Dyrick Hill Wind Farm

Screening Report for Appropriate Assessment

and

Natura Impact Statement

DEC Ltd.

May 2023

Dyrick Hill Wind Farm

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Co. Sligo

Screening Report in support of Appropriate Assessment

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

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1.0 INTRODUCTION

Doherty Environmental Consultants Ltd has been commissioned by Dyrick Hill Wind Farm Ltd. to undertake a Screening Statement in support of an Appropriate Assessment (AA), under Article 6 of the EU Habitats Directive, for a proposed:

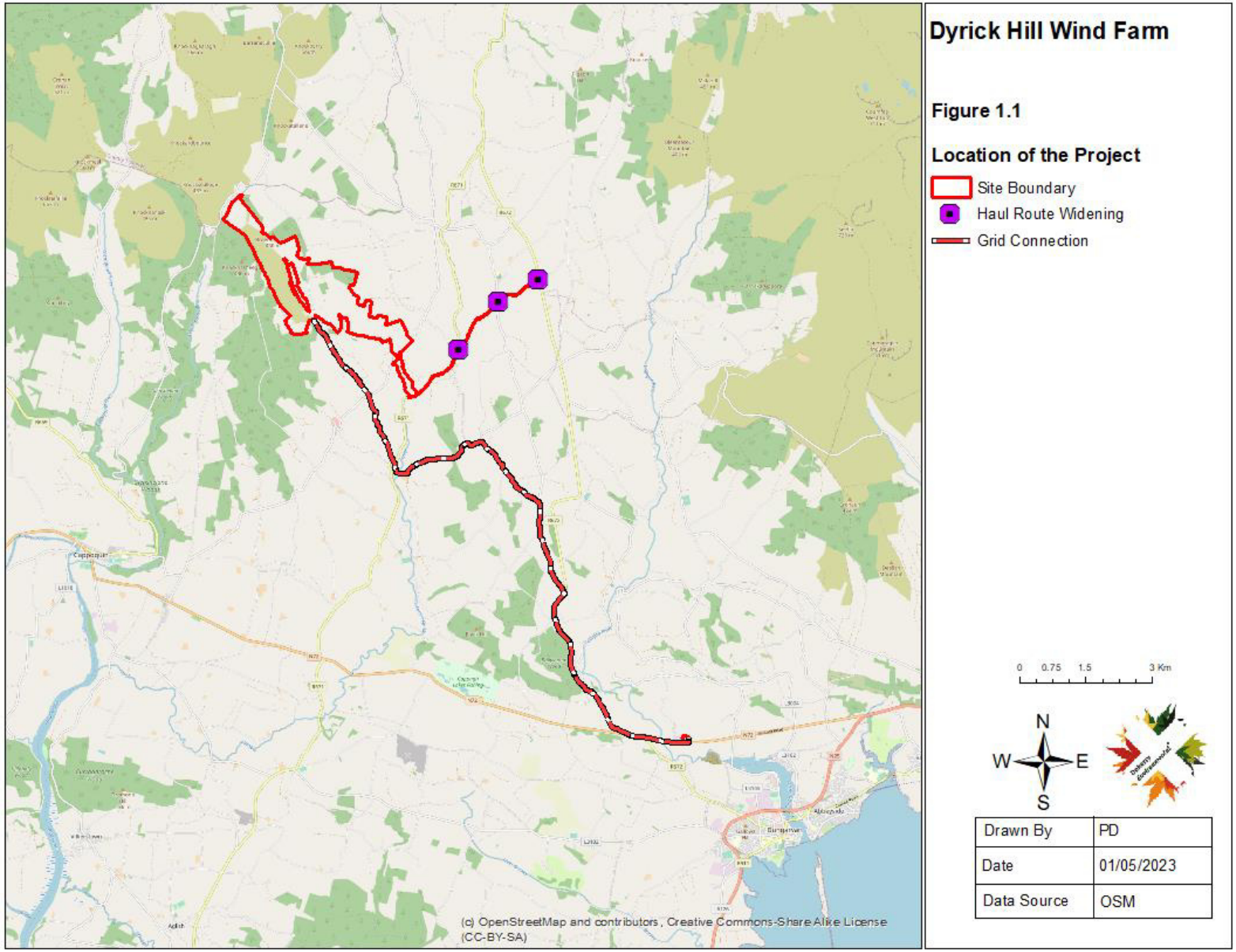
- 12 turbine wind farm at Dyrick Hill, Co. Waterford;
- grid connection route between the proposed wind farm site and the existing ESB substation at Dungarvan, Co. Waterford,
- a haul route from Belview Port to the proposed development site via the N29, N25, N722 and R671. Widening of the existing haul route will be required at three no. locations.

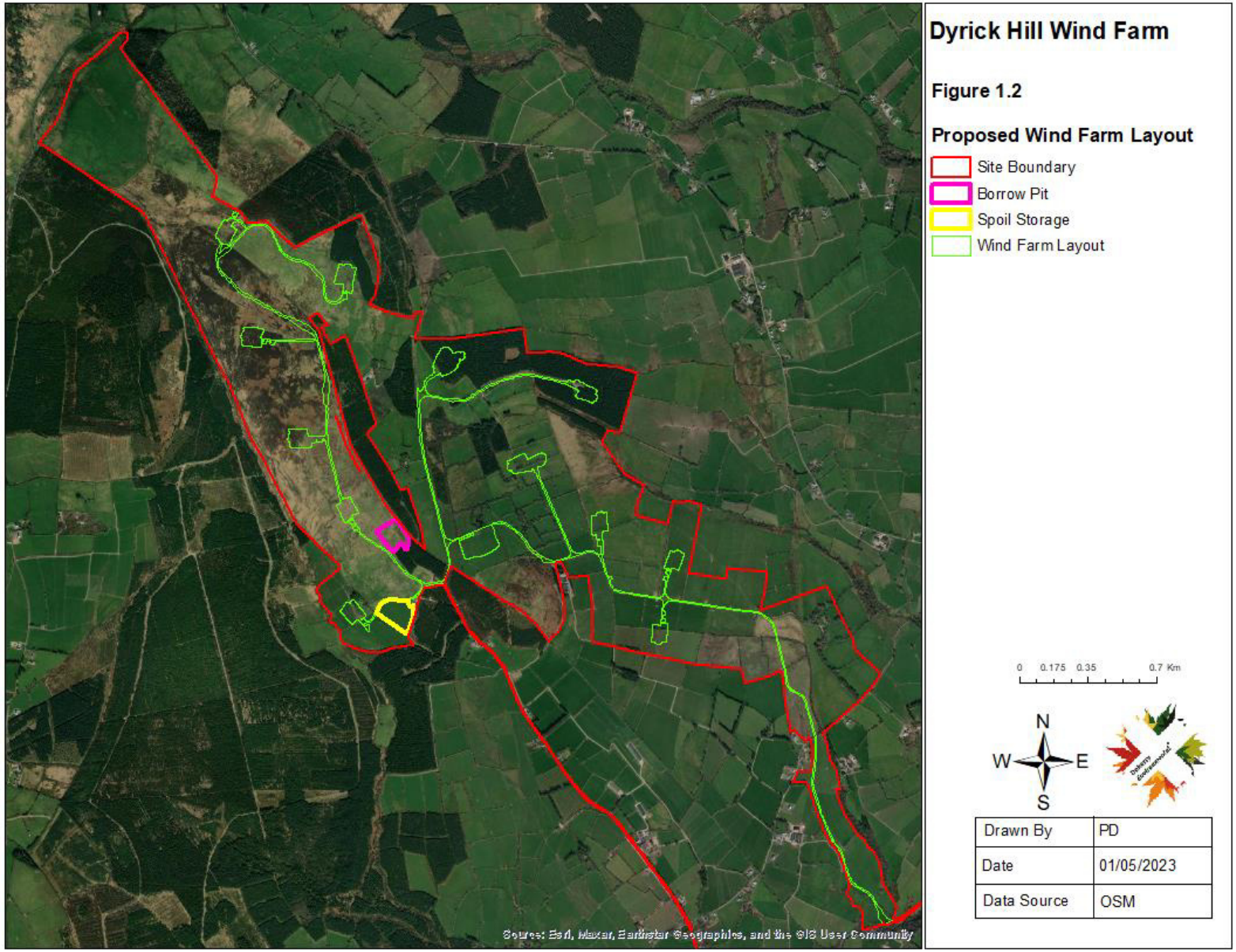
Figure 1.1 shows the location of the proposed wind farm site; the location of the proposed grid connection route and the three no. haul route widening locations along the proposed haul route. **Figure 1.2** shows the proposed wind farm layout.

This Screening Report for Appropriate Assessment forms Stage 1 of the Habitats Directive Assessment process and is being undertaken in order to inform the competent authority's assessment under Article 6(3) of the Habitats Directive 92/43/EEC (as amended). The function of this Screening Report is to identify the potential for the project to result in likely significant effects to European Sites and to provide information so that the competent authority can determine whether a Stage 2 Appropriate Assessment is required for the project.

1.1 STATEMENT OF AUTHORITY

This Natura Impact Statement has been prepared by Mr. Pat Doherty BSc., MSc, MCIEEM, of DEC Ltd. Mr. Doherty is a consultant ecologist with over 20 years' experience in completing ecological impact assessments and environmental impact assessments. Pat has been involved in the completion of assessment reports for proposed developments and land use activities under the EIA Directive and Article 6 of the Habitats Directive since 2003 and 2006 respectively. He has extensive experience completing such reporting for projects located in a variety of environments and has a thorough understanding to the biodiversity issues that may


Dyrick Hill Wind Farm
Figure 1.1
Location of the Project
Site Boundary
Haul Route Widening
Grid Connection
0 0.75 1.5 3 Km
N
W
E
S
Drawn By PD
Date 01/05/2023
Data Source OSM
(c) OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)


Dyrick Hill Wind Farm
Figure 1.2
Proposed Wind Farm Layout
Site Boundary
Borrow Pit
Spoil Storage
Wind Farm Layout
0 0.175 0.35 0.7 Km
N
W
E
S
Drawn By PD
Date 01/05/2023
Data Source OSM
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

arise from proposed land use activities. Pat was responsible for completing one of the first Appropriate Assessment reports for large scale infrastructure developments in Ireland when he prepared the Appropriate Assessment for the N25 New Ross Bypass in 2006/07. Since then Pat has completed multiple examinations of both plans and projects in Ireland. He has completed Natura Impact Statements for national scale plans such as Ireland's CAP Strategic Plan and National Seafood Development Plan and regional and county scale plans including County Development Plans, Local Area Plans, Tourism Strategies and Climate Action Plans. Pat has completed multiple Natura Impact Statements for a range of development types that include large scale infrastructure developments in sectors such as transport and energy as well as industrial, commercial and residential developments.

Pat has completed focused certified professional development training in Appropriate Assessment as well as in a range of ecological survey techniques and assessment processes. Training has been completed for National Vegetation Classification (NVC) and Irish Vegetation Classification (IVC) surveying, bryophyte survey for habitat assessment and identification, professional bat survey and assessment training, mammal surveying and specific training for bird and bat survey techniques. Ongoing training has been completed by approved training providers such as CIEEM, British Trust for Ornithology, the Botanic Gardens and the Field Studies Council.

1.2 LEGISLATIVE CONTEXT

Legislative protection for habitats and species is provided within the European Union by the Habitats Directive. The Habitats Directive has been implemented in Ireland and throughout Europe through the establishment of a network of designated conservation areas known as the Natura 2000 (N2K) network. The N2K network includes sites designated as Special Areas of Conservation (SACs), under the EU Habitats Directive and Special Protection Areas (SPAs) designated under the EU Birds Directive 2009/147/EC (as amended). SACs are designated in areas that support habitats listed on Annex I and/or species listed on Annex II of the Habitats Directive. SPAs are designated in areas that support: 1% or more of the all-Ireland population of bird species listed on Annex I of the EU Birds Directive; 1% or more of the population of a migratory species; and more than 20,000 waterfowl.

The European Communities (Birds and Natural Habitats) Regulations 2011 – 2021(hereafter referred to as the Habitats Regulations) requires competent authorities, to carry out a Screening

for Appropriate Assessment of plans and projects that, alone or in combination with other plans or projects, would be likely to have significant effects on European Sites in view of best scientific knowledge and the Site's conservation objectives. This requirement is transposed into Irish Law by Part 5 of the Habitats Regulations and Part XAB of the Planning and Development Act, 2000 (as amended).

Under the Habitat Regulations all sites that have been identified as part of the N2K Network, including SACs, SPAs, candidate SACs (cSACs) and proposed SPAs (SPAs) are referred to as European Sites.

This Screening Report for Appropriate Assessment is being prepared in order to enable the competent authority to comply with Article 6(3) of Council Directive 92/43/EEC (The Habitats Directive). It is prepared to assess whether or not the project alone or in combination with other plans and projects is likely to have a significant effect on any European Site in view of best scientific knowledge and in view of the conservation objectives of the European Sites and specifically on the habitats and species for which the sites have been designated. Measures intended to avoid or reduce the harmful effects of the proposed project on European sites (i.e. "mitigation measures") or best practice measures have not been taken into account in this screening stage appraisal.

1.2.1 Requirement for an Assessment under Article 6 of the Habitats Directive

According to Regulation 42(1) of the European Communities (Birds and Natural Habitats) Regulations 2011 – 2021 and: s177U(1) of the Planning and Development Act 2000 (as amended) the competent authority has a duty to:

- Determine whether the proposed Project is directly connected to or necessary for the management of one of more European Sites; and, if not,

- Determine if the Project, either individually or in combination with other plans or projects, would be likely to have a significant effect on the Eurpoean Site(s) in view of best scientific knowledge and the Conservation Objectives of the site(s).

This report contains information to support a Screening for Appropriate Assessment and is intended to provide information that assists the competent authority when assessing and

addressing all issues regarding the construction and operation of the Project and to allow the competent authority to comply with the Habitats Directive. Article 6(3) of the Habitats Directive defines the requirements for assessment of projects and plans for which likely significant effects on European Sites may arise. The Birds Directive and the Habitats Directive together list habitats and species that are of international importance for conservation and require protection. The Habitats Regulations requires competent authorities, to carry out a Screening for Appropriate Assessment of plans and projects that, alone or in combination with other plans or projects, would be likely to have significant effects on European Sites in view of best scientific knowledge and the Site's conservation objectives. This requirement is transposed into Irish Law by, inter alia, Part XAB of the Planning and Development Act, 2000 (as amended). Section 177U(4) of Part XAB of the Planning and Development Act states:

"The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is required if it cannot be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. "

1.3 SCREENING METHODOLOGY

This Screening Report has been prepared in order to comply with the legislative requirements outlined in Section 1.1 above and aims to establish whether or not the proposed project, alone or in combination with other plans or projects, would be likely to have significant effects on European Sites in view of best scientific knowledge and the Site's conservation objectives. In this context "likely" means a risk or possibility of effects occurring that **cannot** be ruled out based on objective information and "significant" means an effect that would undermine the conservation objectives of the European sites, either alone or in-combination with other plans and projects (Office of the Planning Regulator (OPR), 2021) .

The nature of the likely interactions between the proposed development and the Conservation Objectives of European Sites will depend upon the:

- the ecological characteristics of the species or habitat, including their structure, function, conservation status and sensitivity to change; *and/or*

- the character, magnitude, duration, consequences and probability of the impacts arising from land use activities associated with the plan, in combination with other plans and projects.

This Screening Report for Appropriate Assessment has been undertaken in accordance with respective National and European guidance documents: Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (DEHLG 2010) and *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC; Office of the Planning Regulator – OPR Practice Note PN01: Appropriate Assessment Screening for Development Management* (2021), and recent European and National case law. The following guidance documents were also of relevance during the preparation of this Screening Report:

- A guide for competent authorities. Environment and Heritage Service, Sept 2002. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2010). DEHLG.

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats Directive 92/42/EEC. European Commission (2021).

- Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats Directive 92/43/EEC. European commission (2018).

The EC (2021) guidelines outline the stages involved in undertaking a Screening Report for Appropriate Assessment for projects. The methodology adopted during the preparation of this Screening Report is informed by these guidelines and was undertaken in the following stages:

1. Describe the project and determine whether it is necessary for the conservation management of European Sites;

2. Identify European Sites that could be influenced by the project;

3. Where European Sites are identified as occurring within the zone of influence of the project identify potential effects arising from the project and screen the potential for such effects to negatively affect European Sites identified under Point 2 above; and

4. Identify other plans or projects that, in combination with the project, have the potential to affect European Sites.

1.4 SCIENTIFIC INVESTIGATIONS

A range of scientific site investigations have been completed for the project and these are relied upon in this Natura Impact Statement. The primary investigations include ecological field surveys, hydrological field surveys and geotechnical field surveys.

Desk-based investigations were completed to identify pathways connecting the proposed development to European Sites. Datasets used to assist with the desk-based investigations include:

- NPWS European Sites and site-specific conservation objectives datasets;
- EPA Rivers and Lakes dataset;
- EPA surface water catchment and sub-catchment datasets
- NPWS Article 17 Habitats and Species datasets;
- OSI Geohive and OSI Historic townlands online mapping portal; and
- National Biodiversity Data Centre (NBDC) online mapping portal.
- NPWS Protected Species Dataset for the proposed development site and surrounding area.

The ecological field surveys that have been completed include:

Habitats and vegetation surveys and mapping at the proposed development site

Ornithological surveys which included non-breeding season and bird species vantage point surveys, transect surveys and hinterland surveys completed between the breeding season of 2020and the non-breeding season of 2021/2022.

Bat surveys over spring, summer and autumn during the 2020, 2021 and 2022 bat activity seasons.

Aquatic surveys including habitat assessment, fish habitat suitability assessment surveys, biological water quality surveys and physio-chemical water sampling.

Detailed hydrological and geotechnical surveys were also completed at the proposed development between 2020 and 2022.

The methods used during the completion of these site investigations are described in full in Chapter 6, 7 and 8 of the Dyrick Hill Wind Farm EIAR (Jennings O'Donovan, 2022).

2.0 PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

The Project will comprise of the following main components:

- Erection of 12 no. 6.0-7.2 MW wind turbines (Note* this is the current output available for the turbine of this size. It is possible that with improvements in technology, the output my increase at the time of construction.) with an overall ground tip height of up to 185m. The candidate wind turbines will have a rotor diameter of circa 162m and a hub height of 104m.

- Construction of crane hardstand areas and turbine foundations.

- Construction of new internal site access roads and upgrade of existing site roads, to include passing bays and all associated drainage.

- Construction of a new wind farm site entrance with access onto the R671 regional road in the townlands of Lickoran.

- Improvement of existing site entrance with access onto local roads in the townlands of Broemountain.

- Improvements and temporary modifications to existing public road infrastructure to facilitate delivery of abnormal loads and turbine delivery.

- Construction of one temporary construction compound with associated temporary site offices, parking area and security fencing.

- Development of one-site borrow pit.

- Installation of one permanent meteorological mast up to a height of 110m.

- Development of a site drainage network.

- Construction of one permanent 110 kV substation.

- All associated underground electrical and communications cabling connecting the wind turbines to the wind farm substation.

- All works associated with the connection of the wind farm to the national electricity grid, which will be via 110 kV underground cable connection approximately 16.8km in length to the existing Dungarvan 110 kV Substation.

- Upgrade works on the turbine delivery route from Waterford Port.

- Ancillary forestry felling to facilitate construction and operation of the Development and any onsite forestry replanting.

2.2 WIND TURBINE GENERATOR

The proposed turbines will be of typical modern design and will be a three-bladed, rotor up wind of the tower, variable speed, pitched blade regulated machine. Turbine appearance will be a matt non-reflective finish in a white, off-white or grey colour. The foundation-to-tip height will be a maximum of 185m.

The turbine will have a circular based tower, sitting on a reinforced concrete foundation. The tower will support the nacelle, rotor hub, and rotor blades. Commercial wind turbine towers are

typically made of steel or a hybrid of steel and concrete. The nacelle is mainly metal (steel, copper, aluminium, etc.) with a metal/plastic/glass-reinforced plastic (GRP) body, while the blades can be made of a matrix of glass-fibre reinforced polyester or wood-epoxy or similar composite materials.

Each turbine will have an installed generator with a maximum capacity of 6.0- 7.2 MW. The turbines proposed contain a (two planetary stages) gearbox. The final turbine will be chosen in a competitive tendering process as part of the Project financing process, after all necessary consents have been secured.

The final choice of turbine model is anticipated to be Vesta V162 IEC S..

For the purposes of the assessments, the dimensions of the candidate turbine is presented in **Table 2.1**. These are the proposed dimensions of the turbines for which planning permission is being sought.

Table 2.1: Turbine Parameters

Turbine Parameter	Assessment Envelope
Turbine Blade Tip Height	185m
Rotor Diameter	162m
Hub Height	104m

2.3 TURBINE FOUNDATION AND TURBINE HARDSTANDS

All turbine suppliers have a requirement for a Turbine Hardstand area to be constructed beside each turbine. The general layout of the Turbine Hardstand is designed to accommodate the delivery, laydown, and assembly of turbine components (in particular rotor assembly) prior to turbine lifting and assembly. The Turbine Hardstands are needed to support the cranes during

turbine construction, the operational and maintenance phase, and for decommissioning. The Turbine Hardstands will be constructed in advance of the Turbine Foundation and will be used to facilitate foundation construction, such as steel reinforcement delivery and pouring of concrete.

