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Appropriate Assessment Screening Report and Natura Impact Statement

Briskalagh Renewable
Energy Development, Co.
Kilkenny



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1. INTRODUCTION

1.1 Background

MKO has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Appropriate Assessment of a renewable energy development comprising 7 no. wind turbines, and associated infrastructure at Briskalagh and adjacent townlands, near Kilmanagh in Co. Kilkenny, including an on-site 38kV substation and c.23km underground cabling route connecting to the national grid at Ballyragget 110kV substation, in the townland of Moatpark, Co. Kilkenny.

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

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

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

1.1.1 Appropriate Assessment Process

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

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

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

(i) identify, in the light of the best scientific knowledge in the field, all aspects of the proposed project which may, by itself or in-combination with other plans or projects, affect the conservation objectives of the European site;

(ii) contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps; and

(iii) may only include a determination that the proposed project will not adversely affect the integrity of any relevant European site where the competent authority decides (on the basis of complete, precise and definitive findings and conclusions) that no reasonable scientific doubt remains as to the absence of potential adverse effects. If adverse impacts can be satisfactorily avoided or successfully mitigated at this stage, so that no reasonable doubt remains as to the absence of the identified potential effects, then the process is complete. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to stage three (assessment of alternative) and, if necessary, stage four (IROPI).

1.2

References to Proposed Project

The Proposed Project, which will be known as the 'Briskalagh Renewable Energy Development', is referenced within this NIS as follows:

- Where the 'Proposed Project' is referred to this encompasses the entirety of the project for the purposes of this EIA in accordance with the EIA Directive. The Proposed Project is described in detail in Chapter 4 of the EIAR, available in appendix 1.
- Where the 'Proposed Wind Farm' is referred to, this refers to turbines and associated foundations and hard-standing areas, meteorological mast, access roads, temporary construction compounds, underground cabling, borrow pit, spoil management, site drainage, biodiversity enhancement and all ancillary works and apparatus. The Proposed Wind Farm is described in detail in Chapter 4 of the EIAR, available in appendix 1.
- Where the 'Proposed Grid Connection' is referred to, this refers to the 38kV onsite substation, associated temporary construction compound and 38kV underground cabling connecting to the existing Ballyragget 110kV substation, and all ancillary works and apparatus. The Proposed Grid Connection is described in detail in Chapter 4 of the EIAR, available in appendix 1.
- Where the 'Site' is referred to, this relates to the primary study area for the NIS as delineated by the NIS Site Boundary in green as shown on Figure 2-1 and encompasses an area of approximately 1,000 hectares.
- Where the 'Proposed Wind Farm site' is referred to, this refers to the portion of the Site surrounding the Proposed wind farm but excluding the portion of the Site surrounding the Proposed Grid Connection underground cabling route.

1.3

Statement of Authority

This report has been prepared by Colin Murphy (B.Sc., (Ecology), M.Sc.) and Fiona Killeen (B.Sc., (Env)), reviewed by Corey Cannon (B.Sc, M.Sc CEcol MCIEEM) and approved by John Hynes (B.Sc. Env., M.Sc., MCIEEM). Corey is a Project Director (Ecology) at MKO, she is also a Chartered Ecologist and Full Member of CIEEM. Corey has over ten years' consultancy experience. John is Ecology Director at MKO with over 12 years professional consultancy experience. Colin is a Project Ecologist at MKO and has over 4 years' professional consultancy experience. Fiona is an experienced Practitioner Ecologist with over 1.5 years' professional consultancy experience. The baseline ecological surveys were undertaken in across multiple dates in 2023 and 2024 by Fiona Killeen, Tom Peters (B.Sc., M.Sc.), Rachel Minogue (B.Sc., (Env)). Rachel and Tom are Ecologists with MKO. Bat ecologists Ryan

Connors (B.Sc., M.Sc.), Laura Gránicz (BSc., MSc.), Nora Szijarto (B.Sc., M.Sc.) and David Culleton (BSc., MSc.) conducted specific bat surveys within the site between 2023 and 2024. All surveyors have relevant academic qualifications and are competent in undertaking habitat and ecological assessments.

1.4

Structure of Report

- Section One provides an introduction to the Proposed Project.
- Section Two provides a full description of all elements of the Proposed Project. .
- In Section Three, 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 Proposed Project. .
- Section 5, the Natura Impact Statement 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 are assessed.
- A concluding statement is provided in Section 9.

2.

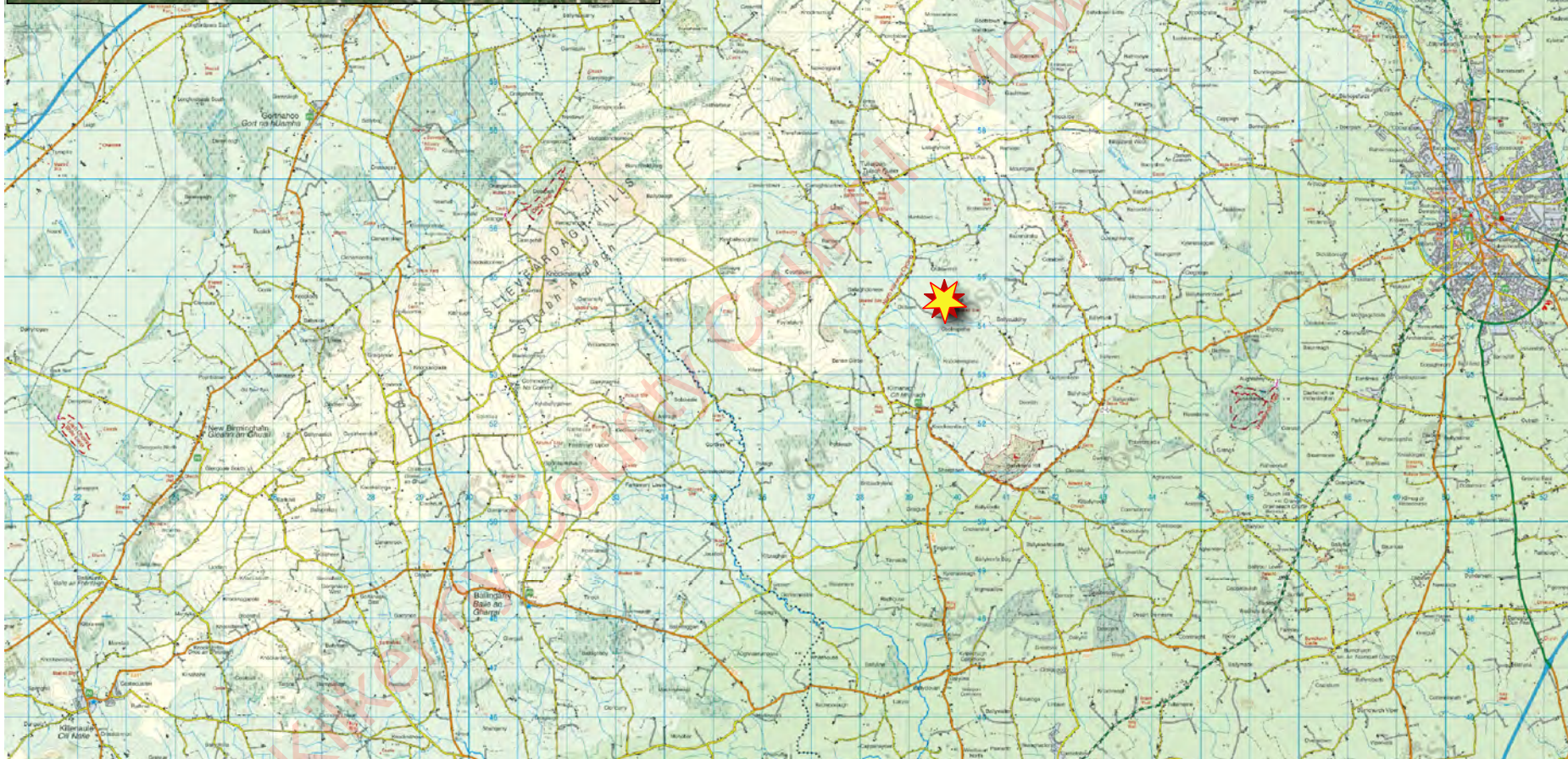
DESCRIPTION OF PROPOSED PROJECT

2.1

Site Location

The Proposed Wind Farm site is located within a rural, agricultural setting in northwest Kilkenny, approximately 8.5km west of Kilkenny City. The settlement of Kilmanagh is located approximately 1.2km south of the nearest proposed turbine, and the settlement of Tullaroan is located approximately 2.7km north of the nearest proposed turbine. The R695 regional road runs immediately south of the Site in an east-west orientation entering the settlement of Kilmanagh and then heading south from Kilmanagh towards Callan, passing within 1.3km of the nearest proposed turbine. Existing access is via farm entrances off the L5023 local road to the northwest, L5024 to the north, and L1009 to the south. The Site is traversed by a number of existing agricultural roads and tracks. The Site measures approximately 1,000 hectares.

The location of the Proposed Project is shown in Figure 2-1 below.



Map Legend

-  EIAR Site Boundary
-  Site Location Point



Drawing Title
Site Location

Project Title
Enerco Brisklagh Wind Farm

Drawn By FK	Checked By CM
Project No. 230502	Drawing No. Figure 2-1
Scale 1:131,197.739	Date 13.09.2024



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2.2

Characteristics of the Proposed Project

A full description of the Proposed Project is provided in Chapter 4 of the EIAR, which is included as appendix 1 of this NIS.

The Proposed Project will comprise the construction of 7 no. wind turbines with an overall blade tip height of 185 metres and all associated works, and a 38 kV substation and associated works, including underground 38kV cabling to connect to the national grid at Ballyragget 110kV substation. The full description of the Proposed Project is detailed in Chapter 4 of this EIAR, available in appendix 1 of this NIS.

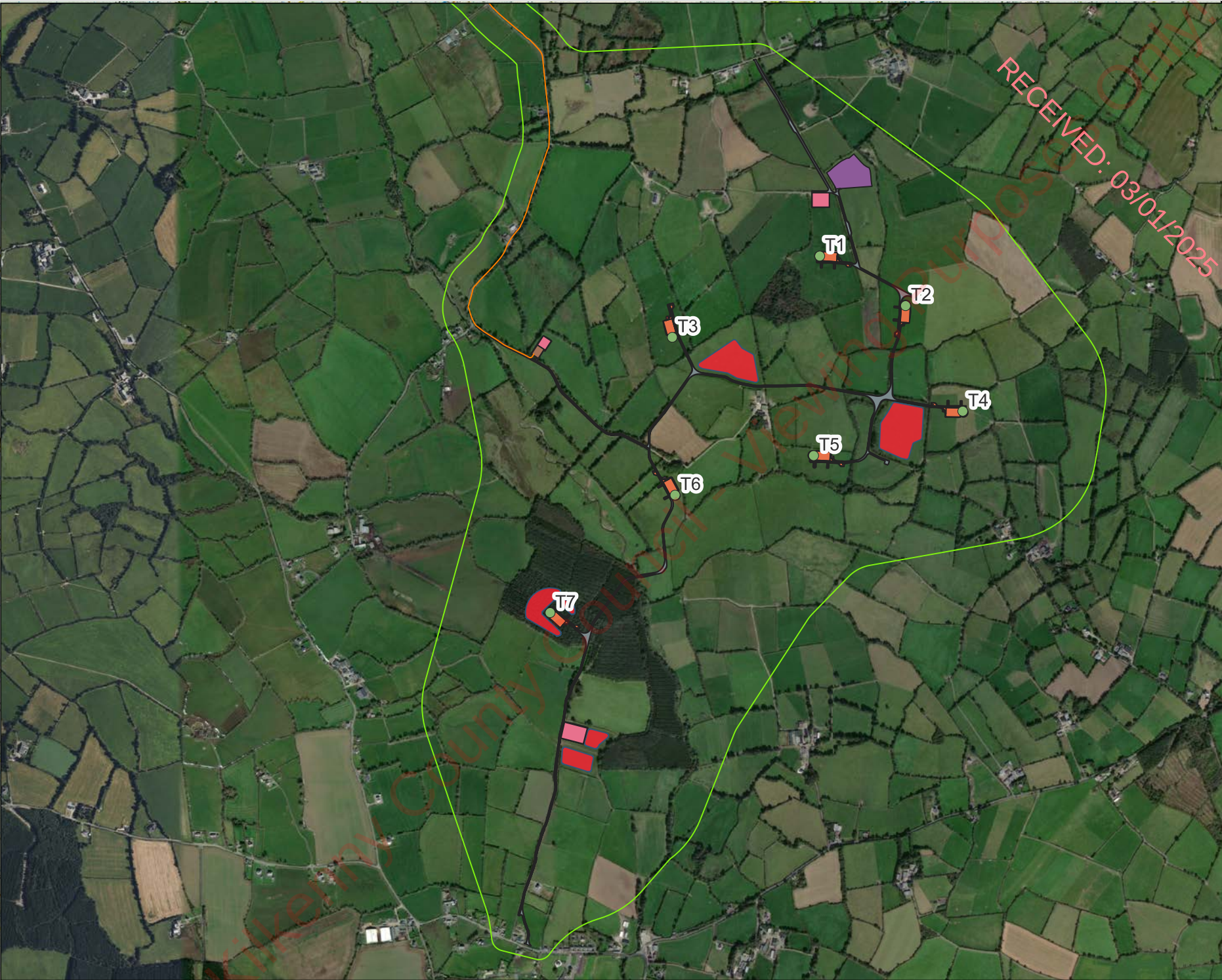
The development description for the current planning application as appears in the public notices is as follows:

The development will consist of the provision of the following:

- i. 7 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 permanent 38kV substation compound (control building with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, storage containers, wastewater holding tank, site drainage and all ancillary works);
- iii. Permanent underground electrical (38kV) and communications cabling to the existing Ballyragget 110kV substation in the townland of Moatpark (including joint bays, communication and earth sheath link chambers and all ancillary works along the route);
- iv. Underground electrical (33kV) and communications cabling connecting the wind turbines and meteorological mast to the on-site substation;
- v. 3 no. temporary construction compounds (including site offices and welfare facilities) ;
- vi. A meteorological mast with a height of 30 metres, security fencing and associated foundation and hard-standing area;
- vii. A new temporary site entrance on the L1009;
- viii. A new gated site entrance on the L5024;
- ix. Upgrade of existing site tracks/roads and provision of new site access roads, junctions and hardstand areas.
- x. A borrow pit;
- xi. Spoil Management;
- xii. Tree felling and hedgerow removal;
- xiii. Biodiversity Management and Enhancement Plan measures (including establishment of a riparian buffer and hedgerow enhancement);
- xiv. Site Drainage;
- xv. Operational Stage site signage; and
- xvi. All ancillary works and apparatus.

The application is seeking a ten-year planning permission. Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the Proposed Project, will have an operational lifespan greater than the 35-year operational life that is being sought as part of the planning application.

The Proposed Project layout is illustrated on Figure 2-2 below.



Map Legend

- EIAR Site Boundary
- Proposed New Roads
- Turbine numbers
- Proposed Spoil Management Areas
- Proposed Borrow Pit
- Temporary Construction Compounds
- Proposed Onsite Substation
- Proposed Hardstands
- Proposed Met Mast
- Existing Roads to be Upgraded
- Proposed Grid Cable Route



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Drawing Title
Proposed Project Layout

Project Title
Enerco Briskalagh Wind Farm

Drawn By FK	Checked By CM
Project No. 230502	Drawing No. Figure 2-2
Scale 1:19,000	Date 08.10.2024



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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).

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 Conservation Objectives supporting documents, site synopsis, standard data forms and supporting documents for European Designated Sites,

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA),
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper,
- Review of NPWS Article 17 metadata and GIS database.

3.2

Scoping and Consultation

The below table provides a list of the organisations consulted with regard to biodiversity during the scoping process and their response.

Table 3-1. Organisations consulted with regard to biodiversity

Consultee	Response
Bat Conservation Ireland	No response was received from Bat Conservation Ireland
An Taisce	No response was received from An Taisce
Birdwatch Ireland	No response was received from Birdwatch Ireland
Forest Service	No response was received from Forest Service
Irish Wildlife Trust (IWT)	No response was received from IWT
Development Application Unit Department of Housing, Local Government and Heritage – National Parks and Wildlife Services (NPWS)	A Request was made to the DAU on the and a response was received on the 15 th January 2024 stating, ‘the department were not in a position to make specific comments to this particular referral at this time. No inference should be drawn from this that the Department is satisfied or otherwise with the proposed activity. The Department may submit observations/recommendations at a later stage in the process.’

	A meeting with a National Parks and Wildlife Services representative was requested by MKO ecologists on the 1 st February 2024 and no response was received.
Inland Fisheries Ireland - Shannon Region & Western Region	No response was received from IFI.
Kilkenny County Council	The scoping response (available in appendix 2 of this NIS) provides a number of recommendations regarding Biodiversity, including impacts to flora and fauna, ecology (including hydrological connectivity to Natura 2000 sites), habitats and tree felling and impacts.

3.3 Ecological Survey Methodologies

3.3.1.1 Ecological Multidisciplinary Walkover Surveys

Multidisciplinary walkover surveys were undertaken on the following dates.

- 27th July 2023
- 28th July 2023
- 24th August 2023
- 21st February 2024
- 22nd February 2024
- 12th March 2024
- 2nd April 2024
- 16th April 2024
- 27th June 2024
- 29th July 2024

A comprehensive walkover of the entire site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys for example bats, marsh fritillary and botanical quadrat surveys. Habitat and botanical surveys were undertaken within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). The walkover surveys are designed to detect the presence, or likely presence, of a range of protected species and invasive species.

The multi-disciplinary walkover surveys comprehensively covered the entire site 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).

3.3.1.2 Otter Surveys

Otter surveys were conducted adhering to best practice guidance (NRA, 2009) and CIEEM best practice competencies for species surveys¹. All watercourses within the Proposed Wind Farm site, and

¹ CIEEM, 2013, *Technical Guidance Series – Competencies for Species Survey: Otter*, Online, Available at: <https://cieem.net/wp-content/uploads/2019/02/CSS-EURASIAN-OTTER-April-2013.pdf>

along the Proposed Grid Connection underground cabling route were identified as providing potential habitat for otter and were subject to targeted surveys for this species. This involved a search for all otter signs (e.g. spraints, scat, prints, slides, trails, couches and holts) within 150m of proposed works areas crossing watercourses within the Proposed Wind Farm site. Watercourse crossings along the Proposed Grid Connection underground cabling route were searched for signs and evidence of otter at the bridging locations. Where otter signs were observed these were mapped.

3.3.1.3 Aquatic surveys

Dedicated aquatic baseline surveys were undertaken by MKO. Electro-fishing operations for the purpose of forming baseline fisheries data of the Proposed Wind Farm site were undertaken on the 13th and 14th of September 2023. Macroinvertebrate surveys were carried out within watercourses along the Proposed Grid Connection underground cabling route. Dedicated fisheries assessments were undertaken at the Site for targeted species groups including salmon, trout and lamprey in September 2023 and March 2024. The methodology followed was the same as that used by the EPA for their national water sampling regime (Toner et al. 2005). A two-minute kick sample was collected from a stream bed area of approximately one square metre with a standard handnet (250 mm x 250 mm, with a 300 mm bag depth and a 1 mm mesh size). One minute hand searches, of large objects such as tree branches or stones, was undertaken prior to each of the kick samples. The kick sampling time was then divided proportionally among the habitats present in the area, such as fast-moving riffles, shallow water, and silted banks. Samples were sorted on site with identified species classed into groups according to their pollution tolerance levels, as per Environmental Protection Agency (EPA) practice (Toner et al., 2005). Specimens were identified using the FBA Guide to Freshwater Invertebrates (Dobson et al., 2012).

