (2022) Conservation objectives for River Nore SPA [004233]. First Order Site specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.

European Sites and distance from the EIAR Study Boundary	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 19/10/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain
			<p>no significant effects as a result of disturbance or displacement to Kingfisher are anticipated.</p> <p>No pathway for likely significant effect on this SPA was identified, when considered in the absence of any mitigation, individually or cumulatively with other projects and/or plans. The SPA is not within the Likely Zone of Impact and is not considered further in this assessment.</p>

4.2

Stage 1 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 projects and/or plans, would be likely to have a significant effect on the following European Site:

- Lower River Suir SAC [002137]

As a result, an Appropriate Assessment is required and a Natura Impact Statement shall be prepared in respect of the Proposed Project.

No other SACs and their QIs or SPAs and their SCIs have been identified as being within the likely zone of influence for any significant effect as a result of the Proposed Project. As such the potential for significant effect on all other SACs and SPAs can be excluded as this stage.

5. **STAGE 2- NATURA IMPACT STATEMENT (NIS)**

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

- Lower River Suir SAC [002137]

The following sections consider this European Site 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 effected.

5.1 Identification of relevant Qualifying Features and Desk Study

5.1.1 Lower River Suir SAC [002137]

The potential for impacts on this SAC were identified in Section 4.1 above. The identified pathways for effect include the following:

- The Proposed Project has potential hydrological connectivity with the SAC approx. 23.1km downstream, via the River Suir. Taking a precautionary approach, a potential pathway for indirect effects on the SAC was identified in the form of deterioration of water quality during construction.
- Additionally, the potential for a significant effect in the form of ex-situ disturbance to the QI species Otter was identified during the construction phase.

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 potentially affected

Qualifying feature	Conservation Objective (NPWS, Version 1, March 2017 ⁹),	Rationale	Potential for Adverse Effects Y/N
[1029] Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	To restore the favourable conservation condition of Freshwater Pearl Mussel in Lower River Suir SAC	According to Map 6 of the Conservation Objectives; the designated catchment for <i>Margaritifera margaritifera</i> within the SAC, the Clodiagh catchment, is located within a different hydrological sub-catchment to the Site and is located upstream of the River Suir. Therefore, there is no downstream hydrological connectivity from the River Suir to the Clodiagh catchment and as such no source pathway receptor model for adverse effect on the QI species.	No

⁹ NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Qualifying feature	Conservation Objective (NPWS, Version 1, March 2017 ⁹),	Rationale	Potential for Adverse Effects Y/N
[1092] White-clawed Crayfish <i>Austropotamobius pallipes</i>	To maintain the favourable conservation condition of White-clawed Crayfish in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI species via water quality deterioration associated with construction activities for the Proposed Project. A potential for adverse effect was identified.	Yes
[1095] Sea Lamprey <i>Petromyzon marinus</i>	To restore the favourable conservation condition of Sea Lamprey in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI species via water quality deterioration associated with construction activities for the Proposed Project. A potential for adverse effect was identified.	Yes
[1096] Brook Lamprey <i>Lampetra planeri</i>	To restore the favourable conservation condition of Brook Lamprey in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI species via water quality deterioration associated with construction activities for the Proposed Project. A potential for adverse effect was identified.	Yes
[1099] River Lamprey <i>Lampetra fluviatilis</i>	To restore the favourable conservation condition of River Lamprey in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI species via water quality deterioration associated with construction activities for the Proposed Project. A potential for adverse effect was identified.	Yes
[1103] Twait Shad <i>Alosa fallax fallax</i>	To restore the favourable conservation condition of Twait Shad in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI species via water quality deterioration associated with construction activities for the Proposed Project.	Yes

Qualifying feature	Conservation Objective (NPWS, Version 1, March 2017 ⁹),	Rationale	Potential for Adverse Effects Y/N
		A potential for adverse effect was identified.	
[1106] Salmon <i>Salmo salar</i>	To restore the favourable conservation condition of Atlantic Salmon in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI species via water quality deterioration associated with construction activities for the Proposed Project. A potential for adverse effect was identified.	Yes
[1330] Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>)	To restore the favourable conservation condition of Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Atlantic salt meadows habitat is mapped on map 3 of the SSCO document for this SAC however does not have detailed mapping for this SAC and the SSCO document states that ‘further unsurveyed areas may be present within the SAC’. Atlantic salt meadows are a saltmarsh habitat and therefore coastal in nature. The upstream limit of the Upper Suir Estuary transitional waterbody (as mapped on catchments.ie) is located approximately 1.2km north of Carrick-on-Suir. This effectively represents the limit of the QI habitats theoretical range. This upstream limit of the Upper Suir Estuary is located over 120km downstream of the Proposed Project. Therefore, due to the nature and scale of the Proposed Project, the coastal nature of the QI habitat and the assimilative capacity of the intervening waterbodies there is no potential for adverse effect on the QI habitat. There is no source pathway receptor model for adverse effect on the QI habitat.	No
[1355] Otter <i>Lutra lutra</i>	To maintain the favourable conservation condition of Otter in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI species via water quality deterioration associated with construction activities for the Proposed Project, thus potentially affecting fish biomass availability. A potential for adverse effect was identified.	Yes

Qualifying feature	Conservation Objective (NPWS, Version 1, March 2017 ⁹),	Rationale	Potential for Adverse Effects Y/N
		<p>The SAC is located approx. 23.1km hydrologically downstream of the Site. However, taking a precautionary approach, a potential for disturbance effects associated with construction activities to the other population associated with the SAC which may commute along rivers outside of the SAC was identified.</p>	
<p>[1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>)</p>	<p>To restore the favourable conservation condition of Mediterranean salt meadows (<i>Juncetalia maritimi</i>) in Lower River Suir SAC</p>	<p>The SAC is approx. 23.1km hydrologically downstream of the Site. Mediterranean salt meadows habitat does not have detailed mapping for this SAC however mediterranean salt meadows are a saltmarsh habitat and therefore coastal in nature. The upstream limit of the Upper Suir Estuary transitional waterbody (as mapped on catchments.ie) is located approximately 1.2km north of Carrick-on-Suir. This effectively represents the limit of the QI habitats theoretical range. This upstream limit of the Upper Suir Estuary is located over 120km downstream of the Proposed Project. Therefore, due to the nature and scale of the Proposed Project, the coastal nature of the QI habitat and the assimilative capacity of the intervening waterbodies there is no potential for adverse effect on the QI habitat.</p> <p>There is no source pathway receptor model for adverse effect on the QI habitat.</p>	<p>No</p>
<p>[3260] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation</p>	<p>To maintain the favourable conservation condition of Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation in Lower River Suir SAC</p>	<p>The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI habitat where it occurs in the SAC, which is dependent on aquatic inputs, as a result of construction activities associated with the Proposed Project.</p> <p>A potential for adverse effect was identified.</p>	<p>Yes</p>
<p>[6430] Hydrophilous tall herb fringe communities of</p>	<p>To maintain the favourable conservation condition of</p>	<p>The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI habitat where it occurs</p>	<p>Yes</p>

Qualifying feature	Conservation Objective (NPWS, Version 1, March 2017 ⁹),	Rationale	Potential for Adverse Effects Y/N
plains and of the montane to alpine levels	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in Lower River Suir SAC	in the SAC, which is dependent on aquatic inputs, as a result of construction activities associated with the Proposed Project. A potential for adverse effect was identified.	
[91A0] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	To restore the favourable conservation condition of Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles in Lower River Suir SAC	The SAC is located 13.2km over-land from the Site. Due to the terrestrial nature of this QI habitat, and the intervening distance between the SAC and the Site, there is no source-pathway-receptor chain for adverse effect on the QI habitat.	No
[91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	To restore the favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)* in Lower River Suir SAC	The SAC is approx. 23.1km hydrologically downstream of the Site. Taking a precautionary approach, there is potential for impacts to this QI habitat where it occurs in the SAC, which is dependent on aquatic inputs, as a result of construction activities associated with the Proposed Project. A potential for adverse effect was identified.	Yes
[91J0] <i>Taxus baccata</i> woods of the British Isles	To restore the favourable conservation condition of <i>Taxus baccata</i> woods of the British Isles* in Lower River Suir SAC	The SAC is located 13.2km over-land from the Site. Due to the terrestrial nature of this QI habitat, and the intervening distance between the SAC and the Site, there is no source-pathway-receptor chain for adverse effect on the QI habitat.	No

5.1.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to impact on the European Site were reviewed and considered in relation to the Proposed Project. These are provided in Table 5-2.

Table 5-2 Site-specific threats, pressures and activities

Negative Impacts			
Rank	Threats and Pressures		Inside/Outside/Both (i/o/b)
H	A08	Fertilisation	o
H	E01	Urbanised areas, human habitation	b
H	E03	Discharges	b
H	H01	Pollution to surface waters (limnic, terrestrial, marine & brackish)	b
H	J02.12.02	Dykes and flooding defense in inland water systems	i
L	A01	Cultivation	i
L	B	Sylviculture, forestry	o
L	D03.01	Port areas	b
L	I01	Invasive non-native species	i
L	J02.01.02	Reclamation of land from sea, estuary or marsh	i
M	J02.01	Landfill, land reclamation and drying out, general	b

Potential pathways for effect with regard to site-specific threats, pressures and activities have been identified in relation to potential for ‘Discharges’ and ‘Pollution to surface waters (limnic, terrestrial, marine & brackish)’ in relation to this SAC.