Construction of the turbine and met mast hardstands will require the excavation of overburden material to the noted area and depth, the laying of a geotextile material on the formation surface and placing engineered stone and a top dressing. The main Turbine Hardstands will be 380m2 and will be 2.25m in depth depending on the local bedrock profile and the varying soil depth. In total, this represents a surface area of 4,560m2 for 12 turbines and a material displacement volume requirement of approximately 10,260m³.

The Turbine Foundations will be 22m in diameter and have a depth of approximately 2.5m. The Turbine Foundation design will depend on the turbine type and will be decided by the structural engineers at detailed design stage and will be within these design parameters. The central part of the foundation (plinth) will be 6m in diameter and will be raised from the main Turbine Foundation below ground level. It will encompass a cast-in insert or bolts to connect to the bottom of the turbine tower and reinforced bar structural elements.

The volume of concrete and steel required for each Turbine Foundation will be 590m³ and 86 tonnes respectively. The area around and above the Turbine Foundation will be backfilled with compacted granular material and the only portion exposed in the long term will be the central foundation section.

Depending on the results of detailed site investigations (post consent), the possibility of installing rock anchors will be explored as a means of reducing the footprint and material volumes of the turbine foundations. The application of traditional gravity emplacement foundation design has been considered for EIA purposes. This represents a worst-case scenario, but it should be noted that the predicted environmental effects could be reduced where rock anchor foundations could be used for some of the turbine foundations.

Based on the results of peat probing and geotechnical assessments to date, mineral soil is not deep enough to require the piling of turbine hardstands. Therefore, the construction method for all of the turbine hardstands will be via an excavated soil overburden approach.

The construction methodology for each of the turbine foundations will depend on the strength and depth of the substrata specific to each location. Turbine foundations will need to be taken down to competent bearing strata by excavating through the subsoil, and rock where necessary.

A typical method of construction for turbine foundation is described as follows:

- Install temporary drainage around the perimeter of the excavation area.
- Excavate soil and rock within the foundation design footprint area.
- Back fill the foundation with excavated rock.
- Form a level working area to build the foundation.
- Install formwork and reinforcement.
- Pour the concrete.
- Once the concrete has set and the earthing system is in place, backfill the foundation with suitable excavated material.
- Use the soil to build up the area around the turbine foundation.

2.1.1 Access to the Site

There are two proposed site entrances associated with the Development; Site Entrance 1 is an existing site entrance located in the southeast of the Site located off R671 road and Site entrance 2 is an existing site entrance located in the southwest corner of the Site off the L1027 Local Road. The Turbine Delivery Route and the Construction Haul Routes will utilise Site Entrance 1.

It is currently proposed that the turbine nacelles, tower hubs and rotor blades will be landed in Belview Port (Port of Waterford). From there, they will be transported to the Site via the N29, N25, N72, and R671.

The delivery of the turbines to the site will require co-ordination with a number of statutory bodies including Transport Infrastructure Ireland (TII) Waterford City and County Council, and An Garda Síochána. All details will be set out in the Traffic Management Plan.

There are ten areas on the haul route that will require works in third party lands. These are shown on **Table 2.2**.

Table 2.2: Areas of Works on Haul Route in Third Party Lands

No.	Area	ITM (Easting)	ITM (Northing)	Description
1	R672 / L5071 Junction	620394	605624	A swept path assessment has been undertaken and indicates that loads will need to utilise an offline track in order to 'cut the corner'. A load bearing surface should be laid in **third party land** and a stone wall, trees and wire fence should be removed. Embankment to be reprofiled. Detailed design of the proposed track is required. *An indicative road edge has been provided from this point to the site entrance based on the available aerial mapping where the road is considered to be greater than 4.5m. An indicative 4.5m has been provided for the remaining section as this is the minimum required running width required by turbine manufacturers. All marking up is beyond this 4.5m road width.* *A clearance width of 5.5m is required.* ***Third party land*** *may be*

No.	Area	ITM (Easting)	ITM (Northing)	Description
				required to achieve the above mitigation.
2	L5071 North East of Clooncogaile	619481	605121	A swept path assessment has been undertaken and indicates that loads will oversail the verge on the inside of the left bend where the embankment will need to be reprofiled. **Third party land** required.
3	River Finisk Bridge / R671 Junction	618628	604027	A swept path assessment has been undertaken and indicates that loads will oversail into **third party land** on both sides of the road and trees / vegetation should be cleared throughout the section. A load bearing surface will be required in the eastern verge on approach to the bridge. Suspension settings should be raised to allow oversail of the bridge parapets by loads and care should be taken to ensure adequate clearance is still available to overhead utilities. Discussions with the council should be held to ensure that the bridge has suitable bearing capacity for the proposed loads. Loads will overrun the western verge following the bridge where the land will need to be reprofiled and a load bearing surface laid. A total of seven utility poles and two road signs will need to be removed through the section. Loads will turn right onto the unclassified road to the south of the bridge. This road will require full reconstruction and widening to meet the turbine manufacturer minimum 4.5m running width and 5.5m clearance width. Land reprofiling will be

No.	Area	ITM (Easting)	ITM (Northing)	Description
				required on both sides of the road and a retaining structure may be required on the inside.

2.1.2 Site Access Tracks

The site access roads are necessary to allow access for cranes and delivery trucks during construction of the Development and also during servicing/repairs to the wind turbines. The existing site access roads will be used as far as possible to minimise additional land take. These roads will be upgraded as necessary so that the minimum width will be 5m, site access roads will be wider at bends and at passing bay locations with a width of 5.5m is provided. Gradients will generally, be limited to 1 in 7 (approximately 12%) and a stone layer provided, so as to provide a good grip during wet weather. Gradients of site access roads will not exceed this value.

All roads shall be free from overhead and side obstructions to provide a clear corridor. The larger components require 9.5m overhead minimum clearance for turbine deliver.

Approximately 1,780m of the existing Site Access Track length will be used for the Development. Site Access Tracks. The upgraded Site Access Tracks will be approximately 8,900m^2 in surface area and will require approximately 2,937m³ of stone material.

There will also be 10,684m of new Site Access Tracks required for the Development. These will be constructed to provide a width of 5m and will cover an area of 53,420m^2 and require c.3,526m^3 of rock. These roads will be excavated to firm bearing strata and constructed using rock from the turbine foundation excavations or imported to Site from a nearby quarry.

The Site Access Track layout follows the existing access track into the Site as far as possible, avoids environmental constraints, and follows the natural contours of the land. Every effort has been made to minimise the length of track necessary.

Site access roads will have to be maintained during the construction phase. When weathered, the stone should not contain any constituents which may be harmful to the environment; in particular, surface water and groundwater.

Turbine hardstand areas in addition to turning areas are required in the vicinity of each turbine location. Turbine hardstand areas must allow two cranes to work in the vicinity of a turbine.

2.1.3 Rural (Local) Electricity Supply

A rural/local supply will be required as a back-up power supply to the substation for light, heat and power purposes. The rural/local supply will be designed and constructed by ESB Networks. The rural/local supply will have an associated step-down transformer (i.e. MV to LV) and will enter the substation building by underground cable and terminate onto the control building distribution board.

2.3.1 Electrical Substation, Control Building and Associated Compound

It is proposed to construct one 110kV electricity substation within the site. This will provide a connection point between the wind farm and the grid connection node point at the existing Dungarvan 110kV substation. Electricity transmitted between the turbines and the substation on the Site will be at 110kV.

The substation will serve two main functions:

1. provide housing for switchgear, control equipment, monitoring equipment, and storage space necessary for the proper functioning of the wind farm
2. provide a substation for metering and for switchgear to connect to the ESB grid

The construction and electrical components of the substation will be to EirGrid specifications within the parameters assessed. The substation compound will be 20,800m^2 and will be 2m in depth and will be constructed from engineered stone material using similar construction techniques as for the crane hardstands. The overall compound will be enclosed by a 2.65m high fence and will contain a single building, ancillary equipment, including the transformers, switch gear, fault protection, metering, car parking and other ancillary elements necessary for the operation of the Development. Provision is made for the inclusion of a container sized unit

which can be used to accommodate a statcom (for grid reactive power compensation) or a harmonic filter for grid stabilization.

The substation building will contain control elements of the Development. The control components housed at the substation will include metering equipment, switchgear, the central computer system and electrical control panels. A spare parts store and workshop will also be located in the substation. The control building will be a single story pitched roof structure with traditional rendered finishes. The appearance and finish of the substation building will be similar to an agricultural building with a slated roof and nap plaster finish proposed. It will have a suitably sized footpath around it and an adjacent parking area. The final finish of the control building will be an off-white or grey colour.

The control building will contain an ESB room, control room, switchgear room, small store, an office and toilet. There will be four lightning monopole protection masts which will be up to approximately 18m in height and associated site works. Warning / health & safety signage will be displayed as is normal practice for such installations. Motion sensitive lighting only will be used. It is proposed to install a rainwater harvesting system as the source of water for toilet facilities, with potable water being brought onsite in bottles. Wastewater from the staff welfare facilities in the control building will be collected in a sealed storage tank, fitted with a high-level alarm. All wastewater will be tankered off-site by a licensed waste collector to a wastewater treatment plant. There will be no onsite treatment of wastewater.

A telecommunication antenna will be fixed externally to the substation control building for communication and control purposes (e.g. for the Supervisory Control and Data Acquisition (SCADA) System) for the Developer, turbine suppliers and ESB networks. There will be a small area outside the compound and adjacent to the access road that will be a hard-surfaced area for operational and maintenance for 4 parking spaces.

2.1.4 Transformers and Internal Cabling

Each turbine will be connected to the substation on site via underground MV cables. There will be approximately 21,815m of internal cabling. Fibre-optic cables will also connect each wind turbine to the wind turbine control system located within the Control Building. The electrical and fibre-optic cables running from the turbines to the substation compound will be run in cable ducts 1m below the ground surface within the Site Roads and/or their verges.

2.1.5 Grid Connection

Connection will be sought from the grid system operators by application to EirGrid. The substation will connect via underground 110kV cable. The route of this underground grid connection is provided in **Figure 1.1** above**.** The overall length of the grid connection between the substation and the existing Dungarvan 110kV substation is 16.8km, of which, 368m is within the site of the Development, and 16,432m is located along the public road corridor. The 368m is located in lands under the Developer's control (12.8km is located in an existing road).

The Grid Connection will be constructed to the requirements and specifications of EirGrid. The electricity will be transmitted as a three-phase power supply meaning there will be three individual conductors in each cable circuit. The three conductors will be laid in separate ducts which will be laid in accordance with EirGrid functional specifications for 110kV underground cables. The width of a 110kV cable trench with a trefoil formation will be 600mm. The depth of the trench for 110kV cables is 1.335m. A separate duct will be provided within the trench for fibre optic communications.

The following is a summary of the main activities for the installation of ducts:

- All relevant bodies i.e. EirGrid, Gas Networks Ireland, Eir, Local Authorities, Irish Water etc. will be contacted and up to date drawings for all existing services will be sought.
- Immediately prior to construction taking place, the area where excavation is planned will be surveyed using a Cable Avoidance Tool (CAT) and all existing services will be verified. Temporary warning signs will be erected.
- Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.
- A 13-tonne rubber tracked 360-degree excavator will be used to excavate the trench to the dimensions of 600mm wide by 1.335m deep.
- A silt fencing filtration system will be installed on all existing drainage channels for the duration of the cable construction to prevent contamination of any watercourse.
- Once the trench is excavated, a 50mm depth base layer of sand (in road trench) or 15 Newton CGBM B concrete (off road trench) will be installed and compacted. All concrete will be offloaded directly from the concrete truck into the trench.

- uPVC ducts will be installed on top of the compacted base layer material in the trench.
- Once the ducts are installed, couplers will be fitted and capped to prevent any dirt entering the unjointed open end of the duct.
- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to record the exact location of the ducts.
- The co-ordinates will be plotted on as-built record drawings for the grid connection cable operational phase.
- When ducts have been installed in the correct position on the trench base layer, sand (in road trench) or Lean-mix CBM4 (CL1093) (off road trench) will be carefully installed in the trench around the ducts so as not to displace the duct and compacted.
- Spacer templates will be used during installation so that the correct cover of duct surround material is achieved above, below and at the sides of the duct in the trench.
- A red cable protection strip will be installed above duct surround layer of material and for the full length of the cable route.
- A layer of Lean-mix CBM4 (CL1093) (in road) or excavated material (off road) will be installed on top of the duct surround material to a level 300mm below the finished surface level.
- Yellow marker warning tape will be installed for the full width of the trench, and for the full length of the cable route, 300mm from the finished surface level.
- The finished surface of the road will then be reinstated to its original condition.
- Precast concrete cable joint bays (junction boxes) will be installed within the excavated trench.
- The junction boxes will be backfilled and the finished surface above the junction box reinstated as per its original condition. The cable junction boxes will be re-excavated a second time during cable pulling and jointing, after which the finished surface above the joint bays will be reinstated again to its original condition.
- When trenching and ducting is complete, the installation of the grid connection cable will commence between the substation and the existing 110kV substation at Dungarvan.
- The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable will be pulled through.

- The cables will be jointed within the precast concrete cable junction box. (Joint Bay)
- The finished surface above each cable joint bay is reinstated to its original condition.

2.1.5.1 Joint Bays

Joint Bays are pre-cast concrete chambers where individual lengths of cables will be joined to form one continuous cable. A joint bay is constructed in a pit. Each joint bay typically will be 6m long x 2.5m x 2.3m deep. A reinforced concreted slab will be constructed on top of the bay.

The joint bay locations have been dictated by suitable terrain and access to facilitate the operation of cable pulling equipment at any phase of the development and future operation of the installation in accordance with the EirGrid specifications.

Communication chambers, which are similar to small manholes, will be installed at the joint bay locations to facilitate connection of fibre-optic communication cables.

2.1.5.2 Trench Layout

The trench layout will be as per the appropriate EirGrid drawings. The specification of Waterford City and County Council will be followed for the excavation and reinstatement of the ducted cable trenches. When the trench has been excavated to the required depth and all loose material and protruding stones have been removed, a bedding layer of sand will be laid and compacted to a minimum thickness of 65mm.

2.1.5.3 Joining Ducts

All joining ducts shall be laid in straight lines to even gradients. Once the ducts have been installed and backfilled with lean-mix concrete and with Clause 804 stone the duct run will be thoroughly cleaned by pulling the appropriate size of EirGrid approved duct brush through the duct.

Details of the construction methodology are summarised below:

- Preparatory Works
    - Preparatory Trial Pit Survey along the cable route

- Access to the start point and setting out
- Access to joint bays
- Silt Attenuation Features and watercourse set back buffer
- Joint Bay Excavation

- Trenching Works
  - Storage of Materials
  - Trench Operations
  - Managing excess material from trench works

2.1.5.4 Directional Drilling Works

There are total of 3 HHD which are required along the grid connection route, these include 2 no. water crossings and a HHD is required for a cattle underpass. All crossings will be constructed by means of directional drilling technology. The crossings will comprise 4 x 110mm HPPE pipes/ducts each directionally drilled. Two separate excavations will be made to a depth of 2 metres to accommodate the directional drilling launch and reception pits. Spoil arisings will be stored adjacent to the pit locations for reinstatement, at a minimum 25 metre buffer distance from the watercourse. These temporary spoil mounds will have side slopes battered back to 1:1. Silt fencing will to be erected around the base of each temporary mound. The excavation launch and reception pits will be reinstated on completion of drilling and jointing operations.

The Drill head will be placed in the open excavation (launch pit) and it will be guided in by the operator for the first 1-2 metres. A series of drill rods will be connected to the head as it travels further along the shaft.

The drill position is always known to the operator and the drill can be manoeuvred in 3 planes / axis. A drilling lubricant will be required this will be delivered directly to the drill head. This will be ultrabore non-toxic bentonite slurry mixture. Once the conduit is completed, the drill head is exposed at the reception pit and removed. The drill rods are connected to the duct pipe and the drill I reversed pulling the pipe back through the conduit.

A spoil volume of 4m³ will be excavated for each 100m run of 4 pipes. This spoil will be largely subsoil material. The 100m arisings will exit the launch pit within the bentonite slurry mixture.

A mobile bunded tank will be located next to the launch pit into which the arisings will be pumped. This will be stored outside of the 25m watercourse buffer zone.

The following measures will be implemented during the directional drilling works:

- No in-stream works will be permitted.
- Works shall not take place at periods of high rainfall and shall be scaled back or suspended if heavy rain is forecast.
- A floating hydrocarbon boom and spill kit will be employed.
- Plant will travel slowly across bare ground at a maximum of 5km/hr. If truck rutting is observed, then bog mats or rolling road will be employed.
- Silt fencing will be erected at a setback distance of 5m during excavation.
- Any excess construction material shall be removed from the works areas and disposed of in a fully licensed landfill.
- No re-fuelling of machinery will take place on site or within 50 metres of any watercourse.
- All construction workers will be given a toolbox talk addressing the environmental topics concerning the drilling prior to commencement of construction.

2.1.6 Borrow Pit

One borrow pit will be constructed as part of the Development. The borrow pit will be located on the commonage land and will provide excavated material to provide fill for the roads, hardstands, upfill to foundations and temporary compounds. The borrow pit will be excavated as required. Where rock and fill material is available from the excavation of turbine foundations, this material will be used first. The use of on-site borrow pit will reduce the environmental effect of other aspects of the Development such as by reducing the need to transport material to the Site. The location of the borrow pits can be seen on **Figure 1.2**.

When the borrow pits are no longer required, they will be reinstated using any surplus inert material from the site and made secure using permanent stock proof fencing.

The rock will be extracted from the proposed borrow pits using two main methods, rock breaking and rock blasting. The primary method will be rock breaking.

2.3.1.1 Rock Breaking

Weaker rock will be extracted using a hydraulic excavator and a ripper. Where stronger rock is encountered and cannot be extracted using an excavator, then rock breaking equipment will be employed. This will typically involve the use of a 40-60 tonne 360-degree hydraulic excavator with a rock breaker. The rock breaker is supported by a smaller 30-40 tonne rock breaker which breaks the rock down further for feeding into the rock crusher machine. The larger rock breaker breaks out the rock in a progressive manner from the borrow pit and the smaller rock breaker breaks it down further.

The broken-down rock is loaded into mobile crusher using a wheeled loading shovel machine and crushed down into the correct grade for use in the civil construction of Site Access Roads and Turbine Hardstands.

2.3.1.2 Rock Blasting

If blasting is required, then this is generally carried out using a mobile drilling rig which is used to drill vertical holes into the rock area that requires blasting. It typically takes the drilling rig 3 or 4 days to drill the number of holes required for a single blast. A specialist engineer will be employed to determine the locations and depths of blasting required. The specialist blasting engineer will arrange for the correct amount of explosives to be delivered to the Site for each blast. The management of explosives delivery and storage on-site will be agreed with An Garda Síochána in advance. The blast engineer will set the explosives and manage the blast. The rock generated from the blast will usually be the correct size to be loaded directly into the mobile crusher.

2.1.7 Onsite Drainage

The surface water runoff contained within natural and artificial drainage channels includes stream and river waterbodies, drainage ditches, and other minor natural and artificial manmade drainage features. Drainage measures will be provided to attenuate runoff, guard against soil erosion, soil compaction, and safeguard local water quality. Details of the drainage system are

outlined in detail in the Surface Water Management Plan, part of the CEMP attached as **Appendix 2.1** to the EIAR of the proposed development**.**

There are a number of natural streams on the Site. A buffer zone of at least 50m will be in place for natural streams where possible. Sustainable Urban Drainage System (SuDS) principles will be employed as follows:

Source controls for surface water

Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sandbags, 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 or other similar/equivalent or appropriate measures.

In-line controls for surface water

Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sandbags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriates systems.

Treatment systems for surface water:

Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbusters and/or other similar/equivalent or appropriate systems.

When heavy rainfall is predicted, then works will be suspended or scaled back.

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2.1.8 Table of Key Development Infrastructure Metrics

The Key Development Infrastructure Metrics are contained in **Table 2.3**.

Table 2.3: Key Development Infrastructure Metrics

Description	Length [m]	Width [m]	Depth [m]	No.	Area [m^2]	Volume of Excavation [m^3]
Upgraded Site Access Track	1,780	5	0.3	1	8,900	2,670
New Site Access Track	10,760	5	0.3	1	53,800	16,140
Internal Cabling (power & communications)	10,997	0.6	1	4	6,598	6,598
Turbine Hardstands - cranes	97	35	0.3	12	40,740	12,222
Turbine Foundations (25.5m diameter)	25.5	25.5	2.5	12	6,128.4	15,321
Electrical Substation	123	63	2	1	7,749	15,498
Site Compound	25	35	2	1	875	1,750
Cut & Fill Areas & Junctions	X	X	X	1	X	337,075
110kV Cable Trench	16,013	0.825	1.265	1	13,211	16,712
Joint Pits	6	2.5	2.3	21	315	724
Borrow Pit	127	127	2	1	13,211	31,894
Total					151,527	456,604

2.4 CONSTRUCTION

The first phase of the Development will comprise the construction phase. This phase will begin with site preparation works and will be complete when the turbines are built and ready for commissioning, and when all wastes have been removed from the site. For this Development, it is envisaged that the construction phase will last approximately 18 months. An indicated construction programme is set out at **Table 2.4**.

