Planning and Environmental Consultants

Appropriate Assessment Screening Report and Natura Impact Statement

Seskin Wind Farm, Co. Carlow – NIS

DOCUMENT DETAILS

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2. INTRODUCTION

2.1 Background

MKO has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Appropriate Assessment of the Proposed Project.

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).

2.2 References to Proposed Project

The Proposed Project, 'Seskin Wind Farm, Co Carlow', is referenced within this NIS as follows:

- The 'Proposed Wind Farm' refers to the 7 no. turbines and supporting infrastructure which is the subject of this application.
- The 'Proposed Grid Connection Route' refers to underground 38kV cabling connecting to the existing Kilkenny 110kV substation, and all ancillary works and apparatus.
- The 'Proposed Project' comprises the Proposed Wind Farm and the Proposed Grid Connection Route, all of which are located within the NIS Study Boundary (the 'Site') and assessed together within this NIS.

2.3 Statement of Authority

This report has been prepared by Corey Cannon. Corey is a Senior Ecologist at MKO and holds a BSc in Zoology and an MSc in Biodiversity Survey. Corey is also a Chartered Ecologist and Full Member of CIEEM. Corey has over ten years' consultancy experience. She is an experienced ecologist with skills covering habitat and botanic assessments and specialist mammal (including all bat species) surveys. Corey has undertaken numerous Ecological Impact Assessment and AA assessments for public and private sector clients. This report has been reviewed by Pat Roberts (B.Sc., M.Sc., MCIEEM). Pat has 18 years' experience in ecological management and assessment.

The baseline ecological surveys for the Proposed Project were conducted by MKO ecologists; Aoife Joyce (BSc., MSc.), Sara Fissolo (BSc), Stephanie Corkery (BSc, MSc), Valerie Kendall (B.Sc(H)., M.Env.Sc.), Cathal Bergin (BSc), Cora Twomey (BSc), Brónagh Boylan (BSc Env), Corey Cannon and

Ciara Hackett (BSc). All surveyors have relevant academic qualifications and are competent in undertaking habitat and ecological assessments.

2.4 Methodology

2.4.1 Appropriate Assessment Process

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

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

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

> (i) identify, in the light of the best scientific knowledge in the field, all aspects of the proposed project which may, by itself or in-combination with other plans or projects, affect the conservation objectives of the European site;
>
> (ii) contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps; and
>
> (iii) may only include a determination that the proposed project will not adversely affect the integrity of any relevant European site where the competent authority decides (on the basis of complete, precise and definitive findings and conclusions) that no reasonable scientific doubt remains as to the absence of potential adverse effects. If adverse impacts can be satisfactorily avoided or successfully mitigated at this stage, so that no reasonable doubt remains as to the absence of the identified potential effects, then the process is complete. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to stage three (assessment of alternative) and, if necessary, stage four (IROPI[1]).

2.4.2 Ecological Survey Methodologies

The following sections describe the methodologies followed to establish the baseline ecological condition of the site and surrounding area.

[1] *IROPI - 'imperative reasons of overriding public interest', the test found in Article 6(4) of the Habitats Directive.*

2.4.2.1 Ecological Multidisciplinary Walkover Surveys

Multidisciplinary walkover surveys were undertaken on the following dates:

- 19th and 20th of July 2022
- 22nd and 24th August 2022
- 22nd September 2022
- 29th and 30th November 2022
- 5th January 2023
- 15th February 2023
- 19th and 20th July 2023
- 24th October 2023

A comprehensive walkover of the entire site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys for example 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 study area 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).

2.4.2.2 Otter Surveys

Otter surveys were conducted adhering to best practice guidance (NRA, 2009) and CIEEM best practice competencies for species surveys[2]. All watercourses within the Proposed Wind Farm site, and along the Proposed Grid Connection 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 each survey site. Where otter signs were observed these were mapped.

2.4.2.3 Aquatic surveys

Dedicated aquatic baseline surveys were undertaken by Triturus Environmental. The baseline assessment focused on aquatic ecology including fisheries and biological water quality, as well as protected aquatic species and habitats in the vicinity of the Proposed Wind Farm. Undertaken on a catchment-wide scale, the baseline surveys focused on the detection of freshwater habitats and species of high conservation value. These included surveys for white-clawed crayfish (*Austropotamobius pallipes*), freshwater pearl mussel (*Margaritifera margaritifera*) (eDNA only), macro-invertebrates (biological water quality) and fish species, inclusive of supporting nursery and spawning habitat. The surveys also documented macrophyte and aquatic bryophyte communities including Annex I habitat associations in the vicinity of the project. This holistic approach informed the overall aquatic ecological evaluation of each site in context of the Proposed Project and ensured that any habitats and species of high conservation value would be detected. Full details of the methodology followed for the aquatic

[2] *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

surveys as well as details of the locations of survey sites is provided in the Aquatic Baseline Report, Appendix 1.

2.4.2.4 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 Project site were undertaken throughout multidisciplinary walkover surveys carried out in 2022 and 2023. These surveys provided an understanding of the baseline and informed further survey work following finalisation of the Proposed Project infrastructure layout.

2.4.2.5 Bird Surveys

In order to inform the scope of the bird surveys required to inform the NIS, a review was undertaken of the location of nearby Special Protection Areas and associated Special Conservation Interest (SCI) species so that the survey design would include a focus on target SCI species in addition to all species recorded for the purpose of the EIAR chapter, Chapter 7 - Ornithology. Field surveys were undertaken during the survey period April 2020 – May 2022, consisting of 2 breeding seasons (April – September) and 2 non-breeding seasons (October – March).

A summary of surveys undertaken in relation to birds is provided below:

- Vantage point surveys
- Breeding walkover surveys
- Breeding raptor surveys
- Breeding woodcock surveys
- Winter walkover surveys
- Waterbird distribution and abundance surveys
- Hen harrier surveys
- Bird surveys were also undertaken as part of the wider multidisciplinary walkover survey.

2.4.3 Desk Study

The desk study undertaken for this assessment included a thorough review of the available ecological data associated with the screened-in European Sites within the likely zone of impact of the proposed development. Sources of data included the following:

- Review of NPWS Conservation Objectives supporting documents, site synopsis, standard data forms and supporting documents for European Designated Sites,
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA),
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper,
- Review of NPWS Article 17 metadata and GIS database.

2.5 Structure and Format of this Document

- Section 1 provides an introduction, background information, methodology and statement of authority for the AASR and NIS.
- Section 2, provides a full description of all elements of the Proposed Project.
- In Section 3, the characteristics of the receiving environment are fully described.
- In Section 4, a Stage 1 Screening is undertaken to identify any European Sites upon which there is a potential for a likely significant effect to occur either individually or in combination with other plans and projects as a result of the 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. Where impact pathways have been identified this section prescribes the mitigation required to avoid adverse effects on any European site. This section also prescribes mitigation to robustly block any identified pathways for impact for effect.
- Section 7 provides an assessment of residual effects taking into consideration the proposed mitigation.
- In Section 8, the potential in combination effects of the Proposed Project on European Sites, when considered in combination with other plans and projects were assessed.
- A concluding statement is provided in Section 9.

3. DESCRIPTION OF PROPOSED PROJECT

3.1 Site Location

The Proposed Wind Farm site is located approximately 3.1 km northwest of the village of Oldleighlin, Co. Carlow, 5km northwest of Leighlinbridge, Co. Carlow, and 9.9 kilometres southeast of Castlecomer, Co. Kilkenny. It is proposed to access the Proposed Wind Farm via upgrades to an existing agricultural entrance off the L3037 Local Road along the western boundary of the Proposed Project site. The Proposed Wind Farm site is served by a number of existing public, forestry and agricultural roads and tracks. A site location context map is included as Figure 2-1. The grid reference for the approximate centre of the Proposed Wind Farm site is S 64084 68754.

The Proposed Grid Connection Route includes for underground 38kV cabling from the proposed onsite 38kV substation, in the townland of Seskinrea, Co. Carlow, to the existing Kilkenny 110kV substation in the townland of Scart, Co. Kilkenny. The underground cabling route to Kilkenny, measuring approximately 20.1 km in length, is primarily located within the public road corridor.

Current land-use on the Proposed Wind Farm comprises coniferous forestry and agriculture. Current land-use along the Proposed Grid Connection Route comprises of public road corridor, public open space, pastures, coniferous forestry and land principally used by agriculture with significant areas of natural vegetation. Land-use in the wider landscape of the site comprises a mix of agriculture, peat cutting, quarrying, low density residential and commercial forestry.

3.2 Characteristics of the Proposed Project

A detailed development description is fully described in Chapter 4 of the EIAR (provided as Appendix 2) and summarised below. Two separate planning applications, relating to the Proposed Project, will be made to Carlow County Council and to Kilkenny County Council.

i. The Proposed Project will consist of the provision of the following: *The construction of 7 no. wind turbines with the following parameters (all within Co. Carlow):*
   a. *Total tip height range of 179.5m – 180m,*
   b. *Rotor diameter range of 149m – 155m,*
   c. *Hub height range of 102.5m to 105m,*

ii. *Construction of associated foundations, hardstand and assembly areas (all within Co. Carlow);*

iii. *All associated wind farm underground electrical and communications cabling connecting the turbines and meteorological mast to the proposed onsite electrical substation including road crossing at L30372, Co. Carlow (all within Co. Carlow);*

iv. *Construction of 1 no. permanent 38kV electrical substation compound including a single-story control building with welfare facilities, all associated electrical plant and equipment, security fencing, entrance on to the access track, all associated underground cabling, wastewater holding tank and all ancillary works in the townland of Seskinrea, Co. Carlow (all within Co. Carlow);*

v. *A permanent Battery Energy Storage System within the electrical substation compound in the townland of Seskinrea, Co. Carlow (all within Co. Carlow);*

vi. *All works (within County Carlow) associated with the connection of the proposed wind farm to the national electricity grid, via underground 38kV electrical cabling predominantly within the public road corridor from the proposed onsite electrical substation in the townland of Seskinrea, Co. Carlow to the existing 110kV Kilkenny substation (all within Co. Carlow);*

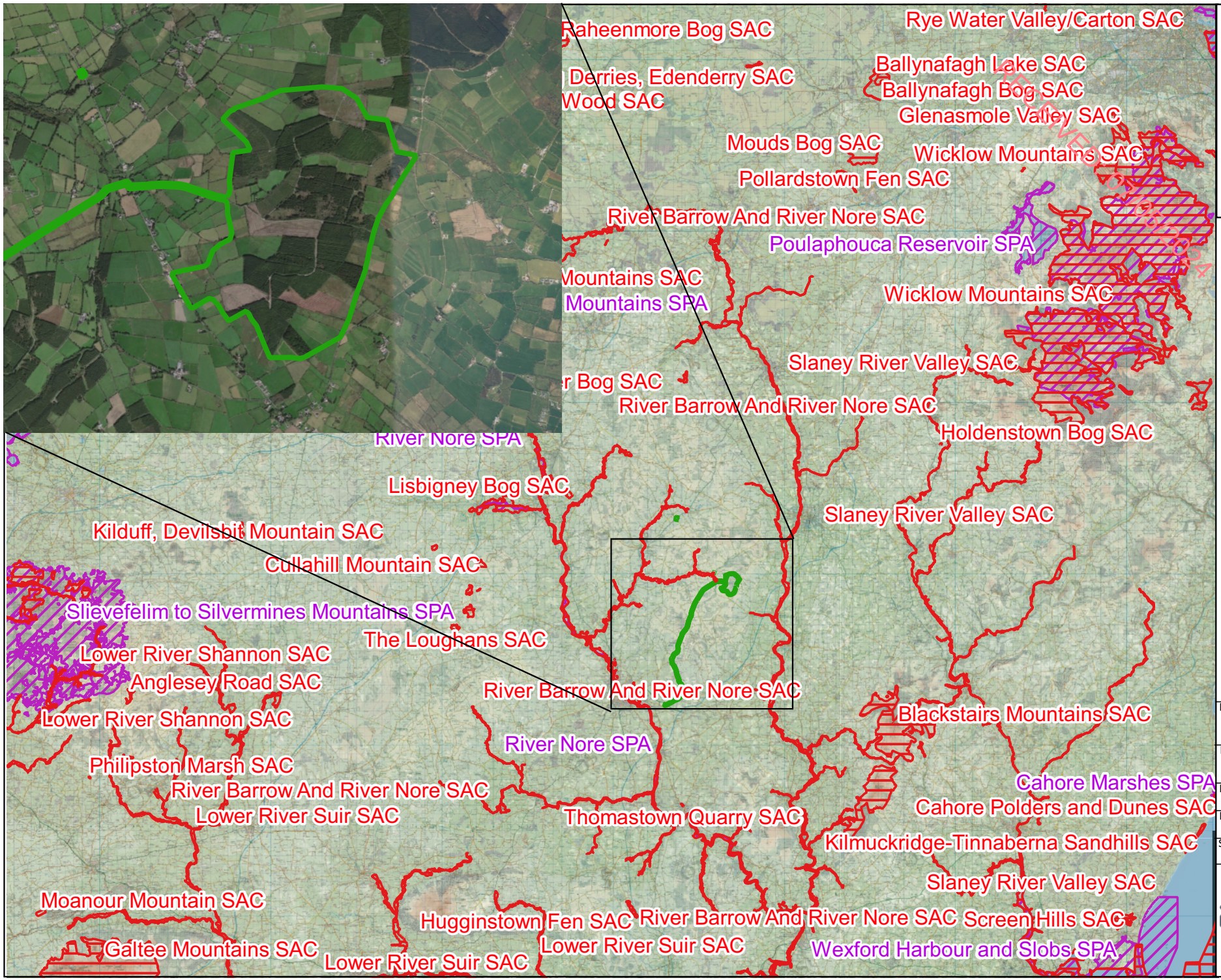
vii. *Provision of 2 no. joint bays, communication chambers and earth sheath links along the underground electrical cabling route (all within Co. Carlow);*