5.1.1.3 QI Specific Information

5.1.1.3.1 [1092] White-clawed Crayfish *Austropotamobius pallipes*

According to the Site-Specific Conservation Objectives Document (NPWS, 2017), White-clawed crayfish (*Austropotamobius pallipes*) occurs extensively on the River Suir and on many of its tributaries. On the River Suir main channel, the species has been recorded on almost the entire length of non-tidal river from the most upstream point at Cabragh, near Thurles, to downstream of Kilsheelan. It is also present on the following tributaries: Anner and Clashawley, Clodiagh and Owenbeg, Multeen, Tar, Nier, and Clodiagh Lower. A distribution map is available for this species within the SSCO (Map 7). According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is ‘Bad’ and the overall Conservation Trend is ‘Deteriorating’.

As per map 7 of the SSCO, the closest record for White-clawed crayfish is located approx. 23.1km downstream of the EIAR Study Boundary, on the River Suir. The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-3 Targets and attributes associated with the site-specific conservation objectives for White-clawed Crayfish

Attribute	Target
Distribution	No reduction from baseline.
Population structure: recruitment	Juveniles and/or females with eggs in all occupied tributaries
Negative indicator species	No alien crayfish species
Disease	No instances of disease
Water quality	At least Q3-4 at all sites sampled by EPA
Habitat quality: heterogeneity	No reduction in habitat heterogeneity or habitat quality

5.1.1.4 [1095] Sea Lamprey *Petromyzon marinus*

According to the Site Synopsis for the Lower River Suir SAC (NPWS, 2013) the site is of particular conservation interest for the presence of a number of Annex II animal species including Sea Lamprey. According to Site-Specific Conservation Objectives Document (NPWS, 2017), Lampreys spawn in clean gravels. Substantial areas of suitable spawning habitat are available from Cahir to Carrick-on-Suir, but access to areas upstream of Clonmel is problematic. Float-over surveys by Inland Fisheries Ireland (IFI) point to little success of sea lamprey adults in passing the weirs in Clonmel in Lower River Suir SAC. Modifications to these weirs would facilitate upstream passage of sea lamprey.

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is ‘Bad’ and the overall Conservation Trend is ‘Stable’.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-4 Targets and attributes associated with the site-specific conservation objectives for Sea Lamprey

Attribute	Target
Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary
Population structure of juveniles	At least three age/size groups present
Juvenile density in fine sediment	Juvenile density at least 1/m ²
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	More than 50% of sample sites positive

5.1.1.4.1 [1096] Brook Lamprey *Lampetra planeri*

According to the Site Synopsis for the Lower River Suir SAC (NPWS, 2013) the site is of particular conservation interest for the presence of a number of Annex II animal species including Brook Lamprey. According to Site-Specific Conservation Objectives Document (NPWS, 2017), Brook lampreys spawn in clean gravels where they excavate shallow nests and can spawn communally (Rooney et al., 2013). Artificial barriers can block or cause difficulties to lampreys’ migration both up- and downstream, thereby possibly limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007). Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal.

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is ‘Favourable, and the overall Conservation Trend is ‘Stable’.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-5 Targets and attributes associated with the site-specific conservation objectives for Brook Lamprey

Attribute	Target
Distribution	Access to all water courses down to first order streams
Population structure of juveniles	At least three age/size groups of brook/river lamprey present
Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m ²
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	More than 50% of sample sites positive

5.1.1.5 [1099] River Lamprey *Lampetra fluviatilis*

According to the Site Synopsis for the Lower River Suir SAC (NPWS, 2013) the site is of particular conservation interest for the presence of a number of Annex II animal species including River Lamprey. According to Site-Specific Conservation Objectives Document (NPWS, 2017), River lampreys spawn in clean gravels where they excavate shallow nests and can spawn communally in numbers (Rooney et al., 2013). Artificial barriers can block river lampreys’ migration both up- and downstream, thereby limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007). Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal.

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is ‘Unknown’.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-6 Targets and attributes associated with the site-specific conservation objectives for River Lamprey

Attribute	Target
Distribution	Access to all water courses down to first order streams
Population structure of juveniles	At least three age/size groups of brook/river lamprey present

Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m ²
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	More than 50% of sample sites positive

5.1.1.6 [1103] Twaite Shad *Alosa fallax fallax*

According to the Site Synopsis for the Lower River Suir SAC (NPWS, 2013) the site is of particular conservation interest for the presence of a number of Annex II animal species including Twaite shad, and is one of the only three known spawning grounds in the country for Twaite Shad. According to Site-Specific Conservation Objectives Document (NPWS, 2017), in some catchments, artificial barriers block twaite shads' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas.

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is 'Bad' and the overall Conservation Trend is 'Stable'.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-7 Targets and attributes associated with the site-specific conservation objectives for Twaite Shad

Attribute	Target
Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary
Population structure: age classes	More than one age class present
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning habitats
Water quality: oxygen levels	No lower than 5mg/l
Spawning habitat quality: Filamentous algae; macrophytes; sediment	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth

5.1.1.7 [1106] Salmon *Salmo salar*

According to the Site Synopsis for the Lower River Suir SAC (NPWS, 2013) the site is of particular conservation interest for the presence of a number of Annex II animal species including Salmon. According to Site-Specific Conservation Objectives Document (NPWS, 2017), Artificial barriers block salmon's upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Salmon spawn in clean gravels. Artificial barriers are generally not currently preventing salmon from accessing suitable spawning habitat in Lower River Suir SAC. Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*).

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is 'Inadequate' and the overall Conservation Trend is 'Stable'.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-8 Targets and attributes associated with the site-specific conservation objectives for Salmon

Attribute	Target
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary
Adult spawning fish	Conservation limit (CL) for each system consistently exceeded
Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling
Out-migrating smolt abundance	No significant decline
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes
Water quality	At least Q4 at all sites sampled by EPA

5.1.1.8 [1355] Otter *Lutra lutra*

According to Site-Specific Conservation Objectives Document (NPWS, 2017), the extent of terrestrial habitat area was mapped and calculated as 116.17ha above high water mark (HWM) and 726.61ha along river banks, which was mapped to include a 10m terrestrial buffer along the shoreline (above the HWM and along river banks) identified as critical for otters (NPWS, 2007). The extent of marine habitat area was mapped and calculated as 712.27ha, which was mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (Kruuk, 2006; NPWS, 2007).

The extent of freshwater (river) habitat length was mapped and calculated as 382.31km. No field survey was carried out, the length was calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982). Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed.

Otters have a Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006; Reid et al., 2013) and wrasse and rockling in coastal waters (Kingston et al., 1999).

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is 'Favourable'.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-9 Targets and attributes associated with the site-specific conservation objectives for Otter

Attribute	Target
Distribution	No significant decline
Extent of terrestrial habitat	No significant decline. Area mapped and calculated as 116.17ha above high water mark (HWM) and 726.61ha along river banks
Extent of marine habitat	No significant decline. Area mapped and calculated as 712.27ha

Extent of freshwater (river) habitat	No significant decline. Length mapped and calculated as 382.31km
Couching sites and holts	No significant decline
Fish biomass available	No significant decline
Barriers to connectivity	No significant increase

5.1.1.9 [3260] Water courses of plain to montane levels with the *Ranuncion fluitantis* and *Callitricho-Batrachion* vegetation

According to Site-Specific Conservation Objectives Document (NPWS, 2017), the selection of Lower River Suir SAC uses the broad interpretation that habitat 3260 covers upland rivers with bryophytes and macroalgae to lowland depositing rivers with pondweeds and starworts. Conservation objectives for habitat 3260 concentrate on the high conservation value sub-types, however, little is known of the habitat's distribution or its sub-types in Lower River Suir SAC. The typical species may include higher plants, bryophytes, macroalgae and microalgae, and invertebrates. The banks of the Suir, particularly its tidal stretches, support a notable population of the rare *Rumex crispus* subsp. *uliginosus* (Green, 2008). There is a large number of lowland and tidal rivers in the SAC, as well as faster-flowing tributaries. The uncommon, protected opposite-leaved pondweed (*Groenlandia densa*) was recorded in the SAC from floodplain ditches of the Suir near Carrick on-Suir and Clonmel, as well as the Clodiagh near Portlaw (Colgan and Scully, 1898; NPWS internal files). There are no known records for rare or threatened bryophytes from the rivers in the SAC (Lockhart et al., 2012). The rivers in the SAC are mainly lowland, depositing and tidal, and are likely dominated by marginal and submerged higher plants.

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this habitat is 'Inadequate' and the overall Conservation Trend is 'Deteriorating'.