Table 2.4: Indicative Construction Programme

Activity	Month																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Site Establishment/ Fencing of …..	X	X	X																		
Internal Access Road Upgrade & Construction		X	X	X	X	X	X														
Substation & Compound Construction		X	X	X	X	X	X	X													
Substation Electrical Works									X	X	X	X	X	X	X	X	X				
Substation Commissioning																X	X				
Excavation & Construction of Turbine Foundations & Hardstands		X	X	X	X	X	X	X	X	X	X										
Internal Cabling Installation										X	X	X	X	X	X	X					
Turbine Delivery and Erection												X	X	X	X	X					
Grid Connection						X	X	X	X	X	X	X	X	X	X	X	X				

Energisation																	X			
Turbine Commissioning																		X	X	X
Site Restoration																	X	X	X	X

2.4.1 Micrositing

The Development infrastructure is designed around considerations of technical, economic, and environmental constraints. While the Site layout was optimised as far as practicable and EIA standard environmental investigations have taken place, adverse geotechnical ground conditions may require the minor micrositing of Development infrastructure. As per Section 5.3 Ground Conditions/Geology of the current 2006 Wind Energy Planning Guidelines ("the 2006 WEPG"):

"Provision must be made for carrying out site-specific geo-technical investigations in order to identify the optimum location for each turbine. These investigations may suggest minor adjustments to turbine location. In order to accommodate this practice there should be a degree of flexibility built into the planning permission and EIS. The extent of flexibility will be site specific but should not generally extend beyond 20 metres. Any further changes in location beyond the agreed limits would require planning permission."

Any such movement will only be implemented if necessary and the above noted requirements of the 2006 WEPG will be followed. Such variations in ground conditions will only become apparent following excavation of the turbine foundation area during the construction phase. A movement of the turbine will require the associated turbine hardstand and site access track to 'follow' the turbine foundation move.

2.4.2 Construction and Environmental Management Plan (CEMP)

A CEMP is appended to the EIAR in **Appendix 2.1**. The CEMP includes an emergency response plan, spoil management plan, surface water management plan, surface water quality

and inspection management plan and a waste management plan. The CEMP includes all the mitigation measures recommended within the EIAR and the NIS. A summary of the mitigation measures is included in **Appendix 17.1** of the CEMP.

In the event planning is granted for the Development, the CEMP provides a commitment to mitigation and monitoring, and reduces the risk of pollution whilst improving the sustainable management of resources. The environmental commitments of the project will be managed through the CEMP and will need to be secured in contract documentation and arrangements for construction and later phases, such that there is a robust mechanism in place for their implementation. The CEMP will address the construction phase, and will be continued through to the commissioning, operation and final decommissioning phases. An Environmental Manager / Ecological Clerk of Works (ECoW) with appropriate experience will be appointed for the duration of the construction phase so that the CEMP is effectively implemented.

2.4.3 Refuelling

Vehicles will be refuelled off-site where possible. For vehicles that require refuelling on-site, fuels will be stored in the temporary construction compound and bunded to at least 110% of the capacity of the largest tank within the bund or 25% of the total tank capacity, whichever is greater. Refuelling will take place via a mobile double skinned fuel bowser. The bowser will be a double axel refuelling trailer which will be towed to the refuelling locations by a 4x4 vehicle. The 4x4 will carry a drip tray, spill kit and absorbent mats in case of any accidental spillages. Only designated competent personnel will refuel plant and machinery on the Site.

2.4.4 Concrete

There will be no concrete batching on the Site. Rather, it will be transported to the Site as it is required. A dedicated, bunded area will be created to cater for concrete wash-out and this will be within the temporary construction compound. This will be for the wash-out of the chutes only after the pour. Concrete trucks will then exit the Site and return to the supply plant to wash out the mixer itself.

The main concrete pours at the turbine locations will be planned in advance and mitigation measures will be as follows:

- Avoiding large concrete pours, for turbine foundations for example, on days when heavy or prolonged rainfall is forecast.

- Providing that all concrete pour areas are dewatered prior to pouring concrete and while the concrete is curing.

- Making covers available so that areas can be covered if heavy rain arrives during the curing process which will prevent runoff of concrete which has a high pH.

2.4.5 Dust Suppression

During periods of dry and windy weather, there is potential for dust to become friable and cause nuisance to nearby residences and users of the local road network. Damping down may be required to see that dust does not become friable. A wheel wash facility will be employed on-site which will wash mud and debris from vehicles egressing the Site and reduce mud and debris from getting onto the local road network where it could dry out and become friable and potentially causing a nuisance. Where stone is sourced off-site, HGVs entering the Site carrying stone will be covered to prevent dust generation. A road sweeper will be made available for use in case of any mud or debris making it onto the public road network.

2.4.6 Construction Hours

The Development will have 123 to 147 construction workers during the construction phase. Working hours for construction will be from 07:00 to 19:00 throughout the week, with reduced working hours at weekends. It should be noted that during the turbine erection phase, operations will need to take place outside those hours to facilitate turbine foundation construction and so that lifting operations are completed safely. Hours of working for turbine foundation construction will be agreed with Waterford City and County Council prior to the commencement of turbine foundation construction. A detailed Traffic Management Plan ("TMP") will be put in place for the construction phase, which shall be agreed during the

planning compliance stage with the Planning Authority so that strict controls are in place with all suppliers coming to the Site.

2.4.7 Construction Compound and Temporary Works Area

The temporary construction compound will be set up upon commencement of the construction phase. The proposed location for the temporary construction compound is southwest of T04 as shown in Figure 2.1 and the layout is shown in Figure 2.11. The compound will be 25m by 35m and approximately 2m in depth 875m² / 1,750m³. The compound will be used as a secure storage area for construction materials and to contain temporary site accommodation units for sealed type staff welfare facilities. The compound will contain cabins for offices space, meeting rooms, canteen area, a drying room, parking facilities, and similar personnel facilities.

An area within the compound will be used for the storage of fuel and oils and this will be suitably bunded. The bund will be lined with an impermeable membrane in order to prevent any contamination of the surrounding soils, vegetation and water table. Double protection containers / equipment will be used along with drip trays. Full details will be included in the final CEMP.

During the construction phase, water will be supplied by water bowser. The maximum wastewater production is estimated to be the same as the maximum water consumption (4,920-5,880 litres per day). The project will include an enclosed wastewater management system at the temporary compound capable of handling the demand during the construction phase with 123 to 147 construction workers on site at peak. A holding tank is proposed for wastewater management. Wastewater will be removed off-site and disposed at an appropriate licenced facility.

2.4.8 Construction of Crane Hardstands and Foundations

The construction method for all the crane hardstands will be via excavated approach. Each crane hardstand will be 97m by 35m. Foundations will be taken down to competent bearing strata by excavating through the soil, subsoil, and rock if necessary.

The method of construction for turbine foundation is also described below:

- Install temporary drainage around perimeter of excavation area;
- Excavate soil and rock;
- Form a level working area to build foundation;
- Install formwork and reinforcement;
- Pour concrete;
- Cure concrete;
- Once the concrete has set and the earthing system is in place, backfill the foundation with stone and excavated soil deposits;
- Use retained excavated soil deposits to build up the area around the turbine base.

2.4.9 Turbine Assembly

Once on Site, the wind turbine components will be routed according to a specific detailed route plan to minimise manoeuvring. Components will be placed on turbine hardstands prior to assembly. A *'just in time'* delivery strategy will be in place for turbine blades to reduce the need for temporary set down areas. One large crane will be required for erecting the turbines, assisted by smaller cranes. Similar cranes will also be required for maintenance during the operational phase. As with all other vehicles, refuelling of cranes will be carried out in accordance with site procedures to minimise the risk of spillage or pollution.

The towers will be delivered in sections, and work on assembly will not start until a suitable weather window is available. Three methods can be used to attach the blades:

The blades can be attached to the nacelle and hub on the ground. The hub and blades are then lifted as one;

1. The hub can be attached to the nacelle and the two blades attached to the hub while the nacelle is on the ground – the "*bunny lift*". The nacelle is then lifted into position and the third blade lifted into place separately. This requires manoeuvring of several components on the ground and usually the repositioning of cranes;

2. Lifting the nacelle and hub as one unit, as described above and then attaching the blades one at a time, rotating the hub between lifts. The blade lifting operations do not require repositioning of the crane.

3. The most appropriate method will be decided by the lifting contractor and the turbine manufacturer, prior to turbine erection.

2.4.10 Construction Traffic

It is estimated that during civil construction, approximately 5,944 loads will be delivered to Site. This breaks down to approximately 297 loads per month or an average of 83 per day raging between 3 to 141 loads (per day) excluding Sundays and bank holidays. The peak number of deliveries per day will occur during the concrete pour for Turbine Foundation construction. An estimated 102, depending on the capacity of the concrete truck (6 or 7m3), concrete truck deliveries will be required per turbine foundation. Some other materials will also be delivered on such days, so a realistic estimation of peak deliveries is approximately 141 deliveries per day (for at least 20 separate days in the construction programme when the Turbine Foundations will be poured).

2.4.11 Reinstatement and Monitoring

Following completion of construction, all plant and machinery will be removed from the Site. The temporary works areas needed for the construction period such as blade laydown areas, will be reinstated using the original spoil material removed and stockpiled close to the location from where it was excavated. The grid connection route will be reinstated to its original condition.

The on-site installed drainage network will be left in place where considered beneficial to do so. This will be periodically monitored to see that it is operating to its stated design purpose. Water monitoring on nearby natural watercourses will be undertaken during and post construction to determine if any pollution has migrated off-site, and if so, implement measures to rectify the impact.

2.4.12 Construction Supervision and Monitoring

The construction activities will be monitored by a geotechnical engineer, a qualified archaeologist and an ecological clerk of works (ECoW). The geotechnical engineer will be

contracted for the detailed design phase and their services retained throughout the construction and reinstatement phases. The geotechnical engineer will oversee all earthworks and excavation activities and monitor for issues such as ground stability, water ingress into excavations etc.

The ECoW will be employed prior to the commencement of the construction phase and will monitor the working corridor and review the pollution control measures and working practices during construction and have input into site remediation. The ECoW will have stop work authority if, for example, there is potential for a sensitive habitat features to be encroached upon or there is the possibility of silt/pollution runoff to natural watercourses. The archaeologist will have responsibility for ensuring that potential archaeological features are protected and will also have stop work authority should any be discovered during excavations. If any potential archaeological features are discovered, the archaeologist will inform the National Monuments Service (NMS).

An inspection and maintenance plan will be developed for the planned site drainage prior to commencement of construction. Regular inspections of the installed drainage system will be undertaken, especially after heavy rainfall events, to check blockages and see that there is no build-up of standing water in any part of the system where is it not designed to be.

Excess build-up of silt at check dams, attenuation/settlement ponds or any other drainage feature will be removed.

During the construction phase, field testing and laboratory analysis of a range of parameters with relevant regulatory limits and Environmental Quality Standards (EQSs) should be undertaken for each primary watercourse close to the site, and specifically following heavy rainfall events (i.e. weekly, monthly and event based).

The CEMP for the Development will set out the proposed site organisation, sequencing of works, methodologies, mitigation measures (including these outlined above) and monitoring measures.

Daily monitoring of excavations by the geotechnical engineer will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken.

The local road network near the Site used to transport construction materials will be monitored during construction, so that any damage caused by construction traffic associated with the project can be identified and repaired. Any required monitoring programme will be agreed with the local authority, prior the commencement of any construction works. Ready mix concrete and rock will be sourced from local quarries and monitoring may also be undertaken on the route as required.

2.4.13 Construction Sequencing

It is envisaged that the following will be the sequence of construction for the Development:

1. Contractor compound and welfare facilities
2. Site preparation
3. Site roads
4. Crane hardstandings
5. Turbine foundations
6. Internal cable ducting
7. Installation of the grid connection
8. Erection of wind turbines
9. Commissioning and energisation

The 110 kV substation will be constructed in parallel with turbine hardstands, foundations and ducting. The first step will be to construct the Temporary Construction Compound and Welfare Facilities. Access to the area will be Site Entrance 1. The next step will be to prepare the areas of the site where site infrastructure is to be located by marking out the construction works corridor and the relevant environmental buffer zones as needed.

Following the site preparation, the site roads will be constructed according to the specifications of the chosen turbine manufacturer. The next step will involve construction of the crane hard-standing areas for the 12 no. turbines according to the specifications of the chosen turbine manufacturer. The 12 no. turbine foundations can then be excavated, and foundations constructed using rebar and imported concrete. Following the construction of the turbine foundations, internal cable ducting from the

turbine locations to the on-site 110 kV substation will be laid in trenches along the constructed Access Roads.

The grid connection will be installed in trenches within the national road network infrastructure from the site to the 110kV substation located in Dungarvan.

The last step will be to erect the 12 no. wind turbines on the previously constructed foundations using two cranes. Commissioning and testing of the turbines can then proceed.

2.4.14 Construction Employment

It is estimated that 123 to 147 construction workers will be employed on-site during the peak period of turbine foundation construction.

2.5 COMMISSIONING

Wind farm commissioning can take in the region of 2 months to complete from the erection of the final turbine to the commercial exportation of power to the national grid. It involves commissioning engineers working through an entire schedule of SCADA (Supervisory Control and Data Acquisition) and electrical and mechanical testing and control measures to check that the wind farm will perform and export power to the national grid, as designed.

2.6 OPERATION AND MAINTENANCE

During the operation of the wind farm, the turbine manufacturer, the Transmission System Operator (TSO) (EirGrid), the operator, or a service company will carry out regular maintenance of the turbines. In addition, operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link. Routine inspection and preventative maintenance visits will be necessary to provide for the smooth and efficient running of the wind farm.

2.7 DECOMMISSIONING

The Applicant is applying for a consent for a period of 40 years. Cranes of similar size to those used for construction will disassemble each turbine using the same crane hardstands. The towers, blades and all components will then be removed from site and reused, recycled, or disposed of in a suitably licenced facility. The turbine transformers will also be removed from site. There is potential to reuse turbine components, while others can be recycled.

Underground cables will be removed while the ducting will be left in-situ. The foundations will remain in-situ.

Hardstand areas will be remediated to match the existing landscape as closely as possible. Access Roads will be left for use by the relevant landowner(s).

Any structural materials suitable for recycling will be disposed of in an appropriate manner. The financial costs of decommissioning, at current material values, will be more than met by the recycling value of the turbine components.

Prior to wind turbine removal, due consideration will be given to any potential impacts arising from these operations. Some of the potential issues could include:

- Potential disturbance by the presence of cranes, HGVs, and personnel on-site.
- On-site temporary compound would need to be located appropriately.
- Time of year and timescale (to be outside sensitive periods).

Prior to the decommissioning work, a comprehensive plan will be drawn up that takes account of the findings of this EIAR and the contemporary legislative requirements and best practice at that time, to manage and control the component removal and ground reinstatement.

2.8 COMMUNITY BENEFIT

The Project has the potential to bring significant positive benefits to local communities. It will support sustainable local employment; it will contribute annual rates to the local authority and it will provide opportunity for local community investment in the project

in line with the new Renewable Energy Support Scheme (RESS). A community benefit fund will be put in place for the lifetime of the Project to provide direct funding to those areas surrounding the Project.

Two important areas of Government policy are in development which will have a bearing on the establishment of future community benefit funds, the updated Wind Energy Guidelines and the Renewable Energy Support Scheme (RESS-2)[1] has been updated in 2022 and provides the Government requirements on future community benefit funds for renewable energy projects.

A significant annual Community Benefit Fund will be established in line with Government policy which will include funding for both wider community initiatives and a Near Neighbour scheme focused on houses in close proximity to the Project.

2.8.1 Fund Usage and Administration

The Community Benefit Fund belongs to the local community. The premise of the fund is that it should be used to bring about significant, positive change in the local area. To make this happen, the first step will be to form a benefit fund development working group that clearly represents both the closest neighbours to the Project as well as nearby communities. This group will then work on designing the governance and structure of a community entity that will administer the Community Benefit Fund.

[1] gov.ie - Renewable Electricity Support Scheme 2 (RESS 2) (www.gov.ie) **[Accessed 6th January 2022]**

2.8.2 Community Investment

Under the current Renewable Energy Support Scheme (RESS)[2] renewable energy project proposals must enable local communities in a meaningful way by means of direct capital investment for communities in close proximity to renewable energy projects, each year for the duration of the support scheme. The Developer is committed to working with external agencies to develop workable models of Community Investment under any incoming renewable energy support schemes that succeeded the existing scheme.

3.0 DESCRIPTION OF THE PROPOSED DYRICK HILL WIND FARM & GRID CONNECTION ROUTE

3.1 LOCATION OVERVIEW

The proposed wind farm Development is located in the townlands of Ballynaguilkee Upper, Broemountain, Corradoon, Dyrick, Lickoran, Lickoranmountain, Lisleagh, Lisleaghmountain, Lyrattin and Scartmountain. The Site is located 43km west of Waterford City, 55km northeast of Cork City, and 12.9km northwest of Dungarvan.

The proposed grid connection passes through the townlands of Broemountain, Lyrattin, Farnane Lower, Farnane Upper, Castlequarter, Mountaincastle South, Carrigaun (Mansfield), Langanoran, Sleadycastle, Knockaunnaglokee, Garryduff, Colligan More, Garryclone, Colliganwood, Ballymacmague North, Ballymacmague South and Killadangan.

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https://www.gov.ie/pdf/?file=https://assets.gov.ie/251854/86c32a4e-c3a1-4bda-9140-853e89a0f000.pdf#page=null [Accessed 13th April 2023]

Temporary works will be required to accommodate the delivery of the turbine components. These temporary works are located in the townlands of Ballynaguilkee Lower, Kilcooney, and Lisleagh Gorteens, Kilmurry, Rathpatrick, Ballyduff East, Joulterspark and Burgery.

The redline boundary extends to 358.6ha, and comprises a mixture of farmland, forestry and upland heath. Much of the lands are in private, third-party ownership, while a portion of the site is shared land (commonage).

3.2 TOPOGRAPHY

The proposed Site is located beyond the south-eastern extent of the Knockmealdown Mountains mountain range. The topography of the Site is variable, and it is broadly surrounded by or is partially overlapping three elevated areas. These include Knocknasheega (428m) west of the Site boundary, Broemountain (429m) in the northern extent of the site and Dyrick Hill (286m) within the southern central portion of the site. The western, northern and southern peaks of the site are more elevated than the central and eastern extents of the Site which are relatively flat with lower elevations ranging from between 130m to 190m. The Site is generally topographically elevated in the north / north-west and generally topographically low lying in the south and east with the exception of Dyrick Hill (286) near the southern extent of the site. The steepest incline across the Site occurs at the northern extent of the Site near the proposed T8 position.

3.3 SOILS & GEOLOGY

The Site is located across land which is predominantly underlain by sandstone rock and brown podzolic or podzol soils of coarse loamy drift with siliceous stones of the Knockmealdown, Knockboy and Ballycondon series. According to the Soil Information System National Soils Map, pockets of peat exist at the north-western extent of the site. However no peat has been identified at the site during the geotechnical surveys of the site (EIAR Chapter 8: Lands, Soils and Geology) and it is likely that the areas mapped as pockets of peat on the National Soils Map correspond to areas of heathland habitat occurring in the commonage area of Broemountain.

Forestry and agricultural land uses, including dairy and sheep farming are the predominant land uses within the study area. Forestry plantations border the western extent of the proposed Site on an area of commonage land. Additional areas of forestry exist within the central, north-

eastern and southern extents of the proposed Site. The Site is intersected by Broemountain Road (L5058) which is a narrow local secondary road. The Farnane River, which is a tributary of the Finisk River, rises near the north-western extent of the Site and flows along the western extent of the Site. The Lisleagh Stream, which is also a tributary of the Finisk River, rises in the central portion of the Site and flows in a south-easterly direction until it merges with the Finisk River, north of the townland of Woodhouse. The Aughkilladoon Stream, another tributary of the Finisk River rises at the south-eastern extent of the Site and flows in a south-easterly direction until it merges with the Finisk River, east of the townland of Woodhouse

3.4 HYDROLOGY

The proposed wind farm Site, and current grid connection route are located within the Blackwater (Munster) and Colligan Mahon catchment areas in Hydrometric Areas 18 and 17 respectively. The proposed wind farm Development and grid connection to Dungarvan Substation at Killadangan are located within three WFD sub-catchments. These include the Blackwater (Munster) (SC_140), Finisk (SC_010) and Colligan (SC_010) subcatchments

The National Soils Hydrology Map classifies the majority of the site as being poorly drained, particularly in the western and northern areas. The remainder of the site is classified as being well drained with the majority of these areas being located in the eastern and southern areas of the Site.

The Farnane River, the Lisleagh Stream and the Aughkilladoon Stream are the main surface water bodies that drain the site. All of these surface waters are tributaries of the Finisk River which flows to the east and south-east of the proposed Site. The site is also drained by a network of artificial drainage ditches, many of which are located adjacent to field boundaries, particularly in the central and western extents of the Site. A number of small natural and artificial drains also exist at the western commonage area of the proposed Site.

the western extent of the site is the Farnane River which rises to the east of an area of upland forestry between Knocknasheega and Broemountain at an altitude of 290m. Two small unnamed streams merge with the Farnane River from both the east and west near the townland of Graigueavurra, approximately 1.3km southeast of the Site boundary. An additional small unnamed stream merges from the west of the Farnane River at Graigueavurra, approximately 2km southeast of the Site boundary. The total length of the Farnane River and its tributaries is

9.1km and it covers a catchment area of 8.1km^2. The Farnane River flows in a south-easterly direction near parallel to the western Site boundary and then continues further to the south-east until it merges with the Finisk River at Millstreet, County Waterford.