3.3.1.4 Dedicated Habitat and Vegetation Composition Surveys

All habitats recorded on site and described in this NIS have been classified in accordance with 'A guide to Habitats in Ireland (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2011). Botanical surveys of the Proposed Wind Farm site were undertaken throughout multidisciplinary walkover surveys carried out in 2023 and 2024. These surveys provided an understanding of the baseline and informed further survey work following finalisation of the Proposed Project infrastructure layout.

3.3.1.5 Bird Surveys

Comprehensive bird surveys, fully compliant with best practice guidance, were carried out as part of this application and are described in detail in Chapter 7 within the EIAR accompanying this application. The results of the bird surveys, relevant to this Appropriate Assessment, are discussed in Section 3.2.5 of this NIS. A full description of the bird survey methodologies can be found in appendix 3, 'Ornithology Chapter'.

3.4 Regional and Local Hydrology and Hydrogeology

The following summary of the local hydrology and hydrogeology in the vicinity of the Proposed Wind Farm site and the Proposed Grid Connection is provided below, as extracted from Chapter 9 of the EIAR: Hydrology and Hydrogeology (Appendix 4).

3.4.1

Proposed Wind Farm site

Regional Hydrology:

Regionally, the Proposed Wind Farm site is located in the River Nore surface water catchment within Hydrometric Area 15 of the South Eastern River Basin District. More locally, the Proposed Wind Farm is located within 2 no. WFD river sub-catchments. The vast majority of the Proposed Wind Farm is located in the Munster River sub-catchment (Munster_SC_010) whilst a small area in the northeast is mapped in the Nore_SC_090 sub-catchment.

Within the Munster River sub-catchment the Proposed Wind Farm is mapped in 2 no. WFD river sub-basins. The north is located in the Tullaroan Stream_020 river sub-basin whilst the majority of the Proposed Wind Farm site is mapped in the Tullaroan Stream_020 river sub-basin. The Tullaroan Stream flows to the south, dissecting the Proposed Wind Farm, and continues southwards before discharging into the Munster River ~5.7km to the south. Further downstream the Munster River discharges into the King's River to the northwest of Callan (~7.7km from the Proposed Wind Farm). The King's River discharges into the River Nore ~17km to the southeast.

Local Hydrology:

More locally the Proposed Wind Farm site is drained by several tributaries of the Tullaroan Stream. Many of these streams originate within the Proposed Wind Farm site and flow downslope into the Tullaroan Stream. These watercourses are locally unnamed but have been assigned names in the EPA blueline database (www.epa.ie).

- *Within the Tullaroan_020 WFD river sub-basin the Proposed Wind Farm site is drained by the EPA named Tullaroan watercourse (EPA Code: 15T22) which flows to the southwest and discharges into the Tullaroan Stream. Note that the only infrastructure associated with the Proposed Wind Farm in this sub-basin comprises of 460m of new proposed roadway.*
- *The vast majority of the proposed infrastructure is located in the Tullaroan_030 WFD river sub-basin. The EPA mapped tributaries of the Tullaroan Stream in this area include the Briskalagh (EPA Code: 15B98) and Knockeenglass (EPA Code: 15K44) in the east and the Foylatalure (EPA Code: 15F10) and Kilmanagh (EPA Code: 15K74) in the west.*

Within the Nore_SC_090 sub-catchment the Proposed Wind Farm is mapped in the Breagh(Kilkennit)_010 WFD river sub-basin. This area is drained by the Bregagh River, however no infrastructure associated with the Proposed Wind Farm is located in this WFD river sub-basin.

Within the Proposed Wind Farm site, there are a total of 6 no. watercourse crossing locations over natural watercourses (rivers and streams), two of which involved upgrades to existing structures. The crossing locations are outlined below:

- An existing crossing along a road which is proposed for upgrade over a small stream immediately to the west of the proposed on-site substation location. This crossing is over a watercourse which is not mapped by the EPA but was encountered during the Site walkover surveys;
- An existing crossing along a road which is proposed for upgrade over a small stream ~315m to the southeast of the proposed substation location. This crossing is over a watercourse which is not mapped by the EPA but was encountered during the Site walkover surveys;
- A new proposed crossing over a tributary of the Tullaroan Stream, referred to by the EPA as the Briskalagh Stream (EPA Code: 15B98) ~200m south of T6;
- A new proposed crossing over a tributary of the Tullaroan Stream, which is not mapped by the EPA but was encountered during Site walkover surveys, ~95m to the southeast of T3;

- A new proposed crossing over the Tullaroan Stream ~350m northeast of T7; and,
- A new proposed crossing over the EPA mapped Remeen Stream (EPA Code: 15R27) ~440m northwest of the proposed onsite borrow pit.

3.4.2 Proposed Grid Connection

The Proposed Grid Connection is located entirely within the River Nore surface water catchment and passes through a total of 4 no. WFD river sub-catchment and 8 no. WFD river sub-basins.

There are a total of 10 no crossings over EPA mapped watercourses along the Proposed Grid Connection underground cabling route, comprising of 7 no. existing bridge crossings, 2. no existing culvert crossings and 1 no. new proposed crossing. These crossings are detailed below:

- An existing bridge crossing along a local road in the townland of Oldtown over the EPA mapped Tullaroan watercourse (EPA Code: 15T22);
- 2 no. existing bridge crossings along a local road in the townland of Brittas (to the north and south of Brittas crossroads) over the EPA mapped Blackbottom stream (EPA Code: 15B83);
- An existing crossing (concrete pipe) along a local road in the townland of Picketstown over the EPA mapped Arigna River (EPA Code: 15A01);
- An existing bridge crossing over a local road between the townlands of Ballyroa (Grace) and Ballyroe over the EPA mapped Ballylarkin Stream (EPA Code: 15B85);
- An existing bridge crossing over the Monabrika Stream (EPA Code: 15M30) to the south of Freshford;
- An existing bridge crossing along New Bridge Street (R694) in Freshford over the Nuenna River;
- An existing culvert crossing along the R694 over the Lismaine Stream (EPA Code: 15L16) between the townlands of Sweethill and Clone;
- An existing crossing along the R694 over the Lisdowney Stream (EPA Code: 15L02) at Grange Bridge; and,
- A new proposed crossing under the Nore River, via directional drilling, to the south of Ballyragget 110kV substation.

In addition, walkover surveys have revealed an additional 3 no. crossings along the Proposed Grid Connection underground cabling route which are over watercourses which are not included in the EPA blueline database. These are at existing bridge and culvert crossings.

3.4.3 Baseline Water Quality

Q-rating status data for EPA monitoring points on the Tullaroan river are shown in Table 3-1 below. The Q-Rating is a water quality rating system based on both the habitat and the invertebrate community assessment and is divided into status categories ranging from 0-1 (Poor) to 4-5 (Good/High). Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate community within the waterbody. Individual macro-invertebrate families are classified according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample.

The latest Q-ratings for the watercourses in the vicinity and downstream of the Proposed Wind Farm site are from the 2022 monitoring round. The Tullaroan Stream in the vicinity of the Proposed Wind Farm site at a bridge in Oldtown (Station Code: RS15T020250) achieved a rating of Q4 ('Good' status). Further downstream the Tullaroan Stream is also of 'Good' status upstream of its confluence with the Munster River (Station Code: RS15T020450). The Munster River, upstream of its confluence with the King's River (Station Code: RS15M030700), and the King's River at a bridge in Callan (Station Code: RS15K020500) were also assigned a Q4 rating in 2022

Table 3.2. EPA water quality of watercourses within or in proximity to the Proposed Wind Farm site

Watercourse	Station Code	Easting	Northing	Year	EPA Q-Rating Status
Tullaroan Stream	RS15T020250	2388183	154691	2022	Q4 (Good)
Tullaroan Stream	RS15T020450	239211	146723	2022	Q4 (Good)
Munster River	RS15M030700	239319	145352	2022	Q4 (Good)
King's River	RS15K020500	241439	143933	2022	Q4 (Good)

3.5

Results of Baseline Ecological Surveys

3.5.1

Description of Habitats within the Site

The habitat classifications and codes correspond to those described in ‘*A Guide to Habitats in Ireland*’ (Fossitt 2000). A total of 16 habitats were recorded within the Site (Table 3-2).

The habitats occurring at the proposed turbine locations and throughout the Proposed Wind Farm site are detailed in Section 3.2.1.1.

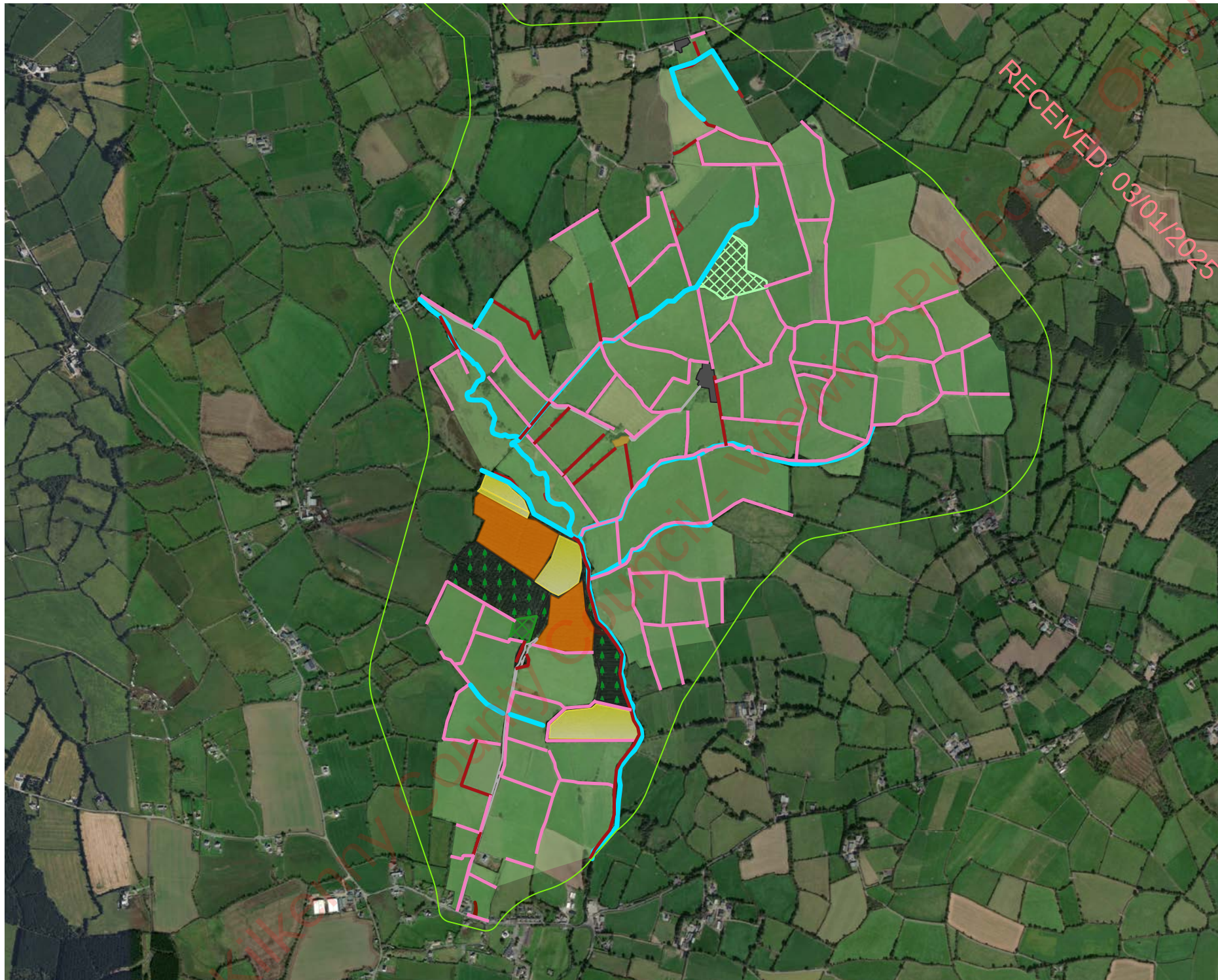
The habitats recorded along the Proposed Grid Connection underground cabling route are detailed in Section 3.2.1.2 The habitats occurring at the proposed substation and temporary construction compound location are described in Section 6.6.1.3.

Table 3-3. Habitats recorded on the Site

Habitat Name	Fossitt Code
Improved Agricultural Grassland	GA1
Wet grassland	GS4
Conifer Plantation	WD4
Mixed broadleaved/conifer woodland	WD2
Broad-leaved woodland	WD1
Semi-Natural Woodland (Wet Willow-Alder-Ash Woodland)	WN6
Dry meadows and grassy verges*	GS2
Spoil and bare ground	ED2
Treeline	WL2
Recolonising bare ground *	ED3
Hedgerow	WL1
Buildings and Artificial Surfaces	BL3
Drainage Ditches*	FW4
Eroding/Upland rivers	FW1
Depositing/lowland rivers	FW2
Scrub*	WS1*

A habitat map of the Proposed Wind Farm site is provided in Figure 3-1. A map showing the Proposed Wind Farm development footprint overlaying the Habitat Map is shown in Figure 3-2.

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Map Legend

- EIAR Site Boundary
- Eroding/Upland
- Rivers (FW1)
- Hedgerows (WL1)
- Treelines (WL2)
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- (Mixed) broadleaved woodland (WD1)
- Mixed broadleaved/conifer woodland (WD2)
- Conifer plantation (WD4)
- Wet willow-alder-ash woodland (WN6)
- Scrub (WS1)



Map data provided by Google Maps. All rights reserved. All trademarks are the property of their respective owners.

Drawing Title

Habitat Map

Project Title

Enerco Brisklagh Wind Farm

Drawn By
FK

Checked By
CM

Project No.
230502

Drawing No.
Figure 3-1

Scale
1:19,000

Date
08.10.2024

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Map Legend

- ELAR Site Boundary
- Eroding/Upland
- Rivers (FW1)
- Hedgerows (WL1)
- Treelines (WL2)
- Buildings and artificial
- surfaces (BL3)
- Spoil and bare ground
- (ED2)
- Recolonising bare
- ground (ED3)
- Improved agricultural
- grassland (GA1)
- Wet grassland (GS4)
- (Mixed) broadleaved
- woodland (WD1)
- Mixed broadleaved/
- conifer woodland (WD2)
- Conifer plantation (WD4)
- Wet willow-elder-ash
- woodland (WN6)
- Scrub (WS1)
- Proposed Met Mast
- Proposed New Roads
- Proposed Spoil Management Areas
- Proposed Borrow Pit
- Proposed Onsite Substation
- Temporary Construction Compounds
- Existing Roads to be Upgraded
- Proposed Hardstands
- Turbine numbers



Drawing Title Habitat Map with Wind Farm infrastructure overlain	
Project Title Enerco Briskalagh Wind Farm	
Drawn By FK	Checked By CM
Project No. 230502	Drawing No. Figure 3-2
Scale 1:19,000	Date 08.10.2024
MKO Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 VW84 +353 (0) 91 735611 email:info@mkoireland.ie Website: www.mkoireland.ie	

3.5.1.1 Habitats within the Proposed Wind Farm site

The majority of habitats within the Proposed Wind Farm site consist of homogenous swards of grazed improved agricultural grassland comprising mainly of perennial rye grass along with existing roads and farm tracks, hedgerows, watercourses and mixed broad leaved woodland and commercial forestry. Field boundaries comprise mainly very dense managed and unmanaged hedgerow habitat dominated by hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), blackthorn (*Prunus spinosa*) and mature ash (*Fraxinus excelsior*). The Proposed Wind Farm site is accessible via existing farm tracks in the north, west and south of the Proposed Wind Farm site. The Tullaroan Stream bisects the Proposed Wind Farm east-west and is located in the west of the Proposed Wind Farm site, flowing in a southerly direction.

Waterbodies within the Proposed Wind Farm site including drainage ditches and both mapped and unmapped streams classified as upland/eroding rivers provide hydrological connectivity with downstream designated sites and are further described in this section.

3.5.1.1.1 Improved Agricultural Grassland (GA1)

The majority of the Proposed Wind Farm site comprises of extensively managed Improved agricultural grassland (GA1) habitat (Plate 3-1). Turbines 1 to 6 are proposed within existing GA1 habitat throughout the Proposed Wind Farm site. This includes grasslands (GA1) of various ages and mixed swards heights including recently harvested fields, actively grazed, tall swards of maturing meadows, along with immature pre-thicket areas of managed grazing rotation. Short homogenous swards with little species diversity resulting from intensive cattle, sheep and horses grazing and poaching were also recorded throughout the Proposed Wind Farm site. New roads are proposed throughout the Proposed Wind Farm site and will pass through Improved agricultural grassland (GA1) to facilitate the turbine delivery route and site construction and operations. Wetter pockets of grassland were recorded throughout the Proposed Wind Farm site. Intense poaching was recorded in wetter grassland areas throughout the Proposed Wind Farm site.

Perennial Rye Grass (*Lolium perenne*) dominated this habitat type. Other species recorded include creeping-jenny (*Lysimachia nummularia*), daisy (*Bellis perennis*), nettle (*Urtica dioica*), chickweed (*Stellaria media*), White clover (*Trifolium repens*), Red Clover (*Trifolium pratense*), Crested dog's tail (*Cynosurus cristatus*), bent grass (*Agrostis spp.*), yorkshire fog (*Holcus lanatus*), smooth meadow grass (*Poa pratensis*), soft rush (*Juncus effusus*) and mouse ear chickweed (*Cerastium fontanum*), common bent (*Agrostis spp.*), creeping buttercup (*Ranunculus repens*), hard rush (*Juncus inflexus*), silverweed (*Potentilla anserina*), annual meadow grass (*Poa annua*), jointed rush (*Juncus articulatus*), creeping thistle (*Cirsium arvense*), short awn foxtail (*Alopecurus aequalis*), red fescue (*Festuca rubra*). Overall, this habitat is of a low biodiversity value.



Plate 3-1. View of managed Improved Agricultural Grassland (GAI) recently harvested. This habitat dominates the Proposed Wind Farm site.

3.5.1.1.2 Wet grassland (GS4)

A grassland habitat categorised as Wet grassland (GS4) was recorded in the west of the Proposed Wind Farm site (Plate 3-2). Wetter pockets of grassland were recorded throughout the Proposed Wind Farm site. Intense poaching was recorded in wetter grassland areas throughout the Proposed Wind Farm site.

A new road is proposed at T7 through existing wet grassland and treeline habitat. Species recorded in this habitat include foxtail (*Alopecurus pratensis*), curly dock (*Rumex crispus*), cocks' foot (*Dactylis glomerata*), dandelion (*Taraxacum vulgaria*), perennial rye grass (*Lolium perenne*), meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*), soft rush (*Juncus effusus*).



Plate 3-2. View of grassland habitat categorised as Wet Grassland (GS4) located in the west of the Proposed Wind Farm site.

3.5.1.1.3 *Woodlands*

A variety of woodland habitats including;

- Conifer Plantation (WD4),
- Mixed Broadleaved/Conifer woodland (WD2),
- Broad-leaved woodland (WD1),
- Semi-Natural woodland (Wet willow-alder-ash woodland) (WN6).

Scrub (WS1) habitat was also recorded within the Proposed Wind Farm site.