From a precautionary perspective this habitat has been identified as occurring within the likely Zone of Impact.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-10 Targets and attributes associated with the site-specific conservation objectives for Water courses of plain to montane levels with the *Ranuncion fluitantis* and *Callitricho-Batrachion* vegetation

Attribute	Target
Habitat area	Area stable or increasing, subject to natural processes
Habitat distribution	No decline, subject to natural processes.
Hydrological regime: river flow	Maintain appropriate hydrological regimes
Hydrological regime: groundwater discharge	Maintain appropriate hydrological regime
Hydrological regime: tidal influence	Maintain natural tidal regime
Substratum composition: particle size range	Maintain appropriate substratum particle size range, quantity and quality, subject to natural processes

Water quality	Maintain appropriate water quality to support the natural structure and functioning of the habitat
Typical species	Maintain typical species in good condition, including appropriate distribution and abundance
Floodplain connectivity	Maintain floodplain connectivity necessary to support the typical species and vegetation composition of the habitat
Fringing habitats	Maintain marginal fringing habitats that support the typical species and vegetation composition of the habitat

5.1.1.10 [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

According to Site-Specific Conservation Objectives Document (NPWS, 2017), Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels habitat has not been mapped in detail for Lower River Suir SAC and thus the total area of the qualifying habitat in the SAC is unknown. The lowland type communities of the habitat are considered to occur in association with the various areas of alluvial forest (91E0) within the SAC, notably at Fiddown, below Carrick-on-Suir and at Tibberaghny Marshes. This habitat type would also be expected to occur in association with other woodland types in fringe areas along the river and with areas of open marsh or wet grassland within the SAC (NPWS internal files). The spread of Japanese knotweed (*Fallopia japonica*) is noted as a threat at Tibberaghny (NPWS internal files).

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this habitat is ‘Bad’ and the overall Conservation Trend is ‘Deteriorating’.

From a precautionary perspective this habitat has been identified as occurring within the likely Zone of Impact.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-11 Targets and attributes associated with the site-specific conservation objectives for Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

Attribute	Target
Habitat area	Area stable or increasing, subject to natural processes
Habitat distribution	No decline, subject to natural processes.
Hydrological regime: Flooding depth/height of water table	Maintain appropriate hydrological regime
Vegetation composition: positive indicator species	At least three positive indicator species present
Vegetation composition: positive indicator species	Cover of positive indicator species at least 40%
Vegetation composition: non-native species	Vegetation composition: non-native species

Vegetation composition: negative indicator species	Cover of negative indicator species not more than 33%
Vegetation composition: scrub, bracken and heath	Cover of scrub, bracken (<i>Pteridium aquilinum</i>) and heath not more than 5%
Vegetation structure: height	Herb height at least 50cm
Physical structure: bare soil	Cover of bare soil not more than 10%
Physical structure: grazing and disturbance	Area of the habitat showing signs of serious grazing or disturbance less than 20m ²

5.1.1.11 [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

According to the Site Synopsis for the Lower River Suir SAC (NPWS, 2013), Alluvial wet woodland is a declining habitat type in Europe as a result of drainage and reclamation. The best examples of this type of woodland in the site are found on the islands just below Carrick-on-Suir and at Fiddown Island.

According to Site-Specific Conservation Objectives Document (NPWS, 2017), Alluvial forest was surveyed in Lower River Suir SAC by Perrin et al. (2008) as part of the National Survey of Native Woodlands (NSNW) at Fiddown (NSNW site code: 0022), Mountbolton (NSNW site code: 1823) and Ballycanvan Big (NSNW site code: 1839). Fiddown (0022) was also included in a national monitoring survey (O'Neill and Barron, 2013). The area of alluvial woodlands in the surveyed sites within the SAC is estimated to be 32.9ha. It is important to note that further unsurveyed areas of alluvial forest are present within the SAC, for example at islands below Carrick-on-Suir, at Shanbally (Coillte LIFE project site), Tibberaghny Marshes, along the lower stretches of the more westerly of the Suir tributaries and along both banks of the Suir as far east as the Dawn River (NPWS internal files). Map 5 shows the alluvial woodlands surveyed by Perrin et al. (2008).

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this habitat is 'Bad' and the overall Conservation Trend is 'Declining'.

From a precautionary perspective this habitat has been identified as occurring within the likely Zone of Impact.

The individual targets and attributes of this Qualifying Interest are considered below:

Table 5-12 Targets and attributes associated with the site-specific conservation objectives for Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Attribute	Target
Habitat area	Area stable or increasing, subject to natural processes, at least 32.9ha for sites surveyed.
Habitat distribution	No decline
Woodland size	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size
Woodland structure: cover and height	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semimature trees and shrubs; and well-developed herb layer

Woodland structure: community diversity and extent	Maintain diversity and extent of community types
Woodland structure: natural regeneration	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy
Hydrological regime: flooding depth/height of water table	Appropriate hydrological regime necessary for maintenance of alluvial vegetation
Woodland structure: dead wood	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder (<i>Alnus glutinosa</i>))
Woodland structure: veteran trees	No decline
Woodland structure: indicators of local distinctiveness	No decline
Vegetation composition: native tree cover	No decline. Native tree cover not less than 95%
Vegetation composition: typical species	A variety of typical native species present, depending on woodland type, including alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp.), oak (<i>Quercus</i> spp.), ash (<i>Fraxinus excelsior</i>) and birch (<i>Betula pubescens</i>)
Vegetation composition: negative indicator species	Negative indicator species, particularly non-native invasive species, absent or under control

5.2 Hydrological Desk Study

5.2.1 Local Hydrology and Hydrogeology

The following description has been summarised from Chapter 9 ‘Water’ of the accompanying EIAR (also provided as Appendix 2) and provides a baseline of the local watercourses within and downstream of the site of the Proposed Project.

Regionally the Site is located in the Suir WFD catchment in Hydrometric Area 16 and the Suir_010 sub-catchment which is a headwater sub-catchment of the River Suir.

Locally the Site is mapped within 2 no. WFD river sub-basins, the Suir_020 sub-basin and the Eastwood_010 sub-basin (Eastwood River). The majority of the Site lies within the Suir_020 sub-basin in the north, east and south, whilst the western portion of the Site is situated in the Eastwood_010 sub-basin.

Within the Suir_020 river sub basin the River Suir enters the Site from the north and continues southwards within the eastern portion of the Site. The Shanakill Stream enters the Site from the northeast. Within the Eastwood_010 river sub basin, the Eastwood River flows easterly, and enters the Site from the west.

The proposed underground grid connection cable route runs easterly within the southeast of the Site and into the Clonmore Stream (Suir)_010 river sub basin. The Clonmore Stream (Suir)_010 flows in a south-westerly direction and joins the River Suir within the southeast of the Site. An unnamed 2nd order tributary stream joins the Eastwood River, and at this point it continues southwards and discharges into the River Suir approximately 500m downstream of the Site. The River Suir continues south and eventually discharge into the Upper Suir Estuary approximately 56.8km southeast from the Site (as the crow flies), just west of Carrick on Suir.

To facilitate turbine delivery to the Site, minor temporary stoning up of verges at junction 22 on the M7 and the construction of a temporary abnormal load access from the L-3248 road into the Site will be required. These works are located within the Nore_SC_010 and the Suir WFD catchments, respectively.

*A regional hydrology map and local hydrology map for the Site is shown as **Figure 9-1** and **Figure 9-2** respectively. Please see Appendix 2.*

The Site is located in the Templemore Ground Water Body (GWB) (IE_SE_G_131) where the WFD description is “poorly productive bedrock”. The majority of the GWB comprises Locally Important Aquifers. The overall groundwater flow direction is southerly with discharge into the River Suir and its tributaries. Discharge occurs via springs, which flow towards the surface water bodies or via baseflow directly into the rivers (GSI, 2004).

The majority of groundwater flow in this GWB is considered to take place in the upper weathered zone (3m). Below this the amount of groundwater flow decreases gradually with depths and large flows are not expected below 10m except in isolated open fractures (GSI, 2004).

The Ballysteen Formation (Dinantian Lower Impure Limestones), which are mapped to underlie the majority of the Site are classified by the GSI (www.gsi.ie) as a Locally Important Aquifer (LI), having bedrock which is moderately productive only in local zones. The Waulstorian limestones (Dinantian Pure Unbedded Limestones) on the northwest of the Site are also classified LI.

The band of the Lisduff Oolite Member (Dinantian Pure Bedded Limestones) mapped across the centre of the Site is classified as a Locally Important Aquifer (Lm), bedrock which is generally moderately productive.

There are no GSI mapped karst features in the area of the Site.’

5.2.2 Water Quality

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. The EPA Envision map viewer was consulted, most recently, on 9th of November 2023 concerning the water quality status of the rivers which run within and directly adjacent to the Site. The WFD River Waterbody Status 2016 – 2021 for the watercourses which flow through the Site have been assessed in Table 5-13.

Table 5-13 Watercourses within the Site with relevant water quality statuses

Name	Location	Q-Value	Status	Risk (WFD 3 rd cycle)
Suir	Flows in a southerly direction through the Site where it then merges with the Eastwood River south of the Site and continues flowing in a southerly direction.	3-4	Moderate	At Risk
Shanakill 16	The Shanakill 16 flows in a south westerly direction through the north eastern portion of the Site until it merges with the Suir River within the north of the Site.	-	Poor	At Risk
Farranacahill	The Farranacahill flows from within the north of the Site in a southerly direction and merges with the Eastwood river within the west of the Site.	-	Moderate	Review
Unnamed watercourse	The unnamed watercourse flows through the west of the Site in a south easterly direction and into the Faranacahill within the west of the Site before the Faranacahill flows into the Eastwood.	-	Moderate	At Risk
Eastwood	The Eastwood flows into the Site from the west in a south easterly direction and then flows in a southerly direction through the west of the Site merging with the Suir River below the Site.	-	Moderate	Review
Clonmore (Stream)	The Clonmore Stream flows westerly passing in and out of the south eastern section of the Site several times and flows into the Suir River within the south east of the Site.	3-4	Moderate	At Risk
Lahagh 16	The Lahagh 16 watercourse is a tributary of the Clonmore (stream) which flows in a north westerly direction and into the Clonmore (stream) within the eastern portion of the Site.	-	Moderate	At Risk
Strogue (Stream)	The Strogue watercourse is a tributary of the Clonmore (stream) which flows in a north westerly direction and into the Clonmore (stream) within the eastern portion of the Site.	-	Moderate	At Risk

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

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 19/10/2023. The Conservation Objectives for these sites are available at the following locations:

- Detailed conservation objectives for Lower River Suir SAC (Version 1, March 2017) were assessed and reviewed as part of this assessment and are available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002137.pdf

Following the initial impact assessment, mitigation is prescribed where necessary to avoid adverse effects on the Conservation Objectives of the relevant QIs.