The Lisleagh Stream rises near the central extent of the Site in an area mapped as a potential wetland to the northwest of the proposed T4 position. According to the EPA maps for the area, an unnamed stream is located immediately west of the proposed T04 position which is mapped as flowing in a north-easterly direction for approximately 390m until it merges with the Lisleagh Stream. However, during all site survey visits, there were no indications that this stream was present. It was initially suspected that this stream could be ephemeral, however it was not visible at the site even after periods of heavy rainfall. It could also be the case that land drainage practices, or the construction of an unpaved road near the stream, have resulted in its removal or alteration of its course over time. The Lisleagh Stream flows in south-easterly direction from its source for approximately 1.8km kilometres where it merges with a small unnamed stream that rises near the townland of Corradoon, approximately 1.5km north of this confluence. To the northeast of the proposed T05, at the north-eastern Site boundary, an additional unnamed stream flows in an easterly direction for approximately 660m until it merges with the unnamed stream mentioned above which ultimately merges with the Lisleagh Stream.

At the south-eastern extent of the Site, the Aughkilladoon Stream rises in the townland of Lickoranmountain. The Aughkilladoon Stream flows along the south-eastern site boundary and continues in a south-easterly direction for approximately 2km until it merges with the Finisk River, east of the townland of Woodhouse. Beyond the northern site boundary, five small unnamed streams flow in a north-easterly direction and merge with the Boolahallagh River. The Boolahallagh River flows along the boundary of Counties Waterford and Tipperary until it merges with the Aughavanlomaun Stream at Priestown Bridge, approximately 1.7km north-east of the Site. Beyond the western site boundary, to the west of Knocknasheega, the Glenshelane River rises to the east of Knocknanask. The Glenshelane River flows in a southerly direction between Knocknansk and Knocknasheega until it merges with the Blackwater River south of Cappoquin. Northeast of Coolagortboy and north of Scarthmountain, an unnamed stream rises approximately 670m west of the Site boundary and flows in a south-westerly direction until it merges with the Glenshelane River.

Two wetlands exist at the site located east and west of the proposed T4 position. The Map of Irish Wetlands (2021) identifies these locations as "Other/Unsurveyed", it was notable that highly saturated ground was evident at these locations during the site surveys.

There are no lakes within the site boundary with the closest being a small reservoir north of Mt. Melleray Monastery, approximately 5Km west of the proposed Site boundary.

3.5 BIODIVERSITY

3.5.1 Designated Sites

The proposed wind farm site is not located within any designated sites. The grid connection route and the proposed haul route intersect the Blackwater River SAC and pNHA. The Dungarvan Harbour SPA and pNHA are located approximately 500m to the south of the proposed haul route and 600m to the south of the proposed cycle route.

All other designated sites are located at more remote distances from the project.

3.5.2 Habitats

The habitats occurring in the centre and eastern section of the proposed wind farm site are dominated by enclosed improved agricultural grassland with hedgerow field boundaries. The western side of the proposed wind farm site is dominated by unenclosed land cover used as commonage. The habitats occurring here include acid grassland, wet grassland and dry heath, whilst improved agricultural grassland also occurs towards the northwestern limit of the site. Conifer plantation occurs along the northern boundary of the site. Smaller areas of poor fen and flush and non-calcareous spring habitat also occur within the project site.

The entire extent of the proposed grid connection route will be situated within existing road formations between the proposed wind farm site and the existing substation at Dungarvan.

The habitats occurring at the three no. haul route widening locations comprise improved agricultural grassland and hedgerows.

3.5.3 Fauna

3.5.3.1 Bats

In general, the landscape that the development is a part of, is of low to moderate suitability for bats where the turbines are located in the upland areas. The landscape is of moderate to high suitability for bats where the turbines are located in the lowland agricultural areas.

Eight species of bats have been recorded as present at the development during the bat surveys. All are listed as 'Least Concern' on the Irish Red List, and Annex IV of the EU Habitats Directive.

No lesser horseshoe bats have been recorded at the project site and the project site is located outside of the known distribution range of this species in Ireland.

3.5.3.2 Non-volant mammals

No breeding or resting places for protected non-volant mammals such as badgers or otters have been recorded within the proposed wind farm site or along watercourses crossed by the proposed grid connection route.

3.5.3.3 Birds

During bird surveys completed for the proposed wind farm site recorded a total of 72 species, ten of which are Red-list status under the BoCCI (Gilbert et al., 2021). These include unidentified eagle[3], golden plover, grey wagtail, kestrel, lapwing, meadow pipit, redwing, snipe, stock dove and swift. A further 11 Amber-listed species were observed. A total of two Annex I species were recorded during hinterland surveys: golden plover and hen harrier.

[3] An unidentified eagle (either a golden eagle or white-tailed sea eagle, both red-listed and Annex I) was observed over 5km from VP1 (outside of the site). This bird was northeast of the VP and heading south easterly towards the Comeragh mountains. Therefore, this species was likely a white-tailed sea eagle, as this species has been observed in the Comeraghs (Roche et al., 2014).

During hen harrier surveys, a roost was not observed but suitable habitat exists on and near the site. During breeding wader surveys, no waders were observed breeding on site.

Table 3.1 lists the bird species that have been identified as key ornithological receptors for the assessment of ornithological impacts (see EIAR Chapter 7). The sensitivity of species as outlined on Table 3.1 are as per Percival (2003).

Table 3.1: Key Ornithological Receptors

Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Golden plover (red-listed, annex I);	Grey wagtail (red-listed);	Goldcrest (amber-listed);	Buzzard (green-listed);
Hen harrier (amber-listed, annex I);	Kestrel (red-listed);	Greenfinch (amber-listed);	Great Black-backed gull (green-listed);
Merlin (amber-listed, annex I);	Lapwing (red-listed);	Herring gull (amber-listed);	Great spotted woodpecker (green-listed);
Peregrine (green-listed, annex I);	Meadow pipit (red-listed);	House martin (amber-listed);	Osprey (green-listed);
Red kite (red-listed, annex I)	Red grouse (red-listed);	House sparrow (amber-listed);	Sparrowhawk (green-listed).
	Redwing (red-listed);	Lesser black-backed gull (amber-listed);	
	Snipe (red-listed);	Linnet (amber-listed);	

Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
	Stock dove (red-listed);	Mallard (amber-listed);	
	Swift (red-listed).	Sand martin (amber-listed);	
		Skylark (amber-listed);	
		Spotted flycatcher (amber-listed);	
		Starling (amber-listed);	
		Swallow (amber-listed);	
		Teal (amber-listed);	
		Wheatear (amber-listed);	
		Willow warbler (amber-listed).	

3.5.3.4 Invertebrates

Invertebrates recorded at the proposed wind farm site include the small heath butterfly which was recorded within the commonage area during field surveys. Other species observed include

orange tip, small tortoiseshell, common blue, green-veined white, meadow brown, ringlet and small white. The heath bumblebee *Bombus jonellus* was also recorded in this area of the proposed wind farm site.

No marsh fritillary were recorded at the proposed wind farm site during field surveys. The commonage area of Broemountain is the only area within the proposed wind farm site where the marsh fritillary larval foodplant, *Succisa pratensis*, occurs. This plant species is restricted to areas of wet grassland habitat to the west of the proposed wind farm site layout. This species rarely occurs within the footprint of the proposed wind farm site and no habitat suitable for supporting this species occurs within the layout. Where Succisa pratensis does occur it is largely as rare to occasional stands within a tall sward of Molinia caerulea wet grassland. The sward here is pre-dominantly greater than 25cm in height making this habitat less suitable for marsh fritillary colonies (Fowles, 2005).

4.0 IS THE PROJECT NECESSARY FOR THE CONSERVATION MANAGEMENT OF EUROPEAN SITES

The project has been described in Section 2 of this Screening Report and it is clear from the description provided that the project is not directly connected with or necessary for the future conservation management of any European Sites.

5.0 IDENTIFICATION OF EUROPEAN SITES WITHIN THE ZONE OF INFLUENCE OF THE PROJECT

5.1 WITHIN/ADJOINING EUROPEAN SITES

In order to identify European Sites that could potential be located within the zone of influence of the project, the current digital mapping (shapefile) of European Sites in Ireland[4], as published by the NPWS, was reviewed to identify the European Sites that could conceivably be connected to the project site via pathways. During this review, elements of the proposed development

[4] Current SAC shapefile layer dated April 2022; current SPA shapefile layer dated October 2021

were identified as occurring within or adjoining one European Site, namely the Blackwater River SAC. The proposed grid connection route and the haul route both intersect this SAC. The proposed grid connection route intersects the SAC at its crossing of the Finisk River along the L5068 local road. The proposed haul route intersections the SAC along the R671 and its crossing of the Finisk River inter.

Given that this European Site overlaps with/adjoin the proposed development it is considered to occur within its zone of influence.

5.2 SOURCE-PATHWAY-RECEPTOR MODEL

Current guidance informing the approach to screening for Appropriate Assessment defines the zone of influence of a proposed development as the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. It is recommended that this is established on a case-by-case basis using the Source-Pathway-Receptor (SPR) model.

Under the SPR model the proposed development, the works associated with the construction and decommissioning phase and the operation of the proposed development represent the source of potential impacts.

Pathways that can arise as a result of develop projects and lead to offsite/downstream impacts are listed below and an appraisal of the potential for these pathways to connect the proposed development to European Sites and their qualifying features of interest (which represent the receptors under the SPR model) is also provided:

- Emissions to surface water: In the absence of a suitable design and control measures the proposed development will have the potential to result in emissions to surface waters. Where receiving surface waters establish a connection between the proposed development and European Sites downstream then a hydrological pathway will be established. EPA sub-catchment and rivers and streams digital baseline mapping was used to identify hydrological pathways between the proposed development and European Sites. The potential for hydrological pathways to function as an impact pathway is examined further in Table 5.3 below.

- Emissions to groundwater: Infiltration of surface waters to ground is not considered to be high at the proposed development site (see Dyrick Hill Wind Farm EIAR Chapter 9) and there are no proposals to discharge surface waters generated at the project site to ground via infiltration. There will be no groundwater emissions pathways with the potential to connect the proposed development to European Sites.

- Noise and vibration emissions: Noise and vibration emissions are considered to have the potential to result in negative impacts to biodiversity up to a 300m distance from the emission source. This distance is based on the maximum noise disturbance zone of 300m for wetland bird species, as specified by Cutts et al. (2013)[5]. Noise and vibration effects for other qualifying species as well as qualifying habitats of European Sites are less than 300m. For mammal species listed as qualifying features of interest for SACs in the surrounding area this distance is set at 150m, as per the NRA (2009). For qualifying aquatic species a potential noise and vibration impact pathway will only arise where works such as piling or blasting are proposed at instream or bankside locations within adjoining SACs. No such proposals form part of the proposed development. There are European Sites occurring within 300m of the proposed development and the potential for noise and vibration emissions to function as a pathway is examined further in Table 5.3 below.

- Emissions to air: Air emissions that have been identified as arising from the proposed development relate to the generation of dust emissions during the construction phase (see EIAR, Chapter 16). Dust emissions can have the potential to result in negative impacts to biodiversity up to 50m from the source of the emission. This is supported by the guidance outlined by Holman et al. (2014), which provides a risk assessment for ecological impacts arising from dust deposition. European Sites are ranked as high

[5] It is noted Nature Scotland (2022) published disturbances zones for bird species at a greater distance than 300m. However unlike Cutt et al. (2013) who specifically examined disturbance effects generated by noise stimuli, the potential disturbance stimuli set out in the Nature Scotland publication are not concerned specifically with noise stimuli. As such the Cutts et al. (2013) publication and maximum noise disturbance distance is relied upon.

sensitive sites and the risk to high sensitive sites ranges from high (at less than 20m from source) and medium (at less than 50m from source), while low risks, representative of insignificant and de-minimis effects arise at distances greater than 50m from source.

- Light emissions: the proposed development will include for the provision of night time beacon lights on turbines. The potential for this operation phase lighting to result in a negative effect to European Sites is examined further in Table 5.3 below.

- Visual emissions: Certain qualifying species of European Sites can be sensitive to visual changes in the landscape and visual disturbance as a result of new structures. Species that are sensitive to such disturbance are wildfowl in the form of geese and swans. The proposed six turbines at the wind farm site will represent the only prominent structures in the landscape. The potential zone of sensitivity arising from turbines for geese and swans is 1km and 600m (as per McGuinness et al., 2015; Nature Scotland 2022). The potential for visual disturbance during the operation phase to result in a negative effect to European Sites is examined further in Table 5.3 below.

- Mobile Species Pathway: Development projects that are located outside of European Sites can also result in impacts to mobile qualifying species of European Sites in the event that such species rely on habitats occurring within the proposed development site. For the purposes of including such a scenario in the consideration of potential pathways this screening report refers to the reliance of mobile qualifying species of European Sites on the proposed development site as a "mobile species pathway". When considering the mobile species pathway the following publications were used to identify their presence within the zone of influence of the project:

  For bird species:

  - Scottish Natural Heritage (SNH, now Natural Scotland) guidance document "Assessing connectivity with Special Protection Areas (SPA) (2016) and McGuiness et al. (2015) for a range of waterbirds were used as the principal sources for establishing foraging range distances. Where no distances for certain species are reported in these two sources, the other sources listed below were used.

- The Bird Foraging Table (version 6th Jan. 2020), prepared for DAFM, Forestry Division, available at https://assets.gov.ie/96741/2601fdba-420a-45da-948a-ac2b5b0babe3.docx
- Thaxter et al. (2012) for gull species;
- Johnson et al (2014) for mallard and teal

were used to identify connectivity between the project site and SPAs in the wider surrounding area.

- Disturbance pathway: Human disturbance, ex-situ of a project site, to a European Sites is representative of an indirect impact arising as a result of land use activities generated by a project. An example of such an indirect impact is an increase in human presence and associated pressures within a European Sites. New developments in areas outside of, but proximate to European Sites, can result in an increase in the presence of people within European Sites, such as for recreational activities. However given the nature of the proposed development, which will not generate increased levels of human activity within surrounding European Sites this example of a human disturbance pathway will not arise.

  Human disturbance in the form of noise and visual emissions arising from activities (e.g. from construction activities) to qualifying species can also arise from areas outside of European Sites if activities are located within the disturbance zone of sensitivity for these species. The qualifying species of surrounding European Sites that could be sensitive to this are special conservation interest bird species and otters. The zone of sensitivity of special conservation interest bird species are set out in Table 5.1 below, while the zone of sensitivity of otters to human activities is dependent on the type of activity and ranges up to a maximum distance of 150m from the activity source (NRA, 2009). The potential for such a human disturbance pathway to effect these species is considered under the noise and visual pathways listed above.

In order to identify a list of European Sites in the wider area surrounding the proposed development site that require examination for pathway connectivity a variety of distance criteria were used to establish a preliminary list of European Sites to be considered.

With respect to SACs, the criteria that requires examination of SACs over the greatest distance is the surface water catchment criteria. As such all SACs occurring downstream within the within the Blackwater (Munster) and Colligan Mahon catchment areas have been included in the preliminary list of SACs to be considered. The location of these European Sites with respect to the proposed development is shown on Figure 5.1.

With respect to SPAs, the preliminary list of SPAs that require to be considered for pathway connectivity is based upon the species that have been identified as key ornithological receptors of the proposed development, as listed on Table 3.1 above. The key ornithological receptors that are special conservation interest bird species of SPAs are listed below in Table 5.1. It is noted that the BirdWatch Ireland Bird Sensitivity to Wind Energy Toolkit has identified the proposed wind farm site to overlap with an area of sensitivity for breeding common scoter and breeding common tern. However neither of these species were recorded during detailed baseline bird surveys completed at the wind farm site (see Chapter 7 of the Dyrick Hill Wind Farm EIAR) and have not been identified as ornithological receptors for the proposed development. As such these two species do not establish a mobile species pathway between the proposed development and SPAs in the surrounding area.

Table 5.1 also identifies the distance from the proposed development site over which each of special conservation interest bird species that have been identified as key ornithological receptors could range. The ranging distances identified in Table 5.1 are based on the referenced sources listed above for the mobile species pathway with respect to bird species. .

Table 5.1: Foraging Ranges for special conservation interest bird species recorded during baseline bird surveys

Special conservation interest bird species	Zone of Sensitivity (m) (McGuinness et al., 2015)	Within Zone of Sensitivity (Bird Sensitivity Tool)	SNH Foraging Range (km)	Other Publication Foraging Range (km)
Golden Plover	800	No	11	12^
Lapwing	800	No	11	12^
Merlin	NR	5	5	-
Grey heron	NR	No	NR	10.5*
Mallard	600	No	8	1†
Teal	600	No	8	3.13†

Peregrine	NR	No	2	-
Hen harrier	2000	2	2	-
Lesser-black backed gull	NR	No	NR	70*
Herring gull	NR	No	NR	10.5*
Colour Key				
	Species recorded in winter non-breeding season only			
	Species recorded in winter non-breeding season and summer breeding season			

*Thaxter et al. (2012) for seabirds;
^Gilling & Fuller (1999)
†Johnson et al. (2014)

The species listed in Table 5.1 above that are included as special conservation interest bird species of SPAs and whose foraging ranges overlap with the proposed development are identified in Table 5.2 above. The SPAs that include these species as special conservation interest bird species are also identified on Table 5.2 below. These SPAs comprise the Dungarvan Harbour SPA (for golden plover and lapwing) and the Ballycotton Bay SPA, Ballymacoda Bay SPA, Cork Harbour SPA and the Saltee Island SPA for lesser-black backed gull. These SPAs are located approximately 25km southwest; 35km southwest; 41km southwest; and 70km east respectively from the project. These five SPAs are included within the preliminary list of SPAs to be screened and are shown on Figure 5.2.

Table 5.2: SPAs to be Considered

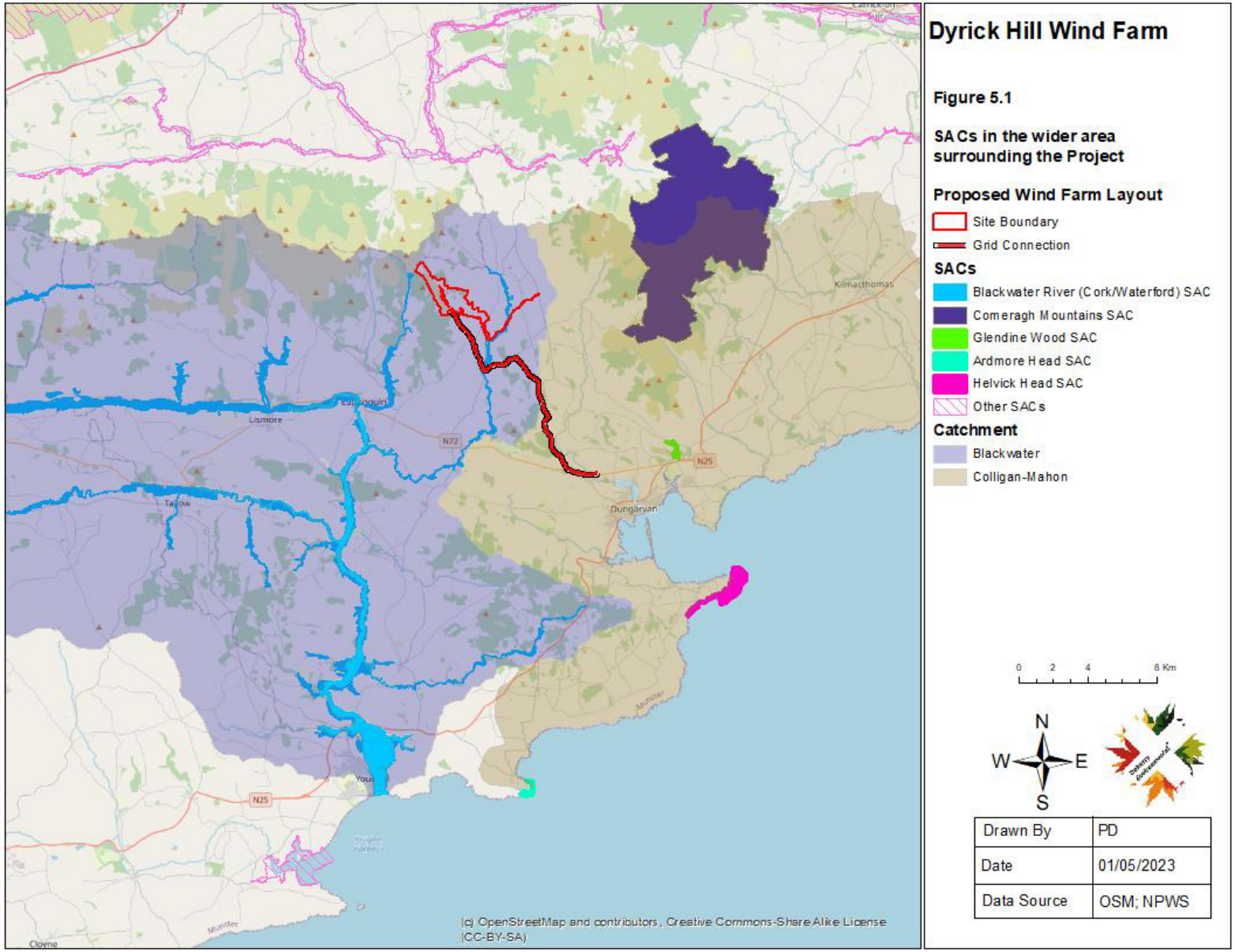
Special conservation interest bird species	Zone of influence (Km) (as per greatest distance set out in Table 5.1)	Proposed development element within zone of influence	SPAs
Golden Plover	12	Wind farm site; grid connection route; haul route	Dungarvan Harbour SPA
Lapwing	12	Wind farm site; grid connection route; haul route	Dungarvan Harbour SPA
Teal	3.13	Na	No SPAs within ZoI
Grey heron	10.5	Na	No SPAs within ZoI
Mallard	1	Na	No SPAs within ZoI
Herring gull	10.5	NA	No SPAs within ZoI
Lesser black-backed gull	70	Wind farm site; grid connection route; haul route	Ballymacoda Bay SPA; Ballycotton Bay SPA; Cork

			Harbour SPA; Saltee Islands SPA
Peregrine	2	NA	No SPAs within ZoI
Hen harrier	2	NA	No SPAs within ZoI
Merlin	5	NA	No SPAs within ZoI

5.3 EUROPEAN SITES IN THE ZONE OF INFLUENCE

Table 5.3 provides an evaluation as to whether the European Sites identified on Figure 5.1 and Figure 5.2 below occur within the proposed development's zone of influence by virtue of pathways that could establish a connection between them.