Turbine 7 is proposed within Conifer plantation (WD4) habitat in the west of the Proposed Wind Farm site. This habitat is dominated by Japanese larch (*Larix kaempferi*) and Sitka spruce (*Picea sitchensis*) (Plate 3-3). Approximately 3.6ha of this habitat will be removed to facilitate the Proposed Wind Farm.

The remaining plantation in the western parcel of the Proposed Wind Farm site consists mainly of ash (*Fraxinus excelsior*) with smaller pockets of alder (*Alnus glutinosa*), Norway Spruce (*Picea abies*) and Sitka spruce (*Picea sitchensis*), classified as Mixed broadleaved/conifer woodland (WD2) habitat. Approximately 0.722 ha of this woodland habitat will be removed to the footprint of the Proposed Wind Farm.

Broad-leaved woodland (WD1) dominated by ash and alder was recorded adjacent to T7, in the south-west of the Proposed Wind Farm site (Plate 3-4). An ash plantation was recorded in the west of the Proposed Wind Farm site (Plate 3-5). A small pocket of this habitat was also recorded adjacent to T6. The ash trees in this woodland contain extensive ash die back disease, *Hymenoscyphus fraxineus*.



Plate 3-3. View of firebreak within the conifer plantation at the location of T7.



Plate 3-4. View of broadleaved woodland (WD1) located west of the Tullaroan stream, adjacent to agricultural grassland (GA1) habitat.



Plate 3-5. View of ash and alder plantation classified as broad-leaved woodland (WD1) located adjacent T7 proposed location. Bramble and *Juncus* spp. dominated the ground flora.

In addition to the planted woodland described above, a small pocket of natural colonised woodland was recorded in the north of the Proposed Wind Farm site (Plate 3-6 & Plate 3-7). This woodland is located entirely outside of proposed infrastructure footprint areas and this habitat will not be impacted by the Proposed Project. The ground conditions within this habitat were wet underfoot. This habitat covers approximately 3.3 hectares and is located approximately 125m southwest of T1 and has been classified as a mosaic between Wet willow-alder-ash woodland (WN6) and Scrub (WS1).

Species recorded within this pocket of semi-native woodland include hazel (*Corylus avellana*), mature holly (*Ilex aquifolium*), grey willow (*Salix cinerea*), goat willow (*Salix caprea*), elder (*Sambucus nigra*), blackthorn (*Prunus spinosa*), speedwell (*Veronica chamaedrys*), nettle (*Urtica dioica*), honey suckle (*Lonicera periclymenum*), remote sedge (*Carex remota*), wood sorrel (*Oxalis acetosella*), ash (*Fraxinus excelsior*), nipplewort (*Lapsana communis*), spindle (*Euonymus europaeus*), opposite leaved golden saxifrage (*Chrysosplenium oppositifolium*), creeping buttercup (*Ranunculus repens*), hard shield-fern (*Polystichum aculeatum*), wood avens (*Geum urbanum*), fox glove (*Digitalis purpurea*), bluebell (*Hyacinthoides non-scripta*), hairy willowherb (*Epilobium hirsutum*), *Plagiomnium undulatum*, *Eurynchium striatum* and *Hypnum cupressiforme*. Gorse (*Ulex europaeus*) was recorded by the western boundary of the woodland habitat. This woodland does not conform to an Annex I habitat. A spring was recorded in the northern section of the woodland. The western parcel of this woodland habitat is grazed by sheep.



Plate 3-6. View of semi-natural woodland (WN6)/scrub (WS1) mosaic located in the north of the Proposed Wind Farm site dominated in this section by hawthorn and blackthorn.



Plate 3-7. Semi-native woodland habitat located by T1. Tree species recorded in this area consist of willow, holly, ash and hawthorn.

3.5.1.1.4 Dry meadows and Grassy verges (GS2), Spoil and Bare Ground (ED2), Treeline (WL2), Recolonising Bare Ground (ED3)

Dry meadows and grassy verges (GS2) were recorded bordering the existing farm tracks throughout the Proposed Wind Farm site (Plate 3-8). This habitat was also recorded along the public road on the Proposed Grid Connection underground cabling route. A mature, dense hedgerow (WL1) with individual mature ash trees classified as treeline (WL2) border the fields located adjacent the existing farm tracks in the west of the Proposed Wind Farm site. Species recorded include cow parsley (*Anthriscus sylvestris*), cocksfoot (*Dactylis glomerata*), cleavers (*Galium spp.*), herb Robert (*Geranium robertianum*), red fescue (*Festuca rubra*), buttercup (*Ranunculus spp.*).

Existing farm tracks classified as *Spoil and bare ground (ED2)* were recorded in the north, south and west of the Proposed Wind Farm site (Plate 3-8) with some adjacent areas categorised as Recolonising bare ground (ED3) (Plate 3-9).



Plate 3-8. View of existing farm access track classified as spoil and bare ground (ED2) located in the centre of the Proposed Wind Farm site and access via the west. It is proposed this existing road undergoes upgrades to facilitate the Proposed Project. A managed hedgerow (WL1) habitat and mature ash trees classified as treeline (WL2) were also recorded in this area of the Proposed Wind Farm site.



Plate 3-9. View of recolonising bare ground (ED3) recorded in the south-west of the Proposed Wind Farm site.

3.5.1.1.5 Hedgerow (WL1)

Field boundaries and margins within the Proposed Wind Farm site were delineated by unmanaged and managed Hedgerow (WL1) habitat (Plate 3-10 - Plate 3-12). Species recorded include hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), blackthorn (*Prunus spinosa*), nettle (*Urtica dioica*), and bramble (*Rubus fruticosus agg.*). Individual mature oak (*Quercus robur*), sycamore (*Acer pseudoplatanus*) and ash (*Fraxinus excelsior*) trees were identified throughout the hedgerow habitats within the Proposed Wind Farm site. Other species recorded throughout hedgerows within the Proposed Wind Farm site include grey willow, alder, guelder rose, field maple, bracken, bent grass, cocksfoot, creeping buttercup, spear thistle. Rich ground flora was recorded by hedgerow habitat in the west of the Proposed Wind Farm site. Species recorded include wood anemone (*Anemone nemorosa*), bluebells (*Hyacinthoides non-scripta*), ground ivy (*Glechoma hederacea*), barren strawberry (*Potentilla sterilis*), primrose (*Primula vulgaris*) and early-purple orchid (*Orchis mascula*).



Plate 3-10. View of unmanaged, dense hedgerow (WLI) habitat recorded in the north-east of the Proposed Wind Farm site. This section of the habitat was dominated by hawthorn with a dense understory dominated by nettle and bramble.



Plate 3-11. View of hedgerow (WLI) habitat in the west of the Proposed Wind Farm site adjacent the existing farm track. Species recorded here include cherry, hawthorn, elder, ash.



Plate 3-12. View of managed hawthorn and blackthorn hedgerow (WL1) habitat recorded in the centre of the Proposed Wind Farm site.

3.5.1.1.6 Buildings and artificial surfaces (BL3)

Farm buildings, cattle sheds and feed stores were recorded within the centre of the Proposed Wind Farm site classified as Buildings and artificial surfaces (BL3) habitat. Additionally, old stone buildings classified as buildings and artificial surfaces (BL3) were recorded within the centre of the Proposed Wind Farm site also (Plate 3-13).



Plate 3-13. View of Buildings and artificial surfaces (BL3) located within the Proposed Wind Farm site.

3.5.1.1.7 Drainage Ditches (FW4)

The majority of field margins within the Proposed Wind Farm site were delineated by Drainage ditches (FW4) (Plate 3-14 & Plate 3-15). Several of these drainage features had flowing water present during the surveys undertaken. Drainage ditches within the Proposed Wind Farm site are likely to connect to the Tullaroan Stream or associated tributaries.



Plate 3-14. View of heavily vegetated drainage ditch with stagnant water present located within the Proposed Wind Farm site.



Plate 3-15. View of freshwater spring flows south and is classified as drainage ditch (FW4). This habitat is located in the north of the Proposed Wind Farm site.

3.5.1.1.8 Eroding/Upland Rivers (FW1)/Depositing/lowland River (FW2)

The Tullaroan Stream classified is mostly categorised as Eroding/Upland river (FW1)/Depositing/lowland river (FW2) and is located within the centre and west of the Proposed Wind Farm site flowing in a southeastern direction (Plate 3-16). Small meandering sections of the Tullaroan stream would be categorised as Depositing Lowland River (FW2). The habitats recorded adjacent the Tullaroan Stream mainly include improved agricultural grassland (GA1) that is actively used by grazing livestock. There are three tributaries streams that flow into it. Ripples and glides were recorded as the watercourse meanders and pools in areas.

Within the Proposed Wind Farm site, there are a total of 6 no. watercourse crossing locations over natural watercourses (rivers and streams), 2 of which involved upgrades to existing structures. The crossing locations are outlined below:

- An existing crossing along a road which is proposed for upgrade over a small stream immediately to the west of the proposed onsite substation location. This crossing is over a watercourse which is not mapped by the EPA but was encountered during the Site walkover surveys;
- An existing crossing along a road which is proposed for upgrade over a small stream ~315m to the southeast of the proposed substation location. This crossing is over a watercourse which is not mapped by the EPA but was encountered during the Site walkover surveys;
- A new proposed crossing over a tributary of the Tullaroan Stream, referred to by the EPA as the Briskalagh Stream (EPA Code: 15B98) ~200m south of T6;

- A new proposed crossing over a tributary of the Tullaroan Stream, which is not mapped by the EPA but was encountered during Site walkover surveys, ~95m to the southeast of T3;
- A new proposed crossing over the Tullaroan Stream ~350m northeast of T7; and,
- A new proposed crossing over the EPA mapped Remeen Stream (EPA Code: 15R27) ~440m northwest of the proposed onsite borrow pit.

The proposed new watercourse crossings will be bottomless or clear span culverts, ensuring no instream works are necessary. These watercourses are all tributaries to the Tullaroan Stream. In areas throughout the Proposed Wind Farm site, these watercourses were accessible by grazing livestock with evidence of river crossing and poaching present. All EPA mapped and unmapped watercourses primarily correspond to Eroding/Upland rivers (FW1).

A full description of watercourses is attached in the Aquatic Baseline Report attached as Appendix 5.



Plate 3-16. View of the Tullaroan Stream located in the west of the Proposed Wind Farm site, flowing south. This watercourse is located adjacent improved agricultural grassland (GAI).



Plate 3-17. View of EPA mapped watercourse, Briskalagh located in the centre of the Proposed Wind Farm site.

3.5.1.1.9 Habitats within Turbine Hardstand Locations

Turbines 1 to 6 are proposed within Improved Agricultural Grassland GA1 habitat and Turbine 7 is proposed within Conifer Woodland WD4 habitat in the west of the Proposed Wind Farm site, as described in sections 3.5.1.1.1 and 3.5.1.1.3.

3.5.1.1.10 Habitats at the Met Mast

The proposed met mast is proposed in the east of the Proposed Wind Farm site within Improved agricultural grassland (GA1) habitat and adjacent Hedgerow (WL1) habitat. Species recorded in the grassland include dandelion, buttercup, daisy, perennial rye grass, curly dock.

The hedgerow (WL1) habitat is dominated by hawthorn (*Crataegus monogyna*) and understory dominated by unmanaged bramble encroaching on the grassland habitat (Plate 3-18). Mature ash trees were recorded also. Other species identified in this location include gorse, hawthorn, blackthorn, ivy nettle, herb robert. A new road is proposed west of the proposed met mast location. This new road will pass through existing hedgerow habitat consisting of grey willow, hawthorn, blackthorn, dense bramble and a drainage ditch (FW4).



Plate 3-18. View of hedgerow (WL1) habitat with dense bramble dominated understory located at the edge of grassland (GA1).

3.5.1.1.11 Habitats at the Spoil Management Areas and Borrow Pit

The proposed borrow pit is located in existing grazed and heavily poached grassland habitat categorised Improved agricultural grassland (GA1) located in the north of the Proposed Wind Farm site.

Spoil management areas are proposed in 5 no. locations throughout the Proposed Wind Farm site. The habitats recorded in these areas consist mostly of improved agricultural grassland (GA1), with one occurring within the Conifer Plantation (WD4).

The habitats recorded within this section of the Proposed Wind Farm site include eroding/upland river (FW1), treeline (WL2), hedgerow (WL1), eroding/upland river (FW1) and improved agricultural grassland (GA1) habitat (Plate 3-19 & Plate 3-20). Species recorded adjacent the watercourse (Remeen) include cow parsley, lesser celandine, meadow buttercup, creeping buttercup, cleavers (*Galium spp.*), creeping bent grass, bramble, perennial rye grass, harts tongue fern, scaly male fern, opposite leaved golden saxifrage, *brachium rivulare*, pignut, thisdens moss, ground ivy and wood sorrel. Other species recorded in this section of the Proposed Wind Farm site include blackthorn, alder, gorse, hawthorn, bracken, bent grass, cocks foot, creeping buttercup and spear thistle.



Plate 3-19. View of Improved agricultural grassland and gorse scrub habitat identified along the proposed new road located north of the Proposed Wind Farm site to facilitate the main construction and operational entrance, soil management area in this locality.



Plate 3-20. View of eroding/upland river (FW1), located north of the Proposed Wind Farm site. The proposed new road will cross this watercourse to reach to public road located north.

3.5.1.1.12 Habitats at Substation and Construction Compound

A substation is proposed in the west of the Proposed Wind Farm site by the existing farm track. Habitats recorded in this vicinity include grazed grassland categorised as Improved Agricultural grassland (GA1) and treeline (WL2) (Plate 3-22). Mature ivy-covered ash trees dominate the treeline habitat while the understory is managed and comprises hawthorn, blackthorn, gorse and grey willow. A drainage ditch (FW4) was recorded at the treeline north of the proposed substation and water was present at the time of surveying. An unmapped watercourse was recorded west of the proposed substation.



Plate 3-21. View of Improved Agricultural Grassland (GA1) and treeline (WL2) dominated by mature ash trees. Understory comprises of gorse, willow, hawthorn and blackthorn. A drainage ditch (FW4) was recorded at this treeline.

3.5.1.2 Habitats on the Proposed Grid Connection underground cabling route and Turbine Delivery Route

The Proposed Grid Connection underground cabling route has an approximate length of 23km. It will leave the on-site substation and travel north-west for 250m following existing farm track proposed for upgrade works to facilitate this development. The Proposed Grid Connection underground cabling route will then join the public road classified as Buildings and artificial surfaces (BL3). The cable will pass beneath the River Nore via HDD. Improved agricultural grassland (GA1) habitat was also recorded along the Proposed Grid Connection underground cabling route.

It is proposed that the large wind turbine components will be delivered from Belview Port, Waterford to the Proposed Wind Farm site via the M9, exiting at Junction 9 onto the N10 heading north, joining the N76, a combined stretch of 22.4km along the national road network. The turbine components will then turn on to the R695 north of Callan, travelling along the regional road for approx. 9.2km, before turning onto the L1009 in Kilmanagh for approx. 150m before reaching the proposed new turbine component entrance at the south of the Proposed Wind Farm site. There will be no loss of road fringe habitats (such as treeline, hedgerow) to facilitate the delivery of the turbines.

The verges across much of the Proposed Grid Connection underground cabling route contained species typical of dry grassy verges (GS4) which were not mapped due to their small size and mosaic-like occurrence throughout and along the route.

Several drainage ditches (FW4) with and without water present were recorded along the Proposed Grid Connection underground cabling route during the surveys undertaken. Several watercourses are culverted, box culverted, or bridges created to allow watercourses to pass beneath the roads along the Proposed Grid Connection underground cabling route.

Other habitats recorded by the River Nore along the Proposed Grid Connection underground cabling route include Improved agricultural grassland (GA1) and hedgerow (WL1).

A full description of the watercourses along the Proposed Grid Connection underground cabling route is provided in section 3.4 of this report.



Plate 3-22. View of the River Nore where the HDD works are proposed to pass beneath.



Plate 3-23. View of culvert beneath the road along the Proposed Grid Connection underground cabling route.



Plate 3-24. View of stone arched bridge crossing an EPA mapped watercourse classified as Eroding/upland river (FW1) along the Proposed Grid Connection underground cabling route.

3.5.2

Invasive Species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. No Third Schedule Alien Invasive species listed on the Third Schedule of the European Communities (Birds and natural Habitats) Regulations, 2011 were recorded within the footprint of the proposed infrastructure or along the Proposed Grid Connection underground cabling route during the survey conducted.

A Third Schedule Invasive Alien plant species, Japanese knotweed (*Fallopia japonica*) was recorded along the proposed turbine delivery route (Plate 3-25), however, the delivery of turbines will not interact with this stand of Japanese knotweed.



Plate 3-25. View of Japanese knotweed located adjacent the public road along the proposed turbine delivery route

3.5.3 Aquatic Surveys

Full details of results of aquatic surveys undertaken for the Proposed Project are provided in the Aquatic Baseline Report (Appendix 5) and are summarised in this section. All survey locations are shown in Figure 2-1 in the Aquatic Baseline report (Appendix 5).

3.5.3.1 Watercourses

Proposed Wind Farm Site

The watercourses surveyed within the Proposed Wind Farm site consist of a number of Eroding/ upland rivers (FW1) and Depositing/ lowland rivers (FW2). All watercourses had a predominantly cobble and gravel substrate with a number of surveyed watercourses impacted to different degrees by siltation. Siltation in some watercourses were considered heavy with the likely cause being surrounding agricultural land use and runoff of sediments to watercourses. Watercourses within the Proposed Wind Farm site typically had historically modified banks such as alterations to banks, alterations to river bed material and diversion of the Tullaroan Stream. At the time of survey, macrophyte growths were minimal within surveyed stretches of watercourses however at the most downstream survey location south of the Proposed Wind Farm site, luxuriant green algal growths were present. Additionally, at the time of survey the Bregagh [Kilkenny] watercourse was dry with no flowing water.

Proposed Grid Connection

The watercourses surveyed along the Proposed Grid Connection underground cabling route consist of a number of Eroding/ upland rivers (FW1) and Depositing/ lowland rivers (FW2), characterised by predominantly cobble, gravel and boulder channel substrates (in order of dominance). Similar to the sites surveyed within the Proposed Wind Farm site, watercourses along the Proposed Grid Connection underground cabling route displayed varying degrees of siltation, from slight to heavy, most likely as a result of agricultural land use surrounding the surveyed sites.

3.5.3.2 Fish Species

Proposed Wind Farm site

Watercourses within the Proposed Wind Farm site contained a number of fish species with brown trout (*Salmo trutta*) present at all survey locations. Atlantic salmon (*Salmo salar*) was present at 3 of the survey locations and only on the Tullaroan stream watercourse, being absent from any of its tributaries which were surveyed. European eel was recorded at one location on the Foylatalure watercourse, a tributary of the Tullaroan stream watercourse.

Proposed Grid Connection

Incidentals of note during kick-sampling include the unintentional catching of a Brook Lamprey (*Lampetra planeri*) at survey site GR-1, salmonid alevins present at GR-8 and the identification of a dead salmonid parr at survey site GR-2. While watercourses within the Proposed Wind Farm site surveyed often displayed gravels of adequate size and mobility for spawning, the salmonid carrying capacity of several watercourses within the Proposed Grid Route was limited by a high degree of siltation, resulting from excessive bank erosion, bank reprofiling and surrounding agricultural land use (which dominated the landscape surrounding the Proposed Grid Route).

3.5.3.3 eDNA analysis

Environmental DNA (eDNA) surveys were undertaken on watercourses at 4 locations within the Proposed Wind Farm site.