6.1 Potential for Direct Effects on the European Sites

There will be no direct effects on the QIs of any EU Designated Sites identified in this NIS. The EU Designated Sites are located entirely outside of the Site.

6.2 Potential for Indirect Effects on the European Sites

6.2.1 Hydrological Impacts

The Proposed Project site is located hydrologically upstream of the Lower River Suir SAC and associated aquatic dependant QIs/SCIs. A potential for adverse effect on the following QIs in the absence of mitigation has been identified within Section 5:

- [1092] White-clawed Crayfish *Austropotamobius pallipes*
- [1095] Sea Lamprey *Petromyzon marinus*
- [1096] Brook Lamprey *Lampetra planeri*
- [1099] River Lamprey *Lampetra fluviatilis*
- [1103] Twaité Shad *Alosa fallax fallax*
- [1106] Salmon *Salmo salar*
- [1355] Otter *Lutra lutra*
- [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
- [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
- [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

6.2.1.1 Construction Phase

The footprint of the Proposed Project has been specifically designed to avoid significant impacts on watercourses. This was initially achieved by way of a constraints mapping exercise. The key mitigation

measure during the construction phase is the avoidance of sensitive aquatic areas where possible, by application of suitable buffer zones (i.e. 50m buffer from streams and rivers). Proposed Infrastructure which is within a 50m distance from the hydrologically very sensitive rivers and streams onsite must be considered throughout the construction and mitigation processes so that treatment of surface runoff is effective before it reaches local watercourses.

All of the key development components of the Proposed Wind Farm are located significantly away from the delineated 50m watercourse buffer zones with the following exceptions. 1 no. new watercourse crossing location within the Proposed Wind Farm has been specifically chosen to facilitate the use of a clear span bridge structure (see the site layout drawings in Appendix 4.1 of this EIAR), thereby ensuring that no instream works are necessary in this location and minimising potential for impact on the receiving environment. In addition, Horizontal Directional Drilling (HDD) will be required at an existing watercourse crossing in the south of the Site leading to the proposed substation. The locations of the water crossing structures are shown on Figure 2-2. As part of the Proposed Project, it is proposed to restore an approximately 240m long segment of the Eastwood River within the Site. Through the restoration process the watercourse segment will be further meandered resulting in a final length of approximately 300m for the restoration segment. Works associated with the river restoration have the potential to cause downstream deterioration of water quality in the absence of mitigation. Full details of the river restoration can be seen in Appendix 6-4 of the EIAR submitted alongside this report.

The Proposed Grid Connection also crosses 2 no. watercourses. One of these crossings will require the construction of a new clear span bridge structure while the other will utilise HDD on an existing bridge. As no instream works are proposed to natural watercourses, there will be no direct effects on these habitats or the species that are associated with them.

There will be no net loss of fisheries habitat or potential for the Proposed Project (Proposed Wind Farm and Proposed Grid Connection) to result in any barriers to the movement of aquatic species post completion of construction. The Proposed Project will result in the re-meandering of a section of the Eastwood River which, as well as increasing the length of the River within the Site, will increase the habitat quality and diversity from what is at present a heavily silted, deepened and straightened channel. However, while the majority of the construction of the restored channel will be done in the dry, during the construction of the river restoration there will be a temporary short term barrier to movement for aquatic species within the segment of the Eastwood River undergoing restoration.

There is potential for the construction activity to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons into these watercourses. This represents a potential indirect effect on the identified aquatic receptors in the form of habitat degradation through water pollution.

6.2.1.1.1 **Surface Water Quality Deterioration**

A drainage plan for the Proposed Project is provided in Appendix 4 (CEMP) and Appendix 2 of this report. This plan provides details of how surface water quality will be protected during the construction of the Proposed Project. In addition to this, specific mitigation is provided in relation to water quality in Appendix 2. These mitigation measures will ensure that there will be no potential adverse indirect effects on the aquatic dependent QIs of the Lower River Suir SAC as a result of a deterioration in water quality. Specific mitigations for the proposed works are detailed below including mitigation by avoidance, mitigation by design, mitigation against release of suspended solids, hydrocarbons, cementitious materials, dewatering works controls, prevention of contamination from wastewater disposal, and clear-felling mitigations.

6.2.1.1.2 **Clear Felling of Forestry, Woodland and Linear Vegetation**

Tree felling is a minor component of the Proposed Project with approx. 4.22ha felling proposed. In addition to the felling, 1.8km of linear vegetation will be removed to facilitate the infrastructure footprint.

The tree felling activities required as part of the Proposed Project will be the subject of a Felling Licence 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 licences for wind farm developments.

Potential effects during tree felling occurs mainly from:

- Exposure of soil and subsoils due to vehicle tracking, and skidding or forwarding extraction methods resulting in a source of suspended sediment which can become entrained in surface water runoff and enter surface water courses;
- Entrainment of suspended sediment in watercourses due to vehicle tracking through watercourses;
- Damage to roads resulting in a source of suspended sediment which can become entrained in surface water runoff and enter surface water courses;
- Release of sediment attached to timber in stacking areas; and,
- Nutrient release.

Proposed Mitigation Measures:

Best practice methods related to water incorporated into the forestry management and mitigation measures have been derived from:

- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): Forest Operations and Water Protection Guidelines;
- Coillte (2009): Methodology for Clear Felling Harvesting Operations; and,
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.

Mitigation by Avoidance:

There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document “Forestry and Water Quality Guidelines” are shown in Table 6-1.

Table 6-1 : Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

During the construction phase a self-imposed conservative buffer zone of 50 metres will be maintained for all streams. These buffer zones are shown on Figure 9-10 of Appendix 2.

The large distance between the majority of the proposed felling areas and sensitive aquatic zones means that potential poor quality runoff from felling areas can be adequately managed and attenuated prior to even reaching the aquatic buffer zone and primary drainage routes.

Mitigation by Design:

Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which are set out as follows:

- Machine combinations (i.e. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance;
- Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works;
- Ditches which drain from the proposed area to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and avoid being placed at right angles to the contour;
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the peat disposal areas. All new silt traps will be constructed on even ground and not on sloping ground;
- All drainage channels will taper out before entering the 50m buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone;
- Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled;
- Brush mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brush mat renewal will take place before they become heavily used and worn. Provision will be made for brush mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall;
- Timber will be stacked in dry areas, and outside a local 50 metre watercourse buffer. Straw bales and check dams will be emplaced on the down gradient side of timber storage/processing sites;
- Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off;
- Checking and maintenance of roads and culverts will be on-going through the felling operation;
- Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required;
- A permit to refuel system will be adopted;
- Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors;
- Direct crossing of streams with machinery will not be permitted;
- Travel only perpendicular to and away from stream.

Silt Traps:

Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner.

Drain Inspection and Maintenance:

The following items will be carried out during pre-felling inspections and after:

- Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines;
- Inspection of all areas reported as having unusual ground conditions;
- Inspection of main drainage ditches and outfalls. During pre-felling inspections the main drainage ditches will be identified. Ideally the pre-felling inspection will be carried out during rainfall;
- Following tree felling all main drains will be inspected to ensure that they are functioning;
- Extraction tracks within 10m of drains will be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground;
- Culverts on drains exiting the Site, if impeded by silt or debris, will be unblocked; and,
- All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.

Surface Water Quality Monitoring:

Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The ‘before’ sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The “during” sampling will be undertaken once a week or after rainfall events. The ‘after’ sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e. where an impact has been shown).

Details of the proposed surface water quality monitoring programme are outlined in Appendix 1 and the Construction Environment Management Plan (CEMP) Appendix 4.

Criteria for the selection of water sampling points include the following:

- Avoid man-made ditches and drains, or watercourses that do not have year round flows, i.e. avoid ephemeral ditches, drains or watercourses;
- Select sampling points upstream and downstream of the forestry activities;
- It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry;
- Downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and,
- The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed.

Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection..

6.2.1.1.3 Earthworks Resulting in Suspended Solids Entrainment in Surface Waters

Site construction phase activities including access road construction, turbine base/hardstanding construction, temporary construction compound, met mast construction, borrow pit opening, spoil management areas and River Restoration works will require varying degrees of earthworks resulting in excavation of soil and mineral subsoil where present. The main earthworks along the Grid Connection will be related to the underground cabling, substation and temporary construction compound, access road and end masts. Potential sources of sediment-laden water include:

- Drainage and seepage water resulting from excavations;
- Stockpiled excavated material providing a point source of exposed sediment; and,
- Erosion of sediment from emplaced site drainage channels.