viii. *Reinstatement of the road and track surfaces above the cabling trench along existing roads and tracks (all within Co. Carlow);*
ix. *1 no. meteorological mast of c. 36.5m in height, and associated foundation and hard-standing area in the townland of Ridge, Co. Carlow (all within Co. Carlow);*
x. *The permanent upgrade of 1 no. existing site entrance off L3037 for the provision of construction and operational access (all within Co. Carlow);*
xi. *The provision of 1 no. new permanent site entrance and the upgrade of 1 no. existing site entrance off the L30372 (all within Co. Carlow);*
xii. *Upgrade of existing tracks/ roads and provision of new site access roads, 2 no. clear span bridge crossings, junctions and hardstand areas (all within Co. Carlow);*
xiii. *2 no. temporary construction compounds with temporary offices and staff facilities in the townland of Ridge and Seskinrea, Co Carlow (all within Co. Carlow);*
xiv. *Carriageway strengthening works at 'Black Bridge' on the L1835 / L3037 (Protected Structure: Kilkenny RPS Ref. D84) (within Co. Carlow and Co. Kilkenny);*
xv. *Peat and Spoil Management (all within Co. Carlow);*
xvi. *Tree Felling to accommodate the construction and operation of the proposed development (all within Co. Carlow);*
xvii. *Operational stage site signage; and*
xviii. *All ancillary apparatus and site development works above and below ground, including soft and hard landscaping and drainage infrastructure (all within Co. Carlow).*
xix. *All works (within county Kilkenny) associated with the connection of the proposed Seskin Wind Farm to the national electricity grid, via underground 38kV electrical cabling within the public road corridor to the existing Kilkenny 110kV substation (all within Co. Kilkenny);*
xx. *Provision of 16 no. joint bays, communication chambers and earth sheath links along the underground electrical cabling route (all within Co. Kilkenny);;*
xxi. *Reinstatement of the road and track surfaces above cabling trench along existing roads and tracks (all within Co. Kilkenny);;*
xxii. *Carriageway strengthening works at 'Black Bridge' on the L1835 / L3037 (Protected Structure RPS Ref. D84) (within Co. Carlow and Co. Kilkenny);*
xxiii. *A new temporary access road off the N78 to the L30372 in the townlands of Cloneen, Co. Kilkenny to facilitate the delivery of turbine components and other abnormal loads (all within Co. Kilkenny);;*
xxiv. *All ancillary apparatus and site development works above and below ground (all within Co. Kilkenny).*

The majority of the Proposed Project including the 7 no. turbines and associated infrastructure, on-site 38kV substation and approximately 2 kilometres (km) of the underground grid connection cabling route is located in Co. Carlow and will be the subject of an application for planning permission to Carlow County Cuoncil. The remaining 18.1 km of the underground grid connection cabling route is located in Co. Kilkenny, along with junction accommodation works areas for facilitation of turbine delivery, will be the subject of an application for planning permission to Kilkenny County Council.

All elements of the Proposed Project which encompasses the Proposed Wind Farm and the Proposed Grid Connection Route have been assessed as part of this NIS.

The applicant is seeking a ten-year planning permission for development.



Map Legend

- EIAR Site Boundary
- Special Area of Conservation
- Special Protection Area

Drawing Title: Site Location

Project Title: Seskin, Co. Carlow

Drawn By	Checked By
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Project No.	Drawing No.
220246	Figure 2.1
Scale	Date
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4. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

4.1 Regional and Local Hydrology and Hydrogeology

The following summary of the local hydrology and hydrogeology in the vicinity of the Proposed Project is provided below, as extracted from Chapter 9 of the EIAR: Water (Appendix 3).

4.1.1 Proposed Wind Farm

Regional hydrology:

Regionally, the Proposed Wind Farm site is located in 2 no. surface water catchments. The vast majority of the Proposed Wind Farm site, including all proposed infrastructure is located in the River Nore surface water catchment within Hydrometric Area No. 15 of the South Eastern River Basin District. Small areas in the northeast of the Proposed Wind Farm site, which do not include any proposed infrastructure, are mapped within the River Barrow surface water catchment within Hydrometric Area No. 14 of the South Eastern River Basin District.

Within the River Nore surface water catchment, the Proposed Wind Farm site is located in the Dinin River sub-catchment (Dinin[South]_SC_010) and the Dinin(South)_020 WFD river sub-basin. The Proposed Wind Farm site drains towards the Coolcullen River which flows to the north ~1km west of the Proposed Wind Farm site. This watercourse discharges into the Dinin River ~1.8km northwest of the Proposed Wind Farm site. The Dinin River flows to the west before it veers to the southwest ~10km west of the Proposed Wind Farm site. The Dinin River flows southwards before it discharges into the River Nore ~17km to the southwest.

Local hydrology:

More locally the Proposed Wind Farm site is drained by several tributaries of the Coolcullen River. These 1st order streams originate within the Proposed Wind Farm site and flow to the west. These watercourses are locally unnamed but some have been assigned names by the EPA. The north of the Proposed Wind Farm site drains towards the Seskinrea stream, mapped ~70m east of T01. Further south the Proposed Wind Farm site is drained by a tributary of the Seskinrea Stream which is mapped ~130m north of T06. The streams confluence to the east of the L3037 before joining the Coolcullen River.

4.1.2 Proposed Grid Connection Route

The Proposed Grid Connection Route is predominantly located in the River Nore surface water catchment. Within this catchment there are a total of 10 no. watercourse crossings, comprising 7 no. bridge crossings and 3 no. culvert crossings. These crossings are detailed below:

- *An existing bridge crossing along the L30372 over an unnamed tributary of the Seskinrea stream;*
- *An existing bridge crossing (Philips Bridge) along the L30371 over the Coolcullen River;*
- *An existing culvert crossing along the L30371 over an unnamed tributary of the Coolcullen River;*
- *An existing bridge crossing (Kane's Bridge) along the L1840 over an unnamed tributary of the Coolraheen stream (EPA Name);*

- *A culvert crossing along a local road over an unnamed watercourse in the townland of Reevanagh;*
- *2 no. bridge crossings overall locally unnamed watercourses in the townland of Ballysallagh; and,*
- *3 no. watercourse crossings over the Lyrath Stream (EPA Name).*

    - 1 no. bridge crossing along the L2627 in the townland of Ballysallagh;
    - 1 no. culvert crossing in the townland of Kilmagar; and,
    - 1 no. bridge crossing in the townland of Kilmagar.

A small section of the Proposed Grid Connection Route along the L30371 is also mapped in the River Barrow surface water catchment. However, there are no mapped watercourses in close proximity to this section of the Proposed Grid Connection Route.

4.1.3 Baseline Water Quality

Q-rating status data for EPA monitoring points on the Dinin [South] River and the Dinin [Nore] River are shown on 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.

Most recent data available (2005 to 2020) show that the Q-rating for the Dinin [South] River upstream of the Proposed Wind Farm site at the Black Bridge is of Good status. Meanwhile, downstream of the Proposed Wind Farm site, the Dinin [South] River is reported to be of Good status in the latest monitoring round (2020). Further downstream, the Dinin [Nore] River is also reported as being of Good status. No Q-rating is available for the Seskinrea River, or the tributaries located in the western section of the Proposed Wind farm site.

Table 3-1: Water quality status of watercourses within or in proximity of the Proposed Wind Farm site

Waterbody	EPA Location Description	Year	Easting	Northing	EPA Q-Rating Status
DININ (SOUTH)_010	Black Bridge	2022	261802.93	170092.56	Good
DININ (SOUTH)_020	Dysart Bridge	2022	253090.78	169833.52	Good
DININ (MAIN CHANNEL) _010	Lisnafunshion	2022	252180	168082	Good

4.2 Results of Baseline Ecological Surveys

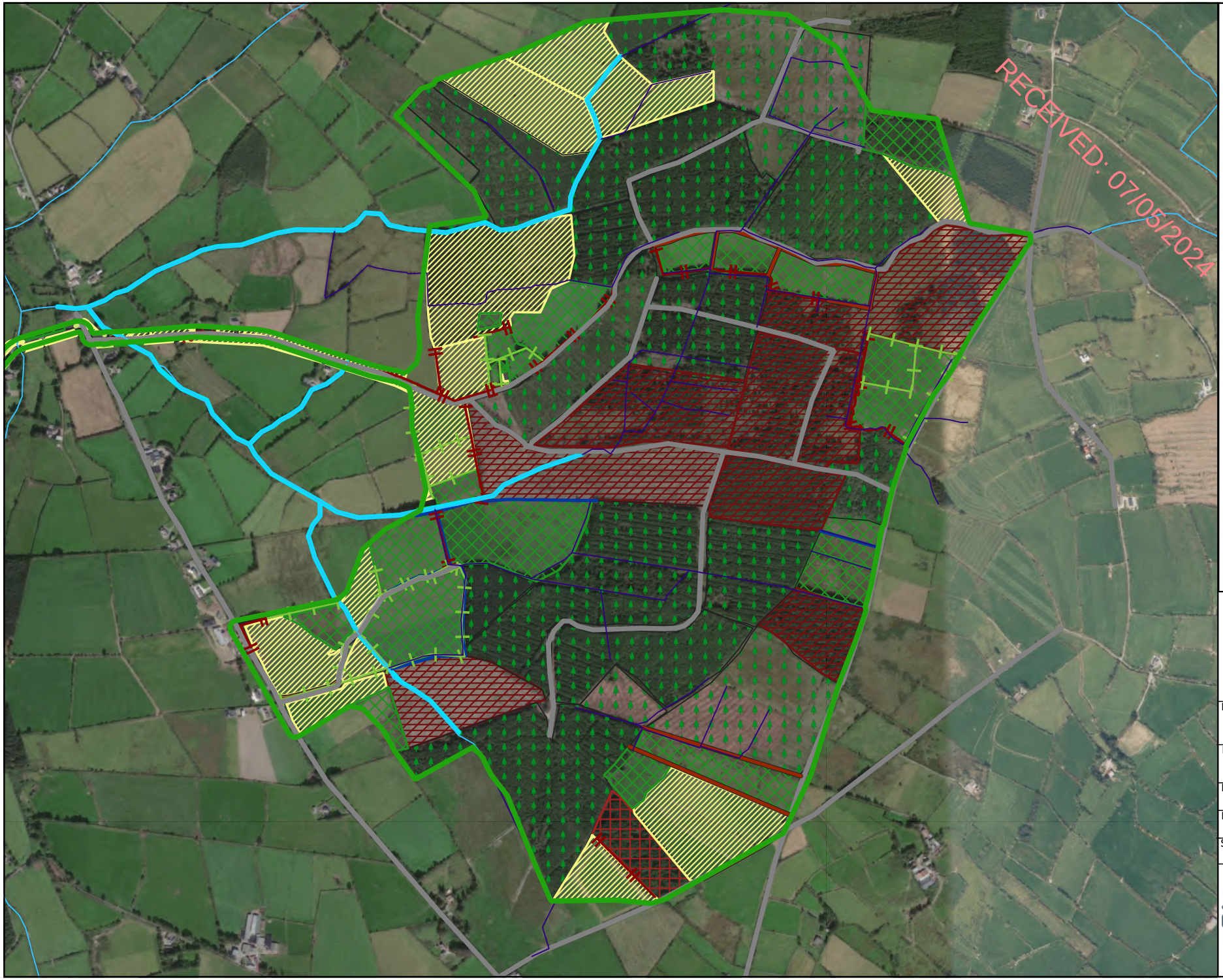
4.2.1 Ecological Walkover Surveys

4.2.1.1 Description of Habitats and Flora with the Proposed Project Site

A total of twelve habitats were recorded within the Proposed Wind Farm site including:

- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- Conifer plantation (WD4)
- Recently felled woodlands (WS5)
- Scrub (WS1)
- Hedgerows (WL1)
- Stonewalls (BL1)
- Earth banks (BL2)
- Treelines (WL2)
- Drainage Ditches (FW4)
- Eroding Upland Rivers/Streams (FW1)
- Buildings and artificial surfaces (BL3)

A habitat map of the site is provided in Figure 4-1. A map showing the Proposed Wind Farm development footprint overlaying the Habitat Map is shown in Figure 4-2.