In line with Section 5.1 above all European Sites that occur within or adjoin the proposed development are automatically considered to occur within the zone of influence of the project. For those other European Sites listed on Table 5.3 and shown on Figure 5.1 and 5.2 the pathways set out in Section 5.2 above are used to examine whether or not these European Sites occur within the zone of influence of the project.


Dyrick Hill Wind Farm
Figure 5.1
SACs in the wider area surrounding the Project
Proposed Wind Farm Layout
Site Boundary
Grid Connection
SACs
Blackwater River (Cork/Waterford) SAC
Comeragh Mountains SAC
Glendine Wood SAC
Ardmore Head SAC
Helvick Head SAC
Other SACs
Catchment
Blackwater
Colligan-Mahon
0 2 4 8 Km
N
W
E
S
Drawn By PD
Date 01/05/2023
Data Source OSM; NPWS
(c) OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)
Lismore
Tallow
Dungarvan
Kilmacthomas
N25
N72

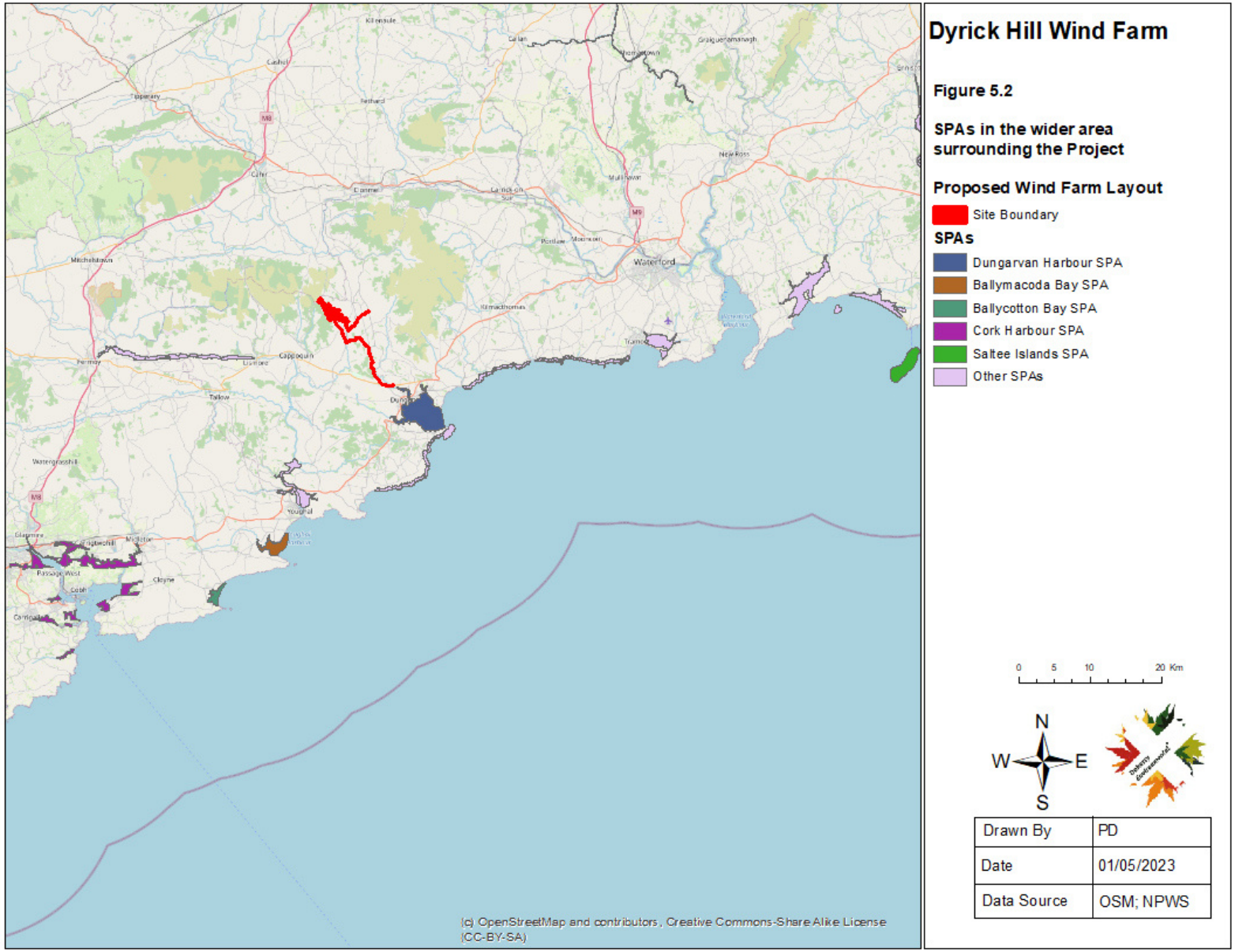

Dyrick Hill Wind Farm
Figure 5.2
SPAs in the wider area surrounding the Project
Proposed Wind Farm Layout
Site Boundary
SPAs
Dungarvan Harbour SPA
Ballymacoda Bay SPA
Ballycotton Bay SPA
Cork Harbour SPA
Saltee Islands SPA
Other SPAs
0 5 10 20 Km
N
W E
S
Drawn By PD
Date 01/05/2023
Data Source OSM; NPWS
(c) OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

Table 5.3: identification of European Sites within the Zone of Influence of the Proposed Development

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Blackwater River SAC (Site Code: 2170) Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]	200m to the west of the proposed wind farm site. Crossed by the grid connection route and the haul route.	The proposed development haul route and grid connection route intersect the boundary of this SAC. As such this SAC is considered to occur within the zone of influence of the project.	Yes.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] Austropotamobius pallipes (White-clawed Crayfish) [1092] Petromyzon marinus (Sea Lamprey) [1095] Lampetra planeri (Brook Lamprey) [1096] Lampetra fluviatilis (River Lamprey) [1099] Alosa fallax fallax (Twaite Shad) [1103] Salmo salar (Salmon) [1106] Lutra lutra (Otter) [1355]			

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Trichomanes speciosum (Killarney Fern) [1421]			
Comeragh Mountains SAC (Site Code: 1952) Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Northern Atlantic wet heaths with Erica tetralix [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110]	8km to the east of the proposed wind farm. 5km to the east of the haul route. 6km to the east of the grid connection route.	**Hydrological pathway** This SAC is located within a separate surface water sub-catchment to the proposed wind farm site and proposed haul route. The proposed grid connection route is located in the lower sections of the Colligan-Mahon catchment and there is no hydrological pathway connecting this element of the proposed development to this SAC. A s such there is no hydrological pathway connecting the project to this SAC. **Noise & vibration Pathway** This SAC is circa 5km from the nearest point of the proposed development site and lies outside the maximum distance (150m) of the zone of sensitivity of features of interest supported by this SAC. No noise emission pathway connects the proposed development to this SAC.	No.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Hamatocaulis vernicosus (Slender Green Feather-moss) [6216]		**Air Emission Pathway** This SAC is circa 5km from the nearest point of the proposed development site, which is beyond the distance of air emission risks. No air emission pathway connects the proposed development to this SAC. **Light Emission Pathway** This SAC does not support features of interest that are sensitive to light emissions. As such no light emission pathway connects the proposed development to this SAC. **Visual Emission Pathway** This SAC does not support features of interest that are sensitive to visual emissions. Given this and the distance to this SAC no visual emission pathway connects the proposed development to this SAC. **Mobile Species Pathway**	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		This SAC is designated for its role in supporting one sessile qualifying species which is not a mobile species and therefore there is no mobile species pathway connecting the project to this SAC. **Human Disturbance Pathway** This SAC is circa 5km from the nearest point of the proposed development site and given this distance and the nature of the proposed development, there will be no potential for it to result in changes to human activity within this SAC.	
Glendine Wood SAC (Site Code: 2324) Trichomanes speciosum (Killarney Fern) [1421]	12.5km southeast of the proposed wind farm. 4.5km east of the grid connection route and the existing Dungarvan substation. 150m north of the N25	**Hydrological pathway** There is no hydrological pathway between the proposed development and this SAC. **Noise & vibration Pathway**	Yes. A hydrological pathway and mobile species pathway have been identified as pathways

European Sites & Qualifying Features of Interest/Special Conservation Interests	Distance (Km)	Pathway Connection	Does European Site occur within the Projects Zone of Influence?
	section of the haul route.	This SAC does not support any qualifying features of interest that are sensitive to noise or vibration emissions. In addition there are no noise or vibration pathways connecting the project to this SAC. **Air Emission Pathway** This SAC is circa 12.5km from the nearest point of the proposed wind farm site, which is beyond the distance of air emission risks. No air emission pathway connects the proposed wind farm to this SAC. This SAC is located circa 4.5km from the nearest point of the proposed grid connection route, , which is beyond the distance of air emission risks. No air emission pathway connects the proposed grid connection route to this SAC. This SAC is located circa 150m from the nearest point of the proposed haul route. No works are proposed as part of the project along this section of the haul route. The nearest area of works along the haul route to this SAC is at the haul route widening location no. 1, circa 11.2km to the north. This location is beyond the distance of air emission risks. No air emission pathway connects the proposed wind farm to this SAC.	connecting this SAC to the proposed development.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		Light Emission Pathway This SAC does not support features of interest that are sensitive to light emissions. As such no light emission pathway connects the proposed development to this SAC. **Visual Emission Pathway** This SAC does not support features of interest that are sensitive to visual emissions. As such no visual emission pathway connects the proposed development to this SAC. **Mobile Species Pathway** This SAC is designated for its role in supporting one sessile qualifying species which is not a mobile species and therefore there is no mobile species pathway connecting the project to this SAC. **Human Disturbance Pathway**	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		This SAC is circa 12.5km from the nearest point of the proposed wind farm site and given the nature of the proposed development, there will be no potential for it to result in changes to human activity in the wider surrounding area and within this SAC.	
Ardmore Head SAC (Site Code: 2123) Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]	18km southeast of the proposed wind farm site. 9.5km southeast of the grid connection route. 7km south of the N25 section of the haul route.	**Hydrological pathway** There is no hydrological pathway between the proposed development and this SAC. **Noise & vibration Pathway** This SAC does not support any qualifying features of interest that are sensitive to noise or vibration emissions. In addition there are no noise or vibration pathways connecting the project to this SAC. **Air Emission Pathway** This SAC is circa 7km from the nearest point of the project, which is along the N25 section of the proposed haul route. No works are proposed along this section of the	No.

European Sites & Qualifying Features of Interest/Special Conservation Interests	Distance (Km)	Pathway Connection	Does European Site occur within the Projects Zone of Influence?
		proposed haul route. The nearest location of any proposed works to this SAC is along the proposed grid connection route terminus connection to the existing Dungarvan sub-station. This is located approximately 9.5km from this SAC, a distance that is outside the zone of influence of air emission risks. No air emission pathway connects the project to this SAC. **Light Emission Pathway** This SAC does not support features of interest that are sensitive to light emissions. As such no light emission pathway connects the proposed development to this SAC. **Visual Emission Pathway** This SAC does not support features of interest that are sensitive to visual emissions. As such no visual emission pathway connects the proposed development to this SAC. **Mobile Species Pathway**	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		There are no mobile qualifying species listed for this SAC and as such there is no mobile species pathway. **Human Disturbance Pathway** This SAC is circa 18km from the nearest point of the proposed wind farm site and given the nature of the proposed development, there will be no potential for it to result in changes to human activity in the wider surrounding area and within this SAC.	
Helvick Head SAC (Site Code: 665) Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]	20km southeast of the proposed wind farm site. 9.5km southeast of the grid connection route. 7km south of the N25	**Hydrological pathway** There is no hydrological pathway between the proposed development and this SAC. **Noise & vibration Pathway** This SAC does not support any qualifying features of interest that are sensitive to noise or vibration emissions. In addition there are no noise or vibration pathways connecting the project to this SAC.	No.

European Sites & Qualifying Features of Interest/Special Conservation Interests	Distance (Km)	Pathway Connection	Does European Site occur within the Projects Zone of Influence?
	section of the haul route.	**Air Emission Pathway** This SAC is circa 7km from the nearest point of the project, which is along the N25 section of the proposed haul route. No works are proposed along this section of the proposed haul route. The nearest location of any proposed works to this SAC is along the proposed grid connection route terminus connection to the existing Dungarvan sub-station. This is located approximately 9.5km from this SAC, a distance that is outside the zone of influence of air emission risks. No air emission pathway connects the project to this SAC. **Light Emission Pathway** This SAC does not support features of interest that are sensitive to light emissions. As such no light emission pathway connects the proposed development to this SAC. **Visual Emission Pathway**	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		This SAC does not support features of interest that are sensitive to visual emissions. As such no visual emission pathway connects the proposed development to this SAC. **Mobile Species Pathway** There are no mobile qualifying species listed for this SAC and as such there is no mobile species pathway. **Human Disturbance Pathway** This SAC is circa 18km from the nearest point of the proposed wind farm site and given the nature of the proposed development, there will be no potential for it to result in changes to human activity in the wider surrounding area and within this SAC.	
Dungarvan Harbour SPA (site Code: 4032) Great Crested Grebe (Podiceps cristatus) [A005]	11.5km to the southeast of the proposed wind farm site. 600m to the south of the grid	**Hydrological pathway** There is a hydrological pathway between the proposed grid connection route and this SPA. The proposed grid connection route crosses the Colligan River via the existing	Yes.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Light-bellied Brent Goose (Branta bernicla hrota) [A046] Shelduck (Tadorna tadorna) [A048] Red-breasted Merganser (Mergus serrator) [A069] Oystercatcher (Haematopus ostralegus) [A130] **Golden Plover (Pluvialis apricaria) [A140]** Grey Plover (Pluvialis squatarola) [A141] **Lapwing (Vanellus vanellus) [A142]** Knot (Calidris canutus) [A143] Dunlin (Calidris alpina) [A149] Black-tailed Godwit (Limosa limosa) [A156] Bar-tailed Godwit (Limosa lapponica) [A157] Curlew (Numenius arquata) [A160]	connection route. 500m to the south of the N25 section of the haul route. .	N25. The Colligan River drains to this SPA circa 1km downstream of the crossing point. **Noise & vibration Pathway** The proposed grid connection route is the nearest element of the project to this SPA and is located circa 1km to the northwest. It is located outside the zone of influence for noise and vibration emissions (as set out in Section 5.2 above) for the special conservation interest bird species of this SPAs. **Air Emission Pathway** This SPA is located outside the zone of influence for air emissions (as set out in Section 5.2 above) from all elements of the project and as such there is no potential for an air emission pathway to connect the haul route to this SPA. **Light Emission Pathway**	Hydrological pathway between proposed grid connection route and SPA. Light emission pathway between turbines and golden plover and lapwing population of the SPA. Mobile species pathway between wind farm site and SPA.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Redshank (Tringa totanus) [A162] Turnstone (Arenaria interpres) [A169] Wetland and Waterbirds [A999]		The zone of sensitivity for the populations of golden plover and lapwing supported by this SPA overlaps with the proposed wind farm site. Lighting will be provided on turbines at the proposed wind farm site. As such there is a potential light emission pathway connecting the proposed wind farm site to the golden plover and lapwing populations of this SPA. **Visual Emission Pathway** Visual emissions that will arise as a result of the project are restricted to the presence of the turbines at the proposed wind farm site. golden plover and lapwing are the only special conservation interest bird species of this SPA whose zone of sensitivity overlaps with the proposed wind farm site. These species is not sensitive to disturbance as a result of changes in the visual setting of the wider surrounding landscape. No visual pathway connects the proposed development to this SPA. **Mobile Species Pathway**	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		Golden plover and lapwing are the only special conservation interest bird species of this SPA for which a mobile species pathway occurs between the wind farm site and the SPA. The grid connection route and haul route are located within the zone of sensitivity of all special conservation interest bird species of this SPA, however the habitats occurring along these elements of the project are representative of existing road surface (buildings and artificial surfaces) that do not offer suitable habitat for and is not relied upon by special conservation interest bird species of the SPA. As such no mobile species pathway is triggered by these two elements of the project. **Human Disturbance Pathway** The proposed development will not result in changes in land use or human activity within or adjoining this SPA.	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Ballymacoda Bay SPA (Site Code: 4023) ***Special conservation interests (key ornithological receptors highlighted in bold)*** Wigeon (Anas penelope) [A050] Teal (Anas crecca) [A052] Ringed Plover (Charadrius hiaticula) [A137] Golden Plover (Pluvialis apricaria) [A140] Grey Plover (Pluvialis squatarola) [A141] Lapwing (Vanellus vanellus) [A142] Sanderling (Calidris alba) [A144] Dunlin (Calidris alpina) [A149] Black-tailed Godwit (Limosa limosa) [A156]	25km southwest	**Hydrological pathway** There is no hydrological pathway connecting the proposed development to this SPA. **Noise & vibration Pathway** This SPA is located beyond the noise emission zone of sensitivity. No noise emission pathway connects the proposed development to this SPA. **Air Emission Pathway** This SPA is located beyond the air emission zone of sensitivity. No air emission pathway connects the proposed development to this SPA. **Light Emission Pathway** The zone of sensitivity for the lesser-black backed gull populations of this SPA overlaps with the proposed wind farm site. Lighting will be provided on turbines at the	Yes. Light emission pathway from turbines Mobile species pathway between lesser-black backed gull and the proposed wind farm site.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Bar-tailed Godwit (Limosa lapponica) [A157] Curlew (Numenius arquata) [A160] Redshank (Tringa totanus) [A162] Turnstone (Arenaria interpres) [A169] Black-headed Gull (Chroicocephalus ridibundus) [A179] Common Gull (Larus canus) [A182] **Lesser Black-backed Gull (Larus fuscus) [A183]** Wetland and Waterbirds [A999]		proposed wind farm site. As such there is a potential light emission pathway connecting the proposed wind farm site to the lesser-black backed gull populations of this SPA. **Visual Emission Pathway** Visual emissions that will arise as a result of the project are restricted to the presence of the turbines at the proposed wind farm site. Lesser-black backed gull are not sensitive to disturbance as a result of changes in the visual setting of the wider surrounding landscape. No visual pathway connects the proposed development to this SPA. **Mobile Species Pathway** The zone of sensitivity for Lesser-black backed gull overlap with the proposed development and as such there is potential for a mobile species pathway between the proposed development and these special conservation interest bird species. **Human Disturbance Pathway**	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		The proposed development will not result in changes in land use or human activity within or adjoining this SPA.	
Ballycotton Bay SPA (Site Code: 4022) ***Special conservation interests (key ornithological receptors highlighted in bold)*** Teal (Anas crecca) [A052] Ringed Plover (Charadrius hiaticula) [A137] Golden Plover (Pluvialis apricaria) [A140] Grey Plover (Pluvialis squatarola) [A141] Lapwing (Vanellus vanellus) [A142] Black-tailed Godwit (Limosa limosa) [A156]	35km southwest	**Hydrological pathway** There is no hydrological pathway connecting the proposed development to this SPA. **Noise & vibration Pathway** This SPA is located beyond the noise emission zone of sensitivity. No noise emission pathway connects the proposed development to this SPA. **Air Emission Pathway** This SPA is located beyond the air emission zone of sensitivity. No air emission pathway connects the proposed development to this SPA. **Light Emission Pathway**	Yes. Light emission pathway from turbines Mobile species pathway between lesser-black backed gull and the proposed wind farm site.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Bar-tailed Godwit (Limosa lapponica) [A157] Curlew (Numenius arquata) [A160] Turnstone (Arenaria interpres) [A169] Common Gull (Larus canus) [A182] **Lesser Black-backed Gull (Larus fuscus) [A183]** Wetland and Waterbirds [A999]		The zone of sensitivity for the lesser-black backed gull populations of this SPA overlaps with the proposed wind farm site. Lighting will be provided on turbines at the proposed wind farm site. As such there is a potential light emission pathway connecting the proposed wind farm site to the lesser-black backed gull populations of this SPA. **Visual Emission Pathway** Visual emissions that will arise as a result of the project are restricted to the presence of the turbines at the proposed wind farm site. Lesser-black backed gull are not sensitive to disturbance as a result of changes in the visual setting of the wider surrounding landscape. No visual pathway connects the proposed development to this SPA. **Mobile Species Pathway** The zone of sensitivity for Lesser-black backed gull overlap with the proposed development and as such there is potential for a mobile species pathway between the proposed development and these special conservation interest bird species.	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		Human Disturbance Pathway The proposed development will not result in changes in land use or human activity within or adjoining this SPA.	
Cork Harbour SPA (Site Code: 4030) ***Special conservation interests (key ornithological receptors highlighted in bold)*** Little Grebe (Tachybaptus ruficollis) [A004] Great Crested Grebe (Podiceps cristatus) [A005] Cormorant (Phalacrocorax carbo) [A017] Grey Heron (Ardea cinerea) [A028] Shelduck (Tadorna tadorna) [A048] Wigeon (Anas penelope) [A050]	41km southwest	**Hydrological pathway** There is no hydrological pathway connecting the proposed development to this SPA. **Noise & vibration Pathway** This SPA is located beyond the noise emission zone of sensitivity. No noise emission pathway connects the proposed development to this SPA. **Air Emission Pathway** This SPA is located beyond the air emission zone of sensitivity. No air emission pathway connects the proposed development to this SPA.	Yes. Light emission pathway from turbines Mobile species pathway between lesser-black backed gull and the proposed wind farm site.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Teal (Anas crecca) [A052] Pintail (Anas acuta) [A054] Shoveler (Anas clypeata) [A056] Red-breasted Merganser (Mergus serrator) [A069] Oystercatcher (Haematopus ostralegus) [A130] Golden Plover (Pluvialis apricaria) [A140] Grey Plover (Pluvialis squatarola) [A141] Lapwing (Vanellus vanellus) [A142] Dunlin (Calidris alpina) [A149] Black-tailed Godwit (Limosa limosa) [A156] Bar-tailed Godwit (Limosa lapponica) [A157] Curlew (Numenius arquata) [A160] Redshank (Tringa totanus) [A162]		**Light Emission Pathway** The zone of sensitivity for the lesser-black backed gull populations of this SPA overlaps with the proposed wind farm site. Lighting will be provided on turbines at the proposed wind farm site. As such there is a potential light emission pathway connecting the proposed wind farm site to the lesser-black backed gull populations of this SPA. **Visual Emission Pathway** Visual emissions that will arise as a result of the project are restricted to the presence of the turbines at the proposed wind farm site. Lesser-black backed gull are not sensitive to disturbance as a result of changes in the visual setting of the wider surrounding landscape. No visual pathway connects the proposed development to this SPA. **Mobile Species Pathway**	