These activities can result in the release of suspended solids to surface water and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. Potential effects on all watercourses downstream of the Site could be significant if not mitigated against.

Proposed Mitigation by Avoidance:

The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to main watercourses). All of the key infrastructure elements of the Proposed Project areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the horizontal directional drilling (HDD) underground cabling crossing at the existing watercourse crossing on the River Suir, a new watercourse crossing on the Eastwood River, HDD for an existing watercourse crossing on the Clonmore River within the Proposed Grid Connection underground cabling route and a new clearspan bridge watercourse crossing on the Strogue River within the Proposed Grid Connection underground cabling route. Additional control measures, which are outlined further on in this section, will be undertaken at these locations.

The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will:

- Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment;
- Avoid excavations within close proximity to surface watercourses;
- Avoid the entry of suspended sediment from earthworks into watercourses; and,
- Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.

Mitigation by Design:

- Source controls:
 - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems.
 - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas.
- In-Line controls:
 - Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps,

temporary sumps, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.

- Treatment systems:
 - Temporary sumps and ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems.

It should be noted for this Site that an extensive network of drains already exists, and these will be integrated and enhanced as required and used within the Proposed Project drainage system. The integration of the existing drainage network and the Proposed Project drainage system is relatively simple. The key elements being the upgrading and improvements to existing water treatment elements, such as in line controls and treatment systems, including silt traps, settlement ponds and buffered outfalls.

The main elements of interaction with existing drains will be as follows:

- Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the Proposed Project drainage into the existing site drainage network. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion;
- Silt traps will be placed in the existing drains upstream of any streams where construction works / tree felling is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area;
- Runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through settlement ponds and buffered outfalls onto vegetated surfaces;
- Buffered outfalls which will be numerous over the Site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the Site; and,
- Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity and silt control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters.

It should be noted that 10% (~930m) of the Proposed Project roads already exist (as farm tracks) and are proposed for upgrade. The upgrading of these roads, albeit presents a potential short-term potential non-significant effect on surface water quality during construction, will be a positive effect in the long-term with regard to improved drainage controls..

Pre-commencement Temporary Drainage Works

Prior to the commencement of Site infrastructure works the following key temporary drainage measures will be installed:

- All existing dry land drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps;
- Clean water interceptor drains will be installed upgradient of the works areas;
- Check dams/silt fence arrangements (silt traps) will be placed in all land drains that have surface water flows and also along existing farm track roadside drains; and,
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone.

These details are included in the drainage plans attached as Appendix 4-1a to the EIAR submitted alongside this report.

Silt Fences:

Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids such as those present in the subsoils/sandstone tills that overlie the Site. This will act to prevent entry to water courses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be placed within drains down-gradient of all construction areas inside the 50m buffer zones.

Silt Bags:

Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimat. Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimat will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.

Settlement Ponds:

The Proposed Project footprint has been divided into drainage catchments (based on topography, outfall locations, catchment size) and stormwater runoff rates based on the 50-year return period rainfall event were calculated for various catchment sizes as shown below.

POND SIZE W [M] x L [M] x D [M]			CATCHMENT SIZE (M ²)		
RETURN PERIOD	50 YRS	STORM DURATION	500	1000	2000
6HR RETENTION FOR COARSE SILT		6 HRS	2.8 x 9 x 1 M	4 x 13 x 1 M	5.7 x 18 x 1 M
11HR RETENTION FOR MEDIUM SILT		12 HRS	3.2 x 10 x 1 M	4.5 x 14 x 1 M	6.4 x 20 x 1 M
24HR RETENTION FOR FINE SILT		24 HRS	3.5 x 11 x 1 M	5 x 16 x 1 M	7 x 22 x 1 M

Level Spreaders and Vegetation Filters:

The purpose of level spreaders is to release treated drainage flow in a diffuse manner, and to prevent the concentration of flows at any one location thereby avoiding erosion. Level spreaders are not intended to be a primary treatment component for development surface water runoff. They are not stand alone but occur as part of a treatment train of systems that will reduce the velocity of runoff prior to be released at the level spreader. In the absence of levelspreaders, the potential for ground erosion is significantly greater than not using them.

Vegetation filters are essentially end-of-line polishing filters that are located at the end of the treatment train. In fact, vegetation filters are ultimately a positive consequence of not discharging directly into watercourses which is one of the mitigation components of the drainage philosophy. This makes use of the natural vegetation of the Site to provide a polishing filter for the wind farm drainage prior to reaching the downstream watercourses.

Again, vegetation filters are not intended to be a single or primary treatment component for treatment of works area runoff. They are not sand alone but are intended as part of a treatment train of water quality improvement/control systems (i.e. source controls→check dams→silt traps→settlement ponds→level spreaders →silt fences→vegetation filters).

Water Treatment Train:

A final line of defence will be provided by a water treatment train such as a “Siltbuster”. If the discharge water from construction areas fails to be of a high quality during regular inspections, then a filtration treatment system (such as a ‘Siltbuster’ or similar equivalent treatment train (sequence of water treatment processes) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply for all of the construction phase.

Pre-emptive Site Drainage Management

The works programme for the entire construction stage of the development will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of soil/subsoil or vegetation stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

The following forecasting systems are available and will be used on a daily basis at the Site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.

Works will be suspended if forecasting suggests either of the following is likely to occur:

- >10 mm/hr (i.e. high intensity local rainfall events);
- >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
- >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures will be completed:

- All active excavations will be secured and sealed off;
- Temporary or emergency drainage will be installed to prevent back-up of surface runoff; and,

- No works will be completed during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.

Management of Runoff from Spoil Storage Areas

It is proposed that excavated soil/subsoil (spoil) will be used to reinstate the proposed borrow pit and any excess spoil will be placed in dedicated spoil management areas. The borrow pit and spoil management areas are located outside the 50m stream buffer zone (refer to Figure 9-10 of Appendix 2).

Proposed surface water quality protection measures regarding the spoil storage areas are as follows:

- During the initial emplacement of spoil at the storage area, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the enclosure.
- Drainage from the storage areas will be directed to settlement ponds as required or will overflow through controlled overflow pipes.
- Discharge from the storage areas will be intermittent and will depend on preceding rainfall amounts.
- Once the storage areas have been seeded and vegetation is established the risk to downstream surface water is significantly reduced.

Therefore, at each stage of the spoil storage area development the above mitigation measures will be deployed to ensure protection of downstream water quality.

The spoil management area settlement ponds have been designed to allow a 24hr retention time as per EPA guidance (2006) which is highest level of protection recommended by the EPA with regard to retention time.

Timing of Site Construction Works:

Construction of the site drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.

Monitoring:

An inspection and maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Inspections will also be undertaken after tree felling.

Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. Checks will be carried out on a daily basis.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for each primary watercourse, and specifically following heavy rainfall events (as per the CEMP included in Appendix 4).

Allowance for Climate Change

Climate Change rainfall projections are typically for a mid-century (2050) timeline. The projected effects of climate change on rainfall are therefore modelled towards the end of the life cycle of the Proposed Project, as the turbines have a life span of 30- 35 years. It is likely that the long-term effects of climate

change on rainfall patterns will not be observed during the lifetime of the Proposed Project. As outlined in the above sections settlement ponds have been designed for a 1 in 10 year return flow. This approach is conservative given that the Proposed Project will likely be built over a much shorter period (18-24 months), and therefore this in-built redundancy in the drainage design more than accounts for any potential short term climate change rainfall effects.

However, the settlement ponds are designed for 1 in 10 years flows with built in redundancy (+20%) to account for climate change effects on rainfall.

6.2.1.1.4 **Potential Impacts on Groundwater Levels during Excavation Works**

Potential dewatering of the borrow pit (as required) and other deep excavations (i.e. turbine bases) have the potential to impact on local groundwater levels and flows. However, due to the Proposed Project design measures outlined below no significant effects are likely.

No groundwater level impacts are predicted from the construction of the Proposed Grid Connection infrastructure due to the shallow nature of the excavations (i.e. 0 ~-1.3m).

Impact Assessment/Mitigation Measures:

The deepest excavation works will be centred around the turbine foundations and borrow pit.

During the early design phase, site investigations and groundwater level monitoring were carried out at the area of the proposed borrow pit to establish the depth of unsaturated bedrock that could be extracted above the underlying groundwater table.

The proposed final extraction depth/floor level at the proposed borrow pit is 112.5m OD. Groundwater level monitoring shows that the groundwater level at the proposed borrow pit is generally below 112.5m OD. There were brief spikes in water levels above 112.5m OD due to very heavy rainfall events that were experienced during October/November 2023. The maximum recorded groundwater level was 112.61m OD which is approximately 0.10m above the proposed borrow pit floor level. In the rare event of the base of the borrow pit being flooded to a level of 112.61m OD during its operation, there will be no requirement to pump water (i.e. dewater) due to the shallow depth of water which will only be there temporarily.

In addition, the edge of the borrow pit (i.e. existing greenfield ground level) will be at a minimum 0.7m above the base of the borrow, therefore there will be no potential for water to escape from the borrow pit and flow onto adjacent ground.

Therefore, the proposed borrow pit will have no potential to affect local groundwater levels as no groundwater dewatering will be required. Refer to Figure 9-6 in Appendix 2 for groundwater level monitoring at the proposed borrow pit.