Map Legend

- EIAR Site Boundary
- Earth Banks
- Buildings and Artificial Surfaces
- Eroding/Upland Rivers
- Hedgerows
- Treelines
- Stone walls and other stonework
- Buildings and artificial surfaces
- Improved agricultural grassland
- Wet grassland
- Conifer plantation
- Scrub
- Recently-felled woodland
- Watercourses
- Drains

Drawing Title

Habitat Map

Project Title

Seskin Wf, Co. Carlow

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Project No.	Drawing No.
220246	Figure 3.1
Scale	Date
1:13,500	03/05/2024

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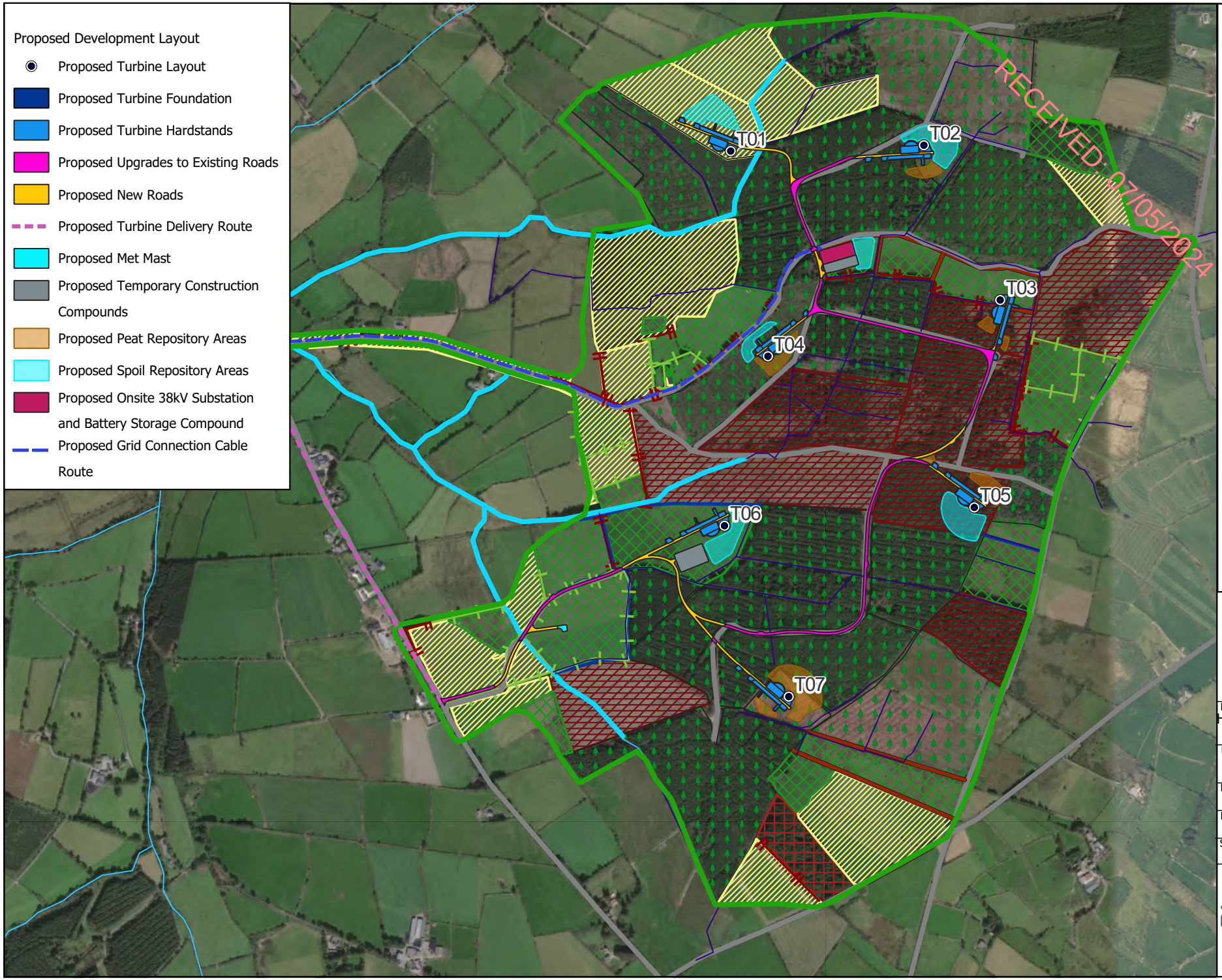
Proposed Development Layout
Proposed Turbine Layout
Proposed Turbine Foundation
Proposed Turbine Hardstands
Proposed Upgrades to Existing Roads
Proposed New Roads
Proposed Turbine Delivery Route
Proposed Met Mast
Proposed Temporary Construction Compounds
Proposed Peat Repository Areas
Proposed Spoil Repository Areas
Proposed Onsite 38kV Substation and Battery Storage Compound
Proposed Grid Connection Cable Route
T01
T02
T03
T04
T05
T06
T07
RECEIVED: 07/05/2024
Map Legend
EIAR Site Boundary
Earth Banks
Buildings and Artificial Surfaces
Eroding/Upland Rivers
Hedgerows
Treelines
Stone walls and other stonework
Buildings and artificial surfaces
Improved agricultural grassland
Wet grassland
Conifer plantation
Scrub
Recently-felled woodland
Watercourses
Drains
N
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Drawing Title
Habitat Map with development overlay
Project Title
Seskin Wf, Co. Carlow
Drawn By
CH
Checked By
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Improved Agricultural Grassland (GA1)

A number of agricultural fields within the Proposed Wind Farm site were characterised as improved agricultural grassland (GA1) pasture. This habitat type (see Plate 3-1) was predominantly recorded along the southwestern section of the Proposed Wind Farm site, as well as in the south and north of the Proposed Wind Farm site. The sward within most fields of this nature was dominated by perennial ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), and occasional soft rush (*Juncus effusus)*. These areas of grassland are under agricultural management, used for silage and grazed by livestock. Turbine 1 (and associated infrastructure) are proposed to be located on improved agricultural grassland (GA1) habitat.

Plate 3-1. An example of improved agricultural grassland (GA1) in the vicinity of the proposed location for Turbine 1, in the northwest section of the Proposed Wind Farm site.

Wet Grassland (GS4)

Wet grassland was recorded within agricultural fields throughout the Proposed Wind Farm site, with the greatest concentration of this habitat located in the southwestern corner of the Proposed Wind Farm site. This habitat type (see Plate 3-2) within the Proposed Wind Farm site was dominated by grasses and rushes, in particular soft rush, Yorkshire-fog, Common Bent *(Agrostis capillaris)*, and creeping buttercup (*Ranunculus repens*). Other species recorded within this habitat included perennial ryegrass, meadow buttercup and marsh thistle (*Cirsium palustre*). Turbines 3 and 6 (and associated infrastructure) are proposed to be located in areas of wet grassland (GA4) habitat.

Plate 3-2. Wet grassland (GS4) recorded in the vicinity of the proposed location for Turbine 3

Conifer Plantation (WD4) & Recently Felled Woodland (WS5)

Conifer plantation (WD4) and recently felled woodland (WS5) were the two dominant habitat types recorded through the Proposed Wind Farm site. Conifer plantation was recorded within the central southern half of the site, extending through the greater central vicinity and spanning the majority of the northern portion of the Proposed Wind Farm site.

These forestry blocks (see Plate 3-3) were dominated by Sitka (Picea sp.) with ground flora dominated by bryophyte species, as well as bramble, rushes, bracken (*Pteridium aquilinum*). There was a greater diversity of flowering plants recorded within areas of recently felled woodland (see Plate 3-4) some additional species recorded in these areas comprised foxglove (*Digitalis purpurea*), heath bedstraw (*Galium saxatile*), tormentil (*Potentilla erecta) and* rosebay willowherb (*Chamaenerion angustifolium).*

Areas of conifer plantation which had been felled but not yet replanted, were classified as recently felled woodland (WS5).

Plate 3-3: Example of receiving habitat (WS5) at Turbine 5

Plate 4-4: Example of bryophyte-dominant woodland floor cover within conifer plantation (WD4) July 19th, 2023.

Scrub (WS1)

This habitat type was only recorded in a small number of areas within the Proposed Wind Farm site and was predominantly associated with areas of previously felled woodland or scrub encroachment around field boundaries. Where scrub habitat had started to develop it was dominated by willow (*Salix spp.*) gorse (*Ulex europaeus*) and bramble, with spruce saplings also present (see Plate 3-5).

Plate3-5. An area of scrub habitat (WS1) establishing in an area of previously felled woodland.

Hedgerow (WL1) and Stonewalls (BL1)

Hedgerow habitat was only occasionally recorded within the Proposed Wind Farm site, the majority of linear habitats forming field boundaries within the site comprised of heavily vegetated stonewalls and/or earth banks (discussed further below). Hedgerow habitat was mainly associated with agricultural fields and an old farmstead in the west of the Proposed Wind Farm site and west of turbine 4. Here the hedgerows were outgrown in nature (see Plate 3-6) and dominated by Hawthorn (*Crataegus monogyna*). As per Fossitt (2000) heavily vegetated, overgrown stone walls should also be considered as hedgerow habitat, heavily vegetated stone walls (see Plate 3-7) were recorded along a farm track which will form the new entrance to the Proposed Wind Farm site. Vegetation on these stone walls was dominated by bramble, gorse and grasses with occasional rosebay willowherb.

Plate 3-6. Hedgerow (WL1) habitat forming field boundary around old farmstead west of Turbine 4.

Plate 3-7. Heavily vegetated/overgrown stone walls mapped as hedgerow (WL1) along existing farm track which will form the new entrance to the Proposed Wind Farm site.

Earth banks (BL2)

Earth banks are a common type of field boundary in many parts of Ireland (Fossitt, 2000). Most are completely vegetated when intact as was the case on the Proposed Wind Farm site. This habitat type was recorded around field boundaries in the northeast of the Proposed Wind Farm site in close proximity to the proposed location for Turbine 3 and also in the south of the Proposed Wind Farm site, south of the proposed location for Turbine 7. Vegetated earth banks were very overgrown in parts and were dominated by gorse and hawthorn. These vegetated earth banks are very similar in nature of hedgerows in that they form a linear wildlife corridor within the landscape.

Treeline (WL2)

Where linear 'hedgerow' features were over 5m in height and were made up of semi-mature to mature trees, these were characterised as treelines, with *Picea* species and *Salix* species making up the majority of the treelines on the Proposed Wind Farm site (see Plate 3-8), occasional treelines of native broadleaved species were also recorded comprising of ash (*Fraxinus excelsior),* sycamore *(Acer pseudoplatanus)* and silver birch *(Betula pendula)* (Plate 3-8).

Plate 3-8: Conifer treeline along a field boundary separating an area of scrub (WS1) and an agricultural grassland, located in the southwest of the Proposed Wind Farm site.

Plate 3-9. Treeline of mixed broadleaved native species recorded along field boundary east of the proposed substation/battery storage compound.

Drainage Ditches (FW4)

A number of manmade ditches/drains were recorded across the Proposed Wind Farm site. These drains were associated with areas of coniferous forestry and along sections of the existing forestry access roads (see Plate 3-10). Most were deep and narrow (30-40cm wide) and devoid of any significant aquatic vegetation, pondweed (*Potamogeton spp.*) was recorded on occasion. Overall, these drains were

considered to be of relatively low ecological value given their narrow, deep, shaded nature and lack of aquatic vegetation.

Plate 3-10. Example of typical drain recorded throughout the Proposed Wind Farm site (within areas of forestry)

Upland Eroding Rivers (FW1)

Three watercourses were recorded within the Proposed Wind Farm site all of which drain to the west side of the Proposed Wind Farm site. All three watercourses within the Proposed Wind Farm site were classed as upland eroding streams (FW1). The Seskinrea stream (see site A5, Figure 2.1 in Aquatics Report, Appendix 1), flows through agricultural pasture and conifer plantation. Within the conifer plantation, the stream is a channelised narrow watercourse with steep high banks. Bankside vegetation cover extended along the channel and consisted of moss species cover with dense overhanging vegetation of *Picea saplings*, *bramble,* rosebay willowherb and other herbaceous species (Plate 3-11).

Two further unnamed streams (see site A1 and A2, Figure 2.1 in Aquatics Report, Appendix 1) were recorded within the Proposed Wind Farm site. The stream at site A1 (farm access track crossing) comprised a small upland steam which had had been straightened and over-deepened historically. This stream had very low flows at the time of survey and no macrophytes or aquatic bryophytes were recorded. There was also evidence of significant cattle poaching at this location. The stream at site A2 had also been straightened and deepened historically. Macrophytes were limited to bog pondweed (*Potamogeton polygonifolius*), with occasional water mint (*Mentha aquatica*) along the margins. Aquatic bryophytes were not recorded.

Plate 3-11. Seskinrea River flowing in a generally west direction through a conifer plantation in the northwest region of the Proposed Project site.

Buildings and Artificial Surfaces (BL3)

Existing forestry and farm tracks within the Proposed Wind Farm site were categorised as buildings and artificial surfaces (BL3). Any private dwellings and/or agricultural buildings within the site were also categorised as BL3.

4.2.1.2 Habitats along the Proposed Grid Connection Route

The underground cabling required to facilitate the Proposed Grid Connection Route will be laid beneath the surface of the internal site road network and public road It is proposed that the Proposed Grid Connection Route will originate at the onsite 38kV substation, which is located within an area of **wet grassland (GS4)** in the north-central vicinity of the Proposed Wind Farm site. The cable will run northwest through the site consisting of **conifer plantation (WD4)**, **wet grassland (GS4),** and **improved agricultural grasslands (GA1)** within the Proposed Wind Farm site before meeting the local public road L30372 in the townland of Seskinrea.

It is proposed that the Proposed Grid Connection Route will continue west along local road L30372 before crossing the L3037 and onto the local road L30371, then entering the townland of Coolcullen and Co. Kilkenny. Habitats along this section of the route were assessed as predominantly consisting of **improved agricultural grasslands (GA1)**, with occasional **scrub (WS1)** and **buildings and artificial surfaces (BL3)**.