Freshwater Pearl Mussel (*Margaritifera margaritifera*) (FWPM), White-clawed crayfish (*Austropotamobius pallipes*) (WCC) and Crayfish plague (*Aphanomyces astaci*) (CP) were tested for at each location. There were no positive results for FWPM or WCC at any survey location indicating an absence of these species within the areas surveyed and areas upstream of these survey areas. However, there was a strong positive result for Crayfish Plague at three of the survey locations.

All eDNA results can be found in Appendix III of the Aquatic Baseline Report attached as Appendix 5.

3.5.3.4 Kick-sampling and Q-Value

Proposed Wind Farm site

Kick sampling (Q-Value Assessment) conducted at each of the survey locations revealed that water quality throughout the Proposed Wind Farm site was on average Q3 Poor with 4 of the 5 surveyed locations awarded a Q3 Poor status. One of the survey locations was awarded a Q-value of Q3-4 Moderate. Pollution tolerant aquatic macroinvertebrates dominated all samples taken with very pollution sensitive taxa absent from all but one survey location. Therefore, at present, watercourses within the Proposed Wind Farm site are not satisfying the objectives of the Water Framework Directive (WFD) which is to achieve at least Q4 Good Status.

Proposed Grid Connection

Results for Q-Value assessment conducted at each of the Proposed Grid Connection underground cabling route Survey Locations saw Q-values range from Q3- Poor (GR-4, GR-10) to Q4 Good (GR-2, GR-3, GR-6, GR-9, GR-12, GR-13), with some sites assessed as being Q3-4 Moderate (GR-1, GR-5, GR-7, GR-8, GR-11). Group A 'Very Pollution Sensitive' Taxa were present at all survey sites except GR-4 and GR-10. Therefore, at present, while six of the watercourses surveyed were assigned scores of Q4 Good, over half (seven) of the thirteen watercourses surveyed along the proposed grid route are not satisfying the objectives of the Water Framework Directive (WFD) which is to achieve at least Q4 Good Status by 2027.

3.5.3.5 Otter

Proposed Wind Farm site

No otter (*Lutra lutra*) holts were located upstream or downstream within the vicinity of any survey location within the Proposed Wind Farm site. Otter spraint and tracks were recorded under the bridge upstream of survey point WF-1. No other otter signs (spraint, prints, anal jelly, couches) were recorded in the vicinity of survey locations. However, it is likely that otter populations are utilising the watercourses in which surveys were undertaken.

Proposed Grid Connection

No otter (*Lutra lutra*) holts were located upstream or downstream within the vicinity of any survey location along the Proposed Grid Connection underground cabling route. Otter prints were recorded approx. 60m upstream of survey location GR-13 along the right-hand bank. The River Nore is designated as part of The River Barrow and River Nore SAC.

A potential otter couch was recorded on the banks of the River Nore approximately 300m south the proposed launch pit location. An otter spraint and prints were recorded by the River Nore approximately 185m north of the launch pit location. No potential otter holts or evidence of otter were recorded directly adjacent to the proposed works areas.

No other signs of otter, including resting or breeding sites were recorded.

3.5.4 Kingfisher Surveys

Only one Special Conservation Interest (SCI) species of relevance to this Appropriate Assessment (based on SPAs within the ZoI of the Proposed Project) was recorded during the surveys, namely Kingfisher (*Alcedo atthis*).

Kingfisher were infrequently recorded during breeding walkover surveys, the species was observed on average once every 20 hours of breeding walkover survey. Kingfisher was recorded on five occasions during breeding walkover surveys; one observation in June 2022 and the remaining four observations from one day in July 2022. All observations were associated with the Tullaroan Stream and comprised single birds travelling up/downstream. One of the observations comprised a bird calling

Kingfisher were infrequently recorded during dedicated breeding kingfisher surveys, the species was observed on average once every 12 hours of breeding kingfisher survey. There were two observations of kingfisher during breeding kingfisher surveys, in April 2021 and May 2022, both of single birds travelling along the Tullaroan Stream.

Kingfisher was recorded on three occasions during waterbird distribution surveys. One observation was from the Tullaroan Stream within the Proposed Wind Farm site, comprising a bird travelling upstream calling in August 2021. The remaining two observations were of single birds travelling, at Killaloe Bridge and along the King's River, these birds were over 4km and 11km distant from the Proposed Wind Farm site respectively.

No confirmed breeding territory was recorded within the Proposed Wind Farm site or within the surrounding area. Of the eight total observations of kingfisher along the Tullaroan stream, two involved birds calling and the remaining comprised birds travelling and perching. There were some suitable nesting banks observed along this watercourse within the Proposed Wind Farm site, where bank collapse has created vertical exposed soil banks. Numerous burrows were recorded, however these were confirmed to be sand martin nests. However, given the number of observations of kingfisher along the Tullaroan Stream, and the presence of suitable nesting banks and following a precautionary approach, it is considered that a possible breeding territory was present along this watercourse within the Proposed Wind Farm site in 2021 and 2022.

The results of bird surveys undertaken for the Proposed Project are fully described in Chapter 7, which is included as Appendix 3

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 08/08/2024.
- 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 Site are shown on Figure 4-1. Information on these European Sites according to the site-specific conservation objectives is provided in Table 4-1. European Sites that were further away from the Site were also considered and no complete source-pathway-receptor chain for significant effect was identified for any other European Site.
- The catchment mapping was used to establish or discount potential hydrological connectivity between the Site 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 a 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 effects 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 European Sites, as per the NPWS website (www.npws.ie), were consulted and reviewed on multiple occasions in 2023 and 2024 while preparing this report.
- Where potential pathways for Likely Significant Effect are identified, the European 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.

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

European Sites and distance from the Site	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the in 2023 and 2024.	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Special Areas of Conservation (SAC)				
River Barrow and River Nore SAC [002162] Distance: 0m from Proposed Grid Connection underground cabling route (located adjacent the SAC) Hydrological distance: approximately 5.9km from the Proposed Wind Farm site	[1016] Desmoulin's whorl snail (<i>Vertigo moulinsiana</i>) [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</i>)	Detailed conservation objectives for this site, (Version 1, July 2011²), were reviewed as part of the assessment and are available at www.npws.ie	Direct Effects The launch pit for proposed horizontal directional drilling (HDD) as part of the Proposed Grid Connection underground cabling route is located within the boundary of this SAC. However, the location of the launch pit is within the existing road corridor and Improved agricultural grassland (GA1) and located completely outside of any QI designated habitat or species for this SAC. As such, there is no potential for direct effects on this SAC. No instream works are proposed as part of the Proposed Grid Connection . Indirect Effects The Proposed Project (Proposed Wind Farm and Proposed Grid Connection) is hydrologically linked to the SAC. The Tullaroan Stream flows south in the centre of the Proposed Wind Farm site and joins the SAC approximately 5.9km downstream. Four additional EPA mapped watercourses within the Proposed WF site are linked with the Tullaroan Stream. The Proposed Grid Connection underground cabling route crosses 13 no. watercourses which are also hydrologically linked to the SAC.	Yes

² NPWS (2011) Conservation Objectives: The River Barrow and River Nore SAC [002162]. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

European Sites and distance from the Site	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the in 2023 and 2024.	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	[1106] Atlantic salmon (<i>Salmo salar</i>) (only in fresh water) [1130] Estuaries [1140] Mudflats and sandflats not covered by seawater at low tide [1310] Salicornia and other annuals colonizing mud and sand [1330] Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) [1355] Otter (<i>Lutra lutra</i>) [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1421] Killarney fern (<i>Trichomanes speciosum</i>) [1990] Nore freshwater pearl mussel (<i>Margaritifera durrovensis</i>) [3260] Water courses of plain to montane levels with the <i>Ranunculon</i>		The Proposed Grid Connection underground cabling route crosses 13 watercourses located within the same hydrological sub-catchments as this SAC (Munster_SC_010, Nore_SC_010). All watercourses draining the Proposed Grid Connection underground cable route discharge to the River Nore, which is designated as part of the River Barrow and River Nore SAC. Horizontal Directional Drilling (HDD) associated with bridge crossings, culverts and along the Proposed Grid Connection underground cabling route have the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. The proposed HDD works have the potential to impact on Otter associated with the River Barrow and River Nore SAC via disturbance. Further, the Proposed Wind Farm site and parts of the Proposed Grid Connection underground cabling route are underlain by the same groundwater body (Kilmanagh Gravels) as the River Barrow and River Nore SAC. Two of the proposed turbine locations are situated on an area of “High” groundwater vulnerability rating.. Therefore, there is potential for indirect effects on groundwater dependent QIs designated as part of this European Designated site, via ground water pollution resulting from works associated with the construction, operational and decommissioning phases of the Proposed Project. In addition, there is potential for pollution with dust arising from works along the Proposed Grid Connection underground cabling route and as such there is potential for deterioration to Qualifying Interests (QIs) habitats	

European Sites and distance from the Site	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the in 2023 and 2024.	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	<i>fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [4030] European dry heaths [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [7220] * Petrifying springs with tufa formation (<i>Cratoneurion</i>) [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>)		and supporting habitats for QI species within this SAC during the construction phase. Works associated with the Proposed Project have the potential to result in drainage and seepage water resulting from infrastructure excavations, run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream of the Site. Large volumes of concrete will be required for the construction of turbine foundations, therefore taking a precautionary approach potential impacts on ground water quality were also considered. A pathway for indirect effects on the aquatic qualifying interest (QIs) species and habitats of the SAC exist in the form of water quality deterioration and habitat degradation via surface and ground water pathways. A complete source-pathway-receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Project to result in likely significant effects on this European Site. The SAC is considered to be within the Likely Zone of Influence of the Proposed Project and further assessment is required.	
The Loughans SAC [000407] Distance:	[3180] Turloughs	Detailed conservation objectives for this site, (Version 1,	There will be no direct effects on this SAC. The Proposed Wind Farm site is located approximately 11.2km southeast of this SAC, while the Proposed Grid Connection underground cabling route is located over 8km from the site.	No

European Sites and distance from the Site	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the in 2023 and 2024.	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
8.4km from the Proposed Grid Connection underground cabling route 11.2km from Proposed Wind Farm site		December 2020³), were reviewed as part of the assessment and are available at www.npws.ie	There is no surface water hydrological connectivity between the Proposed Project and this SAC. The Proposed Project is also located in a separate sub-catchment and groundwater body. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Project. Therefore, it is not considered further in this assessment.	
Spahill and Clomantagh Hill SAC [000849] Distance: 6.9km from the Proposed Grid Connection underground cabling route	[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)	Detailed conservation objectives for this site, (Version 1, November 2021⁴), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects on this SAC. The Proposed Wind Farm site is located approximately 11.4km southeast of this SAC, while the Proposed Grid Connection underground cabling route is located over 6.9km from the site. The Qualifying Interests for which the site is designated are terrestrial in nature and located 11.4km to the northwest of the Proposed Project .	No

³ NPWS (2020) Conservation Objectives: The Loughans SAC 000407. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

⁴ NPWS (2021) Conservation Objectives: Spahill and Clomantagh Hill SAC 000849. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

European Sites and distance from the Site	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the in 2023 and 2024.	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
11.4km from the Proposed Wind Farm site			There is no surface water hydrological connectivity between the Proposed Project and this SAC. Due to the distance from the SAC, no complete source-pathway-receptor chain has been identified between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Project. Therefore it is not considered further in this assessment.	
Special Protection Area (SPA)				
River Nore SPA [004233] Distance: 0m from Proposed Grid Connection underground cabling route	[A229] Kingfisher (<i>Alcedo atthis</i>)	Detailed conservation objectives for this site, (Version 1, October 2022⁵), were reviewed as part of the	Direct Effects (Disturbance) The Proposed Wind Farm site is located approximately 9km (overland) from the SPA therefore direct effects on kingfisher (SCI population) associated with development of the site have been ruled out.	Yes

⁵ NPWS (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 Site	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the in 2023 and 2024.	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
approximately 9km from Proposed Wind Farm site Hydrological distance: approximately 15km from the Proposed Wind Farm site		assessment and are available at www.npws.ie	Kingfisher were recorded along the Tullaroan Stream within the Proposed Wind Farm site during surveys. However, these birds are considered to be separate from the SPA population given the distance between the SPA and the Proposed Wind Farm site – i.e. over 9km overland and over 15km channel distance. Results from the 2010 national kingfisher survey estimated individual kingfisher territories on the River Nore as spanning from <1km up to a maximum of 5km of channel length (Cummins et al., 2010). The Proposed Wind Farm site is over 15km channel distance from the SPA. The Proposed Grid Connection underground cabling works will be largely confined to the existing road network. The Proposed Grid Connection underground cabling crosses the SPA approximately 1km north-west of Ballyragget. The crossing will be via Horizontal Directional Drilling (HDD) and has been designed to pass cabling beneath the River Nore, thus avoiding works within the SPA boundary. The Proposed Grid Connection underground cabling works are broadly analogous in scale to existing activities in the general area (e.g. farm machinery, road works, vehicle movements). The proposed works are not significant in the context of the baseline conditions. As such, given the nature of the Proposed Grid Connection underground cabling works, the potential for direct impacts (disturbance) on populations of SCI species associated with the SPA as a result of the Proposed Project have been ruled out. .	

European Sites and distance from the Site	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the in 2023 and 2024.	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			Indirect Effects (Deterioration in Water Quality) Taking a precautionary approach a potential for indirect effect to the SPA (and associated SCI species) was identified via a direct surface water pathway between the SPA and the Proposed Project, both the Proposed Wind Farm site and Grid Connection Route are hydrologically linked to the SPA. Therefore, there is potential for deterioration of water quality during the construction and operational phases of the Proposed Project. Potential pathways for indirect effects on kingfisher were identified via a deterioration in water quality potentially resulting in habitat degradation and reduced prey availability. A complete source-pathway-receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Project to result in likely significant effects on this European Site. The SAC is considered to be within the Likely Zone of Influence of the Proposed Project and further assessment is required.	

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, would be likely to have a significant effect on the following European Sites:

- River Barrow and River Nore SAC
- River Nore SPA

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

5.

INFORMATION TO INFORM APPROPRIATE ASSESSMENT

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

- River Barrow and River Nore SAC [002162]
- River Nore SPA [004233]

The following sections consider each European Site individually to:

1. Determine which individual qualifying interests (QI) 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 interest that have the potential to be adversely affected.

5.1 Identification of relevant Qualifying Features and Desk Study

5.1.1 River Barrow and River Nore SAC [002162]

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

- A pathway for indirect effects on the aquatic qualifying interest (QIs) species and habitats of the SAC exist in the form of water quality deterioration and habitat degradation via surface and ground water pathways during construction, operation and decommissioning of the Proposed Project.

Table 6-1 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 Interests potentially affected.

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
[1016] Desmoulin's whorl snail (<i>Vertigo moulinsiana</i>)	To maintain the favourable conservation condition of Desmoulin's whorl snail in the River Barrow and River Nore SAC.	<i>Vertigo moulinsiana</i> is a terrestrial species associated with vegetation of wetland habitats often bordering waterbodies such as canals, ditches lakes and rivers (Long and Brophy, 2019 ⁶). The proposed drilling pits associated with the HDD are located outside the riparian habitat, where this species might occur. As such, no direct impacts will occur on this species. No further assessment is required.	No

⁶ https://www.npws.ie/sites/default/files/publications/pdf/TWM104_0.pdf

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
[1029] Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)	The status of the freshwater pearl mussel (<i>Margaritifera margaritifera</i>) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review.	The Proposed Project is located within the Nore Lower Margaritifera catchment and the Barrow Margaritifera catchment, both of which are classified as 'Catchments with previous records of Margaritifera, but current status unknown'. The Proposed Wind Farm site is hydrologically connected to the Nore Lower Margaritifera catchment. The Proposed Grid Connection underground cabling route is also hydrologically connected to the Nore Lower Margaritifera catchment. No freshwater pearl mussel eDNA was detected samples (see Aquatic Baseline Report, Appendix 5). These results were considered as evidence of the species absence within the survey area, in keeping with the known distribution (absence) of the species in the wider survey area. However, given the status of the species within the SAC is currently under review, and taking a precautionary approach, this species is still considered a QI of the SAC for the purposes of this assessment. SSCOs for Nore freshwater pearl mussel would be considered applicable to the freshwater pearl mussel and as such deterioration in water quality within the SAC would also be considered to impact on this species. A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.	Yes
[1990] Nore freshwater pearl mussel <i>Margaritifera durrovensis</i>	To restore the favourable conservation condition of the Nore freshwater pearl mussel in the River Barrow and River Nore SAC	The Proposed Project is hydrologically linked to the River Barrow and River Nore SAC. as per map 7 of the Site Specific Conservation Objectives (SSCO) for this SAC), the population of Nore freshwater pearl mussel occurs between Poorman's Bridge and the Avonmore Creamery above Ballyragget. The location of the HDD may overlap with the mapped population of this species. However, the HDD launch and receptor pits will be located within the existing road infrastructure and an agricultural grassland. No instream works within the River Nore are proposed. As such, there is no potential for direct impacts on this QI species.	Yes

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
		There is however, the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. The Conservation Objectives (Cos) for this species is to restore the favourable conservation status of the species within the SAC and specific conservation targets for this species relate to water quality and the maintenance of their host fish species, specially to maintain sufficient juvenile salmonids to host glochidial larvae. Deterioration in water quality within the SAC would undermine both of these conservation objectives in particular, and prevent the Nore freshwater pearl mussel from regaining favourable conservation status within the SAC. A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.	
[1092] White-clawed crayfish (<i>Austropotamobius pallipes</i>)	To maintain the favourable conservation condition of White-clawed crayfish in the River Barrow and River Nore SAC.	Due to the hydrological proximity of the River Barrow and River Nore SAC to the Proposed Wind Farm site (5.9km) and the HDD crossing of the River Nore, designated as part of the River Barrow and River Nore SAC, a potential pathway for indirect effects on this QI species via the deterioration of water quality resulting from pollution entering the Tullaroan Stream within the Proposed Wind Farm site, associated with the construction and operational phases of the development. No white clawed cray fish eDNA was detected in any samples, however, crayfish plague was detected in a sample taken from within the Proposed Wind Farm site (see Aquatic Baseline Report, Appendix 5). This QI species is located in the same hydrological sub-catchment and groundwater bodies to the Site, as seen in Map 7 of the SSCO document (NPWS 2011). Pollution of surface water may result in adverse impacts on the following downstream aquatic species: White-clawed crayfish (<i>Austropotamobius pallipes</i>) in the absence of mitigation. A complete source-pathway-receptor chain for adverse effects on this species was identified and it is assessed further in this NIS.	Yes