Trial pitting and boreholes were carried out at the proposed turbines locations to determine ground conditions for design purposes.

During the trial pitting, relatively shallow bedrock was proven at proposed turbine locations T4 (2.3m), T5 (1.4m), T6 (1.1m) and T7 (1.8m). The subsoils encountered at these locations was unsaturated with very minor seepages recorded.

Follow up investigation drilling (constructed as monitoring wells) was carried out by Peterson Drilling Services Ltd on 10th & 11th July 2023. Boreholes (3 no. in total) were drilled at the proposed borrow pit (BH01), turbine location T2 (BH02) and turbine location T8 (BH03). The drilling was carried out to investigate the full geological profile (overburden and bedrock) at the Site and in particular to determine the full depth of the alluvial deposits.

Results:

Borehole ID	Total Depth (mbgl)	Summary of Geology
BH1 (Borrow Pit)	15	0 – 0.4: Firm brown TOPSOIL 0.4 -1.0: Weak highly weathered grey LIMESTONE 1.0 – 5.0: Very strong light grey LIMESTONE rare fractures 5.0 – 15.0: Medium strong to Strong grey LIMESTONE with frequent clay filled fractures
BH2 (Turbine T2)	24.5	0 – 0.3: Firm brown silty TOPSOIL 0.3 -0.7: Firm brown silty gravelly CLAY [BOULDER CLAY] 0.7 – 1.5: Soft dark brown PEAT 1.5 – 5.3: Loose grey gravelly SAND 5.3 – 8.8: Firm grey very sandy gravelly CLAY 8.8 -24.5: Strong dark grey LIMESTONE rare fractures
BH3 (Turbine T8)	12	0 – 0.3: Firm brown silty TOPSOIL 0.3 - 4.8: Soft to firm grey sandy silty CLAY becoming gravelly 4.8 – 12.0: Medium strong to Strong dark grey LIMESTONE occasional fractures

Mitigation by Best Practice Guidelines

Environmental management guidelines from the EPA quarry 2006 guidance document – “*Environmental Management in the Extractive Industry*” in relation to groundwater issues at the borrow pit will be implemented during the construction phase.

6.2.1.1.5 Excavation Pumping/Drainage and Potential Impacts on Surface Water Quality

Some minor shallow groundwater/surface water seepages will likely occur during the excavations and this will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the Site and therefore pollution issues arising from such sources will not occur.

Proposed Mitigation Measures:

Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;

- The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters;
- The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit or silt bag;
- The borrow pit settlement ponds have been designed to allow a 24hr retention time as per EPA guidance (2006) which is highest level of protection recommended by the EPA with regard to retention time;
- There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur;
- Daily monitoring of excavations by the Environmental Clerk of Works will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken; and,
- A mobile ‘Siltbuster’ or similar equivalent specialist treatment system will be available on-site for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.

6.2.1.1.6 **Potential Release of Hydrocarbons during Construction**

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Proposed Mitigation Measures:

Mitigation measures proposed to avoid release of hydrocarbons at the Site are as follows:

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser will be parked on a level area on-site when not in use. All refuelling will be carried out outside designated watercourse buffer zones. Only designated trained and competent operatives will be authorised to refuel plant on-site. Mobile measures such as drip trays and fuel absorbent mats will be used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage
- Onsite refuelling will be carried out by trained personnel only;
- A permit to fuel system will be put in place;
- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- The electrical control building (at the substation) will be bunded appropriately to 110% of the volume of oils that will be stored, and to prevent leakage of any associated oils to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;

- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages is included within the Construction and Environmental Management Plan (Appendix 4-3). Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area.

6.2.1.1.7 **Groundwater and Surface Water Contamination from Wastewater Disposal**

Release of effluent from on-site wastewater treatment systems could have the potential to impact on groundwater and surface water quality. Impacts on surface water quality could affect fish stocks and aquatic habitats.

Proposed Mitigation Measures:

- During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds, maintained by the providing contractor, and removed from site on completion of the construction works;
- Water supply for the site office and other sanitation will be brought to site and removed after use from the Site to be discharged at a suitable off-site treatment location; and,
- No water or wastewater for sanitation purposes will be sourced on the Site, nor discharged to the Site.

6.2.1.1.8 **Release of Cement-Based Products**

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. A pH range of $6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Batching of wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

Proposed Mitigation Measures:

- No batching of wet-concrete products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where possible pre-cast elements for culverts and concrete works will be used;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined concrete washout ponds;
- Weather forecasting will be used to plan dry days for pouring concrete; and
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

6.2.1.1.9 Morphological Changes to Surface Water Courses & Drainage Patterns at the Site

Diversion, horizontal directional drilling culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase.

It is proposed that only 1 no. new stream crossing on the Eastwood River will be required to facilitate the Proposed Wind Farm infrastructure and 1 no. new stream on the Strogue Stream to facilitate the Grid Connection underground cabling route.

There is a total of 16 no. proposed drain crossings within the Site.

In addition, access roads constructed in flood zones can result in alteration of drainage patterns.

Proposed Mitigation Measures

- All proposed new watercourse crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing location;
- All proposed drain crossing culverts will be minimum 900mm in diameter;
- New access roads in mapped flood zones will be placed close to ground level to maintain the hydrology of the Site. Culverts will be placed along access roads accordingly (i.e. low points and depressions) to facilitate drainage of flood waters;
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland¹⁰ is incorporated into the design of the proposed crossings;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document “Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites”, i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- Where works are necessary inside the 50m buffer double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. and,
- All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

6.2.1.1.10 Site Entrance and Turbine Delivery Works

Minor temporary accommodating works are required for turbine delivery works at junction 22 of the M7. A temporary entrance will be constructed off the L-3248, adjacent to the N62 in the northwest of the Site. A second construction entrance will be constructed off the L-3248, approximately 70m northeast of the N62. This entrance will be used as the main entrance for construction traffic and staff vehicles, and will

¹⁰ Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*

form the main operational phase Site access. Secondary access will be via the L-70391 located to the southeast of the Site.

These Site Entrances and minor temporary accommodating works at junction 22 are described in Appendix 1.

‘Pre-commencement Temporary Drainage Works’ as described above within ‘*Earthworks Resulting in Suspended Solids Entrainment in Surface Waters*’ will be employed at all the Site Entrances.

6.2.1.1.11 Use of Siltbuster and Impacts on Downstream Surface Water Quality

Siltbusters (or similar equipment) are regularly used to remove suspended sediments on construction sites by means of chemical dosing and sedimentation (i.e. use of coagulants and flocculants to accelerate the settlement process). The benefits of using enhanced settlement systems on downstream surface water quality are widely known and are a positive effect. However, potential overdosing with chemical agents means there is a perceived risk of chemical carryover in post treatment water which could result in negative effects on downstream water quality.

Wind farm and Grid Connection construction water (i.e. surface water runoff or pumped groundwater) has sometimes very fine particles, particularly clays and peat, with slow settling velocities which do not settle out efficiently, even in a lamella clarifier at normal flow rates. In these cases, chemical dosing can be used to aggregate the particles (i.e. force them to combine and become heavier), increasing the particle settling rate and cleaning the water via gravity separation techniques. Agents commonly used include poly aluminium chloride (PAC), aluminium sulphate, ferric iron and ferrous iron. These agents are commonly used in drinking water treatment plants. So their use is widespread, and there is significant scientific knowledge around their use and control.

Mitigation Measures:

Measures employed to prevent overdosing and potential chemical carryover:

- The siltbuster system comprises an electronic in-line dosing system which provides an accurate means of adding reagents, so overdosing cannot occur;
- Continued monitoring and water analysis of pre and post treated water by means of an inhouse lab and dedicated staff, means the correct amount of chemical is added by the dosing system;
- Dosing rates of chemical to initiate settlement is small, being in the order of 2-10 mg/L and the vast majority of the chemical is removed in the deposited sediment;
- Final effluent not meeting the discharge criteria is recycled and retreated, which has a secondary positive effect of reducing carryover; and,
- Use of biodegradable chemical agents can be used at very sensitive sites (i.e. upstream of SACs).

6.2.1.1.12 Potential Effects of the Proposed Grid Connection Earthworks Works at Watercourse Crossings

The Proposed Wind Farm requires crossing the Eastwood River east of T6 via a new clear span crossing and directional drilling under a bridge crossing on the River Suir to facilitate IPP cabling connection to the proposed 110kV substation. In addition to this several field drains will require culverting.

The Proposed Grid Connection includes an approx. 2km underground grid connection cabling route which requires crossing the Clonmore Stream via directional drilling and the Strogue Stream via a new clearspan crossing. In addition to this, 3 field drains will require culverting.