Beyond the intersection with L3037, the Proposed Grid Connection Route is proposed to continue on the L30371 through the townlands of Reevanagh, Coolgreany, Mount Nugent Upper, Mount Nugent Lower, Ballysallagh, Feathallagh, Kilmagar, and Clara Upper before turning right on the local road L2627. The predominant habitats bordering this section of the route have been assessed as **improved agricultural grasslands (GA1)** and **wet grassland (GS4)**. Less dominant habitats also occurring along this section of the route comprised **scrub (WS1)**, **mixed broadleaved/conifer woodland (WD2)**, **amenity grassland (improved) (GA2)**. Occasional **buildings and artificial surfaces (BL3)**, which mainly consist of

residential properties, were also recorded for this area. In the vicinity of Reevanagh, and Mount Nugent Upper, **conifer plantation (WD4)** border and extend beyond sections of the L30371.

The Proposed Grid Connection Route is proposed to continue south along the L2627 through the townlands Churchclara and Clarabricken. The Proposed Grid Connection Route then veers south onto the R712 through the townlands of Rathgarvan, Scart and Highrath, Ballynamona where it enters the Kilkenny substation property and follows the access road to the 110kV Kilkenny substation. Bordering habitat composition south along the remaining section of the Proposed Grid Connection Route remains similar to that along the preceding sections of the Proposed Grid Connection Route. Predominant habitat was assessed as **improved agricultural grasslands (GA1)** and **wet grassland (GS4)** with occasional areas of **mixed broadleaved/conifer woodland (WD2)**, **amenity grassland (improved) (GA2),** and **buildings and artificial surfaces (BL3)** also occurring.

4.2.1.3 Annex I Habitats

In summary, as described in the preceding sections, no Annex I habitats were recorded within the study area (Proposed Wind Farm site and Proposed Grid Connection Route).

4.2.1.4 Invasive species

No invasive species listed on the Third Schedule were recorded within the Proposed Wind Farm site or along the Proposed Grid Connection Route.

4.2.2 Aquatic Surveys

Full details of results of aquatic surveys undertaken in August 2022 are provided in the Aquatic Baseline Report (Appendix 1) and are summarised in this section. All survey locations (n=20) are shown in Figure 2-1 in the Aquatic Baseline report (Appendix 1). The following summary has been extracted from the baseline report.

4.2.2.1 Watercourses

With the exception of the Dinin River (a larger semi-natural upland river) and the River Barrow (large lowland river), the watercourses in the vicinity of the Proposed Project site were typically small, modified channels which suffered from reduced summer flows in August 2022. These characteristics resulted in in reduced habitat and water quality, often poor fluvial connectivity, habitat fragmentation and fish passage issues. Low summer flows are a common occurrence in the wider survey area and, in addition to considerable agricultural (eutrophication, siltation) pressures, is a significant threat to aquatic ecology in the vicinity of the Proposed Project site. Approximately half of the survey sites were of international importance by virtue of their location within the River Barrow and River Nore SAC but these were not always of inherently high aquatic value (e.g. site C3, Figure 2-1, Appendix 1). Broadly speaking, the highest value watercourses within vicinity of the Proposed Project were the Dinin River and its tributary the Knocknabranagh & Knockbaun River (east) and, to the west of the Proposed Wind Farm site, the River Barrow.

4.2.2.2 Fish Species

The following paragraphs summarise the fish species that were recorded during the aquatic baseline surveys. The below paragraphs should be read in conjunction with Figure 2.1 (survey locations) in the Aquatic Baseline Report (Appendix 1):

- **Salmonids** were present at 7 no. sites in total, with **Atlantic salmon** present at six of these (i.e. A6, A7, A9, A01, A11 & A12).

- **Lamprey ammocoetes** (Lampetra sp.) were only recorded from a single site (C3 Oldleighlin Stream) during targeted electro-fishing across the 19 no. survey sites in the vicinity of the Proposed Projectsite.
- Despite widespread suitability, **European eel** were only recorded in low densities from sites A11 & A12 on the Dinin River and C3 on the Oldleighlin Stream.

4.2.2.3 White-clawed crayfish & crayfish plague

No white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia during the survey and no crayfish remains were identified in otter spraint sites recorded during the survey. However, white-clawed crayfish was detected from eDNA surveys as was crayfish plague (discussed further below).

4.2.2.4 eDNA analysis

White-clawed crayfish was detected from eDNA in a water sample collected from the Dinin River at site A10. No crayfish eDNA was detected at sites A12 (Dinin River), B3 (Rathornan River), C3 (Old leighlin Stream) or B4 (River Barrow). However, Site A12 on the Dinin River tested positive for crayfish plague (*Aphanomyces astaci*).

No freshwater pearl mussel eDNA was detected in the 5 no. samples. 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.

4.2.2.5 Kick-sampling and Q-Value

The following summarise the results of kick-sampling and Q-Value evaluation carried out:

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from n=17 wetted riverine sites in August 2022. No rare or protected macrophytes/aquatic bryophytes were recorded at any of the aquatic survey locations.

Site A11 on the Dinin River achieved **Q4 (good status)** water quality and thus met the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters)(Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC). The remaining 16 no. sites achieved **Q3-4 (moderate status)** or **Q2-3 or Q3 (poor status).** All three watercourses within the Proposed Project site (Sites A1, A2 and A5) all achieved **Q3 (poor status).**

The biological water quality of the survey area was generally poor, with the majority of the water courses in the study area significantly impacted via eutrophication, siltation and or historical modifications (hydromorphology). The widespread low summer flows and water volumes further reduced the water quality within the survey area in August 2022. Abstraction and agricultural eutrophication are among the primary threats to water quality within the survey area (EPA, 2019,2018 cited in Aquatic Report) and this was observed during the site surveys.

4.2.2.6 Otter

Desk based review identified that otter are widespread in wider area surrounding the Proposed Project. Watercourses within the Proposed Wind Farm site and along the Proposed Grid Connection Route provide suitable habitat for otter, as such all watercourses within the Proposed Wind Farm site and along the Proposed Grid Connection Route were surveyed for signs of otter, watercourses in the wider study area were also surveyed to inform the aquatic baseline, including for otter (see Figure 3.1, Aquatic Baseline Report, Appendix 1 for survey locations). No otter signs were recorded within the Proposed Wind Farm site or along the Proposed Grid Connection Route. However, otter surveys undertaken in the wider study area identified a single regular sprainting site downstream of the bridge

at survey location Site A10 – Dinin River and a single spraints at Site A11, Site A12 – Dinin River and Site B4, Site C4 – River Barrow (see Appendix 1 for further detail). All otter spraints were checked for signs of crayfish remains, no crayfish remains were identified. No breeding (holts) or resting (couch) sites were identified either within the site, along the Proposed Grid Connection Route or in the wider study area where otter surveys were conducted.

4.2.3 Bird Surveys

Only one 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*). No kingfisher were recorded within the Proposed Wind Farm site, however, kingfisher were recorded during waterbird distribution surveys with the closest record 5.3km from the Proposed Wind Farm site. There were 11 observations of kingfisher during waterbird distribution surveys comprising between 1-2 birds travelling, calling and hunting. All observations were along the River Barrow. No kingfisher nesting sites were identified during the surveys.

5. APPROPRIATE ASSESSMENT SCREENING

5.1 Identification of Relevant European Sites

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

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

Figure 5-1 European Designated Sites

Table 5-1 Identification of European Sites within the Likely Zone of Influence

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	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: 0km from Proposed Grid Connection Route (located adjacent to the SAC) 1km from Proposed Wind Farm site	• [1016] Desmoulin's Whorl Snail *Vertigo moulinsiana* • [1029] Freshwater Pearl Mussel *Margaritifera margaritifera* • [1092] White-clawed Crayfish *Austropotamobius pallipes* • [1095] Sea Lamprey *Petromyzon marinus* • [1096] Brook Lamprey *Lampetra planeri*	Detailed conservation objectives for this site, (Version 1, 19 July 2011[3]), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project and associated infrastructure is located outside of this designated site. The Proposed Grid Connection Route is located adjacent to the SAC. However, no instream works are required as part of the Proposed Grid Connection Route. Only minor cabling installation works are proposed within the public road and all bridge crossings will be by Horizontal Directional Drilling (HDD). The Proposed Project (Proposed Wind Farm and Proposed Grid Connection Route) are hydrologically linked to the SAC. The River Seskinrea flows west from within the north area of the Proposed Wind Farm site and enters the SAC approximately 1.1km downstream. Two unnamed watercourses also flow from within the central and south areas of the site, both merging with the River Seskinrea approximately 100m upstream of the confluence with the SAC. The Proposed Grid Connection Route crosses a number of water courses which are also hydrologically linked to the SAC. The Proposed Wind Farm site is located within the same hydrological sub-catchment (Dinin [South]_SC_010) and	**Yes**

[3] https://www.npws.ie/protected-sites/sac/002162

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	• [1099] River Lamprey *Lampetra fluviatilis* • [1103] Twaite Shad *Alosa fallax fallax* • [1106] Atlantic salmon (*Salmo salar*) (only in fresh water) • [1355] Otter *Lutra lutra* • [1421] Killarney Fern *Trichomanes speciosum* • [1990] Nore Pearl Mussel *Margaritifera durrovensis* • [1130] Estuaries • [1140] Mudflats and sandflats not covered by seawater at low tide • [1310] *Salicornia* and other annuals colonising mud and sand		groundwater catchment (Castlecomer) as the SAC. There are no karst features in the area of the Proposed Wind Farm site. However, a section of the Proposed Grid Connection Route is underlain by a Regionally Important Karst Aquifer. A small number of karst features were mapped over 400m from the Proposed Grid Connection Route which are considered to be outside the ZoI of the Proposed Project. No groundwater level impacts are predicted from the construction of the Proposed Grid Connection Route, Proposed Wind Farm and associated access roads, substation compound, due to the shallow nature of the excavations proposed (i.e. 0 -~1.2m). Horizontal Directional Drilling (HDD) associated with bridge crossings along the Proposed Grid Connection 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. 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 Proposed Wind Farm and Proposed Grid Connection Route. Large volumes of concrete will be required associated with construction of turbine foundations, therefore taking a precautionary approach potential impacts on ground water quality were also considered. Therefore a pathway for indirect effects on the aquatic qualifying interest (QIs) species and habitats of the SAC exist in the form of	

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	• [1330] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) • [1410]Mediterranean salt meadows (*Juncetalia maritimi*) • [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* 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 (*Cratoneurion*)		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.**	

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	• [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles • [91E0] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)			
Thomastown Quarry SAC [002252] **Distance**: 11.5km from Proposed Grid Connection Route 25km from Proposed Wind Farm site	• [7220] Petrifying springs with tufa formation (*Cratoneurion*)	Detailed conservation objectives for this site (Version 1, 2 July 2019) 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 25km north of this SAC, while the Proposed Grid Connection Route is located over 11km from the site. 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.**	No

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Lisbigney Bog SAC [000869] **Distance**: 18.5km from Proposed Grid Connection Route 20km from Proposed Wind Farm site	• [7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* • [1016] Desmoulin's Whorl Snail *Vertigo moulinsiana*	Detailed conservation objectives for this site, (Version 1, 13 December 2021), 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 20km southeast of this SAC, while the Proposed Grid Connection Route is located over 18km from the site. 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.**	No
Special Protection Area (SPA)				
River Nore SPA [004233] **Distance**:	• [A229] Kingfisher (*Alcedo atthis*)	Detailed First Order Site-specific conservation objectives for this site, (12/10/2022), were reviewed as part of the assessment and	The Proposed Project is located outside this SPA. **Direct Effects (Disturbance)** There were no observations of kingfisher within a minimum 5km of the Proposed Wind Farm site during ornithological surveys undertaken between April 2020 and May 2022. Furthermore, no	**Yes**

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
1.8km from Proposed Grid Connection Route 16.5km from Proposed Wind Farm site		are available at: www.npws.ie	observation of kingfisher were made during walkover surveys of the Proposed Grid Connection Route and no nesting sites identified. The Proposed Wind Farm site is located over 16.5km (overland) from the SPA therefore direct effects on kingfisher (SCI population) associated with development of the Proposed Project have been ruled out. The Proposed Grid Connection Route is situated 1.8km from the nearest point of the SPA. A disturbance buffer for kingfisher of between 50-100m has been recommended by Goodship & Furness (2022)[4]. The SPA is significantly beyond this distance from the Proposed Grid Connection Route. The Proposed Grid Connection Route works will be confined to the existing road network and involve minor works over a short period, broadly analogous to existing activities in the general area (i.e. farm machinery, road works, vehicle movements etc.). No instream works are proposed as part of the Proposed Grid Connection Route as all watercourse crossings will be by way of horizontal directional drilling (HDD). As such, given the nature of the Proposed Grid Connection Route works and the distance from the SPA, the potential for direct impacts (disturbance, habitat loss) on populations of SCI species associated with the SPA as a result of the Proposed Project have been ruled out. **Indirect Effects (Deterioration in Water Quality)**	

[4] *https://www.nature.scot/doc/naturescot-research-report-1283-disturbance-distances-review-updated-literature-review-disturbance*

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			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. Given the above 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.**	

5.2 Appropriate Assessment Screening Conclusion

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

- 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.

6. 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
- River Nore SPA

The following sections consider each European Site individually to:

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

6.1 Identification of relevant Qualifying Features

6.1.1 River Barrow and River Nore SAC

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 and operation of the Proposed Project.

Table 5-1 below lists the QIs 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.

6.1.1.1 Identification of Individual Qualifying Interest species with the Potential to be Affected.

Table 6-1 Assessment of Qualifying Interest species potentially affected.