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
[1095] Sea lamprey (<i>Petromyzon marinus</i>)	To restore the favourable conservation condition of Sea lamprey in the River Barrow and River Nore SAC.	Due to the hydrological proximity of the River Barrow and River Nore SAC to the Proposed Wind Farm Site (5.9km) and the HDD crossing of the River Nore, designated as part of the River Barrow and River Nore SAC, a potential pathway for indirect effects on these QI species via the deterioration of water quality resulting from pollution entering the Tullaroan Stream within the Site.	Yes
[1096] Brook lamprey (<i>Lampetra planeri</i>)	To restore the favourable conservation condition of River lamprey in the River Barrow and River Nore SAC.	As stated in the Aquatic Baseline Report the findings of the aquatic surveys within the Proposed Wind Farm site include, ‘ <i>Salmonid, lamprey and European eel habitat was predominantly poor and moderate across the Proposed Wind Farm site with one location displaying good habitat for salmonid spawning, nursery and holding as well as good spawning habitat for lamprey. Lamprey was not found</i> ’ (Appendix 5).	Yes
[1099] River lamprey (<i>Lampetra fluviatilis</i>)	To restore the favourable conservation condition of River lamprey in the River Barrow and River Nore SAC.	The findings of the aquatic surveys conducted along the Proposed grid connection underground cabling route as stated in the Aquatic Baseline Report include, ‘ <i>Salmonid, lamprey and European eel habitat ranged from poor to moderate to good along the proposed grid route. A number of locations (e.g. GR-1, GR-9, GR-12) displaying moderate to good habitat for salmonid spawning, nursery and holding as well as moderate to good spawning and nursery habitat for lamprey and locations GR-12 and GR-13 provided good habitat for European eel. A brook lamprey was recorded at sample location GR-1</i> ’. (Appendix 5). Pollution of surface water may result in adverse impacts on the following downstream QI aquatic species: Sea lamprey (<i>Petromyzon marinus</i>), Brook lamprey (<i>Lampetra planeri</i>) and River lamprey (<i>Lampetra fluviatilis</i>) in the absence of mitigation. A complete source-pathway-receptor chain for adverse effects on these species was identified and it is assessed further in this NIS.	Yes
[1103] Twaite shad (<i>Alosa fallax</i>)	To restore the favourable conservation condition of Twaite	Due to the hydrological proximity of the River Barrow and River Nore SAC to the development site (5.9km) and the HDD crossing of the River Nore, designated as part of the	Yes

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
	shad in the River Barrow and River Nore SAC.	River Barrow and River Nore SAC, a potential pathway for indirect effects on these QI species via the deterioration of water quality resulting from pollution entering the Tullaroan Stream within the site. Pollution of surface water may result in adverse impacts on the following downstream QI aquatic species: Twaite shad (<i>Alosa fallax</i>) in the absence of mitigation. A complete source-pathway-receptor chain for adverse effects on these species was identified and it is assessed further in this NIS.	
[1106] Atlantic salmon (<i>Salmo salar</i>) (only in fresh water)	To restore the favourable conservation condition of Salmon in the River Barrow and River Nore SAC.	Due to the hydrological proximity of the River Barrow and River Nore SAC to the development site (5.9km) and the HDD crossing of the River Nore, designated as part of the River Barrow and River Nore SAC, a potential pathway for indirect effects on these QI species is the deterioration of water quality resulting from pollution entering the Tullaroan Stream within the site. According to the Aquatic Baseline Report (Appendix 5), ‘<i>Salmonid habitat was predominantly poor and moderate across the Proposed Wind Farm site with one location displaying good habitat for salmonid spawning, nursery and holding. Atlantic salmon was found within surveys on the Tullaroan stream which flows through the Proposed Wind Farm site. Salmonid habitat ranged from poor to moderate to good along the Proposed grid connection underground cabling route. A number of locations (e.g. GR-1, GR-9, GR-12) displaying moderate to good habitat for salmonid spawning, nursery and holding. A dead salmonid parr was found at sample location GR-2, salmonid alevins were recorded at sample site GR-8.</i>’ Pollution of surface water may result in adverse impacts on the following downstream QI aquatic species: Atlantic salmon (<i>Salmo salar</i>) in the absence of mitigation. A complete source-pathway-receptor chain for adverse effects on these species was identified and it is assessed further in this NIS.	Yes

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
[1130] Estuaries	To maintain the favourable conservation condition of Estuaries in the River Barrow and River Nore SAC.	The Site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located >40km downstream of the Site, any changes in water quality as a result of the Proposed Project would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Project (separation distance of >40km) along with the attenuating and diluting property of the intervening waterbody. No further assessment is required.	No
[1140] Mudflats and sandflats not covered by seawater at low tide	To maintain the favourable conservation condition of the Mudflats and sandflats not covered by seawater at low tide in the River Barrow and River Nore SAC.	According to Map 3 of the NPWS Conservation Objectives document this QI habitat is located approx. 60km from the Site. Given the large hydrological distance and nature of the works proposed as part of the Proposed Project, no complete source- pathway- receptor chain for any effect on this habitat as a result of the Proposed Project was identified. No further assessment is required.	No
[1310] Salicornia and other annuals colonizing mud and sand	To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in the River Barrow and River Nore SAC.	According to Map 5 of the NPWS Conservation Objectives document, the nearest known location of this QI habitat is located approx. 65km from the Site. The Site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located >60km downstream of the Site, any changes in water quality as a result of the Proposed Project would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Project (separation distance of >60km) along with the attenuating and diluting property of the intervening waterbody. No further assessment is required.	No

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
[1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	To restore the favourable conservation condition of Atlantic salt meadows in the River Barrow and River Nore SAC.	According to Map 5 of the NPWS Conservation Objectives document, the Site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located >60km downstream of the Site, any changes in water quality as a result of the Proposed Project would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Project (separation distance of >60km) along with the attenuating and diluting property of the intervening waterbody. No further assessment is required.	No
[1355] Otter (<i>Lutra lutra</i>)	To restore the favourable conservation condition of Otter in the River Barrow and River Nore SAC.	While no signs of otter were recorded within the Proposed Project infrastructure footprint, signs of otter were identified in the wider study area within the Proposed Wind Farm site and Proposed Grid Connection underground cabling route, including along Tullaroan River and the River Nore which forms part of the River Barrow and River Nore SAC to which the Proposed Project is hydrologically linked. HDD will take place underneath the River Nore, north of Ballyragget Bridge. Given the proposed works and the findings of the baseline surveys for otter, no potential for habitat destruction, loss of breeding or resting places and no direct mortality related impacts on otter. However, otter are considered to be within the ZoI of the Proposed Project. There is potential for construction works to result in the run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream of the Proposed Wind Farm site and Proposed Grid Connection underground cabling route. This has the potential to impact on the conservation objectives for this species in particular in relation to fish biomass available, for example a degradation in water quality could impact on prey resource for otter. In addition to the above, construction works associated with the Proposed Project have the potential to result in disturbance related impacts to otters associated with the SAC.	Yes

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
		A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.	
[1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	To restore the favourable conservation condition of Mediterranean salt meadows in the River Barrow and River Nore SAC.	According to Map 5 of the SSCO document for this SAC, the Site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located >70km downstream of the Site. Any changes in water quality as a result of the Proposed Project would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Project (separation distance of >70km) along with the attenuating and diluting property of the intervening waterbody. No further assessment is required.	No
[1421] Killarney fern (<i>Trichomanes speciosum</i>)	To maintain the favourable conservation condition of Killarney Fern in the River Barrow and River Nore SAC.	According to Map 7 of the SSCO document (NPWS 2011), the nearest known location of this QI species is located approx. 45km downstream of the Site. Given this QI species is terrestrial in nature potential indirect impacts associated with deterioration of water quality within the SAC as a result of the Proposed Project would not have an effect on this QI species. No further assessment is required.	No
[3260] Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	To maintain the favourable conservation condition of Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation in the River Barrow and River Nore SAC.	The full distribution of this habitat and its sub-types within the SAC is currently unknown. Taking a precautionary approach, the potential for significant effect on this QI habitat cannot be excluded. A deterioration in water quality, in particular from silt laden runoff, could have the potential to undermine the conservation objectives for this QI habitat which requires the substratum to be free from fine sediment. A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.	Yes

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
[4030] European dry heaths	To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC.	Works are proposed within this SAC as part of the construction of the Proposed Grid Connection underground cabling route. No instream works are proposed and this habitat was not recorded at the launch pit location within the SAC and therefore there is no potential to impact on this terrestrial QI habitat. Works located within the SAC are located in improved agricultural grassland. No further assessment is required.	No
[6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC. Detailed conservation objectives for this site, (Version 1, July 2011), were reviewed as part of the assessment and are available at www.npws.ie .	The Proposed Wind Farm site is located outside of the SAC and therefore there is no potential to impact on this terrestrial QI habitat. Works are proposed within this SAC as part of the construction of the Proposed grid connection underground cabling route. No instream works are proposed and this habitat was not recorded at the launch pit location within the SAC and therefore there is no potential to impact on this terrestrial QI habitat. No further assessment is required.	No
[7220] * Petrifying springs with tufa formation (Cratoneurion)	To maintain the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion) in the River Barrow and River Nore SAC.	The full extent of this QI habitat within the SAC is currently unknown. However, as per Map 6 of the SSCOs the nearest known record for this QI habitat is located in excess of 20km from the Site. No groundwater level impacts are predicted from the construction of the Proposed Grid Connection underground cabling, access roads, substation compound, turbine delivery route works or met mast due to the shallow nature of the excavations proposed (i.e. 0 ~1.2m). As per guidance (SEPA, 2017 ⁷) a buffer of 250m is required from sensitive ground water dependant habitats where excavations will exceed 1m, and 100m where excavations will not exceed 1m. Based on best available data for this habitat within the SAC and the separation distance from the works associated with the Proposed Project (well in excess of 250m) direct impacts to this QI habitat as a result of the Proposed Project can be excluded.	Yes

⁷ <https://www.sepa.org.uk/media/144266/tips-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions.pdf>

Qualifying Interests	Conservation Objective (NPWS, Version 1, July 2011 ⁵),	Rationale	Potential for Adverse Effects Y/N
		The northern section of the Proposed Grid Connection underground cabling route, between Freshford and Ballyragget, is underlain by a Regionally Important Aquifer – karstified (diffuse). The Proposed Wind Farm site is located within the same hydrological sub-catchment (Munster_SC_010) and groundwater catchment (Kilmanagh Gravels) as the SAC. Significant impacts on groundwater are not predicted to occur given the low permeability nature of the underlying bedrock aquifers within the Proposed Wind Farm site and the low potential for groundwater dispersion and movement within the underlying aquifer (see Appendix 4- Hydrology). However, taking a precautionary approach the potential for indirect impacts as a result of deterioration in ground water quality was considered to have the potential to undermine the conservation objectives for this QI should a significant pollution event occur. A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.	
[91A0] Old sessile oak woods with Ilex and Blechnum in the British Isles	To restore the favourable conservation condition of Old oak woodland with Ilex and Blechnum in the River Barrow and River Nore SAC.	Works are proposed within this SAC as part of the construction of the Proposed grid connection underground cabling route. No instream works are proposed and this habitat was not recorded at the launch pit location adjacent to this SAC along the and therefore there is no potential to impact on this terrestrial QI habitat. No further assessment is required.	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 the River Barrow and River Nore SAC.	Works are proposed within this SAC as part of the construction of the Proposed grid connection underground cabling route. No instream works are proposed and this habitat was not recorded at the launch pit location adjacent to this SAC along the and therefore there is no potential to impact on this terrestrial QI habitat. On review of the conservation objectives for this QI habitat and based on the potential effects from the Proposed Project (deterioration of water quality within the SAC) no potential to undermine the conservation objectives for this QI habitat was identified. No further assessment is required.	No

5.1.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form⁸, 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	Code	Threats, Pressures and Activities	Inside/Outside the SAC
High	A02.01	Agricultural intensification.	Both
High	H01	Pollution to surface waters (limnic, terrestrial, marine & brackish).	Both
High	J02.05.02	Modifying structures of inland water courses.	Inside
High	J02.12.02	Dykes and flooding defence in inland water systems.	Inside
High	K01.01	Erosion (Natural biotic and abiotic processes (without catastrophes)).	Inside
Low	A10.01	Removal of hedges and copses or scrub.	Inside
Low	C01.01.01	Sand and gravel quarries.	Both
Low	D03.01	Port areas.	Inside
Low	E02	Industrial or commercial areas.	Outside
Low	F01.01	Intensive fish farming, intensification.	Inside
Low	F02.01.02	Netting.	Inside
Low	F02.03	Leisure fishing.	Inside
Medium	A04.01.01	Intensive cattle grazing.	Inside
Medium	B02	Forest and Plantation management & use.	Both
Medium	B05	Use of fertilizers (forestry).	Both
Medium	B07	Forestry activities not referred to in the site-specific threats, pressures and activities list.	Both
Medium	C01.03	Peat extraction.	Outside

⁸ The Natura 2000 data form provides information on Natura 2000 sites, through a site-specific standard data form (SDF). In addition to other site-specific information, the standard data form provides the list of all species and habitat types for which a site is officially designated.

Negative Impacts			
Rank	Code	Threats, Pressures and Activities	Inside/Outside the SAC
Medium	F02	Fishing and harvesting aquatic resources.	Outside

Medium	I01	Invasive non-native species.	Inside
Medium	J02	Human induced changes in hydraulic conditions	Both
Medium	J02.02.01	Dredging/ removal of limnic sediments.	Inside
Medium	J02.06	Water abstractions from surface waters.	Inside
Medium	J03.02.01	Reduction in migration/ migration barriers.	Inside
Medium	M01	Changes in abiotic conditions	Inside

Potential pathways for effect with regard to site-specific threats, pressures and activities have been identified in relation to potential for “Pollution: Pollution to surface waters (limnic, terrestrial, marine & brackish)”, “Natural System modifications: Modifying structures of inland water courses”, “Natural System modifications: Human induced changes in hydraulic conditions”, “Agriculture: Removal of hedges and copses or scrub”.

5.1.1.3 QI Specific Information

5.1.1.3.1 [1990] Nore freshwater pearl mussel *Margaritifera durrovensis*

According to the Article 17 Report (NPWS, 2019), the overall Conservation Status for this species is ‘Bad’ and the overall Conservation Trend is ‘Deteriorating’, unchanged since the 2013 assessment.

The current distribution of the Nore freshwater pearl mussel mapped habitats (as per Map 7 of the SSCOs for this SAC) are not hydrologically connected as the Site is located downstream of these mapped habitats. However, the Conservation Objective (CO) for this species is to restore the favourable conservation status of the species within the SAC and specific conservation targets for this species relate to water quality and the maintenance of their host fish species, specially to maintain sufficient juvenile salmonids to host glochidial larvae. Deterioration in water quality within the SAC would undermine both of these conservation objectives in particular and prevent the Nore freshwater pearl mussel for regaining favourable conservation status within the SAC.

Conservation Objective Targets and Attributes - Nore freshwater pearl mussel

Table 5-3. Targets and attributes for Nore freshwater pearl mussel

Attribute	Target	Potential for Proposed Project to undermine Conservation Objective Target
Distribution	Maintain at 15.5km. See map 7	Yes - deterioration in water quality and habitat degradation could impact on host fish species, resulting in reduction in overall distribution
Population size: adult mussels	Restore to 5,000 adult mussels	Yes - deterioration in water quality and habitat degradation could impact on host fish species which could prevent this target being achieved.
Population structure: recruitment	Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	Yes - deterioration in water quality and habitat degradation could impact on host fish species which could prevent this target being achieved.

Population structure: adult mortality	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	No (direct impacts will not occur as a result of the Proposed Project).
Habitat extent	Restore suitable habitat in length of river corresponding to distribution target (15.5km; see map 7) and any additional stretches necessary for salmonid spawning	Yes - deterioration in water quality and habitat degradation could impact on host fish species, silt laden run-off could also impact on salmonid spawning grounds (habitat degradation) which could prevent this target being achieved.
Water quality: Macroinvertebrates and phytobenthos (diatoms)	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93	Yes - deterioration in water quality could impact prevent this target being achieved.
Substratum quality: Filamentous algae (macroalgae), macrophytes (rooted higher plants)	Restore substratum quality- filamentous algae: absent or trace (<5%)	Yes - deterioration in water quality could result in increased algae in the system.
Substratum quality: sediment	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	Yes - construction/operation/ decommissioning of the Proposed Project has the potential to result in silt-laden run-off in the absence of mitigation.
Substratum quality: oxygen availability	Restore to no more than 20% decline from water column to 5cm depth in substrate	Yes - deterioration in water quality could impact prevent this target being achieved.
Hydrological regime: flow variability	Restore appropriate hydrological regimes	No (changes to hydrological regime as a result of the Proposed Project will not occur)
Host fish	Maintain sufficient juvenile salmonids to host glochidial larvae	Yes - deterioration in water quality and habitat degradation, including smothering of spawning grounds could impact on host fish species which could prevent this target being achieved.

5.1.1.3.2 [1029] Freshwater pearl mussel (*Margaritifera margaritifera*)

Description from SSCO document

According to the site-specific conservation objectives the status of Freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review.

Targets and Attributes: [1029] Freshwater pearl mussel *Margaritifera margaritifera*

This species was not recorded at the Site during the surveys undertaken. However, following the precautionary principle a potential pathway for adverse effect on the conservation objectives of the species was identified in the form of deterioration of water quality that could have an adverse effect on the habitat within the downstream SAC.

The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. As such, no Targets and Attributes are available within the SSCO document. The outcome of this review will determine whether a site-specific conservation objective is set for this species.

5.1.1.3.3 [1092] White-clawed crayfish (*Austropotamobius pallipes*)

Description from SSCO document

The distribution of white-clawed crayfish within River Barrow and River Nore SAC is illustrated on Map 7 of the site-specific conservation objective document (NPWS, 2011). According to the site-specific conservation objectives white-clawed crayfish (*Austropotamobius pallipes*) the distribution of crayfish is present almost throughout this SAC. The records extend as far downstream as Thomastown on the Nore and Graiguenamanagh on the Barrow.

Targets and Attributes

Individual targets and attributes for this conservation objective are considered in Table 5-3 below:

Table 5-4 Targets and Attributes for White Clawed Crayfish

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Distribution	No reduction from baseline.	Yes - deterioration in water quality and habitat degradation could result in reduced distribution of this species.
Population structure: recruitment	Juveniles and/or females with eggs in at least 50% of positive samples	Yes - deterioration in water quality and habitat degradation could result in reduced distribution of this species.
Negative indicator species	No alien crayfish species	No (alien crayfish species not known to be present within the system)
Disease	No instances of disease	No (crayfish plague has been detected within the SAC as part of surveys undertaken for this project, however, it will not be spread as a result of the Proposed Project progressing – see rationale in Table 5.1).

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Water quality	At least Q3-4 at all sites sampled by EPA.	Yes - deterioration in water quality could undermine this target.
Habitat quality: heterogeneity	No decline in heterogeneity or habitat quality.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.4 [1095] Sea lamprey (*Petromyzon marinus*)

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2011a), artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Juveniles burrow in areas of fine sediment in still water and lampreys spawn in clean gravels. Surveys undertaken as part of the Proposed Project only identified Lamprey ammocoetes (*Lampetra sp.*) from a single site during targeted electro-fishing across the 19 no. survey sites in the vicinity of the Proposed Project. The SSCO for the SAC don't specify where this QI species may be present within the SAC.

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

CO Targets and Attributes – sea lamprey

Table 5-5 Targets and Attributes for Sea lamprey

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary.	No (Proposed Project will not result in any barriers to movement)
Population structure of juveniles	At least three age/size groups present.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Juvenile density in fine sediment	Juvenile density at least 1/m ² .	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Availability of juvenile habitat	More than 50% of sample sites positive.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.5 [1096] Brook lamprey (*Lampetra planeri*)

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2011a), artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Juveniles burrow in areas of fine sediment in still water and lampreys spawn in clean gravel. Surveys undertaken as part of the Proposed Project only identified Lamprey ammocoetes (*Lampetra sp.*) from a single site during targeted electro-fishing across the 19 no. survey sites in the vicinity of the Proposed Project. The SSCO for the SAC don't specify where this QI species may be present within the SAC.

River and brook lamprey are indistinguishable as larvae. The inability to distinguish between river lamprey and brook lamprey larvae, and the challenges associated with sampling for adult river lamprey, means that an evaluation of their actual range and population size cannot be undertaken (NPWS, 2019). The overall Conservation Status for this species is therefore assessed as 'Unknown' (NPWS, 2019).