Proposed Mitigation Measures:

Pre-commencement Temporary Drainage Works:

Prior to the commencement of cable trenching or crossing works the following key temporary drainage measures will be installed:

- All existing roadside drains (where present) that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps;
- Culverts, manholes and other drainage inlets (where present) will also be temporarily blocked;
- A double silt fence perimeter will 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 will take place along the grid route;
- No refuelling of machinery or overnight parking of machinery is permitted in this area;
- No concrete truck chute cleaning is permitted in this area;
- Works will not take place at periods of high rainfall, and will be scaled back or suspended if heavy rain is forecast;
- All machinery operations will take place away from the stream and ditch banks, apart from where crossings occur. Although no instream works are proposed or will occur;
- Any excess construction material will be immediately removed from the area and sent to a licenced waste facility;
- No stockpiling of materials will be permitted in the constraint zones;
- Spill kits will be available in each item of plant required to complete the stream crossing; and,
- The area around the Clear Bore™ (or similar alternative) batching, pumping and recycling plants will be bunded using terram and sandbags in order to contain any spillages;
- Accidental spillage of fluids will be cleaned up immediately and transported off site for disposal at a licensed facility; and,
- Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush.

6.2.1.1.13 Potential hydrogeological Effects Associated with Piled Foundations

Due to the presence of deep, saturated fluvial deposits at proposed turbine's locations T1, T2, T3 and T8 (and possibly T9), piled foundation are being assessed as a possible solution.

- Piled foundation with a configuration of up to 20 no. 900 mm cylindrical bored piles. These piles could extend to a depth of between 5 to ~18 metres below ground level.

The following potential scenarios arise in respect of proposed piling works:

- Creation of preferential pathways, through lower permeability subsurface layers (silts and clays), to allow downward flow into the underlying bedrock aquifer; and,
- Creation of a blockage to local or regional groundwater flow within the underlying aquifer due to placement of pile clusters.

These pathways are analogous to pathways described for piling works associated with contaminated land sites, as detailed in Environment Agency (2001).

Effects Assessment

For bored piles, as the temporary steel casing is removed, a steel reinforcement cage is added to the pile column and then concrete is added to the toe of the pile using a tremie pipe. Vermiculite is used to create a plug between the concrete and the displaced water, therefore the concrete seals the entire pile column and pushes the vermiculite plug to the surface as concrete is added. The temporary steel casing is removed carefully as the concreting works are being completed. This concreting process is similar to that used when grouting a water supply production well (IGI (2007), and EPA (2013)). This means that a long-term pathway between the upper alluvial deposits and the lower bedrock aquifer will not be sustained.

Scenario 1: Creating a Pathway for Downward Flow

To ensure downward flow of potential pollutants from the piling works does not occur, a bentonite seal will be used in a starter pit for each bored pile, and the mitigation measures outlined above will be implemented. The concrete added to the bored pile will seal the pile annulus. As a result, the potential for either piling work option to create pathways for downward flow of water or pollutants that could affect groundwater quality in the underlying aquifer is imperceptible.

Scenario 2: Blocking Local or Regional Groundwater Flow

For example, if a piling array of 20 no. 900mm piles is applied at each turbine base (T1, T2, T3, T8 and T9), this combined area of piling footprint amounts to ~63.5m², or 12.7m² per turbine base. Each turbine base is 500m – 800m apart. The area of the piles bored into the ground is distributed over a very large area, and that area only amounts to 0.75% of the development footprint, or <0.001% of the Site area. Also, none of the proposed piles would penetrate any great distance into the underlying bedrock aquifer, as they will likely find sufficient resistance upon reaching the top of bedrock. At such wide separation distance, the ability of clusters of piles, with a plan area of ~12.7m² per turbine, to alter or affect local or regional groundwater flow is imperceptible.

Proposed Mitigation Measures:

The proposed mitigation measures designed for the protection of downstream surface water quality and groundwater quality will be implemented at all construction work areas.

- Mitigation measures for sediment control are detailed above in '*Earthworks Resulting in Suspended Solids Entrainment in Surface Waters*'.
- Mitigation measures for the control of hydrocarbons during construction works are detailed above in '*Potential Release of Hydrocarbons during Construction*'.
- Mitigation measures for the control of cement-based products during construction works are detailed above in '*Release of Cement-Based Products*'.

Proposed mitigation measures relative to piling works will comprise:

- Strict QA/QC procedures for piling works will be followed;
- Piles will be kept vertical during piling works;
- Good workmanship will be employed during all piling works; and,
- Where required use bentonite seal to prevent upward/downward movement of surface water/groundwater.

6.2.1.1.14 Potential Water Quality and Morphological/Hydrological Effects Associated with River Channel Restoration

The enhancement of a portion of the Eastwood River within the Site will involve the restoration of a previously deepened and straightened channel to appropriate dimensions, pattern and profile and the establishment of a native woodlands buffer. Therefore, with regard watercourse morphology and hydrology, the effects will be positive. The proposed works are described in Appendix 1.

The primary potential negative effects will be water quality (suspended solids) during the construction phase and this relates to the proposed excavation works required for the channel realignment.

Proposed Mitigation:

The following measures will be employed to reduce release of sediment to downstream waters:

- All stream work to be performed "in the dry" either by pump-around or stream diversion with silt curtain;
- Impervious dikes or sand bags are to be used to isolate work from stream flow;
- The contractor shall not disturb more area than can be stabilised the same working day;
- Maintenance of stream flow operation shall be incidental to the work. This includes pumps and hoses;
- Pumps and hoses shall be of sufficient size to dewater the work area;
- Graded stream banks shall be stabilised, with matting, prior to predicted rain fall events;
- Silt bags and stilling basins shall be used to collect silt and sediment from work area dewatering;
- coir fibre matting shall be installed on the outside of all meander bends where shear stress is likely to be highest, and in other locations where erosion control may be necessary
- Live willow cuttings (live stakes) shall be installed along both sides of the stream channel following the installation of coir fibre matting (where necessary) to provide bank stability through the establishment of fast-growing native willows; and,
- Installation of cross vanes to prevent erosion of the river banks.

6.2.1.2 Operational Phase

The increase in the amount of hard standing associated with the proposed infrastructure has the potential to result in faster water runoff from the Site to the surrounding watercourses. This may have the indirect effect of causing erosion, which could lead to deterioration of surface water and supporting habitat quality. Additionally, there is the potential for the faster run off of any pollutants that may be associated with vehicular usage on the Site.

6.2.1.2.1 Water Quality Deterioration

6.2.1.2.2 Progressive Replacement of Natural Surface with lower Permeability Surfaces

Progressive replacement of vegetated surface with impermeable surfaces could potentially result in an increase in the proportion of surface water runoff reaching the watercourses. This could potentially increase runoff from the Site and increase flood risk downstream of the Proposed Project.

However, it is conservatively assumed in this assessment that the proposed access roads and hardstands are impermeable. The assessed footprint comprises turbine and met mast bases and hardstandings, access roads, site entrance, 110kV substation and end masts. During storm rainfall events, additional runoff coupled with increased velocity of flow could increase hydraulic loading, resulting in erosion of watercourses and impact on aquatic ecosystems.

Effects Assessment:

The emplacement of the proposed permanent development footprint, as described in Appendix 1, (assuming emplacement of impermeable materials as a worst-case scenario) could result in an average total site increase in surface water runoff of approximately 2,808 m³/month (Table 6-2). This represents a

potential increase of approximately 0.7% in the average daily/monthly volume of runoff from the Site area in comparison to the baseline pre-development site runoff conditions. This is a very small increase in average runoff and results from the naturally high surface water runoff rates and the relatively small area of the Site being developed, the proposed total permanent development footprint being approximately 8.47ha, representing 1.3% of the Site (650ha).

Table 6-2: Baseline Site Runoff V Development Runoff

Site Baseline Runoff/month (m ³)	Baseline Runoff/day (m ³)	Permanent Hardstanding Area (m ²)	Hardstanding Area 100% Runoff (m ³)	Hardstanding Area 65% Runoff (m ³)	Net Increase/month (m ³)	Net Increase/day (m ³)	% Increase from Baseline Conditions (m ³)
400,192	12,909	84,700	8,023	5,215	2,808	90.6	0.7

The additional volume is low due to the fact that the runoff potential from the Site is relatively high (65%). Also, the calculation assumes that all hardstanding areas will be impermeable which will not be the case as access tracks will be constructed of permeable stone aggregate. The increase in runoff from the Proposed Project will, therefore, be imperceptible This is even before mitigation measures will be put in place.

Proposed Mitigation by Design:

The operational phase drainage system of the Proposed Project will be installed and constructed in conjunction with the road and hardstanding construction work as described below and as shown on the Drainage drawings submitted with this planning application (Appendix 4-1a of the EIAR submitted alongside this report):

- Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader;
- Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the Site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling;
- On steep sections of access road transverse drains (“grips”) will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains;
- Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock;
- Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses;
- Regular culverts will be placed along access roads in areas prone to flooding; and,
- Settlement ponds have been designed in consideration of the greenfield runoff rate.

As described above the proposed integration of the Proposed Project drainage with the existing drainage is a key component of the proposed drainage management within the development. By integration we

mean maintaining surface water flowpaths where they already exist, avoid creation of new or altered surface water flowpaths, and maintaining the drainage regime (i.e. normal flow). Critically, there will be no alteration of the catchment size contributing to each of the main downstream watercourses. All drainage water captured within individual site sub-catchments will be attenuated and released within the same sub-catchments that it was captured. The natural revegetation over time will eventually overtake the installed drainage.

6.2.1.2.3 **Runoff Resulting in Suspended Solids Entrainment in Surface Waters**

During the operational phase, the potential for silt-laden runoff is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete. Some minor maintenance works may be completed, such as maintenance of site entrances, internal roads and hardstand areas. These works will be of a very minor scale and will be very infrequent. Potential sources of sediment laden water will only arise from surface water runoff from small areas where new material is added during maintenance works.