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
[1016] Desmoulin's whorl snail *Vertigo moulinsiana*	To maintain the favourable conservation condition of Desmoulin's whorl snail in the River Barrow and River Nore SAC.	The Proposed Project is located outside the SAC as such there is no potential for direct impacts on this QI species (e.g. loss of occupied sites within the SAC, population density etc.). *Vertigo moulinsiana* 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]). Given this QI species is terrestrial in nature potential indirect impacts associated with	No

[5] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf
[6] https://www.npws.ie/sites/default/files/publications/pdf/IWM104_0.pdf

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
		deterioration of water quality within the SAC as a result of the Proposed Project would have no effect on this terrestrial QI species. **No further assessment is required.**	
[1990] Nore freshwater pearl mussel *Margaritifera durrovensis*	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. The current distribution of the Nore freshwater pearl mussel mapped habitats (as per Map 7 of the Site Specific Conservation Objectives (SSCO) for this SAC) are not hydrologically connected as the Proposed Project site is located downstream of these mapped habitats. However, the 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 for 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.**	**Yes**
[1029] Freshwater pearl mussel *Margaritifera margaritifera*	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. The outcome of this review will determine whether a site-specific conservation objective is set for this species. Please note that the Nore freshwater pearl mussel (*Margaritifera durrovensis*)	The Proposed Project 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 Route is also hydrologically connected to the Nore Lower Margaritifera catchment. Two records (from 1991 and 2007) were available for freshwater pearl mussel for the River Nore in grid square S46, however, both records were located upstream of the Dinin River confluence. Therefore there is no hydrological connection between the Proposed Project to any known freshwater pearl mussel point records.	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
	remains a qualifying species for this SAC.	No freshwater pearl mussel eDNA was detected in the 5 no. samples (see Aquatic Baseline Report, Appendix 1). 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. SSCO's 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.**	
[1092] White-clawed crayfish *Austropotamobius pallipes*	To maintain the favourable conservation condition of White-clawed crayfish in the River Barrow and River Nore SAC	The Proposed Project is hydrologically linked to the River Barrow and River Nore SAC. Surveys undertaken as part of the Proposed Project, specifically eDNA surveys detected white-clawed crayfish in a water sample collected from the Dinin River at site A10 (see Figure 2.1, Aquatic Baseline report, Appendix 1) which is located within the SAC. This QI species is therefore presumed present within the ZoI of the Proposed Project. A deterioration in water quality as a result of the Proposed Project would have the potential to undermine the conservation objectives for this species. It should be noted that eDNA surveys undertaken as part of the Proposed Project detected crayfish plague (*Aphanomyces astaci*) at site A12 (see Figure 2.1, Aquatic Baseline report, Appendix 1) on the Dinin River within the SAC. Crayfish plague was not detected in the sample at site A10 as such crayfish plague is considered to be present outside the ZoI of the Proposed Project and as such the potential to spread crayfish plague as a result of progressing the Proposed Project has been ruled out. **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 feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
[1106] Atlantic salmon (*Salmo salar*) (only in fresh water)	To restore the favourable conservation condition of Salmon in the River Barrow and River Nore SAC	The Proposed Project is hydrologically linked to the River Barrow and River Nore SAC. Surveys undertaken as part of the Proposed Project identified that salmonids were present at 7 no. sites in total, with Atlantic salmon present at six of these (i.e. A6, A7, A9, A01, A11 & A12) (see Figure 2.1, Aquatic Baseline report, Appendix 1) a number of which are located within the SAC. This QI species is therefore present within the ZoI of the Proposed Project. A deterioration in water quality as a result of the Proposed Project would have the potential to undermine the conservation objectives for 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**
[1095] Sea lamprey *Petromyzon marinus*	To restore the favourable conservation condition of Sea lamprey in the River Barrow and River Nore SAC	The Proposed Project is hydrologically linked to the River Barrow and River Nore SAC. Surveys undertaken as part of the Proposed Project only identified Lamprey ammocoetes (*Lampetra sp.)* from a single site (Site C3, see Figure 2.1, Aquatic Baseline report, Appendix 1) 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. The overall conservation objective is to restore favourable conservation status of this QI. Therefore, taking a precautionary approach this QI it is considered to be within the ZoI of the Proposed Project. A deterioration in water quality, in particular from silt laden runoff, could have the potential to undermine the conservation objectives for this species in particular in relation to extent and distribution of spawning habitat. This species requires clean gravels to spawn. **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**
[1096] Brook lamprey *Lampetra planeri*	To restore the favourable conservation condition of Brook	The Proposed Project is hydrologically linked to the River Barrow and River Nore SAC. Surveys undertaken as part of the Proposed Project only identified Lamprey ammocoetes (*Lampetra sp.)* from a single site (Site C3, see Figure 2.1, Aquatic Baseline report, Appendix 1) during targeted electro-fishing across the 19 no. survey sites in the vicinity of the Proposed	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
	lamprey in the River Barrow and River Nore SAC	Project. The SSCO for the SAC don't specify where this QI species may be present within the SAC. The overall conservation objective is to restore favourable conservation status of this QI. Therefore, taking a precautionary approach this QI it is considered to be within the ZoI of the Proposed Project. A deterioration in water quality, in particular from silt laden runoff, could have the potential to undermine the conservation objectives for this species in particular in relation to extent and distribution of spawning habitat. This species requires clean gravels to spawn. **A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.**	
[1099] River lamprey *Lampetra fluviatilis*	To restore the favourable conservation condition of River lamprey in the River Barrow and River Nore SAC	The Proposed Project is hydrologically linked to the River Barrow and River Nore SAC. Surveys undertaken as part of the Proposed Project only identified Lamprey ammocoetes (*Lampetra sp.)* from a single site (Site C3, see Figure 2.1, Aquatic Baseline report, Appendix 1) 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. The overall conservation objective is to restore favourable conservation status of this QI. Therefore, taking a precautionary approach this QI it is considered to be within the ZoI of the Proposed Project. A deterioration in water quality, in particular from silt laden runoff, could have the potential to undermine the conservation objectives for this species in particular in relation to extent and distribution of spawning habitat. This species requires clean gravels to spawn. **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**
[1103] Twaite shad *Alosa fallax*	To restore the favourable conservation condition of Twaite shad in the River Barrow and River Nore SAC	The Proposed Project is hydrologically linked to the River Barrow and River Nore SAC. Surveys undertaken as part of the Proposed Project did not detect this species. The SSCO for this species note that regular breeding has been confirmed in the River Barrow in recent years, but not in the Nore. The overall conservation objective is to restore favourable conservation status of this QI. Therefore, taking a precautionary approach this QI it is considered to be within the ZoI of the Proposed Project. A deterioration in water quality could have the	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
		potential to undermine the conservation objectives for this species in particular in relation to water quality (oxygen levels) and maintenance of suitable spawning habitat (gravels free of fines material and algal growth which can be exacerbated due to deterioration on water quality. **A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.**	
[1355] Otter *Lutra lutra*	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 site, signs of otter were identified in the wider study area including along the Dinin River which forms part of the River Barrow and River Nore SAC to which the Proposed Project is hydrologically linked. For the Proposed Grid Connection Route, only minor underground cabling installation works are proposed within the public road and all bridge crossings will be by HDD. 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 and Proposed Grid Connection 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. **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**
[1421] Killarney fern *Trichomanes speciosum*	To maintain the favourable conservation condition of Killarney	The Proposed Project is located outside the SAC as such there is no potential for direct impacts on this QI species. As per Map 7 of the SSCOs for this SAC, the nearest known location of this QI species is located approx. 24.7km southeast of the Proposed Project. Given this QI species is terrestrial in nature potential indirect impacts associated with deterioration of	No

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
	Fern in the River Barrow and River Nore SAC	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.**	
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* 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**
[1130] Estuaries	To maintain the favourable conservation condition of Estuaries in the River Barrow and River Nore SAC	The Proposed Project is located outside the SAC as such there is no potential for direct impacts on this QI habitat. The Proposed Project site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >45km downstream of the Proposed Project 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 over >45km) 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	The Proposed Project is located outside the SAC as such there is no potential for direct impacts on this QI habitat. The Proposed Project site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >45km downstream of the Proposed Project site, any changes in water quality as a result of the	No

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
	by seawater at low tide in the River Barrow and River Nore SAC	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 over >45km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	
[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	The Proposed Project is located outside the SAC as such there is no potential for direct impacts on this QI habitat. The Proposed Project site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >45km downstream of the Proposed Project 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 over >45km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	No
[1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	To restore the favourable conservation condition of Atlantic salt meadows in the River Barrow and River Nore SAC	The Proposed Project is located outside the SAC as such there is no potential for direct impacts on this QI habitat. The Proposed Project site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >45km downstream of the Proposed Project 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 over >45km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	No

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
[1410] Mediterranean salt meadows (*Juncetalia maritimi*)	To restore the favourable conservation condition of Mediterranean salt meadows in the River Barrow and River Nore SAC	The Proposed Project is located outside the SAC as such there is no potential for direct impacts on this QI habitat. The Proposed Project site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >45km downstream of the Proposed Project 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 over >45km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	No
[4030] European dry heaths	To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC	The Proposed Project is located outside of the SAC and therefore there is no potential to impact on this terrestrial QI habitat. **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 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in the River Barrow and River Nore SAC	The Proposed Project is located outside of 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	The Proposed Project is located outside of the SAC. The full extent of this QI habitat within the SAC is currently unknown. However, as per Map 7 of the SSCOs the nearest known record for this QI habitat is located in excess of 25km from the Proposed Project site. No groundwater level impacts are predicted from the construction of the Proposed Grid Connection Route, access roads, substation compound, turbine delivery route works or met	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
	(*Cratoneurion*) in the River Barrow and River Nore SAC	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. The Proposed Wind Farm site is located within the same hydrological sub-catchment (Dinin [South]_SC_010) and groundwater catchment (Castlecomer) 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 3 - 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	The Proposed Project is located outside of the SAC and therefore there is no potential to impact on this terrestrial QI habitat. **No further assessment is required.**	No

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

Qualifying feature	Conservation Objective (NPWS, Version 1, July 2011[5])	Rationale	Potential for Adverse Effects Yes/No
[91E0] * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) in the River Barrow and River Nore SAC	The Proposed Project is located outside of the SAC, as such there is no potential for direct effects on this 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

6.1.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form[8] for the River Barrow and River Nore SAC 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 below.

Table 6-2: Site-specific threats, pressures and activities for the River Barrow and River Nore SAC (002162)

Negative Impacts			
Rank	**Threats and Pressures (* Items in bold are of relevance to the proposed project)**		**Inside/Outside**
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	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

[8] https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0002162

Negative Impacts			
Rank	**Threats and Pressures (* Items in bold are of relevance to the proposed project)**		**Inside/Outside**
Medium	B02	**Forest and Plantation management & use**	both
Medium	B05	Use of fertilizers (forestry)	both
Medium	B07	Forestry activities not referred to above	both
Medium	C01.03	Peat extraction	outside
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

6.1.1.3 QI Specific Information

6.1.1.3.1 [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 Proposed Project site is located downstream of these mapped habitats. However, the 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 for regaining favourable conservation status within the SAC.

CO Targets and Attributes - Nore freshwater pearl mussel

Table 6-2 Targets and attributes associated with the site-specific conservation objectives for

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 degredation) 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 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.

6.1.1.3.2 [1029] Freshwater pearl mussel *Margaritifera margaritifera*

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. Given the status of the species within the SAC is currently under review taking a precautionary approach this species is still considered a QI of the SAC for the purposes of this assessment. In the absence of SSCO for the freshwater pearl mussel SSCO's for Nore freshwater pearl mussel (as outlined in Table 5-3 above) would be considered applicable and as such similar impacts in relation to deterioration in water quality and habitat degradation would apply.

6.1.1.3.3 *[1092]* White-clawed crayfish *Austropotamobius pallipes*

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

eDNA surveys undertaken as part of the Proposed Project, detected white-clawed crayfish in a water sample collected from the Dinin River within the SAC and downstream of the Proposed Project. It should be noted that eDNA surveys also detected crayfish plague. Based on survey findings crayfish plague is considered to be present outside the ZoI of the Proposed Project and as such the potential to spread crayfish plague as a result of progressing the Proposed Project has been ruled out.

CO Targets and Attributes – white-clawed crayfish

Table 6-4 Targets and attributes associated with the site-specific conservation objectives for White-clawed Crayfish.

Attribute	Target	Potential for Proposed Project to Undermine Conservation Objective Target
Distribution	No reduction from baseline. See Map 7 of the site-specific conservation objectives document.	**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).

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.

6.1.1.3.4 [1106] Atlantic salmon *(Salmo salar)* (only in fresh water)

According to the Site Synopsis document for the River Barrow and River Nore SAC (NPWS, 2016[9]), the freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.

Surveys undertaken as part of the Proposed Project identified that salmonids were present at 7 no. sites in total, with Atlantic salmon present at six of these (i.e. A6, A7, A9, A01, A11 & A12) (see Figure 2.1, Aquatic Baseline report, Appendix 1) a number of which are located within the SAC. This QI species is therefore present within the ZoI of the Proposed Project. A deterioration in water quality as a result of the Proposed Project would have the potential to undermine the conservation objectives for this species.

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

CO Targets and Attributes – Atlantic salmon

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

Attribute	Target	
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary	No (Proposed Project will not result in any barriers to movement)
Adult spawning fish	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.
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 and habitat degradation as a result of silt-

[9] https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002162.pdf

		laden run-off and other pollutants 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 as a result of silt-laden run-off and other pollutants could undermine this target.

6.1.1.3.5 [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 6-6 Targets and attributes associated with the site-specific conservation objectives for Sea 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 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/m²	**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.

6.1.1.3.6 [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).

CO Targets and Attributes – brook lamprey

Table 6-7 Targets and attributes associated with the site-specific conservation objectives 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/m²	**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.