Targets and Attributes

Table 5-6: Targets and Attributes, for brook lamprey

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Distribution	Access to all watercourses down to first order streams.	No (Proposed Project will not result in any barriers to movement)
Population structure of juveniles	At least three age/size groups of brook/river lamprey present.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m ² .	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Extent and distribution of spawning habitat.	No decline in extent and distribution of spawning beds.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Availability of juvenile habitat	More than 50% of sample sites positive.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.1 [1099] River lamprey (*Lampetra fluviatilis*)

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2011a), artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Juveniles burrow in areas of fine sediment in still water and lampreys spawn in clean gravel. Surveys undertaken as part of the Proposed Project only identified Lamprey ammocoetes (*Lampetra sp.*) from a single site during targeted electro-fishing across the 19 no. survey sites in the vicinity of the Proposed Project. The SSCO for the SAC don't specify where this QI species may be present within the SAC.

River and brook lamprey are indistinguishable as larvae. The inability to distinguish between river lamprey and brook lamprey larvae, and the challenges associated with sampling for adult river lamprey, means that an evaluation of their actual range and population size cannot be undertaken (NPWS, 2019). The overall Conservation Status for this species is therefore assessed as ‘Unknown’ (NPWS, 2019).

Targets and Attributes

Table 5-7: Targets and Attributes for river lamprey

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Distribution: extent of anadromy	Greater than 75% of main stem and major tributaries down to second order accessible from estuary.	No (Proposed Project will not result in any barriers to movement)
Population structure of juveniles	At least three age/size groups of river/brook lamprey present.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m ² .	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Availability of juvenile habitat	More than 50% of sample sites positive.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.2 [1103] Twaite shad (*Alosa fallax*)

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2011a), In some catchments, artificial barriers block twaite shads’ upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Regular breeding has been confirmed in the River Barrow in recent years, but not in the Nore. According to the Site Synopsis document for the River Barrow and River Nore SAC (NPWS, 2016), this site is one of only a handful of spawning grounds in the country for Twaite Shad. Surveys undertaken as part of the Proposed Project did not detect this species.

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

Targets and Attributes

Table 5-8 Targets and Attributes for Twaite Shad

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary.	No (Proposed Project will not result in any barriers to movement)
Population structure: age classes	More than one age class present.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning habitats.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Water quality: oxygen levels	No lower than 5mg/l.	Yes - deterioration in water quality could undermine this target.
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.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.3 [1106] Atlantic salmon (*Salmo salar*)

Description from SSCO document

According to the site-specific conservation objectives document (NPWS, 2011), artificial barriers block salmon's upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. River Dinin (IE_SE_15D080600) was surveyed as part of the Water Framework Directive fish monitoring surveys in 2017, and salmon were the second most abundant fish recorded during this survey within the river Dinin catchment. Two age classes for salmon were present.

Targets and Attributes

Table 5-9 Targets and Attributes for Atlantic Salmon

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary.	No (Proposed Project will not result in any barriers to movement)
Adult spawning fish Number	Conservation Limit (CL) for each system consistently exceeded.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Out-migrating smolt abundance	No significant decline.	Yes - deterioration in water quality could undermine this target.
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Water quality	At least Q4 at all sites sampled by EPA.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.4 [1355] Otter (*Lutra lutra*)

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2011a), otter distribution based on 1980/81 survey findings, is 88% in SACs. Current range in south-east estimated at 73% (Bailey and Rochford, 2006 cited in NPWS, 2019).

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

Targets and Attributes

Table 5-10. Table Targets and Attributes for Otter

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Distribution	No significant decline.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target (reduced prey availability)
Extent of terrestrial habitat	No significant decline. Area mapped and calculated as 122.8ha above high-water mark (HWM); 1136.0ha along riverbanks / around ponds.	No (Proposed Project will not result in any reduction in otter habitat)
Extent of marine habitat	No significant decline. Area mapped and calculated as 857.7ha.	No (Proposed Project will not result in any reduction in otter habitat)
Extent of freshwater (river) habitat.	No significant decline. Length mapped and calculated as 616.6km.	No (Proposed Project will not result in any reduction in otter habitat)

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Extent of freshwater (lake) habitat.	No significant decline. Area mapped and calculated as 2.6ha.	No (Proposed Project will not result in any reduction in other habitat)
Couching sites and holts	No significant decline.	No (Proposed Project will not result in any loss of couching or resting sites)
Fish biomass available	No significant decline.	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target (reduced prey availability)

5.1.1.3.1 [3260] Water courses of plain to montane levels with the Ranunculion fluidities and Callitricho-Batrachion vegetation

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2011a), the full distribution of this habitat and its sub-types in this site is currently unknown. The basis of the selection of the SAC for the habitat is the presence of an excellent example of the vegetation community (nutrient-rich type) associated with extensive tufa deposits on the riverbed in the Kings tributary of the Nore (Heuff, 1987). Other examples of this or other sub-types may be present within the SAC.

According to the Site Synopsis document for the River Barrow and River Nore SAC (NPWS, 2016), Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include water-starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), water-milfoils (*Myriophyllum* spp.), the pondweed *Potamogeton x nitens*, Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and crowfoots (*Ranunculus* spp.).

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

Targets and Attributes

Table 5-11: Target and attributes for Water courses of plain to montane levels with the Ranunculion fluidities and Callitricho-Batrachion vegetation

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Habitat area	Area stable or increasing, subject to natural processes	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Habitat distribution	No decline, subject to natural processes	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Hydrological regime: river flow	Maintain appropriate hydrological regimes	No (changes to hydrological regime as a result of the Proposed Project will not occur).
Hydrological regime: groundwater discharge	The groundwater flow to the habitat should be permanent and	No (changes to hydrological regime as a result of the Proposed Project will not occur).

	sufficient to maintain tufa formation	
Substratum composition: particle size range	The substratum should be dominated by large particles and free from fine sediments	Yes - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.2 [7220] Petrifying springs with tufa formation (Cratoneurion)

The full extent of this QI habitat within the SAC is currently unknown (NPWS, 2019). However, as per Map 6 of the SSCOs the nearest known record for this QI habitat is located in excess of 25km from the Site.

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

Targets and Attributes

Table 5-12. Targets and attributes for Petrifying springs with tufa formation (Cratoneurion)

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Habitat area	Area stable or increasing, subject to natural processes.	Yes - deterioration in ground water quality as a result of silt-laden run-off and other pollutants could undermine this target.
Habitat distribution	No decline	Yes - deterioration in ground water quality as a result of silt-laden run-off and other pollutants could undermine this target.
Hydrological regime: height of water table; water flow	Maintain appropriate hydrological regimes	No (changes to hydrological regime as a result of the Proposed Project will not occur).
Water quality	Maintain oligotrophic and calcareous conditions	Yes - deterioration in ground water quality as a result of silt-laden run-off and other pollutants could undermine this target.
Vegetation composition: typical species	Maintain typical species	Yes - deterioration in ground water quality as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.2

River Nore SPA [004233]

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

- Deterioration to water quality via pollutants to surface water run off to the Tullaroan Stream resulting from works associated with the construction, operational and decommissioning phases of the Proposed Project.
- Deterioration to water quality via pollutants entering the River Nore during the construction of the Proposed Grid Connection underground cabling.

Table 5-15 below lists the qualifying features of this European Site and determines, in the light of their Conservation Objectives, whether there is any complete source-pathway-receptor chain, by which adverse effects may occur.

5.1.2.1

Identification of Individual Qualifying Features with the Potential to be Affected

Table 5-13. Assessment of Qualifying features potentially affected.

Qualifying feature	Conservation Objective (NPWS, Version 1, October 2022 ⁹),	Rationale	Potential for Adverse Effects Y/N
[A229] Kingfisher (<i>Alcedo atthis</i>)	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.	According to the River Nore SPA SSCO document (NPWS 2011), the River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher. Kingfisher were recorded along the Tullaroan Stream within the Proposed Wind Farm site during surveys. However, these birds are considered to be separate from the SPA population given the distance between the SPA and the Proposed Wind Farm site – i.e. over 9km overland and over 15km channel distance. Results from the 2010 national kingfisher survey estimated individual kingfisher territories on the River Nore as spanning from <1km up to a maximum of 5km of channel length (Cummins et al., 2010). The Proposed Wind Farm site is over 15km channel distance from the SPA.	Yes

⁹NPWS (2022) Conservation objectives for River Nore SPA [004233]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.

Qualifying feature	Conservation Objective (NPWS, Version 1, October 2022 ⁹),	Rationale	Potential for Adverse Effects Y/N
		The Proposed Grid Connection underground cabling works will be largely confined to the existing road network and involve minor works over a short period. The Proposed Grid Connection underground cabling crosses the SPA approximately 1km north-west of Ballyragget. The crossing will be done via Horizontal Directional Drilling (HDD) and has been designed to pass cabling beneath the River Nore, thus avoiding works within the SPA boundary. The Proposed Grid Connection underground cabling works are broadly analogous in scale to existing activities in the general area (e.g. farm machinery, road works, vehicle movements). The proposed works are not significant in the context of the baseline conditions. As such, given the nature of the Proposed Grid Connection underground cabling works, the potential for direct impacts (disturbance) on populations of SCI species associated with the SPA as a result of the Proposed Project have been ruled out. . However, the Proposed Project is hydrologically linked to the SPA and taking a precautionary approach it was considered that the Proposed Project has the potential to undermine the favourable conservation status of this SCI species through a deterioration of water quality during the construction and operational phases of the Proposed Project. A deterioration of water quality has the potential to result in habitat degradation and reduced prey availability which could have overall implications for maintaining or restoring favourable conversation status for the SCI species. A complete source-pathway-receptor chain for adverse effects on this species was identified and it is assessed further in this NIS.	

5.1.2.2 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 5-16.

Table 5-14 Site-specific threats, pressures, and activities.

Negative Impacts			
Rank		Threats and Pressures	Inside/Outside the SPA
Medium	D03.01	Port areas	Inside
Medium	J02.01	Landfill, land reclamation and drying out, general	Outside

Potential pathways for effect with regard to site-specific threats, pressures and activities have been identified in relation to potential for “Transportation and service corridors: Port areas” and “Natural System modifications: Landfill, land reclamation and drying out, general”.

5.1.2.3 Species Specific Information

5.1.2.3.1 [A229] Kingfisher (*Alcedo atthis*)

Description from SSCO document

A survey in 2010 recorded 22 pairs of Kingfisher (based on 16 probable and 6 possible territories) within the SPA. Other species which occur within the site include Mute Swan (35), Mallard (267), Cormorant (14), Grey Heron (45), Moorhen (14), Snipe (17) and Sand Martin (1,029) – all figures are peak counts recorded during the 2010 survey. The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.

Targets and Attributes

Table 5-15: Targets and attributes

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Population size	No significant decline in the long term	No (changes to kingfisher population size will not occur as a result of the Proposed Project).
Productivity rate	Sufficient productivity to maintain the population trend as stable or increasing	No (changes to kingfisher productivity rate will not occur as a result of the Proposed Project).
Spatial distribution of territories	No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation	No (changes to kingfisher Spatial distribution of territories will not occur as a result of the Proposed Project).

Extent and quality of nesting banks and other suitable nesting features	Sufficient area of high quality nesting habitat to support the population target	No (Extent and quality of nesting banks and other suitable nesting features will not occur as a result of the Proposed Project).
Forage spatial distribution, extent, abundance and availability	Sufficient number of locations, area of suitable forage habitat and available forage biomass to support the population target	No (changes to Forage spatial distribution, extent, abundance and availability will not occur as a result of the Proposed Project).
Water quality	Both biotic (i.e. Q-value) and abiotic indices reflect overall good-high quality status	Yes - (potential for changes to water quality as a result of the Proposed Project).
Barriers to connectivity	No significant increase	No (barriers to connectivity will not occur as a result of the Proposed Project).
Disturbance to breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding Kingfisher	No (disturbance to breeding sites will not occur as a result of the Proposed Project).

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/Special Conservation Interests. This assessment is undertaken in the absence of any mitigation and in respect of the conservation objectives of the European Site/s. The Conservation Objectives each of the European Sites assessed were reviewed on the 14/08/2024. The Conservation Objectives for these sites are available at the following locations:

- NPWS (2011) Conservation Objectives: River Barrow and River Nore SAC 002162. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2022) Conservation objectives for River Nore SPA [004233]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage
Following the initial impact assessment, mitigation is prescribed where necessary to avoid adverse effects on the Conservation Objectives of the relevant QIs/SCIs.

6.1

Potential for Direct Effects on the European Sites

As detailed in Table 4.1, no potential for direct effects was identified on either the River Barrow and River Nore SAC or the River Nore SPA. The launch pit for proposed horizontal directional drilling (HDD) as part of the Proposed Grid Connection underground cabling route is located within the boundary of the River Barrow and River Nore SAC. However, the location of the launch pit is within the existing road corridor and Improved agricultural grassland (GA1) and located completely outside of any QI designated habitat or species for this River Barrow and River Nore SAC. As such, there is no potential for direct effects on this River Barrow and River Nore SAC. The Proposed Project is entirely outside the boundary for the River Nore SPA, so not direct effects on the SCI species designated

6.2 Potential for Indirect Effects on the European Sites

6.2.1 Hydrological Impacts – Water Quality/Habitat Degradation

River Barrow and River Nore SAC

A potential for indirect effect on the following QI species/habitats of River Barrow and River Nore SAC in the form of water quality deterioration and habitat degradation via surface and ground water pathways during construction, operation and decommissioning of the Proposed Project.

Species:

- Nore freshwater pearl mussel *Margaritifera durrovensis*
- Freshwater Pearl Mussel *Margaritifera margaritifera*
- White-clawed Crayfish *Austropotamobius pallipes*
- Atlantic salmon (*Salmo salar*) (only in fresh water)
- Sea Lamprey *Petromyzon marinus*
- Brook Lamprey *Lampetra planeri*
- River Lamprey *Lampetra fluviatilis*
- Twaite Shad *Alosa fallax fallax*
- Otter *Lutra lutra*

Habitats:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation
- Petrifying springs with tufa formation (*Cratoneurion*)

River Nore SPA

- Kingfisher (*Alcedo atthis*)

6.2.1.2 Construction Phase

A full description of the proposed mitigation to protect water quality during the construction phase of the Proposed Project is described fully in section 9.5.2 of the EIAR Chapter 9: Hydrology and Hydrogeology, available in appendix 4. The mitigation measures are summarised in the sections below.

6.2.1.2.1 Tree felling

A total of 4.7ha of forestry will have to be permanently felled within and around the footprint of T07 and its associated infrastructure. Additional felling of linear vegetation such as hedgerows will also be completed at the Proposed Wind Farm site to facilitate the construction of the Proposed Wind Farm.

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 licenses 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 watercourses;
- 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 watercourses;
- Release of sediment attached to timber in stacking areas; and,
- Nutrient release.

These effects have the potential to affect the water quality and fish stocks of downstream water bodies. Potential effects on all watercourses downstream could be significant if not mitigated.

Proposed Mitigation

Tree felling operations will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte and DAFM guidance documents, including the specific guidelines listed below, to ensure that felling, planting and other forestry operations result in minimal potential negative effects to the receiving environment.

- Forestry Standards Manual (Forest Service, 2015)
- Forest Protection Guidelines (Forest Service, 2002)
- Forest Operations and Water Protection Guidelines (Coillte, 2013)
- Forestry and Water Quality Guidelines (Forest Service, 2000b)
- Forestry and the Landscape Guidelines (Forest Service, 2000c)
- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018)
- Coillte Planting Guideline SOP
- Code of Best Forest Practice (Forest Service, 2000)

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.

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

- Avoid physical damage (river/stream banks and river/stream beds) to watercourses and the associated release of sediment;
- Avoid soil disturbance and compaction within close proximity to surface watercourses;
- Avoid the entry of suspended sediment from works into watercourses; and,
- Avoid the entry of suspended sediment from the 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.

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

In addition to the application of buffer/setback zones, the following supplementary mitigation measures will be employed during felling works:

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;
- All machinery will be operated by suitably qualified personnel;
- 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;
- Machines will traverse the Site along specified off-road routes (referred to as racks);
- The location of racks will be chosen to avoid wet and potentially sensitive areas;
- Brash mats will be placed on the racks to support the vehicles on soft ground, reducing mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal should take place when they become heavily used and worn. Provision should be made for brash 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;
- Silt fences will be installed at the outfalls of existing drains downstream of felling areas. No direct discharge of such drains to watercourses will occur. Sediment traps and silt fences will be installed in advance of any felling works and will provide surface water settlement for runoff from work areas and will prevent sediment from entering downstream watercourses. Accumulated sediment will be carefully disposed of at pre-selected spoil repository areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground;
- In areas particularly sensitive to erosion it will be necessary to install double or triple sediment traps and increase buffer zone width. These measures will be reviewed on Site during construction;
- Double silt fencing will also be put down slope of felling areas which are located in close proximity to streams and/or relevant watercourses;
- 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;
- Timber will be stacked in dry areas, and outside watercourse buffer zones. Check dams and silt traps 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 runoff;
- Refuelling or maintenance of machinery will not occur within 50m of an aquatic zone or within 20m of any other hydrological feature. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required; and,
- 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.

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.

Pre-emptive Site Drainage Management :

The works programme for the felling operations will also take account of weather forecasts and predicted rainfall in particular. Operations 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/weekly basis, as required, to allow site staff to direct proposed and planned construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Éireann 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 Éireann 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 Éireann provide a 24-hour telephone consultancy service. The forecaster will provide an interpretation of weather data and give the best available forecast for the area of interest.

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

Works will be suspended if forecasting suggests any 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.

Timing of Proposed Project Felling Works:

Felling will only be carried out during periods of no or 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.

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).

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 be utilised at every works

6.2.1.2.2 **Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters**

Construction phase activities including access road construction, turbine foundation/hardstanding construction, construction compound construction, met mast construction, substation construction, the opening of the proposed onsite borrow pit, storage of spoil in the designated spoil management areas and the underground cabling works will require varying degrees of earthworks resulting in excavation of soils and subsoils. In addition, the planting of the riparian buffer zone (~1.7ha) on the banks of the Tullaroan stream will have the potential to release suspended solids to surface waters. Potential sources of sediment-laden water include:

- Drainage and seepage water resulting from infrastructure excavations;
- Stockpiled excavated material providing a point source of exposed sediment;
- Construction of the Proposed Grid Connection underground cabling trench resulting in entrainment of sediment from the excavations during construction; 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 in downstream watercourses.

Proposed Mitigation Measures

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 Proposed Project areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the proposed 38kV substation, the upgrading of an existing watercourse crossing, new watercourse crossing and upgrades to existing site access tracks. 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:

1. Proposed Wind Farm site:

- 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 Silbuster, and/or other similar/equivalent or appropriate systems.

It should be noted that for the Proposed Wind Farm site, an extensive network of forestry and agricultural drains already exist, and these will be integrated and enhanced as required and used within the Proposed Wind Farm drainage system. The integration of the existing drainage network 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 Wind Farm site 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 Proposed Wind Farm 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 some of the Proposed Wind Farm site roads already exist (as agricultural 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, slight, long-term effect with regard to improved drainage controls.

2. Proposed Grid Connection:

The majority of the Proposed Grid Connection underground cabling route is >50m from any nearby watercourse, sections within 50m of the Proposed Grid Connection underground cabling route are confined to existing watercourse crossings at bridges and culverts and a new proposed crossing over the River Nore. It is proposed to limit any works in any areas located within 50m of any watercourse/waterbody including the stockpiling of excavated soils and subsoils.