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
Black-headed Gull (Chroicocephalus ridibundus) [A179] Common Gull (Larus canus) [A182] **Lesser Black-backed Gull (Larus fuscus) [A183]** Common Tern (Sterna hirundo) [A193] Wetland and Waterbirds [A999]		The zone of sensitivity for Lesser-black backed gull overlap with the proposed development and as such there is potential for a mobile species pathway between the proposed development and these special conservation interest bird species. **Human Disturbance Pathway** The proposed development will not result in changes in land use or human activity within or adjoining this SPA.	
Saltee Islands SPA (Site Code: 004002) Fulmar (Fulmarus glacialis) [A009] Gannet (Morus bassanus) [A016] Cormorant (Phalacrocorax carbo) [A017] Shag (Phalacrocorax aristotelis) [A018]	70km east	**Hydrological pathway** There is no hydrological pathway connecting the proposed development to this SPA. **Noise & vibration Pathway** This SPA is located beyond the noise emission zone of sensitivity. No noise emission pathway connects the proposed development to this SPA.	Yes. Light emission pathway from turbines Mobile species pathway between lesser-black

European Sites & Qualifying Features of Interest/Special Conservation Interests	Distance (Km)	Pathway Connection	Does European Site occur within the Projects Zone of Influence?
Lesser Black-backed Gull (Larus fuscus) [A183] Herring Gull (Larus argentatus) [A184] Kittiwake (Rissa tridactyla) [A188] Guillemot (Uria aalge) [A199] Razorbill (Alca torda) [A200] Puffin (Fratercula arctica) [A204]		**Air Emission Pathway** This SPA is located beyond the air emission zone of sensitivity. No air emission pathway connects the proposed development to this SPA. **Light Emission Pathway** The zone of sensitivity for the lesser-black backed gull populations of this SPA overlaps with the proposed wind farm site. Lighting will be provided on turbines at the proposed wind farm site. As such there is a potential light emission pathway connecting the proposed wind farm site to the lesser-black backed gull populations of this SPA. **Visual Emission Pathway** Visual emissions that will arise as a result of the project are restricted to the presence of the turbines at the proposed wind farm site. Lesser-black backed gull are not sensitive to disturbance as a result of changes in the visual setting of the wider	backed gull and the proposed wind farm site.

European Sites & Qualifying Features of Interest/Special Conservation Interests	**Distance (Km)**	**Pathway Connection**	**Does European Site occur within the Projects Zone of Influence?**
		surrounding landscape. No visual pathway connects the proposed development to this SPA. **Mobile Species Pathway** The zone of sensitivity for Lesser-black backed gull overlap with the proposed development and as such there is potential for a mobile species pathway between the proposed development and these special conservation interest bird species. **Human Disturbance Pathway** The proposed development will not result in changes in land use or human activity within or adjoining this SPA.	

In summary the following European Sites listed in Table 5.3 above have been identified as occurring within the zone of influence of the proposed development:

Blackwater River SAC;

Dungarvan Harbour SPA

Ballymacoda Bay SPA

Ballycotton Bay SPA

Cork Harbour SPA; and

Saltee Islands SPA

Specific special conservation interest bird species of the above five listed SPAs that occur within the zone of influence and the specific project elements that have been identified as establishing a connection to these SPAs have been identified in Table 5.2 above. However, whilst the above listed Blackwater River SAC has been identified as occurring within the zone of influence of the proposed development, the elements of the proposed development and the features of interest that are connected to these elements have not been identified in the preceding examination. As such the following sub-section examines which features of interest of Blackwater River SAC that are connected to the proposed development and by what element of the proposed development a pathway is established.

5.4 IDENTIFICATION OF BLACKWATER RIVER SAC FEATURES OF INTEREST IN THE ZONE OF INFLUENCE OF THE PROPOSED DEVELOPMENT

The qualifying features of interest of the Connemara Bog Complex SAC are listed in Table 5.4 and an examination of potential pathways between the features of interest and the elements of the proposed development is also provided.

Table 5.4: Identification of qualifying features of interest of the Connemara Bog Complex SAC within the zone of influence of the proposed development

Features of Interest	Pathway
Estuaries [1130]	Outside the zone of influence – this is a coastal habitat and the nearest example of this habitat is located at significant distance downstream. Given the separation distance between the project site and this qualifying habitat and the tidal and marine coastal processes that influence this habitat it is not located within the zone of influence of the project.
Mudflats and sandflats not covered by seawater at low tide [1140]	Outside the zone of influence – this is a coastal habitat and the nearest example of this habitat is located at significant distance downstream. Given the separation distance between the project site and this qualifying habitat and the tidal and marine coastal processes that influence this habitat it is not located within the zone of influence of the project.
Perennial vegetation of stony banks [1220]	Outside the zone of influence – this is a coastal habitat and the nearest example of this habitat is located at significant distance downstream. Given the separation distance between the project site and this qualifying habitat and the tidal and marine coastal processes that influence this habitat it is not located within the zone of influence of the project.
Salicornia and other annuals colonising mud and sand [1310]	Outside the zone of influence – this is a coastal habitat and the nearest example of this habitat is located at significant distance downstream. Given the separation distance between the project site and this qualifying habitat and the tidal and marine coastal processes that influence this habitat it is not located within the zone of influence of the project.
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Outside the zone of influence – this is a coastal habitat and the nearest example of this habitat is located at significant distance downstream. Given the separation distance between the project site and this qualifying habitat and the tidal and marine coastal processes that influence this habitat it is not located within the zone of influence of the project.
Mediterranean salt meadows (Juncetalia maritimi) [1410]	Outside the zone of influence – this is a coastal habitat and the nearest example of this habitat is located at significant distance downstream. Given the separation distance between the project site and this qualifying habitat and the tidal and marine coastal processes that influence this habitat it is not located within the zone of influence of the project.
Floating River Vegetation [3260]	Inside the zone of influence – this is a freshwater instream habitat whose extent along the River Blackwater has not been mapped. It is assumed to occur downstream of the project site along the River Blackwater.

Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	Outside the zone of influence – the nearest example of this habitat to the project site is located to the south of the River Blackwater approximately 25km downstream from the project site. This is a terrestrial habitat that is not reliant on freshwater processes and influenced by hydrological pathways.
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	Outside the zone of influence – the nearest example of this habitat to the project site is located to the east of the River Blackwater approximately 35km downstream from the project site. this woodland habitat is situated on a river cliff face and is not influenced by freshwater processes relating to freshwater water quality. It is also noted that this example of alluvial woodland is located within the tidal stretch of the River Blackwater.
Margaritifera margaritifera (Freshwater Pearl Mussel) [1029]	Outside the zone of influence - No element of the project is located within a freshwater pearl mussel sensitive catchment and no element of the project overlaps with or occurs downstream of the freshwater pearl mussel catchment and target distribution area of this SAC.
Austropotamobius pallipes (White-clawed Crayfish) [1092]	Inside the zone of influence - White-clawed crayfish are known to occur along the Finisk River at and downstream of the project site.
Petromyzon marinus (Sea Lamprey) [1095]	Inside the zone of influence - This species is known to occur along the Finisk River at and downstream of the project site.
Lampetra planeri (Brook Lamprey) [1096]	Inside the zone of influence - This species is known to occur along the Finisk River at and downstream of the project site.
Lampetra fluviatilis (River Lamprey) [1099]	Inside the zone of influence - This species is known to occur along the Finisk River at and downstream of the project site.
Alosa fallax fallax (Twaite Shad) [1103]	Outside – This species is restricted to the coastal and tidal stretches of the River Blackwater and is not reliant on the freshwater sections of the SAC. As such it is deemed to be located outside the zone of influence of the project.
Salmo salar (Salmon) [1106]	Inside the zone of influence - This species is known to occur along the Finisk River at and downstream of the project site.
Lutra lutra (Otter) [1355]	Inside the zone of influence - This species is known to occur along the Finisk River at and downstream of the project site.
Trichomanes speciosum (Killarney Fern) [1421]	Outside the zone of influence - There are no pathways connecting the project site to habitats that support stands of this species.

5.5 SUMMARY OF FEATURES OF INTEREST OF EUROPEAN SITES OCCURRING WITHIN THE ZONE OF INFLUENCE OF THE PROJECT

Following on from the examination set out in Section 5.3 and Section 5.4 above, Table 5.5 below provides a summary of the European Sites and their relevant features of interest that occur within the zone of influence of the proposed development. Also listed in Table 5.5 are the specific elements of the proposed development and the related pathways that trigger the inclusion of these European Sites and relevant features of interest within the zone of influence of the proposed development.

Table 5.5: Summary of European Sites & Features of interest within the zone of influence & the elements and pathways connecting the proposed development

European Sites	Features of interest	Element of the proposed development	Pathway
		SACs	
Blackwater River SAC	Floating River Vegetation [3260]	Proposed wind farm; proposed grid connection route; proposed haul route widening locations	hydrological pathway
	Austropotamobius pallipes (White-clawed Crayfish) [1092]	Proposed wind farm; proposed grid connection route; proposed haul route widening locations	hydrological pathway
	Petromyzon marinus (Sea Lamprey) [1095]	Proposed wind farm; proposed grid connection route; proposed haul route widening locations	hydrological pathway
	Lampetra planeri (Brook Lamprey) [1096]	Proposed wind farm; proposed grid connection route; proposed haul route widening locations	hydrological pathway
	Lampetra fluviatilis (River Lamprey) [1099]	Proposed wind farm; proposed grid connection route; proposed haul route widening locations	hydrological pathway
	Salmo salar (Salmon) [1106]	Proposed wind farm; proposed grid connection route; proposed haul route widening locations	hydrological pathway
	Lutra lutra (Otter) [1355]	Proposed wind farm; proposed grid connection route; proposed haul route widening locations	hydrological pathway noise pathway visual pathway

Dungarvan Harbour SPA	Golden plover	Proposed wind farm	Light pathway Mobile species pathway
	Lapwing	Proposed wind farm	Light pathway
	All special conservation interest bird species	Proposed grid connection route	Hydrological pathway
	Wetland habitats	Proposed grid connection route	Hydrological pathway
Ballymacoda Bay SPA	Lesser-black backed gull	Proposed wind farm	Mobile species pathway
Ballycotton Bay SPA	Lesser-black backed gull	Proposed wind farm	Light pathway
Cork Harbour SPA	Lesser-black backed gull	Proposed wind farm	Mobile species pathway
Saltee Island SPA	Lesser-black backed gull	Proposed wind farm	Light pathway

6.0 IDENTIFICATION OF LIKELY SIGNIFICANT EFFECTS

An examination of the likely significant effects to European Sites and relevant features of interest that could arise as a result of the elements of the proposed development and the pathways summarised in Table 5.5 above is set out in the following subsections. This examination is provided with respect to each of the pathways identified in Table 5.5.

6.1 HYDROLOGICAL PATHWAY

A number of elements of the proposed development will be connected to a variety of features of interest of surrounding SACs and SPA as a result of a hydrological pathway. The features of interest of surrounding European Sites that will be connected to the proposed development as a result of a hydrological pathway are:

3260 Floating River Vegetation;

Wetland habitats of the Dungarvan Harbour SPA;

Annex 2 freshwater species in the form of Atlantic salmon, sea lamprey and brook lamprey; otters, white-clawed crayfish; and

Annex 1 bird species of the Dungarvan Harbour SPA.

All three elements of the project, comprising the proposed wind farm site, , the proposed grid connection route and the proposed haul route are connected to one or more of these features of interest. In the absence of appropriate safeguards works associated with these elements of the proposed development will have the potential to generate contaminated surface water runoff. The discharge of contaminants from the proposed development along hydrological pathways to these receptors has the potential to result in negative effects to their status and undermine their conservation objectives.

Given the potential for such a risk to arise further examination of the proposed development and the impacts that could arise as a result of the release of contaminated surface water runoff along hydrological pathways is required as part of a Natura Impact Statement for the proposed development.

Given the potential for such a risk to arise further examination of the proposed development and the impacts that could arise as a result of the release of contaminated surface water runoff along hydrological pathways is required as part of an Natura Impact Statement of the proposed development.

6.2 MOBILE SPECIES PATHWAY

A mobile species pathway has been identified between the proposed wind farm site and the following special conservation interest bird species: golden plover; lapwing; and lesser-black backed gull. This pathway has been identified as each of these species have been identified as key ornithological receptors of the proposed wind farm site following detailed bird surveys (see EIAR, Chapter 7). Given the potential for interactions between the proposed development and these species the potential for associated impacts such as disturbance, displacement and collision cannot be ruled out at the screening stage. Further examination of these potential impacts will be required as part of an Natura Impact Statement of the proposed development.

6.3 IN-COMBINATION EFFECTS

In the event that the proposed development overlaps within other projects and land use activities that give rise to similar impacts to the features of interest occurring within the zone of influence of the project the potential will exist for cumulative negative impacts to these receptors. In light of this an examination of the proposed developments potential to combine with other projects and land use activities in the surrounding area will be required to determine whether or not these species are at risk of adverse effects. This examination will be required to form part of the Natura Impact Statement of the proposed development.

7.0 SCREENING CONCLUSION

The project has been screened for its potential to result in likely significant effects to surrounding European Sites. A Source-Pathway-Receiver model was used to identify potential impact pathways linking the project site to European Sites.

A total of 6 European Sites comprising 1 SAC and 5 SPAs have been identified as occurring within the zone of influence of the project. Certain features of interest associated with these European Site have been identified as being at risk of adverse effects from a number of potential pathways that connect the project to them. These pathways include: hydrological; light and mobile species pathways.

The potential for the proposed development to result in adverse effects to these European Sites and associated features of interest cannot be ruled out at the screening stage.

The potential for the proposed development to result in adverse effects to these European Sites and associated features of interest cannot be ruled out at the screening stage.

For the reasons outlined above it is the considered view of the authors of this Screening Report for Appropriate Assessment that the potential for likely significant effects to the following eight European Sites:

Blackwater River SAC

Dungarvan Harbour SPA

Ballymacoda Bay SPA

Ballycotton Bay SPA

Cork Harbour SPA

Saltee Island SPA

cannot be ruled out at the Screening stage and that an Appropriate Assessment of the project is required. The authors have also concluded that it can be excluded, on the basis of objective information and in view of best scientific knowledge , that the proposed development, individually or in combination with other plans or projects, will have a significant effect on any other European Site. Based on this conclusion a NIS has been prepared to inform the competent authority, in this case Waterford County Council, during its Appropriate Assessment of the project and its potential to result in adverse effects to the integrity of the above listed European Sites, alone or in-combination with other plans or projects.

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Natura Impact Statement

Dyrick Hill Wind Farm

DEC Ltd.

May 2023

Dyrick Hill Wind Farm

Co. Waterford

Natura Impact Statement

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

TABLE OF CONTENTS

1 INTRODUCTION

Doherty Environmental Consultants Ltd. has been commissioned by Dyrick Hill Windfarm Ltd. to undertake a Natura Impact Statement to inform an Appropriate Assessment (AA), to be undertaken by the competent authority under Article 6(3) of the EU Habitats Directive, Council Directive 92/43/EEC, as transposed into national legislation by *inter alia* Part XAB of the Planning and Development Act 2000 as amended (the "Planning and Development Act"), of a project comprising:

- 12 turbine wind farm at Dyrick Hill, Co. Waterford;
- grid connection route between the proposed wind farm site and the existing ESB substation at Dungarvan, Co. Waterford,
- a haul route from Belview Port to the proposed development site via the N29, N25, N722 and R671. Widening of the existing haul route will be required at three no. locations.

Figure 1.1 shows the location of the proposed wind farm site; the location of the proposed grid connection route and the three no. haul route widening locations along the proposed haul route. **Figure 1.2** shows the proposed wind farm layout.