6.1.1.3.7 [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).

CO Targets and Attributes – river lamprey

Table 6-8 Targets and attributes associated with the site-specific conservation objectives 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 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/m²	**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.

6.1.1.3.8 [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'.

CO Targets and Attributes – twaite shad

Table 6-9: Targets and attributes associated with the site-specific conservation objectives 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.

6.1.1.3.9 [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). While no signs of otter were recorded within the Proposed Project site, signs of otter were identified in the wider study area including along the Dinin River which forms part of the River Barrow and River Nore SAC to which the Proposed Project is hydrologically linked.

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

CO Targets and Attributes – otter

Table 6-10 Targets and attributes associated with the site-specific conservation objectives 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 river banks / 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)
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 otter 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)

6.1.1.3.10 *[3260] Water courses of plain to montane levels with the Ranunculion fluitantis 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'.

CO Targets and Attributes – Water courses of plain to montane levels

Table 6-3 Targets and attributes associated with the site-specific conservation objectives for Water courses of plain to montane levels with the Ranunculion fluitantis 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 sufficient to maintain tufa formation	No (changes to hydrological regime as a result of the Proposed Project will not occur).
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.

6.1.1.3.11 [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 Proposed Project 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'.

CO Targets and Attributes – Petrifying springs with tufa formation (Cratoneurion)

Table 6-12 Targets and attributes associated with the site-specific conservation objectives for Petrifying springs with tufa formation

Attribute	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.

6.2 Identification of relevant Qualifying Features

6.2.1 River Nore SPA

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

- A pathway for indirect effects on the SCI species (kingfisher) of the SPA exists in the form of water quality deterioration via surface water pathways during construction and operation of the Proposed Project.

Table 5-13 below lists the qualifying interests 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.

6.2.1.1 Identification of Individual Qualifying Interest species with the Potential to be Affected.

Table 6-13 Assessment of Qualifying Interest species potentially affected.

Qualifying feature	Conservation Objective (NPWS, 2022[10])	Rationale	Potential for Adverse Effects Yes/No
[A229] Kingfisher (*Alcedo atthis*)	To maintain or restore the favourable conservation of the bird species listed as Special Conservation Interests for this SPA.	The Proposed Project is located over 1.8km from the SPA at the nearest point. Direct impacts on this SCI species have been ruled out as detailed in Table 4.1, Section 4.1. 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	**Yes**

[10] *https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004233.pdf*

Qualifying feature	Conservation Objective (NPWS, 2022[10])	Rationale	Potential for Adverse Effects Yes/No
		have overall implications for maintaining or restoring favourable conversation status for the SCI species.	

6.2.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form[11] for the River Barrow and River Nore SAC 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 5-14 below.

Table 6-14: Site-specific threats, pressures and activities for the River Barrow and River Nore SAC (002162)

Negative Impacts			
Rank	**Threats and Pressures (* Items in bold are of relevance to the proposed project)**		**Inside/Outside**
Medium	D03.01	Port areas	inside
Medium	J02.01	Landfill, land reclamation and drying out, general	outside

6.2.1.3 QI Specific Information

6.2.1.3.1 [A229] Kingfisher (*Alcedo atthis*)

The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher (NPWS, 2011b[12]). A survey in 2010 recorded 22 pairs of Kingfisher (based on 16 probable and 6 possible territories) within the SPA.

Kingfisher is currently on the Amber-list (medium conservation concern) in the Birds of Conservation Concern in Ireland 2020-2026 (Gilbert and Lewis (2021).

CO Targets and Attributes – Kingfisher

Table 6-12 Targets and attributes associated with the site-specific conservation objectives for Kingfisher

Attribute	Target	
Favourable Conservation Status of Habitat is achieved	Its natural range, and area it covers within that range, are stable or increasing, and	No (changes to kingfisher habitat will not occur as a result of the Proposed Project).
	The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future	No (changes to kingfisher habitat will not occur as a result of the Proposed Project).

[11] https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0004233

[12] https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004233.pdf

	the conservation status of its typical species is favourable.	No (changes to kingfisher habitat will not occur as a result of the Proposed Project).
The Favourable conservation status of a species is achieved	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	**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)
	The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and	**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)
	There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.	No (changes to kingfisher habitat will not occur as a result of the Proposed Project).

7. 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. The Conservation Objectives for each of the European Sites assessed were reviewed in April 2024. The Conservation Objectives for these sites are available at the following locations:

River Barrow and River Nore SAC:

- https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf

River Nore SPA:

- https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004233.pdf

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

7.1 Potential for Direct Effects on the European Sites

There will be no direct effects on the QIs/SCIs of any European site identified in this NIS as the Proposed Project is located outside any European site.

7.2 Potential for Indirect Effects on the European Sites

7.2.1 Hydrological Impact - 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 and operation 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 *Callitricho-Batrachion vegetation*
- Petrifying springs with tufa formation *(Cratoneurion)*

River Barrow and River Nore SAC

- Kingfisher (*Alcedo atthis*)

7.2.1.2 Construction Phase

7.2.1.2.1 *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 base/hardstanding construction, construction compound construction, met mast construction, substation and battery energy storage system construction, underground cabling works and turbine delivery route works will require varying degrees of earthworks resulting in excavation of peat and mineral subsoil where present. 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 including small amounts of peat soils, 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 upgrading of the 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:

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 Siltbuster, 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 roadside drains already exists, and these will be integrated and enhanced as required and used within the Proposed Wind Farm drainage system. The integration of the existing forestry drainage network and the Proposed Wind Farm 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 Project 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 the majority of Proposed Wind Farm site roads already exist (as forestry 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.

Proposed Grid Connection Route

The majority of the Proposed Grid Connection Route is >50m from any nearby watercourse, sections within 50m of the Proposed Grid Connection Route are confined to existing watercourse crossings at bridges and a section of the L2627 which runs parallel to the Lyrath Stream. 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 are a total of 10 no. watercourse crossings along the Proposed Grid Connection 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.

Pre-commencement Temporary Drainage Works

Prior to the commencement of road upgrades (or new road/hardstand or turbine base installs) the following key temporary drainage measures will be installed:

- All existing dry 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 forestry drains that have surface water flows and also along existing forestry roadside drains; and,
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone.

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. Regular inspection and maintenance of these of these structures during construction will ensure they function to their 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 Project footprint 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)13. 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.

Level Spreaders and Vegetation Filters:

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

Where there is significant suspended materials/silt in the runoff and additional line of defence will be provided by a water treatment train such as a "Siltbuster" or similar equivalent treatment train (sequence of water treatment processes) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply for all of the construction phase.

Pre-emptive Site Drainage Management

The works programme for the entire construction stage of the development will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of soil/subsoil

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

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 Proposed Project 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 Peat and Spoil Repository Areas:

It is proposed that excavated peat/subsoil (spoil) will be stored in 8 no. peat repository areas and 6 no. spoil repository areas within the Proposed Wind Farm site or used for landscaping throughout the site. The repository areas are located outside the 50m stream buffer zone.

Proposed surface water quality protection measures regarding the peat and spoil repository

areas are as follows:

- During the initial emplacement of peat and subsoil at the repository area, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the enclosure.
- The peat repository is an enclosed area. Its drainage can be easily managed.

- Drainage from the peat repository will be pumped to settlement ponds as required or will overflow through controlled overflow pipes.
- Discharge or pumping will be intermittent and will depend on preceding rainfall amounts.
- Once the peat repository has been seeded and vegetation is established the risk to downstream surface water is significantly reduced.

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

The repository 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.

In relation to the spoil repository areas:

- During the initial construction, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the work areas;
- 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.

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 this EIAR).

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.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on water quality/habitat degradation of European Sites as a result of earthworks and entrainment of suspended solids.

7.2.1.3 Excavation Dewatering and Potential Effects on Surface/Ground Water Quality

Some minor groundwater/surface water seepages will likely occur in turbine base excavations, substation compound excavations, sections of the internal cabling trenches, and this will create additional volumes of water to be treated by the runoff management system. Inflows will require management and treatment to reduce suspended sediments. No contaminated land was noted at the Proposed Wind Farm site and therefore pollution issues arising from such sources will not occur.

With respect to the Proposed Grid Connection Route, some minor groundwater/surface water seepages will also occur in shallow trench excavations, and this will create additional volumes of water to be treated by the drainage management system. Inflows will require management and treatment to reduce suspended solids. No contaminated land was noted along the Proposed Grid Connection Route therefore pollution issues are not anticipated in this respect.

Proposed Mitigation Measures

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

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters;
- The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit;
- There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur;
- Daily monitoring of excavations by the Environmental Clerk of Works will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken; and,
- A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on surface/ground water quality of European Sites as a result of excavation dewatering.

7.2.1.4 Morphological Changes to Surface Watercourses

Proposed Wind Farm Site:

Within the Proposed Wind Farm site, there are a total of 2 no. new proposed crossing locations (clear-span bridge and culvert crossings) over natural watercourses (rivers and streams). The crossing locations are outlined below:

- A new proposed watercourse crossing over the Seskinrea Stream to the east of T01; and,
- A new proposed crossing over a tributary of the Seskinrea Stream to the southwest of the proposed met mast location. Works here will include the removal of a degraded culvert and concrete slab and replacement with a suitably sized culvert.
-
- In addition to the natural watercourses, there is a high density of manmade 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.

Works associated with watercourse crossings within the Proposed Wind Farm site have the potential to result in adverse effects on the River Barrow and River Nore SAC and the River Barrow and River Nore SPA (and associated SCI species and QI species and habitats) only in relation to potential sediment release downstream.

Proposed Mitigation Measures

Mitigation measures for the proposed new crossing over the Seskinrea Stream are detailed below:

- The proposed new stream crossing 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 this location and therefore there will be no direct impact on the stream at the proposed crossing location;
- All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI)[14] 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

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

rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);

- Where works are necessary inside the 50m buffer double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of concrete allowed in the vicinity of the crossing construction areas; and,
- All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

Meanwhile, the following mitigation measures will be implemented during the upgrade of the existing crossing of the tributary of the Seskinrea Stream:

- It is proposed to remove the existing culvert and replace with a clear span bottomless culvert;
- Prior to any works commencing, Inland Fisheries Ireland (IFI) will be consulted to inform detailed design of the culvert removal.
- These works will only be carried out during the period permitted by Inland Fisheries Ireland 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);
- Timing of these works will be planned based on expected weather within the optimum period of July to September, ground conditions and current flow in the drainage ditch, to minimise construction period and disturbance to any potential downstream aquatic environment. It was noted that during the summer period in 2022 and 2023, when this watercourse was visited this drainage channel was running dry, so this would indicate that this would be the optimum period for removal of the existing culvert and installation of new culvert.
- The works will be planned based on expected weather conditions and low flows;
- The area will be fenced off prior to the onset of works;
- Pumping equipment will be set up at the upstream end of the works area, with the hose positioned to one side of the channel and surrounded by clean stone for protection. The hose will be laid out and shall discharge back into the watercourse downstream of the works area;
- A dam will be constructed upstream using sandbags and water will be overpumped and discharged at an approved downstream location;
- Splash plates will be utilised at the discharge point to protect against scouring;
- A second dam will also be constructed downstream of the works location to prevent any sediment laden water from entering the watercourse;
- Any water pumped from the works area will be discharged through a suitable treatment system to remove suspended solids;
- Any suitable material removed from the watercourse during the works will be stockpiled for reinstatement following completion of the works;
- Once the works have been completed, the upstream and downstream dams will be slowly removed, and the watercourse will be allowed to run through the newly installed culvert.

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.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on water quality/habitat degradation of European Sites as a result of watercourse and bridge crossings.

Proposed Grid Connection Route:

The Proposed Grid Connection Route includes a total of 10 no. crossings over EPA mapped watercourses and comprise 7 no. bridge crossings and 3 no. culvert crossings.

The potential proposed crossing methods are as follows:

- Horizontal Directional Drilling (HDD) will be completed at all of the bridge crossing locations. HDD is required due to there being insufficient cover and depth in the bridge to cross within the bridge deck. This method is only employed where standard installation methods are not possible.
- The 3 no. culvert crossings will be crossed via flat formation crossing.
- Option A: Where adequate cover exists above a culvert, the standard 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.
- 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.

- Mitigation measures for HDD are detailed in Section 6.2.1.5 below.

Proposed Mitigation Measures

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

- All existing roadside drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps;
- Culverts, manholes and other drainage inlets will also be temporarily blocked;
- A double silt fence perimeter will be placed along the road verge on the down-slope side of works areas that are located inside the watercourse 50m buffer zone.
- The following mitigation measures are proposed for the 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;
- No stockpiling of materials will be permitted in the constraint zones;
- Spill kits will be available in each item of plant required to complete the stream crossing; and,
- Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on water quality/habitat degradation of European Sites as a result of as a result of watercourse and bridge crossings.

7.2.1.5 Surface Water Quality Effects During Direction Drilling along the Proposed Grid Connection Route

Surface water quality effects on local watercourses may occur during drilling and groundworks associated with potential directional drilling at the 7 no. bridge crossing locations along the Proposed Grid Connection Route to the existing Kilkenny 110kV substation.

It is proposed that directional drilling under the bridge 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 (dryer) 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 15m buffer zone;
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channel along the 15m buffer zone boundary;
- 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 clean up immediately and stored in an adequately sized skip before been 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 percolation area at least 50m from the watercourse;

- The discharge of water onto vegetated ground at the percolation area 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/bentonite 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.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on water quality/habitat degradation of European Sites as a result of directional drilling works along the Proposed Grid Connection Route.