There is a total of 13 no. watercourse crossings (10. no. crossings over EPA mapped watercourses and an additional 3 no. crossings over watercourses which are not included in the EPA database) along the Proposed Grid Connection underground cabling route. All the crossings are existing bridges and culverts along the public road.

No in-stream works are required at any of these crossings, however due to the proximity of the streams to the construction work at the crossing locations, there is a potential for surface water quality impacts during trench excavation work. Mitigation measures are outlined below.

A constraint/buffer zone will be maintained for all crossing locations where possible, whereby all watercourses will be fenced off. In addition, measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse.

Mitigations - Pre-commencement Temporary Drainage Works

Prior to the commencement of construction works (new road/hardstand, turbine foundation installs or upgrade of existing roads) the following key temporary drainage measures will be installed:

- All existing land and forestry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using forestry 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 existing that have surface water flows; and,
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone.

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 hydrological 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 sedimats. 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. Sedimats 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 Wind Farm has been divided into drainage catchments (based on topography, outfall locations, catchment size) and stormwater runoff rates based on the 10-year return period rainfall event were calculated for each catchment. These flows were then used to design settlement ponds for each drainage catchment. The settlement ponds are designed for 11hr or 24hr retention times used to settle out medium silt (0.006mm) and fine silt (0.004mm) respectively (EPA, 2006)¹⁰. Settlement ponds at the borrow pit are designed to allow 24hr retention and settlement ponds along access roads and at turbine hardstands will have 11hr retention as there is additional in-line drainage controls proposed along access tracks and at hardstands.

The supporting design calculations for all settlement ponds are included on Drawing D501 included in appendix 4-3 of the EIAR..

Level Spreaders and Vegetation Filters:

¹⁰ *Environmental Protection Agency (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals).*

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 level spreaders, 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 Proposed Wind Farm site 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 stand 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 Proposed Project 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 the Spoil Management Areas:

It is proposed that excavated soil/subsoil (spoil) will be managed in 5 no. spoil management areas within the Proposed Wind Farm site and in linear berms along access roads and turbine hardstands where appropriate. The spoil management areas are located outside the 50m hydrological buffer zone.

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

- Where applicable the vegetative topsoil layer of the spoil management areas will be rolled back to facilitate placement of excavated spoil up to a maximum height of 1.0 metres, following which the vegetative-top soils layer will be reinstated;
- Where reinstatement is not possible, spoil management areas will be sealed with a digger bucket and seeded as soon possible to reduce sediment entrainment in runoff;
- An interceptor drain will be installed upslope of the identified spoil management areas to divert any surface water away from these areas where necessary;
- Silt fences and double silt-fences will be emplaced down-gradient of the designated spoil management areas and will remain in place throughout the entire construction phase, or until reseeded has been established to a sufficient level;
- The spoil management areas are an enclosed area and its drainage can be easily managed;
- Drainage from the borrow pit will be directed to settlement ponds as required or will overflow through controlled overflow pipes;
- Discharge from the borrow pit will be intermittent and will depend on preceding rainfall amounts; and,
- Once the spoil management area has been seeded and vegetation is established the risk to downstream surface water is significantly reduced.

Therefore, at each stage of the spoil management areas 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 Environmental Quality Standards (EQSs) will be undertaken for each primary watercourse, and specifically following heavy rainfall events (as per the CEMP included in Appendix 4-4 of EIAR accompanying this application.).

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 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 Wind Farm. As outlined in the above sections we have designed settlement ponds for a 1 in 10 year return flow. This approach is conservative given that the project will likely be built over a much shorter period (12-18 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.

6.2.1.2.3 Works Within the Hydrological Buffer Zones within the Proposed Wind Farm site

Whilst the majority of the proposed work areas within the Proposed Wind Farm site are located outside of the delineated 50m natural watercourse buffer, the following work areas encroach upon the delineated buffer zones:

- A total of 6 no. watercourse crossings over natural watercourses (2 no. crossings along existing roads proposed for upgrade and 4 no. new proposed crossings) – appendix 4, section 9.5.4.2;
- Cut and fill associated with new proposed roads and existing roads to be upgraded;
- The construction of the proposed onsite 38kV substation associated with the Proposed Grid Connection which is located within the 50m buffer zone associated with a stream which was observed during site walkover surveys but it not recorded on the EPA databases;
- The western section of the temporary construction compound associated with the onsite substation and,
- Tree felling (~0.016ha of forestry and ~398m of hedgerow/tree lines).

Due to the close proximity of these works to rivers and streams, these works could result in the release of suspended solids to surface waters 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.

Additionally, there are several crossings over manmade forestry and agricultural drains.

Proposed Mitigation

Mitigation by Avoidance:

The Proposed Wind Farm layout has been designed to limit the amount of works within the delineated hydrological buffer zones associated with natural watercourses. Several consultations between HES, MKO and the project design team completed in the spring and summer of 2024 resulted in several design iterations which had the overall aim of reducing the volume of works within the buffer zones.

In relation to Proposed Wind Farm site access tracks, where possible, the Proposed Project design utilises the existing road network within the Site.

Mitigation by Design:

All mitigation measures detailed in section 9.5.2.2 of appendix 4 will be implemented at these work locations.

The following additional mitigation measures will also be implemented:

- Double or triple silt fences will be placed downgradient of all work locations within the hydrological buffer zones;
- All works will be completed during the dry summer months unless otherwise agreed with IFI and works will be postponed in the event of rainfall; and,
- The hedgerow along the watercourse to the west of the substation will be retained. This watercourse recharges to the sand and gravel aquifer downstream of the substation and does not directly discharge into the Tullaroan Stream. Sands and gravels are excellent natural filters.

6.2.1.2.4 **Potential Effects on Groundwater Levels During Excavation Works**

Dewatering of the borrow pit (as required) and other deep excavations (i.e. turbine foundations) have the potential to impact on local groundwater levels and flows. However, temporary reductions in groundwater levels by short duration and transient dewatering works will be very localised and of small magnitude due to the nature and permeability of the local subsoil and bedrock geology. Groundwater level effects will not be significant due to the local hydrogeological regime and the elevation of much of the Proposed Wind Farm site. Any effects will be temporary and will be contained within the lower areas of the Proposed Wind Farm site i.e. within the valley of the Tullaroan Stream.

No groundwater level impacts are predicted from the construction of the Proposed Grid Connection, access roads, or met mast due to the shallow nature of the excavation (i.e. 0 ~1.2m).

Mitigation Measures / Impact Assessment:

The proposed borrow pit location is underlain by a Poor Bedrock Aquifer which is unproductive in terms of groundwater flow.

The topographical (location on the side of a hill) and hydrogeological setting of the proposed borrow pit location means no significant groundwater dewatering will be required during the excavation of the borrow pit during the construction phase. Moreover, direct rainfall and surface water runoff will be the main inflows that will require water volume and water quality management. For the avoidance of doubt, we would generally define dewatering as a requirement to temporarily drawdown the local groundwater table by means of over pumping, e.g. as would be required for the operation of a bedrock quarry in a valley floor. We consider that this example is very different in scale and operation from the proposed operation of a temporary shallow borrow pit on the side of a hill. In order to explain this thoroughly we will outline our reasoning in a series of bullet points as follows:

- Firstly, the borrow pit area is located on the side of a local hill where the ground elevations are between 182m and 189m OD and therefore are rock outcrops;
- These elevations are above the elevations of the local valleys and streams;
- The proposed borrow pit will be between approximately 8 – 10m below ground level which is notable. However, in the context of the topographical/elevated setting of the borrow pits, this depth range is relatively shallow;
- The local bedrock comprises schist and is known to be unproductive. This means that groundwater flows will be relatively minor;
- The flow paths (i.e. the distance from the point of recharge to the point of discharge) in this type of geology is short, localised, and will also be relatively shallow;
- No regional groundwater flow regime, i.e. large volumes of groundwater flow, will be encountered at these elevations;
- Therefore, shallow groundwater inflows will largely be fed by recent rainfall, and possibly by limited groundwater seepage from localised shallow bedrock;
- Site investigations show that there are no deposits of potentially water bearing granular subsoils in the area of the proposed borrow pit – the subsoils are dominated by glacial tills of relatively low permeability;
- The sloping nature of the ground on the hill where the borrow pit is proposed along with the coverage of low permeability soils means groundwater recharge is going to be very low in this area;
- This means that there will be a preference for high surface water runoff as opposed to groundwater recharge and flow; and,
- Hence, we consider that the management of surface water will form the largest proportion of water to be managed and treated at the proposed borrow pit location.

Some temporary dewatering may be required where excavations on the lower ground (i.e. in the valley of the Tullaroan Stream) encounter granular subsoils associated with the Kilmanagh Gravels GWB.

However, any dewatering works will be temporary, and no significant or permanent excavations are proposed in this area of the Site. There will be no significant effect on groundwater quantity within the sand and gravel aquifer as the water will be returned to the aquifer once it has been treated via the Proposed Wind Farm site drainage system.

Relevant environmental management guidelines from the EPA quarry 2006 guidance document “Environmental Management in the Extractive Industry” in relation to groundwater issues will be implemented during the construction phase.

6.2.1.2.5 **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 $\geq 6 \leq 9$ is set in S.I. No. 293/1988 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. Placed concrete in foundations (turbine, met mast and substation foundations) can also have minor local effects on groundwater quality over time. However, due to the contained shuttering that concrete pours are put in, and the limited surface area of exposed concrete, the anoxic conditions below ground, and the higher rate of wider groundwater recharge and flow relative to the small volumes of shallow groundwater that would come in contact with the cured concrete, the potential for impacts are low.

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; and,
- At turbine foundations, sand blinding, DPM, and lean-mix blinding are used to vertically contain the concrete. While the concrete is contained laterally by temporary/permanent shuttering. The concrete cures within 72hrs.

6.2.1.2.6 **Morphological Changes to Surface Watercourses within the Proposed Wind Farm site**

Within the Proposed Wind Farm site, there are a total of 6 no. watercourse crossing locations over natural watercourses (rivers and streams). The crossing locations are outlined below:

- An existing crossing along a road which is proposed for upgrade over a small stream immediately to the west of the proposed onsite substation location. This crossing is over a watercourse which is not mapped by the EPA but was encountered during the Site walkover surveys;

- An existing crossing along a road which is proposed for upgrade over a small stream ~315m to the southeast of the proposed substation location. This crossing is over a watercourse which is not mapped by the EPA but was encountered during the Site walkover surveys;
- A new proposed crossing over a tributary of the Tullaroan Stream, referred to by the EPA as the Briskalagh Stream (EPA Code: 15B98) ~200m south of T6;
- A new proposed crossing over a tributary of the Tullaroan Stream, which is not mapped by the EPA but was encountered during Site walkover surveys, ~95m to the southeast of T3;
- A new proposed crossing over the Tullaroan Stream ~350m northeast of T7; and,
- A new proposed crossing over the EPA mapped Remeen Stream (EPA Code: 15R27) ~440m northwest of the proposed onsite borrow pit.

In addition to the natural watercourses, there are manmade agricultural and forestry drains within the Proposed Wind Farm site. However, these are not considered to be a significant constraint and can be rerouted around the Proposed Wind Farm infrastructure and/or integrated into the proposed drainage design. Several of these drains are deeply incised and will be culverted where road crossings are proposed.

Proposed Mitigation Measures:

The Proposed Project design has been optimised to utilise the existing infrastructure (i.e. existing site roads) where practicable. Only 4 no. new crossings are proposed. This design prevents the unnecessary disturbance of the existing site drainage network prevents the requirement for widespread instream works across the Proposed Wind Farm site.

Mitigation measures for the crossings are detailed below:

- The proposed new stream crossings and upgrade of an existing crossing will be clear span bridge crossings and the existing banks will remain undisturbed. No in-stream excavation works are proposed at these locations and therefore there will be no direct impact on the stream at the proposed crossing locations. Abutments will be constructed from precast units combined with in-situ foundations;
- All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI)¹¹ is incorporated into the design of the proposed crossings;
- All drainage measures will be installed in advance of the works;
- Plant and equipment will not be permitted to track across the watercourse;
- Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge;
- Once the foundations have been completed at both sides of the watercourse, the pre-cast concrete box culvert will be installed using a crane and there will be no contact with the watercourse;
- Where the box culvert is installed in sections, the joint will be sealed to prevent granular material entering the watercourse;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document “Guidelines on protection of fisheries during construction works in and adjacent to waters”, i.e., July 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);

¹¹ Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*

- 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 be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

The watercourse crossings will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.

Confirmatory inspections of the proposed new watercourse crossing location will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.

6.2.1.2.7 **Morphological Changes to Surface Watercourses along the Proposed Grid Connection**

The Proposed Grid Connection underground cabling route includes a total of 13 no. crossings over watercourses (10 no. crossings over EPA mapped watercourses and an additional 3 no. crossings over non-EPA mapped watercourses). These crossings are detailed above in Section 9.3.3.2 of appendix 4 and comprise 12 no. existing bridge/culvert crossings and 1 no. new proposed crossing.

The potential proposed crossing methods are as follows:

- **Option A:** Where adequate cover exists above a culvert, the standard aforementioned trench arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert or water course. The cable trench will pass over the culvert in a standard trench. Where no crossing currently exists, the cable will pass over the watercourse in a bottomless box culvert or pre-cast concrete slab in a standard trefoil arrangement. Where required existing culvert crossings will be extended using appropriately sized corripipes.
- **Option B:** Where the culvert consists of a socketed concrete or sealed plastic pipe and sufficient depth is not available over the crossing, a trench will be excavated beneath the culvert and cable ducts will be installed in the standard formation 300mm below the existing pipe.
- **Option C:** Where cable ducts are to be installed over an existing culvert and sufficient cover cannot be achieved, the ducts will be laid in a much shallower trench, the depth of which will be determined by the cover available at the culvert crossing location. The ducts within the shallow formation trench will be encased in 6mm thick steel galvanized plates and backfilled with 35N concrete. Where sufficient deck cover is not available to fully accommodate the required ducts, it may be necessary to locally raise the pavement level. Any addition of a new pavement will be tied back into the existing road pavement at grade.
- **Option D:** Directional Drilling (DD) is a method of drilling under obstacles such as bridges, culverts, railways, water courses, etc. in order to install cable ducts under the obstacle. This method is employed where installing the ducts using standard installation methods is not possible. The DD method of duct installation will be carried out using Vermeer D36 x 50 Directional Drill (approximately 22 tonnes), or similar plant, for the directional drilling at watercourse/culvert crossings. During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length.

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

- 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 grid connection crossing works:
 - No stockpiling 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;
 - Local road drainage, culverts and manholes will be temporarily blocked during the works;
 - Machinery deliveries will be arranged using existing structures along the public road;
 - 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;
 - Spill kits will be available in each item of plant required to complete the works; and,
 - Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required.

Please note that mitigation measures for HDD are detailed in Section 6.2.1.2.8

6.2.1.2.8 **Potential Effects During Directional Drilling along the Proposed Grid Connection underground cabling route**

Surface water quality effects on local watercourses may occur during drilling and groundworks associated with potential directional drilling at the 4 no. watercourse crossings along the Proposed Grid Connection underground cabling route to the existing Ballyragget 110kV substation.

It is proposed that directional drilling will be undertaken to prevent direct impacts on the watercourse. However, there is a risk of indirect impacts from sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid.

Proposed Mitigation Measures:

- Although no in-stream works are proposed, the drilling works will only be done over a dry period between July and September (as required by IFI for in-stream works) to avoid the salmon spawning season and to have more favourable (drier) ground conditions;
- The crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance;
- There will be no storage of material / equipment or overnight parking of machinery inside the hydrological buffer zone;
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channels;
- Additional silt fencing or straw bales (pinned down firmly with stakes) will be placed across any natural surface depressions / channels that slope towards the watercourse;
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered;

- The area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages;
- Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area;
- Spills of drilling fluid will be cleaned up immediately and contained in an adequately sized skip before being taken off-site;
- If rainfall events occur during the works, there will be a requirement to collect and treat small volumes of surface water from areas of disturbed ground (i.e. soil and subsoil exposures created during site preparation works);
- This will be completed using a shallow swale and sump down slope of the disturbed ground; and water will be pumped to a proposed settlement pond area at least 50m from the watercourse;
- The discharge of water onto vegetated ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire percolation area will be enclosed by a perimeter of double silt fencing;
- Any sediment laden water from the works area will not be discharged directly to a watercourse or drain;
- Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted;
- Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the watercourse;
- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- On completion of the works, the ground surface disturbed during the site preparation works and at the entry and exit pits will be carefully reinstated and re-seeded at the soonest opportunity to prevent soil erosion;
- The silt fencing upslope of the river will be left in place and maintained until the disturbed ground has re-vegetated;
- There will be no batching or storage of cement allowed at the watercourse crossing;
- There will be no refuelling allowed within 100m of the watercourse crossing; and,
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.

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

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

- If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.

6.2.1.2.9 **Potential Release of Hydrocarbons During Construction and Storage**

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.

The potential release of hydrocarbons can occur during the works within the Proposed Wind Farm site and during works along the Proposed Grid Connection underground cabling route.

Whilst no oils are around the cables, a lubricant will be used during cable pulling. The lubricant to be used is Techlude PHD which is a pourable, non-flammable, non-toxic and substantially biodegradable water-based cable that does not pose a threat to the environment (Techlube PHS Technical Information Datasheet).

Proposed Mitigation Measures:

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

- All plant will be inspected and certified to ensure that they are leak free and in good working order prior to use at the Site.
- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off Site, and will be towed around the Site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the temporary construction compound when not in use and 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 all refuelling operations;
- Refuelling or maintenance of machinery will not occur within 100m of a watercourse;
- Fuels stored on Site will be minimised;
- Any diesel or fuel oils stored at the temporary construction compound will be banded. The bund capacity will be sufficient to contain 110% of the storage tank's maximum capacity;
- The plant used will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be contained within the Construction and Environmental Management Plan. Spill kits will be available to deal with accidental spillages.

6.2.1.2.10 **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 $\geq 6 \leq 9$ is set in S.I. No. 293/1988 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. Placed concrete in turbine foundations can also have minor local effects on groundwater quality over time. However, due to the

limited surface area of exposed concrete, the anoxic conditions below ground, and the high rate of dilution from the wider groundwater system relative to the small volumes of groundwater that would come in contact with the concrete, the potential for impacts are low.

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.
- At turbine foundations, sand blinding, DPM, and lean-mix blinding are used to vertically contain the concrete. While the concrete is contained laterally by temporary/permanent shuttering. The concrete cures within 72hrs.

6.2.1.2.11 **Potential Effects to Groundwater**

Release of effluent from on-site temporary wastewater treatment systems has the potential to impact on groundwater and surface water quality if site conditions are not suitable for an on-site percolation unit. Welfare facilities will be located at the proposed temporary construction compounds at the Proposed Wind Farm site. Impacts on surface water quality could affect fish stocks and aquatic habitats.

Mobile welfare facilities with self-contained toilet units will be used during the construction of the Proposed Grid Connection underground cabling route. The temporary construction compound adjacent to the proposed onsite 38kV substation will also contain welfare facilities.

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 will be sourced on the Site, nor discharged to the Site.

6.2.1.3 **Operational Phase – Likely Significant Effects and Mitigation Measures**

A full description of the proposed mitigation to protect water quality during the operational phase of the Proposed Project is described fully in section 9.5.3 of the EIAR Chapter 9: Hydrology and Hydrogeology, available in appendix 4. The mitigation measures are summarised in the sections below.