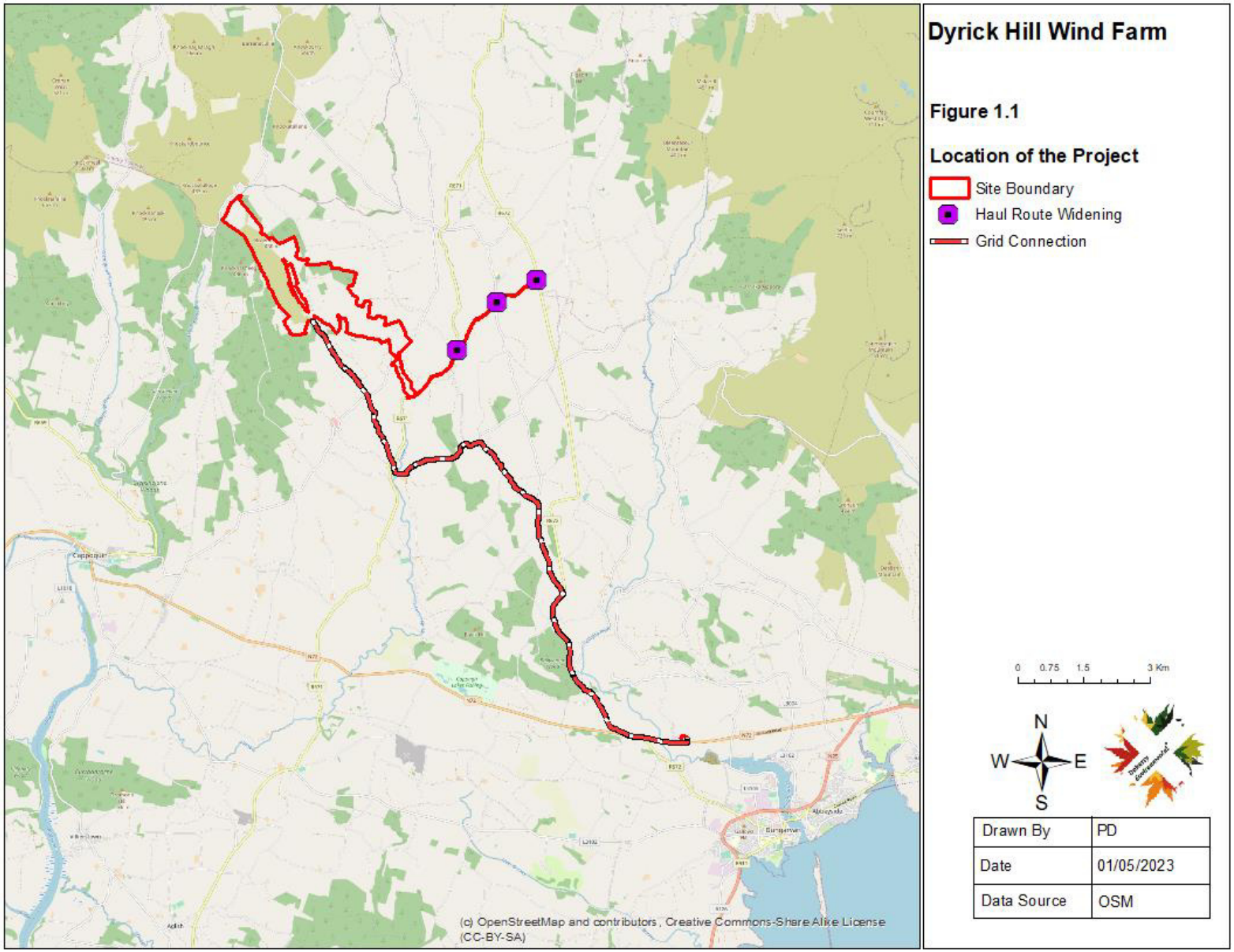
In accordance with Article 6(3) of the Habitats Directive, as transposed into Irish law by *inter alia* Part XAB of the Planning and Development Act, a screening exercise for Appropriate Assessment (AA) has been completed to assess whether it could or could not be excluded, on the basis of objective information, that the project, either individually or in combination with other plans or projects, was likely to have a significant effect on any European Sites. The screening exercise for Appropriate Assessment was completed by DEC Ltd. on behalf of Dyrick Hill Wind Farm Ltd and concluded, on the basis of objective information, that, in the absence of appropriate mitigation, it

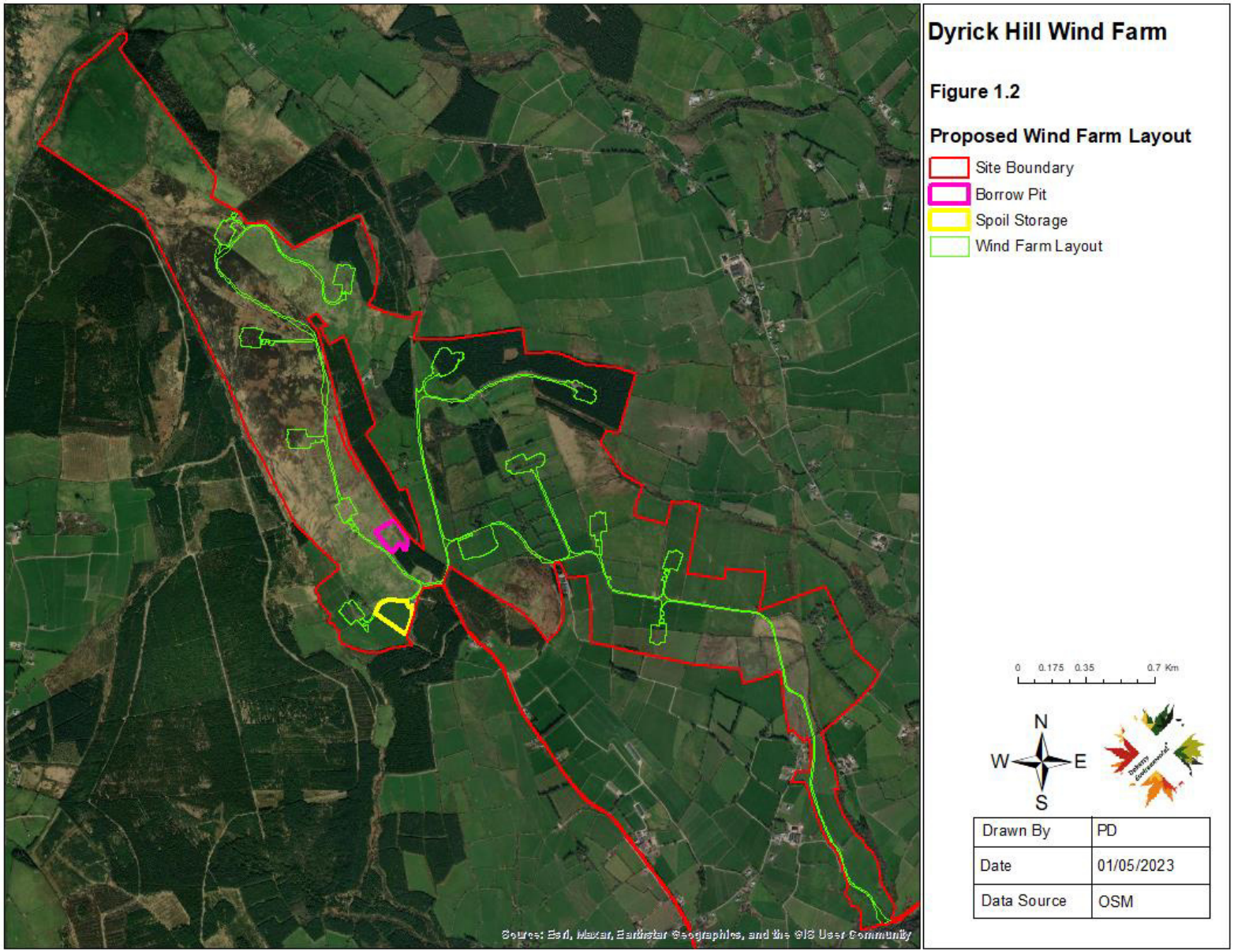
could not be excluded at the screening stage that the project, individually or in combination with other plans or projects, will have a significant effect on six European sites. These sites are:

- Blackwater River SAC
- Dungarvan Harbour SPA
- Ballymacoda Bay SPA
- Ballycotton Bay SPA
- Cork Harbour SPA
- Saltee Island SPA

The screening exercise was informed by a highly precautionary approach. Such an approach was adopted to ensure consistency with the extremely low threshold for triggering likely significant effects as determined in both European and Irish case law. On the basis of that conclusion, it has been determined that AA is required in order to assess the implications of the project for the above listed six European Sites. In accordance with Section 177T of the Planning and Development Act, a NIS of the project has been prepared in order to assist the competent authority, in this case Waterford County Council, in carrying out its Appropriate Assessment. This NIS provides an examination, analysis and evaluation of the likely impacts from the Project, both individually and in combination with other plans and projects, in view of best scientific knowledge and the conservation objectives of the European Sites concerned.

It also prescribes appropriate mitigation to ensure that the Project will not adversely affect the integrity of those sites identified as being at risk of adverse effects. Finally, it provides complete, precise and definitive findings, which are capable of removing all reasonable


Dyrick Hill Wind Farm
Figure 1.1
Location of the Project
Site Boundary
Haul Route Widening
Grid Connection
0 0.75 1.5 3 Km
N
W
E
S
Drawn By PD
Date 01/05/2023
Data Source OSM
(c) OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)


Dyrick Hill Wind Farm
Figure 1.2
Proposed Wind Farm Layout
Site Boundary
Borrow Pit
Spoil Storage
Wind Farm Layout
0 0.175 0.35 0.7 Km
N
W
E
S
Drawn By PD
Date 01/05/2023
Data Source OSM
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

scientific doubt as to the absence of adverse effects on the integrity of the European sites concerned.

1.1 STATEMENT OF AUTHORITY

This Natura Impact Statement has been prepared by Mr. Pat Doherty BSc., MSc, MCIEEM, of DEC Ltd. Mr. Doherty is a consultant ecologist with over 20 years' experience in completing ecological impact assessments and environmental impact assessments. Pat has been involved in the completion of assessment reports for proposed developments and land use activities under the EIA Directive and Article 6 of the Habitats Directive since 2003 and 2006 respectively. He has extensive experience completing such reporting for projects located in a variety of environments and has a thorough understanding of the biodiversity issues that may arise from proposed land use activities. Pat was responsible for completing one of the first Appropriate Assessment reports for large scale infrastructure developments in Ireland when he prepared the Appropriate Assessment for the N25 New Ross Bypass in 2006/07. Since then, Pat has completed multiple examinations of both plans and projects in Ireland. He has completed Natura Impact Statements for national scale plans such as Ireland's CAP Strategic Plan and National Seafood Development Plan and regional and county scale plans including County Development Plans, Local Area Plans, Tourism Strategies and Climate Action Plans. Pat has completed multiple Natura Impact Statements for a range of development types that include large scale infrastructure developments in sectors such as transport and energy as well as industrial, commercial and residential developments.

Pat has completed focused certified professional development training in Appropriate Assessment as well as in a range of ecological survey techniques and assessment processes. Training has been completed for National Vegetation Classification (NVC) and Irish Vegetation Classification (IVC) surveying, bryophyte survey for habitat assessment and identification, professional bat survey and assessment training, mammal surveying and specific training for bird and bat survey techniques. Ongoing training has been completed by approved training providers such as CIEEM, British Trust for Ornithology, the Botanic Gardens and the Field Studies Council.

2 METHODOLOGY

2.1 GUIDANCE

This NIS has been undertaken in accordance with National and European guidance documents: Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (DEHLG 2010) and *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats directive 92/43/EEC.* The following guidance documents were also adhered to during the preparation of this NIS:

- A guide for competent authorities. Environment and Heritage Service, Sept 2002. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2010). DEHLG.

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats Directive 92/42/EED. European Commission (2021).

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

The information provided in this NIS is also guided by European and Irish case law guiding the approach to Stage 2 Appropriate Assessment. It is noted that the consideration of impacts provided in Section 6 this NIS has been undertaken in the absence of any regard to construction phase best practice measures and operation phase design measures that aim to safeguard the receiving environment and European Sites from potential adverse impacts.

2.1.1 Background to Habitats Directive Article 6 Assessments

The EC (2021) guidelines outline the stages involved in undertaking an assessment of a project under Article 6(3) and 6(4) of the Habitats Directive. The assessment process comprises the three stages outlined below. This NIS presents the findings of an examination, analysis and evaluation of the project to inform a Stage 2 Appropriate Assessment of the project.

- Stage 1 – Screening: This stage defines the proposed project, establishes whether the proposed project is necessary for the conservation management of the European Site and assesses the likelihood of the project to have a significant effect, alone or in combination with other plans or projects, upon a European Site.

- Stage 2 – Appropriate Assessment: If a plan or project is likely to have a significant affect an Appropriate Assessment must be undertaken. Case law has established that such an Appropriate Assessment, to be lawfully conducted, in summary:

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

  (ii) must 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 development 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 the identified potential 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 and, if necessary, stage four.

- Stage 3 – This stage of the process is governed by Article 6(4) and arises where adverse effects on the integrity of a European site cannot be excluded and where the developer considers that the plan or project is necessary for imperative reasons of overriding public interest. This is only possible if there are no alternative solutions, the imperative reasons of overriding public interest are duly justified, and if suitable compensatory measures are adopted to ensure that the overall coherence of the European Sites is protected.

2.1.2 Stage 2: Appropriate Assessment

The EC Guidance Assessment Criteria for a Stage Two Appropriate Assessment provides the following steps:

1. the collection of information on the project and on the European Sites concerned;
2. An assessment of the implications of the project in view of the site's conservation objectives, individually or in combination with other plans or projects;
3. An evaluation as to whether the project can have adverse effects on the integrity of European Sites;
4. The consideration of mitigation measures (including their monitoring).

This NIS addresses each of these items, through the following sections provided below.

2.2 SCIENTIFIC INVESTIGATIONS

A range of scientific site investigations have been completed for the project and these are relied upon in this Natura Impact Statement. The investigations include ecological field surveys, hydrological field surveys and geotechnical field surveys.

Desk-based investigations were completed to identify pathways connecting the proposed project to European Sites. Datasets used to assist with the desk-based investigations include:

- NPWS European Sites and site-specific conservation objectives datasets;
- EPA Rivers and Lakes dataset;
- EPA surface water catchment and sub-catchment datasets;
- NPWS Article 17 Habitats and Species Reports datasets;
- OSI Geohive and OSI Historic townlands online mapping portal;

- National Biodiversity Data Centre (NBDC) online mapping portal; and
- NPWS Protected Species Dataset for the proposed development site and surrounding area.

The ecological field surveys that have been completed and that have informed this Natura Impact Statement include:

- Habitats and vegetation surveys and mapping as well as the recording of the presence of fauna at the proposed development site completed on the 24th & 25th June 2020; 9th & 10th September 2021; 9th September 2022; 15th February 2023; and 27th April 2023.
- Ornithological surveys which included non-breeding season and bird species vantage point surveys, transect surveys and hinterland surveys completed over a 2.5 year period between summer 2020 and winter 2021/2022.
- Bat surveys over spring, summer and autumn 2020, 2021 and 2022.
- Aquatic surveys including habitat assessment, fish habitat suitability assessment surveys, biological water quality surveys and physio-chemical water sampling.
- Detailed hydrological and geotechnical surveys were also completed at the proposed development between 2021 and 2022.

The methods used during the completion of these site investigations are described in full in Chapter 6, 7, 8 & 9 of the Dyrick Hill Wind Farm EIAR (Jennings O'Donovan, 2023).

3 PROJECT DESCRIPTION

3.1 PROJECT OVERVIEW

The Project will comprise of the following main components:

- Erection of 12 no. 6.0-7.2 MW wind turbines (Note* this is the current output available for turbines of this size. It is possible that with improvements in technology, the

- output may increase at the time of construction.) with an overall ground tip height of 185m. The candidate wind turbines will have a 162m rotor diameter and a hub
- height of 104m.
- Construction of Crane Hardstand areas and Turbine Foundations.
- Construction of new internal site access tracks and upgrade of existing site roads, to include passing bays and all associated drainage.
- Construction of a new wind farm site entrance with access onto the R671 regional road in the townlands of Lickoran.
- Improvement of existing site entrances with access onto local roads in the townlands of Broemountain.
- Improvements and temporary modifications to existing public road infrastructure to facilitate delivery of abnormal loads and turbine delivery.
- Construction of one temporary construction compound with associated temporary site offices, parking area and security fencing.
- Development of on-site borrow pit.
- Installation of one Permanent Meteorological Mast with an overall height of 104m.
- Development of a site drainage network.
- Construction of one permanent 110 kV Substation.
- All associated wind farm internal cabling connecting the wind turbines to the wind farm substation.
- All works associated with the connection of the wind farm to the national electricity grid, which will be via 110 kV underground cable connection approximately 16km in

- length to the existing Dungarvan 110 kV Substation.
- Upgrade works on the turbine delivery route from Waterford Port.
- Ancillary forestry felling to facilitate construction and operation of the Development.
- This application is seeking a fifteen-year permission and a 40-year operational period from the date of overall commissioning of the entire wind farm.

3.2 WIND TURBINE GENERATOR

The proposed turbines will be of typical modern design and will be a three-bladed, rotor up wind of the tower, variable speed, pitched blade regulated machine. Turbine appearance will be a matt non-reflective finish in a white, off-white or grey colour. The foundation-to-tip height will be 185m.

The turbine will have a circular based tower, sitting on a reinforced concrete foundation. The tower will support the nacelle, rotor hub, and rotor blades. Commercial wind turbine towers are typically made of steel or a hybrid of steel and concrete. The nacelle is mainly metal (steel, copper, aluminium, etc.) with a metal/plastic/glass-reinforced plastic (GRP) body, while the blades can be made of a matrix of glass-fibre reinforced polyester or wood-epoxy or similar composite materials.

Each turbine will have an installed generator with a maximum capacity of 6.0- 7.2 MW. The turbines proposed contain a (two planetary stages) gearbox. The final turbine will be chosen in a competitive tendering process as part of the Project financing process, after all necessary consents have been secured.

The final choice of turbine model is anticipated to be Vesta V162 IEC S.

For the purposes of the assessments, the dimensions of the candidate turbine is presented in **Table 3.1**. These are the proposed dimensions of the turbines for which planning permission is being sought.

Table 3.1: Turbine Parameters

Turbine Parameter	Assessment Envelope
Turbine Blade Tip Height	185m
Rotor Diameter	162m
Hub Height	104m

3.3 TURBINE FOUNDATION AND TURBINE HARDSTANDS

All turbine suppliers have a requirement for a turbine hardstand area to be constructed beside each turbine. The general layout of the turbine hardstand is designed to accommodate the delivery, laydown, and assembly of turbine components (in particular rotor assembly) prior to turbine lifting and assembly and is shown in Figure 2.4. The turbine hardstands are needed to support the cranes during turbine construction, the operational and maintenance phase, and for decommissioning. The turbine hardstands will be constructed first and used to facilitate turbine foundation construction, such as steel reinforcement delivery and pouring of concrete.

Construction of the turbine and hardstands will require the excavation of overburden material to the noted area and depth, the laying of a geotextile material on the formation surface and placing of engineered stone and a top dressing. The main turbine hardstands will be 3,395m2 in area and will be 2.25 m in depth, depending on the local bedrock profile and the varying soil depth. In total, this represents a surface area of 40,740m2 for 12 turbines and a material displacement volume requirement of approximately 12,222m³.

The Turbine Foundations will be 25.5m in diameter and have a depth of approximately 2.5m. The central part of the foundation (plinth) as seen on Drawing No. 6497-PL-702 will be 6m in diameter and will be raised from the main Turbine Foundation below ground level. It will encompass a cast-

in insert or bolts to connect to the bottom of the turbine tower and reinforced bar structural elements.

The volume of concrete and steel required for each turbine foundation will be 814m³ and 90 tonnes respectively. The area around and above the turbine foundation will be backfilled with compacted granular material and the only portion exposed in the long term will be the central foundation section.

Depending on the results of detailed site investigations (post consent), the possibility of installing rock anchors will be explored as a means of reducing the footprint and material volumes of the turbine foundations. The application of traditional gravity emplacement foundation design has been considered for EIA purposes. This represents a worst-case scenario, but it should be noted that the predicted environmental effects could be reduced where rock anchor foundations could be used for some of the turbine foundations.

Based on the results of peat probing and geotechnical assessments to date, mineral soil is not deep enough to require the piling of turbine hardstands. Therefore, the construction method for all of the turbine hardstands will be via an excavated soil overburden approach.

The construction methodology for each of the turbine foundations will depend on the strength and depth of the substrata specific to each location. Turbine foundations will need to be taken down to competent bearing strata by excavating through the subsoil, and rock where necessary.

A typical method of construction for turbine foundation is described as follows:

- Install temporary drainage around the perimeter of the excavation area.
- Excavate soil and rock within the foundation design footprint area.
- Back fill the foundation with excavated rock.
- Form a level working area to build the foundation.
- Install formwork and reinforcement.
- Pour the concrete.

- Once the concrete has set and the earthing system is in place, backfill the foundation with suitable excavated material.

- Use the soil to build up the area around the turbine foundation.

3.3.1 Access to the Site

There are two proposed site entrances associated with the Development; Site Entrance 1 is an existing site entrance located in the southeast of the Site located off R671 road. Site entrance 2 is an existing site entrance located in the southwest corner of the Site off the L1027 Local Road. The Turbine Delivery Route and the Construction Haul Routes will utilise Site Entrance 1.

It is currently proposed that the turbine nacelles, tower hubs and rotor blades will be landed in Belview Port (Port of Waterford). From there, they will be transported to the Site via the N29, N25, N72, and R671.

The delivery of the turbines to the site will require co-ordination with a number of statutory bodies including Transport Infrastructure Ireland (TII), Waterford City and County Council, and An Garda Síochána. All details will be set out in the Traffic Management Plan.

There are 3 areas on the haul route that will require works in third party lands. These are shown on **Table 3.2**.

Table 3.2: Areas of Works on Haul Route in Third Party Lands

No.	Area	ITM (Easting)	ITM (Northing)	Description
1	R672 / L5071 Junction	620394	605624	A swept path assessment has been undertaken and indicates that loads will need to utilise an offline track in order to 'cut the corner'. A load bearing surface should be laid in **third party land** and a stone wall, trees and wire fence should be removed.

No.	Area	ITM (Easting)	ITM (Northing)	Description
				Embankment to be reprofiled. Detailed design of the proposed track is required. *An indicative road edge has been provided from this point to the site entrance based on the available aerial mapping where the road is considered to be greater than 4.5m. An indicative 4.5m has been provided for the remaining section as this is the minimum required running width required by turbine manufacturers. All marking up is beyond this 4.5m road width.* *A clearance width of 5.5m is required.* ***Third party land*** *may be required to achieve the above mitigation.*
2	L5071 North East of Clooncogaile	619481	605121	A swept path assessment has been undertaken and indicates that loads will oversail the verge on the inside of the left bend where the embankment will need to be reprofiled. **Third party land** required.
3	River Finisk Bridge / R671 Junction	618628	604027	A swept path assessment has been undertaken and indicates that loads will oversail into **third party land** on both sides of the road and trees / vegetation should be cleared throughout the section. A load bearing surface will be required in the eastern verge on approach to the bridge. Suspension settings should be raised to allow oversail of the bridge parapets by loads and care should be taken to ensure adequate clearance is still available to overhead utilities.

No.	Area	ITM (Easting)	ITM (Northing)	Description
				Discussions with the council should be held to ensure that the bridge has suitable bearing capacity for the proposed loads. Loads will overrun the western verge following the bridge where the land will need to be reprofiled and a load bearing surface laid. A total of seven utility poles and two road signs will need to be removed through the section. Loads will turn right onto the unclassified road to the south of the bridge. This road will require full reconstruction and widening to meet the turbine manufacturer minimum 4.5m running width and 5.5m clearance width. Land reprofiling will be required on both sides of the road and a retaining structure may be required on the inside.