These minor activities could, however, result in the release of suspended solids to surface water and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. Potential effects could be significant if not mitigated against.

During such maintenance works there is a low risk associated with release of hydrocarbons from site vehicles, although it is not envisaged that any significant refuelling works will be undertaken on site during the operational phase.

Proposed Mitigation Measures:

The mitigation measures outlined above within '*Earthworks Resulting in Suspended Solids Entrainment in Surface Waters*' and '*Progressive Replacement of natural Surfaces with Lower Permeability Surfaces*' will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand and turbine base areas) will be captured and treated prior to discharge/release. Settlement ponds, checks dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment.

It is proposed that clean high-grade stone material will be sourced from local quarries for the maintenance of Site roads.

Mitigation measures for control of hydrocarbons during maintenance works as described above within Section 6.2.1.1.6 '*Potential Release of Hydrocarbons during Construction*'.

6.2.1.3 **Decommissioning Phase**

The accompanying planning application seeks a ten-year planning permission and 30-year operational life from the date of commissioning of the Proposed Wind Farm. Decommissioning of the Proposed Wind Farm is described within the Decommissioning Plan (Appendix 4-4 of the EIAR submitted alongside this report). The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time.

There will be no additional habitat loss associated with the decommissioning of the Proposed Project and therefore there will be no significant effects in this regard.

The proposed wind turbines are expected to have a lifespan of approximately 30-35 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 Wind Farm will be decommissioned fully.

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

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

The Grid Connection infrastructure will remain in place as it will be part of the Electricity Grid under the ownership and control of the ESBN/ EirGrid.

The potential for effects during the decommissioning phase of the Proposed Wind Farm has been fully assessed in the EIAR.

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

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

The impacts on European Sites will be similar in nature to those experienced during construction but on a far lesser scale and magnitude. There will be no additional or ancillary impacts associated with the decommissioning phase.

The same mitigation to prevent significant impacts on water quality and associated aquatic fauna during construction will be applicable to the decommissioning phase. The Decommissioning Plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works. The CEMP (Appendix 4) for the Proposed Project also provides details of the mitigation and best practice that will be employed to avoid any potential for significant residual effects on biodiversity during decommissioning of the Proposed Project. In addition, the measures incorporated into the construction phase, in Section 6.2.1 of this NIS, including specific mitigation provided in relation to water quality will be implemented during decommissioning.

6.2.2 Disturbance to Otter (*Lutra lutra*)

The Proposed Project has been deliberately designed so that all major infrastructure, i.e., turbine bases and hardstands, avoid significant watercourses.

No otter holts were found within the Site.

No instream works are required for any of the water crossing works required for the Proposed Wind Farm or along the Proposed Grid Connection.

For the Proposed Wind Farm, one new watercourse crossing is required along the internal wind farm access road using a clear span bridge design. A clear span bridge design was chosen to avoid impact on the stream and to ensure no fragmentation of otter habitat. In addition to this, Horizontal Directional Drilling (HDD) will be used at an existing watercourse crossing on the Suir River to facilitate IPP cabling connection to the Proposed Substation.

Two water crossings have been proposed for the Proposed Grid Connection in the form of HDD under an existing culvert across the Clonmore Stream and a new clear span culvert of the Strogue Stream.

The locations of these all above detailed crossings are shown on the layout drawings included in Figure 2-2 and Appendix 4-1 of the EIAR submitted alongside this report. The construction of new watercourse crossings and carrying out of HDD for the Proposed Wind Farm and Proposed Grid Connection has the potential for indirect adverse effects in the form of disturbance to otter.

Potential for adverse effects on Otter has been considered regarding NPWS Threat Response Plan (TRP) which identifies four significant threats facing Otter in an Irish context: Habitat destruction, Water pollution, Disturbance (Recreational sources) and Accidental death/persecution.

The construction of the Eastwood River Restoration Proposal for will involve works interacting with a segment of the Eastwood River. No holts were identified within the section of the Eastwood River to be upgraded or in the vicinity of this section of the river.

6.2.2.1 Construction Phase

6.2.2.1.1 Disturbance and Displacement

The Proposed Project site is located hydrologically upstream of the Lower River Suir SAC and as such there is a potential for adverse effect to the QI species Otter (*Lutra lutra*) via ex-situ disturbance and displacement. Potential adverse effects via surface water deterioration have been considered in Section 6.2.1.

Proposed Mitigation Measures

Prior to the commencement of construction works associated with the installation of watercourse crossings, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2007):

- From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that current activity levels are confirmed prior to commencement of works. In the unlikely event that an otter holt is identified within or immediately adjacent to the Proposed Project footprint,

consultation will be undertaken with the National Parks and Wildlife Service and a derogation licence applied for.

- No works will be undertaken within 150m of any holts at which breeding females or cubs are present.
- No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under licence (TII, 2006¹¹).
- All of the above works will be undertaken or supervised by an appropriately qualified ecologist.

6.2.2.2 Operational Phase

The operation of the Proposed Project will not result in any additional habitat loss or deterioration for Otter, nor will it result in a significant increase in anthropogenic activity due to its location and scale. As such there is no anticipated adverse effect to the QI species Otter during the Operational stage of the Proposed Project.

6.2.2.3 Decommissioning Phase

The potential effects on European Sites will be similar in nature to those experienced during construction but on a far lesser scale and magnitude. There will be no additional or ancillary effects associated with the decommissioning phase. The same mitigation to prevent significant effects in relation to disturbance to Otter during construction will be applicable to the decommissioning phase. The Decommissioning Plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works. The CEMP (Appendix 4) for the Proposed Project also provides details of the mitigation and best practice that will be employed to avoid any potential for significant residual effects on biodiversity during decommissioning of the Proposed Project. In addition, the measures incorporated into the construction phase, in Section 6.2.2.1 of this NIS, including specific mitigation provided in relation to disturbance and displacement of Otter will be implemented during decommissioning.

¹¹ NRA, 2006. *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes*. Dublin: Transport Infrastructure Ireland. Available at: www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf

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 Site following the implementation of mitigation, is assessed in this section of the report.

Based on the above information in the preceding section, in view of best scientific knowledge, on the basis of objective information, there is no potential for adverse effect on the identified QIs 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 is provided below:

‘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 associated with the screened in European Site as follows:

- Lower River Suir SAC [002137]

8. ASSESSMENT OF CUMULATIVE EFFECTS

A search and review in relation to other projects and/or plans 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 in Section 4 of this report. This included a review of online Planning Registers, development plans and other available information and served to identify past and future projects and/or plans, their activities and their predicted environmental effects. A list of the projects and/or plans considered is provided in Appendix 5.

Assessment material for this in-combination impact assessment was compiled on the relevant developments within the vicinity of the Proposed Project and was verified in November 2023. 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 and/or plans, their activities and their environmental impacts. All relevant projects and/or plans were considered in relation to the potential for in-combination effects. Relevant data was reviewed (e.g. individual EISs/EIARs, NISs, layouts, drawings etc.) for all relevant projects and/or plans where available. The projects and/or plans considered include those listed in Appendix 5. Non-renewable energy projects and/or plans consisted mainly of small scale domestic and agricultural developments.

For the purposes of this cumulative assessment wind farms within the same hydrological sub-catchment as the Proposed Project (Suir Sub-catchment) have been considered in further detail below.

There are 7 no. wind farm developments operational, consented or proposed, that have been identified due to either an application, a request for pre-application consultation having been lodged or permitted, or proposed wind farm projects identified in the Public Domain within the cumulative study area:

1. *PI ref: 10145, 10129, 10510118 Bruckana (operational)*
2. *PI ref: 09801 Gurteen Lower (operational)*
3. *PI ref: 06510773 (ABP 222142) Lisheen I (operational)*
4. *PI ref: 09510100 Lisheen II (operational)*
5. *PI ref: 20459, 19597 Lisheen III (operational)*
6. *PI ref: (VC92.315655) Brittas (proposed)*
7. *PI ref: 12510385 Cappawhite B (operational)*

No potential additive impacts have been identified which would result in the potential for significant cumulative effects with the Proposed Project. Taking into consideration also the fact that no significant residual effects on European Sites have been identified for the Proposed Project (post mitigation) adverse cumulative effects on key ecological receptors are not anticipated.

The dominant land uses in the area were also considered in the assessment, these included forestry and pastoral agriculture.

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

- > Tipperary County Development Plan 2022 – 2028
- > National Biodiversity Action Plan 2017-2021
- > Draft 4th National Biodiversity Action Plan 2023-2027
- > Eastern and Midlands Regional Assembly: Regional Spatial & Economic Strategy 2019-2031 (RSES)

The review focused on policies and objectives that relate to European Designated Sites. Policies and objectives relating to the conservation of peatlands and sustainable land use were also reviewed, particularly where the policies relate to the preservation of surface water quality. An overview of the search results with regard to projects and/or plans is provided in Appendix 5.

Following the detailed assessment provided in the preceding sections, it is concluded that, the Proposed Project 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. There is therefore no potential for the Proposed Project to contribute to any cumulative adverse effects on any European Site when considered in combination with other projects and/or plans.

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

Taking into consideration the reported residual impacts from other projects and/or plans 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.

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 projects and/or plans, will not adversely affect the integrity of any European Site.

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