6.2.1.3.1 **Progressive Replacement of Natural Surface with Lower Permeability Surfaces**

Progressive replacement of the vegetated surface with impermeable surfaces could potentially result in an increase in the proportion of surface water runoff reaching the surface water drainage network. 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 Wind Farm site access roads and hardstands are impermeable. The assessed Proposed Project footprint comprises turbine and met mast foundations and hardstandings, access roads, junction accommodation areas, site entrances, onsite 38 kV substation, and temporary construction compounds. 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.

There will be no potential increase in runoff along the Proposed Grid Connection underground cabling route. The works are predominantly located in the carriageway of the existing road corridor and no change in surface water runoff rates will result as the trench and road surface will be reinstated.

Proposed Mitigation Measures

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 4-3):

- 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; and,
- Settlement ponds have been designed in consideration of the greenfield runoff rate.

As described above the proposed integration of the Proposed Wind Farm site drainage with the existing drainage is a key component of the proposed drainage management within the Proposed Project. 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) within each forestry compartment. Critically, there will be no alteration of the catchment size contributing to each of the main downstream watercourses. All wind farm drainage water captured within individual site sub-catchments will be attenuated and released within the same sub-catchments that it was captured.

6.2.1.3.2 Runoff Resulting in Contamination of 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 would be of a very minor scale and would be very infrequent. Potential sources of sediment laden water would 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 small 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.

Maintenance works will likely be contained within the Proposed Wind Farm site and no maintenance works will be required along the Proposed Grid Connection underground cable route.

Proposed Mitigation Measures:

- Mitigation measures for sediment control are the same as those outlined above for the construction phase.
- Mitigation measures for control of hydrocarbons during maintenance works are similar to those outlined above for construction phase.

6.2.1.3.3 Potential Effects from Release of Hydrocarbons

Accidental spillage during refuelling of operational 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.

During maintenance works there is a small 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.

Furthermore, transformers within each of the 7 no. turbines will hold oil. Any leakage of oil could impact local surface and groundwater quality. Oil will also be stored within the substation.

Proposed Mitigation (by design)

- Onsite re-fuelling of normal operational vehicles will not be carried out during the operational phase of the development. These vehicles will be refuelled offsite;
- Fuels stored on site will be minimised and any hydrocarbons stored on-site will be bunded. The bund capacity will be sufficient to contain 110% of the storage tank's maximum capacity;
- The substation will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage of any associated chemicals and to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;

- Oil in the turbine transformers will be fully banded within the enclosed turbine and as such, there is no potential pathway to the water environment i.e. the pathway has been blocked;
- Any plant used during the operational phase will be regularly inspected for leaks and fitness for purpose; and,
- Spill kits will be available to deal with accidental spillages.

6.2.1.4 Decommissioning Phase – Likely Significant Effects and Mitigation Measures

The Proposed Project is expected to have a lifespan of ~35 years. Upon decommissioning, the wind turbines and meteorological masts will be dismantled, and all above ground components would be removed off-site for recycling.

The potential effects associated with decommissioning of the Proposed Project will be similar to those associated with construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works in comparison to construction phase works. A description of the decommissioning works is contained in Chapter 4 of this EIAR.

During decommissioning, it will be possible to reverse or at least reduce some of the potential effects caused during construction, and to a lesser extent operation, by rehabilitating constructed areas such as turbine foundations and hard standing areas. This will be done by covering with topsoil to encourage vegetation growth and reduce run-off and sedimentation.

The Proposed Wind Farm site roadways will be kept and maintained following decommissioning of the Proposed Wind Farm, as these will be utilised for forestry and other agricultural operations.

The electrical cabling connecting Site infrastructure to the onsite 38kV substation will be removed, while the ducting itself will remain in-situ rather than excavating and removing it, as this is considered to have less of a potential environmental impact, in terms of soil exposure, and thus on the possibility of the generation of suspended sediment which could enter nearby watercourses.

The turbines will be removed by disassembling them in a reverse order to their erection. This will be completed using cranes as used in their construction. They will then be transported off-site along their original delivery route. The disassembly and removal of the turbines will not have an impact on the hydrological/hydrogeological environment at the Proposed Wind Farm site.

Other impacts such as possible soil compaction and contamination by fuel leaks will remain but will be of reduced magnitude than the construction phase because of the smaller scale of the works and reduced volumes on-site.

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

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

Some of the impacts will be avoided by leaving elements of the Proposed Project in place where appropriate. The onsite 38kV substation and electrical cabling will be retained as a permanent part of the national grid. Mitigation measures to avoid contamination by accidental fuel leakage and

compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.

No significant effects on the hydrological and hydrogeological environment will occur during the decommissioning stage of the Proposed Project.

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6.2.2 Impacts to Otter - Disturbance

A single otter spraint was recorded within the Proposed Wind Farm site. No signs of otter were recorded within 150m of Proposed Wind Farm footprint and associated infrastructures. Although no other signs of otter, holts, slides or prints were recorded within the Proposed Wind Farm site, there is potential for otters to utilise the Tullaroan stream and its associated tributaries for foraging and commuting purposes. Otter prints and numerous slides were recorded along the banks of the River Nore outside the proposed HDD works area, along the Proposed Grid Connection underground cabling route. The River Nore and its adjacent habitats have potential to provide suitable supporting habitat for otter. No other signs of otter were recorded along the remaining Proposed Grid Connection underground cabling route.

The potential for impacts to QI species (otter) via deterioration to water quality from works associated with the construction, operational and decommission phases of the Proposed Project have been identified and mitigation measures are detailed above and thus are not repeated here.

Taking a precautionary approach, in the absence of appropriate design and mitigation measures the construction phase of the proposal has the potential for some localised disturbance to otter resulting from noise and increased anthropogenic activities adjacent the Tullaroan stream within the Proposed Wind Farm site and at the River Nore along the Proposed Grid Connection underground cabling route.

Mitigation Measures to Avoid disturbance during the Construction Phase

No active otter holts were recorded within the Proposed Wind Farm site or along the Proposed Grid Connection underground cabling route. However, taking a precautionary approach, a pre-commencement otter survey will be carried out to determine if otters are utilizing this area prior to construction and the following mitigation measures will be implemented:

- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 “European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996”.
- Operating machinery will be restricted to the proposed works site area.
- Construction works will be limited to daylight hours and artificial lighting to facilitate works will not be permitted. Otters, being crepuscular in nature, will therefore not be disturbed by construction works.
- The best means practical, including proper maintenance of plant machinery, will be employed to reduce the noise produced by on-site operations.
- All vehicles and mechanical plant machinery will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Compressors will be of the “sound reduced” models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machines which are used intermittently will be shut down or throttled back to a minimum during those periods when they are not in use.
- Any plant machinery such as generators or pumps which are required to work outside of normal working hours will be surrounded by an acoustic enclosure.

The development site is located on an existing dairy farm adjacent a primary road. This environment in an area of regular human activity and loud farm machinery. Otters are likely to be accustomed to daytime activity in the area. Similarly, the watercourses suitable for otter identified along the grid connection route are located by road. Farm machinery and regular daily noise from traffic would be expected at these locations. As such, otter are likely to be accustomed to these activities in the area. Otters are crepuscular in nature and are unlikely to be adversely impacted by the proposed works. The NPWS Threat Response Plan for Otter acknowledges that “Little evidence has come to light in recent studies to suggest that disturbance by recreation is a significant pressure.” It also identifies that Otter are

known to travel significant distances from streams and lakes in search of new territory and feeding areas.

Channin, P. (2003)¹² provides a literary review with regard to anthropogenic disturbance and refers to several reports which have found that disturbance is not detrimental to Otters (Jefferies, 1987), (Durbin, 1993). (Green & Green, 1997). The report also describes successful breeding in towns, under ferry terminals and under the jetties of one of Europe's largest oil and gas terminals at Sullom Voe in North Scotland.

Irish Wildlife Manual No. 23 (National Otter Survey of Ireland 2004/2005) found no significant relationship between disturbance and otter occurrence. In addition, no significant difference in otter presence was found between sites with and without recreational activity. It also states, "the lowest percentage occurrence was found at the sites with the lowest recorded disturbance!"

Irish Wildlife Manual No. 76 (National Otter Survey of Ireland 2010/2012) notes that the occurrence of Otter was unaffected by perceived levels of disturbance at the survey sites. It also notes that there is little published evidence demonstrating any consistent relationship between Otter occurrence and human disturbance (Mason & Macdonald 1986, Delibes et al. 1991; Bailey & Rochford, 2006).

¹² Chanin, P., (2003). *Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.*

7.

ASSESSMENT OF RESIDUAL ADVERSE EFFECTS

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

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

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/Special Conservation Interests associated with any European Sites including the following;

- River Barrow and River Nore SAC
- Rive Nore SPA

8.

ASSESSMENT OF CUMULATIVE EFFECTS

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on European Sites was conducted. This assessment focuses on the potential for cumulative in-combination effects on the European Sites where potential for adverse effects was identified in Section 5 of this report. The following Development Plans have been reviewed and taken into consideration as part of this assessment and the review is provided in Appendix 5:

- Kilkenny City and County Development Plan 2021-2027
- 4th National Biodiversity Action Plan 2023-2027
- Regional Spatial and Economic Strategy for the Southern Region (2020-2032)

The review focused on policies and objectives that relate to European sites and natural heritage.

The main likelihood for cumulative effect on the QJs of River Barrow and River Nore SAC and the River Nore SPA associated with the Proposed Project and other developments is assessed to be associated with the hydrological/hydrogeological environment. The only potential impact on Kingfisher (listed as the only SCI for the River Nore SPA) identified is the deterioration of water quality on supporting habitat and food availability (i.e fish stocks). No direct impacts in terms of habitat loss or ex-situ habitat on Kingfisher were identified. As such, all potential cumulative impacts are considered under the assessment described below.

8.1

Assessment of Cumulative Hydrological/Hydrogeological Effects

The hydrological cumulative study area has been fully described in section 9.5.7, Chapter 9: Hydrology and Hydrogeology (appendix 3) and is summarised below.

- The mapped extent of the Kilmanagh Gravels GWB;
- A quantitative assessment based on flow volumes obtained from the EPA HydroTool Nodes downstream of the Proposed Wind Farm site. This assessment concludes that the due to dilution no hydrological cumulative effects will occur beyond EPA Hydrotool Node 15_1733 on the King's River immediately upstream of Callan. At this location the King's River has a total upstream catchment area of 20,000ha. There will be no potential for cumulative effects beyond this cumulative study area due to increases in flow volumes (as the catchment area increases) and increasing distance from the Proposed Wind Farm site.
- A further assessment has been completed within a 200m zone along the Proposed Grid Connection underground cabling route. Due to the shallow nature of the underground cabling trench, a 200m buffer zones is an appropriate scale when considering potential cumulative effects on the water environment.

8.1.1 Other Projects within the Hydrological Sub catchment

The following paragraphs in Section 8.1.1.1 – 8.1.1.5 are extracted from the hydrological cumulative impact assessment from the Chapter 9 ‘Hydrology and Hydrogeology’ of the accompanying ELAR (provided as Appendix 3).

8.1.1.1 Cumulative Effects with Agriculture

The delineated cumulative study area as described in section 8.1 is a largely agricultural area.

Agriculture is the largest pressure on water quality in Ireland. Agricultural practices such as the movement of soil and the addition of fertilizers and pesticides can lead to nutrient losses and the entrainment of suspended solids in local surface watercourses. This can have a negative effect on local and downstream surface water quality.

In an unmitigated scenario the Proposed Project would have the potential to interact with these agricultural activities and contribute to a deterioration of downstream surface water quality through the emissions of elevated concentrations of suspended solids and ammonia.

However, the mitigation measures detailed in section 9.5.2, 9.5.3 and 9.5.4 of Appendix 4, for the construction, operation and decommissioning phases of the Proposed Project will ensure the protection of downstream surface water quality.

For these reasons it is considered that there will not be a significant cumulative effect associated with agricultural activities.’

8.1.1.2 Cumulative Effects with Forestry

‘The Proposed Wind Farm site and the wider hydrological cumulative study area includes some forested areas.

The most common water quality problems arising from forestry relate to the release of sediment and nutrients to the aquatic environment and impacts from acidification. Forestry felling may also give rise to modified stream flow regimes caused by associated land drainage.

Given the occurrence of several forestry blocks within the Proposed Wind Farm site and in the surrounding lands, and given that they drain to the Tullaroan Stream, the Munster River and the King’s River, the potential cumulative effects on downstream water quality and quantity need to be assessed.

However, the mitigation measures detailed in section 9.5.2, 9.5.3 and 9.5.4 of Appendix 4 for the construction, operation and decommissioning phases of the Proposed Project will ensure the protection of downstream surface water quality.

For these reasons it is considered that there will not be a significant cumulative effect associated with commercial forestry activities.’

8.1.1.3 Cumulative Effects with Other Wind Farm Developments

A total of 4 no. existing / permitted wind farms have been identified within the cumulative study area.

- 4 no. existing turbines and 1 no. permitted turbine associated with the Foyle Wind Farm, Co. Kilkenny.

- 7 no. turbines (6 no. existing and 1 no. permitted) associated with the Ballybay Wind Farm, Co. Kilkenny.
- 5 no. turbines associated with the existing An Cnoc Wind Farm, Co. Tipperary.
- 9 no. turbines associated with the permitted Farranrory Wind Farm, Co. Tipperary.
- 2 no. turbines associated with the permitted Kyleballoughter Wind Farm, Co. Kilkenny.
- 1 no. turbine associated with the existing Ballincurry 1 turbine, Co. Tipperary.

The greatest potential for cumulative effects to occur would be if the construction phase of the permitted wind farms and the Proposed Project overlapped. In an unmitigated scenario, there may be some cumulative effects on downstream watercourses. However, a total of 15 of the 23 no. turbines within the cumulative study area are already operational, therefore there is no potential for the construction phases to overlap with the construction of these turbines.

Meanwhile, 8 no. turbines within the cumulative study area are permitted but have not yet been constructed. Potential cumulative effects could occur of the construction phases overlap.

However, the NISs for the above wind farm developments detail potential hydrological and hydrogeological issues relating to the construction, operation and decommissioning phases of these developments and propose a suite of best practice mitigation measures designed to ensure that the developments do not in any way have a negative effect on downstream surface water quality and quantity. Similarly, the mitigation and best practice measures proposed in this EIAR chapter will ensure that the Proposed Project does not have the potential to result in significant effects on the hydrological/hydrogeological environment.

- Therefore, with the implementation of the proposed mitigation measures (both for the Proposed Project and for the other wind farms) there will be no cumulative effects associated with the construction, operational or decommissioning phases of the Proposed Project and other wind farms within the cumulative study area.

8.1.1.4 Cumulative Effects with Other Wind Farm Grid Connection

A study was completed to identify any grid connection routes associated with other wind farm developments which overlap with the Proposed Grid Connection underground cabling route. From this study, the following overlaps were recorded:

~300m overlap with the grid connection underground cabling route associated with the proposed Farranrory Wind Farm. The overlap occurs along the N77. Both grid connections are proposed to cross the Nore via HDD at different locations;

The greatest potential for cumulative effects to occur would be if the construction phase of the underground grid connection routes overlapped with each other. In an unmitigated scenario, there may be some cumulative effects on the downstream receiving watercourses. However, practicalities will make it highly unlikely that the construction phase of the overlapping sections of the grid connections would occur at the same time as this would result in road closures (two trenches being excavated). Therefore, the overlapping sections of the grid connections cannot be built at the same time.

Furthermore, the EIARs for the above wind farm development detail potential hydrological and hydrogeological issues relating to the construction of the grid connection underground cabling routes. The EIARs propose a suite of best practice mitigation measures designed to ensure that the construction of the grid connection underground cabling routes do not in any way have a negative effect on downstream surface water quality and quantity. Similarly, the mitigation and best practice measures proposed in this EIAR chapter will ensure that the construction of the Proposed Grid Connection does not have the potential to result in significant effects on the hydrological/hydrogeological environment.

Therefore, with the implementation of the proposed mitigation measures (both for the Proposed Project and for the other grid connections) there will be no cumulative effects associated with the construction, operational or decommissioning phases of the Proposed Project and other grid connections within the cumulative study area.

8.1.1.5 Cumulative Effects with EPA Licenced Wastewater Treatment Facilities

‘There are 5 no. EPA licenced wastewater treatment facilities within the hydrological cumulative study area.

These Wastewater Treatment Plants (WwTPs) have a population equivalent of <500:

- The Tullaroan WwTP (Registration No: A0156-01) serves a population equivalent of 6, with the plant designed for a population equivalent of 20. The WwTP provides primary treatment and discharges immediately upstream of the Proposed Wind Farm site along the Tullaroan Stream.
- The Kilmanagh WwTP (Registration No: A0145-01) serves a population equivalent of 30 people, with the WwTP designed to cater for a population equivalent of 50 persons. The WwTP provides secondary treatment and discharges to the Tullaroan Stream downstream of the Proposed Wind Farm site;
- The Commons WwTP (Registration No: A0427-01) serves a population of 168 people with the WwTP designed to cater for a population equivalent of 400 people. This WwTP provides secondary treatment and discharges to a tributary of the King’s River.
- The Ballingarry WwTP (Registration No: A0407-01) serves a population of 352 people with the WwTP designed to cater for a population equivalent of 400 people. This WwTP provides secondary treatment and discharges to a tributary of the King’s River.
- The Coalbrook WwTP (Registration No: A0513-01) serves a population of 15 people with the WwTP designed to cater for a population equivalent of 30 people. This WwTP provides secondary treatment and discharges to a tributary of the King’s River.

The potential for cumulative effects associated with the Proposed Project is limited as the mitigation measures detailed in section 6.2 and 9.5.2, 9.5.3 and 9.5.4 of appendix 4 for the construction, operation and decommissioning phases of the Proposed Project will ensure the protection of downstream surface water quality.

For these reasons it is considered that there will not be a significant cumulative effect associated with local WwTPs.’

8.1.1.6 Cumulative Effects with Other Developments

A detailed cumulative assessment has been carried out for all planning applications (granted and awaiting decisions) within the cumulative assessment area for the Proposed Wind Farm site and the Proposed Grid Connection described above.

The planning applications identified within the study area for new dwellings or renovations of existing dwellings, associated wastewater treatment systems as well as for the erection of farm buildings. The planning applications have been reviewed based on their type, scale and proximity to the Proposed Wind Farm site. Based on the scale of the works, their proximity to the Proposed Wind Farm site and

the temporal period of likely works, no cumulative effects will occur as a result of the Proposed Project (construction, operation and decommissioning phases).

A desk study of planning applications within 200m of the Proposed Grid Connection underground cabling route was undertaken. The majority of these applications relate to the construction or renovation/extension of domestic dwellings, which will not generate potential cumulative effects due to their scale. Meanwhile, in the vicinity of Ballyragget substation there are applications for the construction battery energy storage systems. A hydrological and hydrogeological assessment report and drainage strategy was submitted along with the Environmental Report for the Power Reserve Project at Ballyragget. This report detailed mitigation measures for the protection of the hydrological and hydrogeological environment through all phases of the development.

The works along the Proposed Grid Connection underground cabling route are minor and transient, similar to roadworks being completed across the country and have no potential for significant cumulative effects on the hydrological or hydrogeological environment

8.2

Conclusion of Cumulative Assessment

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 plans and projects.

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

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

9.

CONCLUDING STATEMENT

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

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

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

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