7.2.1.6 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.

Hydrocarbon storage will not occur during construction of the Proposed Grid Connection Route as the works are transient. Storage will also not occur during construction of the Junction Accommodation works along the turbine delivery route. Vehicles will be refuelled before reaching these work areas.

Proposed Mitigation Measures

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

- All plant will be inspected and certified to ensure that they are leak free and in good working order prior to uses at the Proposed Project 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 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;
- Onsite refuelling will be carried out by trained personnel only;
- A permit to fuel system will be put in place;

- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- The electrical control building (at the substation) will be bunded appropriately to 110% of the volume of oils that will be stored, and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages is included within the Construction and Environmental Management Plan (Appendix 4-4). Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on water quality/habitat degradation of European Sites as a result of hydrocarbon release during construction of the Proposed Project.

7.2.1.7 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 $\pm$ 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.

Peat ecosystems are dependent on low pH hydrochemistry. They are extremely sensitive to the introduction of high pH alkaline waters into the system. 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 bases and 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.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on water quality/habitat degradation of European Sites as a result of cement-based products being released during construction of the Proposed Project.

7.2.1.7.1 *Groundwater and Surface Water Contamination from Wastewater Disposal*

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. There will be no requirement for the storage of wastewater along the Proposed Grid Connection Route or the turbine delivery route.

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.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on water quality/habitat degradation of European Sites as a result of contamination from wastewater disposal during construction of the Proposed Project.

7.2.1.8 Operation

7.2.1.9 Progressive Replacement of Natural Surface with Lower Permeability Surfaces

Progressive replacement of the peat or 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. In reality, the access roads will have a higher permeability than the underlying peat. However, it is conservatively assumed in this assessment that the Proposed Wind Farm access roads and hardstands are impermeable. The assessed Proposed Project footprint comprises turbine bases and hardstandings, access roads, junction accommodation areas amenity links, site entrances, onsite 38 kV substation and battery energy storage system compound, 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 Route. The works are 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

Proposed Mitigation by Design:

The operational phase drainage system of the Proposed Project will be installed and constructed in conjunction with the road and hardstanding construction work as described below and as shown on the Drainage drawings submitted with this planning application (Chapter 9, Appendix 9-1)

- Interceptor drains will be installed up-gradient of all Proposed Project 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 forestry drainage is a key component of the proposed drainage management within the Proposed Project. In this context, integration means 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 Proposed Project drainage water captured within individual site sub-catchments will be attenuated and released within the same sub-catchments that it was captured.

Residual adverse effects: Once the above listed mitigation measures are implemented, there will be no potential for residual adverse effects on water quality/habitat degradation of European Sites as a result of a reduction in permeable surfaces during Operation of the Proposed Project.

7.2.1.10 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 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 outlined above for construction phase.

7.2.1.11 Decommissioning

Decommissioning is fully described in Chapter 4 (Section 4.10). There will be no additional habitat loss associated with the decommissioning of the Proposed Project and therefore there will be no significant effects in this regard.

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

Upon decommissioning of the Proposed Project, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine will likely be removed from the Proposed Wind Farm site using the same transport methodology adopted for delivery to the Proposed Wind Farm site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

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

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations will remain in place underground and will be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in unnecessary environmental emissions such as noise, dust and/or vibration.

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

The Proposed Grid Connection Route electrical cabling and onsite substation will remain in place as it will be under the ownership and control of the ESBN/Eirgrid. The battery energy storage system will remain in place.

A Decommissioning Plan has been prepared (Appendix 4-8) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed in the EIAR.

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

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

The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase. It can be concluded that following the implementation of preventative mitigation, there is no potential for the decommissioning of the Proposed Project to result in significant effects on biodiversity.

8. 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 Proposed Project design.

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

The Proposed Project will not prevent the QIs/SCIs of European Sites from achieving/maintaining favourable conservation status in the future as defined in Article 1 of the EU Habitats Directive. A definition of Favourable Conservation Status is provided below:

> *'conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2; The conservation status will be taken as 'favourable' when:*
>
> - *Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and*
> - *The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
> - *There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.'*

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the Proposed Project will not adversely affect the Qualifying Interests/SCI species associated with any European Sites including the following:

- River Barrow and River Nore SAC
- River Nore SPA

9. 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. This included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects.

9.1 Assessment of Plans

The following Development Plans have been reviewed and taken into consideration as part of this assessment (see Table 9-1 below):

- Carlow County Council Development Plan 2022-2028
- 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.

Table 9-1 Assessment of Plans

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of Proposed Project compliance with policy
Carlow County Council Development Plan 2022-2028	**NS. P1:** Support the conservation and enhancement of Natura 2000 Sites, and to protect the Natura 2000 network from any plans and projects that are likely to have a significant effect on the coherence or integrity of a Natura 2000 Site, in accordance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines. NBG 10: To ensure that development proposals, where relevant, improve the ecological coherence of the Natura 2000 Network of European Sites and encourage the retention and management of landscape features as per Article 10 of the Habitats Directive.	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The overall aim of the policies and objectives set out in the County Development plan in relation to Biodiversity aim to protect and enhance biodiversity within the county. No potential for negative cumulative impacts were identified when considered in conjunction with the Proposed Project. No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Project. The BEMP for the Proposed Project aims to implement and align with Green Infrastructure policies outlined in the Carlow County Development Plan by enhancing biodiversity within the Proposed Wind Farm site, in particular through providing an overall net gain in linear habitats throughout the Proposed Wind Farm site.
	NS. P2: Screening for Appropriate Assessment and if required Appropriate Assessment is undertaken for all plans to be adopted and projects to be granted permission/authorised by the Council. Where likely significant effects have been identified in respect of any plan or project not directly connected with or necessary to the management of a Natura 2000 site, either individually or in combination with other plans or projects, ensure appropriate assessment, in accordance with Article 6(3) of the Habitats Directive. The Council shall only agree to the plan or project after having ascertained that it will not adversely affect the integrity of the site concerned, unless the plan or project is subject to the provisions of Article 6(4) of the Habitats Directive.	
	NS. P3: Consider impacts within a plan or project's zone of influence, which may include Natura 2000 sites outside the County, when assessing whether a plan or project is likely to have significant effects on Natura 2000 sites.	

	NS. P4: Maintain or restore the favourable conservation status of County's Natura 2000 sites qualifying interest habitats and species.	The AA Screening for the Carlow County Development Plan identified potential for likely significant effects on the following SACs and SPAs: • River Barrow and River Nore SAC • Blackstairs Mountains SAC • Slaney River Valley SAC • Holdenstwon Bog SAC As such the potential for cumulative impacts were identified in-combination with the Proposed Project specifically in relation to the River Barrow and River Nore SAC. However, with the implementation of mitigation measures outlined within this Biodiversity Chapter and the NIS for the Proposed Project and the mitigation measures outlined within the NIS[15] for the Carlow County Development plan **no potential for in-combination effects are identified.** .
	ND. P1: Conserve the existing flora, fauna and wildlife habitats in the County, including rare and threatened plant, animal and bird species, through the preservation of ecological corridors and ecological networks.	
	ND. P2: Ensure that development does not have a significant adverse impact on rare and threatened species, their breeding places, resting places, habitat or environment, as applicable, including those protected under the Wildlife Acts 1976 to 2021, the Birds Directive (2009/147/EC), the Habitats Directive (92/43/EEC) and including plant species listed on the Flora (Protection) Order 2015 (S.I. No. 356 of 2015).	
	ND. P3: Require the submission of an Ecological Impact Assessment, where deemed necessary, for any development proposal likely to have a significant impact on existing flora, fauna and wildlife habitats, including rare and threatened plant, animal and bird species.	
	ND. P4: Ensure that, where evidence exists of species that are protected under the Wildlife Act 1976 (as amended), the Bird Directive 1979, and the Habitats Directive 1992, appropriate avoidance and mitigation measures are incorporated into development proposals as part of any ecological impact assessment. In the event of a proposed development impact on a site known to be a breeding or resting site of species listed in the Habitats Regulations or the Wildlife Act 1976 (as amended) a derogation licence, issued by the Department of Housing, Local Government and Heritage, may be required.	

[15] https://consult.carlow.ie/ga/consultation/draft-carlow-county-development-plan-2022-2028/chapter/ii-natura-impact-report-support-appropriate-assessment

	IW. P4: Require the submission of an Ecological Impact Assessment, where deemed necessary (and where necessary an Appropriate Assessment where in relation to Natura 2000 sites), including bat and otter surveys, for development proposals along rivers, streams and canal corridors and areas of ecological importance.	
	NS. O1: Strictly protect areas designated or proposed to be designated as Natura 2000 sites, including any areas that may be proposed for designation or designated during the period of this Plan.	
	NH. O1: Implement relevant actions from the National Biodiversity Action Plan 2017-2021 (and any superseding plan) and to prepare a County Heritage Plan and Biodiversity Action Plan during the lifetime of this County Development Plan in accordance with RPO 126 in the RSES, to ensure the protection and appreciation of heritage and nature at local level including recognition of rich biodiversity of designation of existing special areas of conservation i.e. Blackstairs Mountains, Slaney River Valley and River Barrow and River Nore SAC.	
	Green Infrastructure - Policies **It is the policy of the Council to:** **GI. P1:** Identify, protect, maintain, and enhance existing and planned green infrastructure assets in the County, and recognise the wide range of environmental, social, and economic benefits of green spaces and nature-based solutions by ensuring the integration of green infrastructure planning and development in the planning process.	

	GI. P2: Protect and enhance the biodiversity and ecological function of the County's green infrastructure network. **GI. P3:** Protect and preserve landscape features which contribute to green infrastructure in the County, including trees, hedgerows, woodlands, wetlands, watercourses and other habitats. **GI. P4:** Require all new development to contribute to the protection and enhancement of existing green infrastructure and the delivery of new green infrastructure, as appropriate. **GI. P5:** Restrict development that would fragment or prejudice landscape features and ecological corridors which significantly contribute to the County's green infrastructure network. **GI. P6:** Require proposals for large scale developments such as road or drainage schemes, wind farms, solar farms, residential schemes, industrial parks or retail schemes, to submit a green infrastructure plan as an integral part of a planning application. **GI. P7:** Promote a network of walking and cycling trails to enhance accessibility to the County's green infrastructure network, and ensure such proposals are subject to feasibility (including alternatives to the use of existing green infrastructure) and route/site selection processes so that impacts to biodiversity and nature conservation interests are avoided. **GI. P8:** Incorporate elements of green infrastructure into existing areas of hard infrastructure, where possible, thereby integrating these areas of the existing urban environment into the overall green infrastructure network. **GI. P9:** Ensure Local Area Plans protect and manage the green infrastructure network in an integrated and coherent manner and add additional green infrastructure where possible. **GI. P10:** Work collaboratively with other neighbouring Local Authorities in facilitating and supporting the development of cross-border green infrastructure networks.	

Kilkenny City and County Development Plan 2021-2027	**It is the Policy of the Council to**: **Objective 1A:** To implement the provisions of Articles 6(3) and 6(4) of the EU Habitats Directive and ensure that any plan or project within the functional area of the Planning Authority is subject to appropriate assessment in accordance with the Guidance Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 20091 or any subsequent version, and is assessed in accordance with Article 6 of the Habitats Directive in order to avoid adverse impacts on the integrity and conservation objectives of the site. **Objective 9A:** Continue to identify and map habitats and green infrastructure of county importance, and raise awareness and understanding of the county's natural heritage and biodiversity identifying green corridors and measures to connect them. - To ensure that development proposals, where relevant, improve the ecological coherence of the Natura 2000 network and encourage the retention and management of landscape features that are of major importance for wild fauna and flora as per Article 10 of the Habitats Directive. - To protect and where possible enhance wildlife habitats and landscape features which act as ecological corridors/networks and stepping stones, such as river corridors, hedgerows and road verges, and to minimise the loss of habitats and features of the wider countryside (such as ponds, wetlands, trees) which are not within designated sites. - To ensure that appropriate mitigation and/or compensation measures to conserve biodiversity, landscape character and green infrastructure networks are required in developments where habitats are at risk or lost as part of a development. **Objective 9B:** To identify and map green infrastructure assets and sites of local biodiversity value over the lifetime of the Plan.	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The overall aim of the policies and objectives set out in the County Development plan in relation to Biodiversity aim to protect and enhance biodiversity within the county. The BEMP for the Proposed Project aligns with Objective 9B of the County Development plan by enhancing the Proposed Development site for local biodiversity including marsh fritillary, red squirrel and pine marten. No potential for negative cumulative impacts were identified when considered in conjunction with the Proposed Project. No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Project. The AA Screening for the Kilkenny City and County Development Plan identified potential for likely significant effects on the following SACs and SPAs: • River Barrow and River Nore SAC • Hugginstown Fen SAC

	- Require all developments in the early pre-planning stage of the planning process to identify, protect and enhance ecological features and habitats, and making provision for local biodiversity (e.g. through protection of existing breeding sites, and provision of appropriate new infrastructure such as swift, bat and barn owl boxes, bat roost sites, green roofs, etc.) and provide links to the wider Green Infrastructure network as an essential part of the design process. **Objective 10B:** To implement the measures of the River Basin Management Plan, including continuing to work with communities through the Local Authority Waters Programmes to restore and improve water quality in the identified areas of action.	• The Loughans SAC • Cullahill Mountain SAC • Spahill and Clomantagh Hill SAC • Galmoy Fen SAC • Lower River Suir SAC • Thomastown Quarry SAC • River Nore SPA • Lisbigney Bog SAC As such the potential for cumulative impacts were identified in-combination with the Proposed Project specifically in relation to the River Barrow and River Nore SAC. However, with the implementation of mitigation measures outlined within this Biodiversity Chapter and the NIS for the Proposed Project and the mitigation measures outlined within the NIS[16] for the Kilkenny County Development plan **no potential for in-combination effects are identified.**
4th National Biodiversity Action Plan 2023-2027	Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "**NBAP**"). The NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. It demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations and will	The objectives set out in the NBAP aim to protect and enhance and promote biodiversity, nature restoration on the Island of Ireland and also contribute to International biodiversity initiative. Mitigation and enhancement measures as outlined in the EIAR and NIS for the

[16] https://kilkennycoco.ie/eng/services/planning/development-plans/city-and-county-development-plan/adopted-city-and-county-development-plan.html

	implement this through a number of key targets, actions and objectives. The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows.	Proposed Project also aim to protect and enhance biodiversity as such no cumulative impacts were identified upon review of the Plan in conjunction with the Proposed Project. The Proposed Project will not contravene the proposed outcomes of the NBAP.
	Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity. Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan.	
	Objective 2: Meet Urgent Conservation and Restoration Needs. Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government.	
	Objective 3: Secure Nature's Contribution to People. Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy.	
	Objective 4: Enhance the Evidence Base for Action on Biodiversity. This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts.	
	Objective 5: Strengthen Ireland's Contribution to International Biodiversity Initiatives. Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international	

	biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.	
Regional Spatial and Economic Strategy for the Southern Region (2020-2032)	**RPO 1.b.** The RSES seeks to protect, manage, and through enhanced ecological connectivity, improve the coherence of the Natura 2000 Network in the Southern Region.	The Regional Spatial and Economic Strategy for the Southern Region was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests. No potential for cumulative effects when considered in conjunction with the current proposed development were identified.
	RPO 5. Population Growth and Environmental Criteria Increased population growth should be planned with regard to environmental criteria, including: • Assimilative capacity of the receiving environment; • Proximity of Natura 2000 sites and potential for adverse effects on these sites, and their conservation objectives; • Areas with flood potential.	
	RPO 117 Flood Risk Management and Biodiversity It is an objective to avail of opportunities to enhance biodiversity and amenity and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned. Plans and projects that have the potential to negatively impact on Natura 2000 sites are subject to the requirements of the Habitats Directive	
	RPO 124 Green Infrastructure a. It is an objective to promote the concept of connecting corridors for the movement of wildlife and encourage the retention and creation of features of biodiversity value, ecological corridors and networks that connect areas of high conservation value such as woodlands, hedgerows, earth banks, watercourses and wetlands. The RSES recognises	

	the necessity of protecting such corridors and the necessity to encourage the management of features of the landscape that support the Natura 2000 network; b. Green infrastructure will be integrated into the preparation of statutory land-use plans in the Region, which will include identifying Green infrastructure and strengthening this network; c. All Development Plans and Local Area Plans shall protect, enhance, provide and manage Green infrastructure in an integrated and coherent manner addressing the themes of biodiversity protection, water management and climate action; and should also have regard to the required targets in relation to the conservation of European sites, other nature conservation sites, ecological networks, and protected species; d. Any future development of greenways, blueways, peatways, cycleways or walkways will include an assessment by the relevant authorities of any impacts that may arise from increased visitor pressures, in particular, on sensitive European sites and the design of the network will consider the provision of protective measures on sites sensitive to disturbance/visitor pressure.	

9.2 Other Projects

Assessment material for this in-combination impact assessment was compiled on the relevant developments within the vicinity of the Proposed Project and was verified in April 2024. The material was gathered through a search of relevant online Planning Registers, reviews of relevant documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. All relevant projects were considered in relation to the potential for in-combination effects. All relevant data was reviewed (e.g. individual EISs/EIARs, layouts, drawings etc.) for all relevant projects where available.

Relevant projects have been assessed in-combination with the Proposed Project and include planning applications in the vicinity of the Proposed Project site, within the zone of influence of all habitats and species considered in this report, and include other wind energy applications within the wider area. The projects considered include those listed in Appendix 4. The residual construction, operational and decommissioning impacts of the Proposed Project are considered cumulatively with other plans and projects. Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed Project and those that could potentially result in impacts on SCI bird species, surface water, groundwater and QI habitats and species.

9.2.1 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 'Water' of the accompanying EIAR (provided as Appendix 3).

9.2.1.1 Cumulative Effects with Agriculture

The delineated cumulative study area 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 above in Section 9.5.2, 9.5.3 and 9.5.4 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.

9.2.1.2 Cumulative Effects with Forestry

The Proposed Wind Farm site is situated in an area of coniferous forestry on the Castlecomer Plateau, Co. Carlow.

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 Dinin 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 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.

9.2.1.3 Cumulative Effects with Other Wind Farm Developments

A total of 3. existing / permitted wind farms have been identified within the cumulative hydrological study area (Figure 9-14).

- *5 no. turbines associated with the permitted Bilboa Wind Farm are located in the Dinin (South)_010 river sub-basin;*
- *7 no. turbines associated with the permitted White Hill Wind Farm are located in the Dinin (South)_020 river sub-basin; and,*
- *8 no. turbines associated with the existing Gortahile Wind Farm are located in the Dinin (South)_010 river sub-basin.*

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 including the Dinin River.

However, the EIARs for the above wind farm developments detail potential hydrological and hydrogeological issues relating to the 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.

9.2.1.4 Cumulative Effects with EPA Licenced Wastewater Treatment Facilities

There are 2 no. EPA licenced wastewater treatment facilities within the cumulative study area. Both of these Wastewater Treatment Plants (WwTPs) have a population equivalent of <500 and provide primary treatment of wastewater:

- *The Bilboa WwTP (Registration No: A0228-01) serves a population equivalent of 30, with the plant designed for a population equivalent of 266. The WwTP discharge location is situated immediately to the north of the settlement of Bilboa and discharges into the Dinin River, ~5.3km upstream of its confluence with the Coolcullen River.*
- *The Coan WwTP (Registration No: A0059-01) serves a population equivalent of 30 people, with the WwTP designed to cater for a population equivalent of 75 persons.*

The WwTP discharges into a tributary of the Dinin River in the vicinity of Coan, co. Kilkenny.

The potential for cumulative effects associated with the Proposed Project is limited as the mitigation measures detailed in Section 9.5.2, 9.5.3 and 9.5.4 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.

9.2.1.5 Cumulative Effects with Other Development

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 Route 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 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.

Several proposed developments plan to connect to the existing Kilkenny 110kV substation, similar to the Proposed Project.

For example, the Proposed Kilderry Solar Farm (Planning Ref. No: 2360382) is located in the vicinity of the Proposed Grid Connection Route. It is proposed to use the same grid connection route from the proposed solar farm site to the existing Kilkenny 110kV substation. A Geology and Hydrogeology Assessment and a Flood risk Assessment and Drainage Report accompanied the submitted application. These reports prescribed mitigation measures which would ensure the protection of surface water quality during the construction of the solar farm and associated grid connection. Furthermore, due to the short term and transient nature of the works being completed along the grid connection (both for the Proposed Project and for the proposed solar farm), the potential for effects is limited. Furthermore, the mitigation measures detailed in Section 9.5.2, 9.5.3 and 9.5.4 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 Proposed Kilderry Solar Farm.

An energy storage system and associated infrastructure (Planning Ref, No: 2360419) are also proposed immediately adjacent to the existing Kilkenny 100kV substation in the townland of Scart, However, due to the duration and transient nature of the works being completed along the grid connection (both for the Proposed Project) and for the proposed solar farm, the potential for effects is limited.

The works along the Proposed Grid Connection 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.

9.2.2 Proposed Grid Connection Underground Cabling Route

A desk-based planning search was undertaken to identify permitted developments within 500m vicinity of the Proposed Grid Connection Route. The projects within this boundary are provided in Appendix 4. 40 projects were identified within this area and consisted predominantly of the construction of individual private dwellings, extensions to existing dwellings, as well as agriculture and energy and telecoms. Projects with the potential for in-combination effects were reviewed in detail and included the following:

- Great Island to Kilkenny 110Kv line (EirGrid). The NIS for this project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Project specifically in relation to the River Barrow and River Nore SAC were initially identified. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS[17] for Great Island to Kilkenny 110Kv line **no potential for in-combination effects were identified.**
- Kilderry Solar Farm Ltd. The NIS for this project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Barrow and River Nore SAC and River Nore SPA (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Project specifically in relation to the River Barrow and River Nore SAC and River Nore SPA were initially identified. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS[18] for Kilderry Solar Farm Ltd. **no potential for in-combination effects were identified.**
- Clashwilliam Solar Farm 38Kv Grid Connection. The NIS for this project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Barrow and River Nore SAC and River Nore SPA. As such the potential for in-combination effects with the Proposed Project specifically in relation to the River Barrow and River Nore SAC and River Nore SPA were initially identified. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS[19] for Clashwilliam Solar Farm 38Kv Grid Connection **no potential for in-combination effects were identified.**

9.2.3 Other Wind Farm Projects

For the purposes of this cumulative assessment, wind farms within a 25-kilometre radius of the Proposed Project area were considered in further detail below. Details of wind farm projects within 25km of the Proposed Project are provided in Appendix 4 and are summarised below. Eight wind farms were identified within the cumulative study boundary.

[17] https://idocsweb.kilkenny.ie/ViewFiles.aspx?docid=263846&format=jpeg

[18] https://idocsweb.kilkenny.ie/ViewFiles.aspx?docid=376137&format=djvu

[19] https://idocsweb.kilkenny.ie/ViewFiles.aspx?docid=338353&format=djvu

Table 9-2 Wind farm projects within 25k of the Proposed Project

Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)	County
Bilboa Wind Farm	Permitted	5	c.1.3km	Co. Carlow & Co. Kilkenny
White Hills Wind Farm	Permitted	7	c.2.1km	Co. Carlow & Co. Kilkenny
Gortahile Wind Farm	Existing	8	c.3.1km	Co. Laois
Coolglass Wind Farm	Proposed	6	c.15.6km	Co. Laois
Pinewood Wind Farm	Conditional	11	c.16.6km	Co. Laois
Greenoge Wind Farm	Existing	4	c.24.6km	Co. Carlow
Lisdowney Wind Farm	Existing	4	c.24.9km	Co. Kilkenny

9.2.3.1 Bilboa Wind Farm

This wind farm consists of 5 no. turbines and is approx. 1.2km from the Proposed Project site. The site of the Proposed Bilboa Wind Farm and that of the Proposed Project are both hydrologically linked to the River Barrow and River Nore SAC and River Nore SPA. The NIS for the Bilboa Wind Farm this project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Project specifically in relation to the River Barrow and River Nore SAC were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for the Bliboa Wind Farm **no potential for in-combination effects were identified.**

9.2.3.2 White Hills Wind Farm

This wind farm consists of 7 no. turbines and is approx. 2.1km from the Proposed Project site. The site of the Proposed White Hills Wind Farm and that of the Proposed Project are both hydrologically linked to the River Barrow and River Nore SAC and River Nore SPA. The NIS for the White Hills Wind Farm project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Project specifically in relation to the River Barrow and River Nore SAC were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within this NIS and the mitigation

measures outlined within the NIS for the White Hills Wind Farm **no potential for in-combination effects were identified.**

9.2.3.3 Gortahile Wind Farm

Gortahile Wind Farm is an existing wind farm consisting of 8 no. and is and is approx. 3.1km from the Proposed Project site. The Gortahile wind farm has already been constructed and as such there is no potential for in-combination effects with the Proposed Project which identified the potential for significant effects on downstream European sites during construction (in the absence of mitigation). No potential for in-combination effects given the projects will not be constructed at the same time.

9.2.3.4 Coolglass Wind Farm

This wind farm consists of 6 no. turbines and is approx. 15km from the Proposed Project site. The site of the Proposed Coolglass Wind Farm and that of the Proposed Project are both hydrologically linked to the River Barrow and River Nore SAC and River Nore SPA. The NIS for the Coolglass Wind Farm project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Project specifically in relation to the River Barrow and River Nore SAC were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for the Coolglass Wind Farm **no potential for in-combination effects were identified.**

9.2.3.5 Pinewood Wind Farm

This wind farm consists of 11 no. turbines and is approx. 16km from the Proposed Project site. The site of the Proposed Pinewood Wind Farm and that of the Proposed Project are both hydrologically linked to the River Barrow and River Nore SAC and River Nore SPA. The NIS for the Pinewood Wind Farm project was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed Project specifically in relation to the River Barrow and River Nore SAC were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for the Pinewood Wind Farm **no potential for in-combination effects were identified.**

9.2.3.6 Greenoge Wind Farm

Greenoge Wind Farm is an existing wind farm consisting of 4 no. and is and is approx. 24km from the Proposed Project site. The Greenoge wind farm has already been constructed and as such there is no potential for in-combination effects with the Proposed Project which identified the potential for significant effects on downstream European sites during construction (in the absence of mitigation). No potential for in-combination effects given the projects will not be constructed at the same time.

9.2.3.7 Lisdowney Wind Farm

Lisdowney Wind Farm is an existing wind farm consisting of 4 no. and is and is approx. 24.5km from the Proposed Project site. The Lisdowney wind farm has already been constructed and as such there is no potential for in-combination effects with the Proposed Project which identified the potential for significant effects on downstream European sites during construction (in the absence of mitigation). No potential for in-combination effects given the projects will not be constructed at the same time.

10. 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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