3.3.2 Site Access Track

The site access roads are necessary to allow access for cranes and delivery trucks during construction of the Development and also during servicing/repairs to the wind turbines. The existing site access roads will be used as far as possible to minimise additional land take. These roads will be upgraded as necessary so that the minimum width will be 5m, site access roads will be wider at bends and at passing bay locations where a width of 5.5m is provided. Gradients will be limited to 1 in 7 (approximately 12%) and a stone layer provided, so as to provide a good grip during wet weather. Gradients of site access roads will not exceed this value.

All roads shall be free from overhead and side obstructions to provide a clear corridor. The larger components require 9.5m overhead minimum clearance for turbine delivery.

Approximately 1,780m of the existing Site Access Track length will be used for the Development. The upgraded Site Access Tracks will be approximately 8,900m^2 in surface area and will require approximately 2,937m³ of stone material.

There will also be 10,684m of new Site Access Tracks required for the Development. These will be constructed to provide a width of 5m and will cover an area of 53,800m^2 and require c.3,526m^3 of rock. These roads will be excavated to firm bearing strata and constructed using rock from the turbine foundation excavations or imported to Site from a nearby quarry.

The Site Access Track layout follows the existing access track into the Site as far as possible, avoids environmental constraints, and follows the natural contours of the land. Every effort has been made to minimise the length of track necessary.

Site access roads will have to be maintained during the construction phase. When weathered, the stone should not contain any constituents which may be harmful to the environment; in particular, surface water and groundwater.

Turbine hardstand areas in addition to turning areas are required in the vicinity of each turbine location. Turbine hardstand areas must allow two cranes to work in the vicinity of a turbine.

3.3.3 Rural (Local) Electricity Supply

A rural/local supply will be required as a back-up power supply to the substation for light, heat and power purposes. The rural/local supply will be designed and constructed by ESB Networks. The rural/local supply will have an associated step-down transformer (i.e. MV to LV) and will enter the substation building by underground cable and terminate onto the control building distribution board.

3.3.4 Electrical Substation, Control Building and Associated Compound

It is proposed to construct one 110kV electricity substation within the site. This will provide a connection point between the wind farm and the grid connection node point at the existing Dungarvan 110kV substation. Electricity transmitted between the turbines and the substation on the Site will be at 110kV.

The substation will serve two main functions:

1. provide housing for switchgear, control equipment, monitoring equipment, and storage space necessary for the proper functioning of the wind farm
2. provide a substation for metering and for switchgear to connect to the ESB grid.

The construction and electrical components of the substation will be to EirGrid specifications within the parameters assessed. The substation compound will be 20,800m^2 and will be 2m in depth and will be constructed from engineered stone material using similar construction techniques as for the crane hardstands. The overall compound will be enclosed by a 2.65m high fence and will contain a single building, ancillary equipment, including the transformers, switch gear, fault protection, metering, car parking and other ancillary elements necessary for the operation of the Development. Provision is made for the inclusion of a container sized unit which can be used to accommodate a statcom (for grid reactive power compensation) or a harmonic filter for grid stabilization.

The construction and electrical components of the substation will be to EirGrid specifications within the parameters assessed. The substation compound will be 7,749m^2 and will be 2m in depth and will be constructed from engineered stone material using similar construction techniques as for the crane hardstands. The overall compound will be enclosed by a 2.65m high fence and will contain a single building, ancillary equipment, including the transformers, switch gear, fault protection, metering, car parking and other ancillary elements necessary for the operation of the Development.

The substation building will contain control elements of the Development. The control components housed at the substation will include metering equipment, switchgear, the central computer system and electrical control panels. A spare parts store and workshop will also be located in the substation. The control building will be a single story pitched roof structure with traditional rendered finishes. The appearance and finish of the substation building will be similar to an agricultural building with a slated roof and nap plaster finish proposed. It will have a suitably sized footpath around it and an adjacent parking area. The final finish of the control building will be an off-white or grey colour.

The control building will contain an ESB room, control room, switchgear room, small store, an office and toilet. There will be four lightning monopole protection masts which will be up to approximately 18m in height and associated site works. Warning / health & safety signage will be displayed as is normal practice for such installations. Motion sensitive lighting only will be used. It is proposed to install a rainwater harvesting system as the source of water for toilet facilities, with potable water being brought on Site in bottles. Wastewater from the staff welfare facilities in the control building will be collected in a sealed storage tank, fitted with a high-level alarm. All wastewater will be tankered off-site by a licensed waste collector to a wastewater treatment plant. There will be no onsite treatment of wastewater.

A telecommunication antenna will be fixed externally to the substation control building for communication and control purposes (e.g. for the Supervisory Control and Data Acquisition (SCADA) System) for the Developer, turbine suppliers and ESB networks. There will be a small area outside the compound and adjacent to the Access Track that will be a hard-surfaced area for 4 operational and maintenance car parking spaces.

3.3.5 Transformers and Internal Cabling

Each turbine will be connected to the substation on site via underground MV cables. There will be approximately 21,815m of internal cabling. Fibre-optic cables will also connect each wind turbine to the wind turbine control system located within the Control Building. The electrical and fibre-optic cables running from the turbines to the substation compound will be run in cable ducts 1m below the ground surface within the Site Roads and/or their verges.

3.3.6 Grid Connection

Connection will be sought from the grid system operators by application to EirGrid. The substation will connect via underground 110kV cable. The route of this underground grid connection is provided in **Figure 1.1** above**.** The overall length of the grid connection between the substation and the existing Dungarvan 110kV substation is 16.8km, of which, 368m is within the site of the Development, and 16,432m is located along the public road corridor. The 368m is located in lands under the Developer's control (12.8km is located in an existing road).

The Grid Connection will be constructed to the requirements and specifications of EirGrid. The electricity will be transmitted as a three-phase power supply meaning there will be three individual conductors in each cable circuit. The three conductors will be laid in separate ducts which will be laid in accordance with EirGrid functional specifications for 110kV underground cables. The width of a 110kV cable trench with a trefoil formation will be 600mm. The depth of the trench for 110kV cables is 1.335m. A separate duct will be provided within the trench for fibre optic communications.

The following is a summary of the main activities for the installation of ducts:

- All relevant bodies i.e. EirGrid, Gas Networks Ireland, Eir, Local Authorities, Irish Water etc. will be contacted and up to date drawings for all existing services will be sought.

- Immediately prior to construction taking place, the area where excavation is planned will be surveyed using a Cable Avoidance Tool (CAT) and all existing services will be verified. Temporary warning signs will be erected.

- Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.

- A 13-tonne rubber tracked 360-degree excavator will be used to excavate the trench to the dimensions of 600mm wide by 1.335m deep.

- A silt fencing filtration system will be installed on all existing drainage channels for the duration of the cable construction to prevent contamination of any watercourse.

- Once the trench is excavated, a 50mm depth base layer of sand (in road trench) or 15 Newton CGBM B concrete (off road trench) will be installed and compacted. All concrete will be offloaded directly from the concrete truck into the trench.

- uPVC ducts will be installed on top of the compacted base layer material in the trench.

- Once the ducts are installed, couplers will be fitted and capped to prevent any dirt entering the unjointed open end of the duct.

- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to record the exact location of the ducts.

- The co-ordinates will be plotted on as-built record drawings for the grid connection cable operational phase.

- When ducts have been installed in the correct position on the trench base layer, sand (in road trench) or Lean-mix CBM4 (CL1093) (off road trench) will be carefully installed in the trench around the ducts so as not to displace the duct and compacted.

- Spacer templates will be used during installation so that the correct cover of duct surround material is achieved above, below and at the sides of the duct in the trench.

- A red cable protection strip will be installed above duct surround layer of material and for the full length of the cable route.

- A layer of Lean-mix CBM4 (CL1093) (in road) or excavated material (off road) will be installed on top of the duct surround material to a level 300mm below the finished surface level.

- Yellow marker warning tape will be installed for the full width of the trench, and for the full length of the cable route, 300mm from the finished surface level.

- The finished surface of the road will then be reinstated to its original condition.

- Precast concrete cable joint bays (junction boxes) will be installed within the excavated trench.

- The junction boxes will be backfilled and the finished surface above the junction box reinstated as per its original condition. The cable junction boxes will be re-excavated a second time during cable pulling and jointing, after which the finished surface above the joint bays will be reinstated again to its original condition.

- When trenching and ducting is complete, the installation of the grid connection cable will commence between the substation and the existing 110kV substation at Dungarvan.

- The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable will be pulled through.

- The cables will be jointed within the precast concrete cable junction box. (Joint Bay)

- The finished surface above each cable joint bay is reinstated to its original condition.

3.3.6.1 Joint Bays

Joint Bays are pre-cast concrete chambers where individual lengths of cables will be joined to form one continuous cable. A joint bay is constructed in a pit. Each joint bay typically will be 6m long x 2.5m x 2.3m deep. A reinforced concreted slab will be constructed on top of the bay.

The joint bay locations have been dictated by suitable terrain and access to facilitate the operation of cable pulling equipment at any phase of the development and future operation of the installation in accordance with the EirGrid specifications.

Communication chambers, which are similar to small manholes, will be installed at the joint bay locations to facilitate connection of fibre-optic communication cables.

3.3.6.2 Trench Layout

The trench layout will be as per the appropriate EirGrid drawings. The specification of Waterford City and County Council will be followed for the excavation and reinstatement of the ducted cable trenches. When the trench has been excavated to the required depth and all loose material and protruding stones have been removed, a bedding layer of sand will be laid and compacted to a minimum thickness of 65mm.

3.3.6.3 Joining Ducts

All joining ducts shall be laid in straight lines to even gradients. Once the ducts have been installed and backfilled with lean-mix concrete and with Clause 804 stone the duct run will be thoroughly cleaned by pulling the appropriate size of EirGrid approved duct brush through the duct.

Details of the construction methodology are summarised below:

- Preparatory Works
  - Preparatory Trial Pit Survey along the cable route
  - Access to the start point and setting out
  - Access to joint bays
  - Silt Attenuation Features and watercourse set back buffer
  - Joint Bay Excavation
- Trenching Works
  - Storage of Materials
  - Trench Operations
  - Managing excess material from trench works

3.3.6.4 Directional Drilling Works

There are total of 3 HDD which are required along the grid connection route, these include 2 no. water crossings and a HDD is required for a cattle underpass. All crossings will be constructed by means of directional drilling technology. The crossings will comprise 4 x 110mm HPPE pipes/ducts each directionally drilled. Two separate excavations will be made to a depth of 2 metres to accommodate the directional drilling launch and reception pits. Spoil arisings will be stored adjacent to the pit locations for reinstatement, at a minimum 25 metre buffer distance from the watercourse. These temporary spoil mounds will have side slopes battered back to 1:1. Silt fencing will be erected around the base of each temporary mound. The excavation launch and reception pits will be reinstated on completion of drilling and jointing operations.

The Drill head will be placed in the open excavation (launch pit) and it will be guided in by the operator for the first 1-2 metres. A series of drill rods will be connected to the head as it travels further along the shaft.

The drill position is always known to the operator and the drill can be manoeuvred in 3 planes / axis. A drilling lubricant will be required and this will be delivered directly to the drill head. This will be ultrabore non-toxic bentonite slurry mixture. Once the conduit is completed, the drill head is exposed at the reception pit and removed. The drill rods are connected to the duct pipe and the drill is reversed pulling the pipe back through the conduit.

A spoil volume of 4m³ will be excavated for each 100m run of 4 pipes. This spoil will be largely subsoil material. The 100m arisings will exit the launch pit within the bentonite slurry mixture. A mobile bunded tank will be located next to the launch pit into which the arisings will be pumped. This will be stored outside of the 25m watercourse buffer zone.

The following measures will be implemented during the directional drilling works:

- No in-stream works will be permitted.
- Works shall not take place at periods of high rainfall and shall be scaled back or suspended if heavy rain is forecast.
- A floating hydrocarbon boom and spill kit will be employed.
- Plant will travel slowly across bare ground at a maximum of 5km/hr. If truck rutting is observed, then bog mats or rolling road will be employed.
- Silt fencing will be erected at a setback distance of 5m during excavation.
- Any excess construction material shall be removed from the works areas and disposed of in a fully licensed landfill.
- No re-fuelling of machinery will take place on site or within 50 metres of any watercourse.
- All construction workers will be given a toolbox talk addressing the environmental topics concerning the drilling prior to commencement of construction.

3.3.7 Borrow Pit

One borrow pit will be constructed as part of the Development. The borrow pit will be located on the commonage land and will provide excavated material to provide fill for the roads, hardstands, upfill to foundations and temporary compounds. The borrow pit will be excavated as required. Where rock and fill material is available from the excavation of turbine foundations, this material will be used first. The use of an on-site borrow pit will reduce the environmental effect of other

aspects of the Development such as by reducing the need to transport material to the Site. The location of the borrow pit can be seen on **Figure 1.2**.

When the borrow pit is no longer required, it will be reinstated using any surplus inert material from the site and made secure using permanent stock proof fencing.

The rock will be extracted from the proposed borrow pit using two main methods, rock breaking and rock blasting. The primary method will be rock breaking.

3.3.7.1 Rock Breaking

Weaker rock will be extracted using a hydraulic excavator and a ripper. Where stronger rock is encountered and cannot be extracted using an excavator, then rock breaking equipment will be employed. This will typically involve the use of a 40-60 tonne 360-degree hydraulic excavator with a rock breaker. The rock breaker is supported by a smaller 30-40 tonne rock breaker which breaks the rock down further for feeding into the rock crusher machine. The larger rock breaker breaks out the rock in a progressive manner from the borrow pit and the smaller rock breaker breaks it down further.

The broken-down rock is loaded into the mobile crusher using a wheeled loading shovel machine and crushed down into the correct grade for use in the civil construction of Site Access Roads and Turbine Hardstands.

3.3.7.2 Rock Blasting

If blasting is required, then this is generally carried out using a mobile drilling rig which is used to drill vertical holes into the rock area that requires blasting. It typically takes the drilling rig 3 or 4 days to drill the number of holes required for a single blast. A specialist engineer will be employed to determine the locations and depths of blasting required. The specialist blasting engineer will arrange for the correct amount of explosives to be delivered to the Site for each blast. The management of explosives delivery and storage on-site will be agreed with An Garda Síochána in advance. The blast engineer will set the explosives and manage the blast. The rock generated from the blast will usually be the correct size to be loaded directly into the mobile crusher.

3.3.8 Onsite Drainage

The surface water runoff contained within natural and artificial drainage channels includes stream and river waterbodies, drainage ditches, and other minor natural and artificial manmade drainage features. Drainage measures will be provided to attenuate runoff, guard against soil erosion, soil compaction, and safeguard local water quality. Details of the drainage system are outlined in detail in the Surface Water Management Plan, part of the CEMP attached as **Appendix 2.1** to the EIAR of the proposed development.

There are a number of natural streams on the Site. A buffer zone of at least 50m will be in place for natural streams where possible. Sustainable Urban Drainage System (SuDS) principles will be employed as follows:

Source controls for surface water

Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sandbags, 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 or other similar/equivalent or appropriate measures.

In-line controls for surface water

Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sandbags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriates systems.

Treatment systems for surface water:

Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbusters and/or other similar/equivalent or appropriate systems.

When heavy rainfall is predicted, then works will be suspended or scaled back.

3.3.9 Table of Key Development Infrastructure Metrics

The Key Development Infrastructure Metrics are contained in **Table 3.3**.

Table 3.3: Key Development Infrastructure Metrics

Description	Length [m]	Width[m]	Depth [m]	No.	Area [m^2]	Volume of Excavation [m^3]
Upgraded Site Access Track	1,780	5	0.3	1	8,900	2,670
New Site Access Track	10,760	5	0.3	1	53,800	16,140
Internal Cabling (power & communications)	10,997	0.6	1	4	6,598	6,598
Turbine Hardstands - cranes	97	35	0.3	12	40,740	12,222
Turbine Foundations (25.5m diameter)	25.5	25.5	2.5	12	6,128.4	15,321
Electrical Substation	123	63	2	1	7,749	15,498
Site Compound	25	35	2	1	875	1,750
Cut & Fill Areas & Junctions	X	X	X	1	X	337,075
110kV Cable Trench	16,013	0.825	1.265	1	13,211	16,712
Joint Pits	6	2.5	2.3	21	315	724
Borrow Pit	127	127	2	1	13,211	31,894

Description	Length [m]	Width[m]	Depth [m]	No.	Area [m^2]	Volume of Excavation [m^3]
Total					151,527	456,604

3.4 CONSTRUCTION

The first phase of the Development will comprise the construction phase. This phase will begin with site preparation works and will be complete when the turbines are built and ready for commissioning, and when all wastes have been removed from the site. For this Development, it is envisaged that the construction phase will last approximately 18 months. An indicated construction programme is set out at **Table 3.4**.

Table 3.4: Indicative Construction Programme

Activity	Month																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Site Establishment/ Fencing of …..	X	X	X																		
Internal Access Road Upgrade & Construction		X	X	X	X	X	X														
Substation & Compound Construction		X	X	X	X	X	X	X													

Substation Electrical Works									X	X	X	X	X	X	X	X	X			
Substation Commissioning																X	X			
Excavation & Construction of Turbine Foundations & Hardstands		X	X	X	X	X	X	X	X	X	X									
Internal Cabling Installation										X	X	X	X	X	X	X				
Turbine Delivery and Erection												X	X	X	X	X				
Grid Connection						X	X	X	X	X	X	X	X	X	X	X	X			
Energisation																		X		
Turbine Commissioning																			X	X	X
Site Restoration																		X	X	X	X

3.4.1 Micrositing

The Development infrastructure is designed around considerations of technical, economic, and environmental constraints. While the Site layout was optimised as far as practicable and EIA standard environmental investigations have taken place, adverse geotechnical ground conditions may require the minor micrositing of Development infrastructure. As per Section 5.3 Ground Conditions/Geology of the current 2006 Wind Energy Planning Guidelines ("the 2006 WEPG"):

"Provision must be made for carrying out site-specific geo-technical investigations in order to identify the optimum location for each turbine. These investigations may suggest minor

adjustments to turbine location. In order to accommodate this practice there should be a degree of flexibility built into the planning permission and EIS. The extent of flexibility will be site specific but should not generally extend beyond 20 metres. Any further changes in location beyond the agreed limits would require planning permission."

Any such movement will only be implemented if necessary and the above noted requirements of the 2006 WEPG will be followed. Such variations in ground conditions will only become apparent following excavation of the turbine foundation area during the construction phase. A movement of the turbine will require the associated turbine hardstand and site access track to 'follow' the turbine foundation move.

3.4.2 Construction and Environmental Management Plan (CEMP)

A CEMP is appended to the EIAR (Jennings O'Donovan, 2023) in **Appendix 2.1**. The CEMP includes an emergency response plan, spoil management plan, surface water management plan, surface water quality and inspection management plan and a waste management plan. The CEMP includes all the mitigation measures recommended within the EIAR and the NIS. A summary of the mitigation measures is included in **Appendix 17.1** of the CEMP.

In the event planning is granted for the Development, the CEMP provides a commitment to mitigation and monitoring, and reduces the risk of pollution whilst improving the sustainable management of resources. The environmental commitments of the project will be managed through the CEMP and will need to be secured in contract documentation and arrangements for construction and later phases, such that there is a robust mechanism in place for their implementation. The CEMP will address the construction phase, and will be continued through to the commissioning, operation and final decommissioning phases. An Environmental Manager / Ecological Clerk of Works (ECoW) with appropriate experience will be appointed for the duration of the construction phase so that the CEMP is effectively implemented.

3.4.3 Refuelling

Vehicles will be refuelled off-site where possible. For vehicles that require refuelling on-site, fuels will be stored in the temporary construction compound and bunded to at least 110% of the capacity of the largest tank within the bund or 25% of the total tank capacity, whichever is greater. Refuelling will take place via a mobile double skinned fuel bowser. The bowser will be a double

axel refuelling trailer which will be towed to the refuelling locations by a 4x4 vehicle. The 4x4 will carry a drip tray, spill kit and absorbent mats in case of any accidental spillages. Only designated competent personnel will refuel plant and machinery on the Site.

3.4.4 Concrete

There will be no concrete batching on the Site. Rather, it will be transported to the Site as it is required. A dedicated, bunded area will be created to cater for concrete wash-out and this will be within the temporary construction compound. This will be for the wash-out of the chutes only after the pour. Concrete trucks will then exit the Site and return to the supply plant to wash out the mixer itself.

The main concrete pours at the turbine locations will be planned in advance and mitigation measures will be as follows:

- Avoiding large concrete pours, for turbine foundations for example, on days when heavy or prolonged rainfall is forecast.
- Providing that all concrete pour areas are dewatered prior to pouring concrete and while the concrete is curing.
- Making covers available so that areas can be covered if heavy rain arrives during the curing process which will prevent runoff of concrete which has a high pH.

3.4.5 Dust Suppression

During periods of dry and windy weather, there is potential for dust to become friable and cause nuisance to nearby residences and users of the local road network. Damping down may be required to see that dust does not become friable. A wheel wash facility will be employed on-site which will wash mud and debris from vehicles egressing the Site and reduce mud and debris from getting onto the local road network where it could dry out and become friable and potentially causing a nuisance. Where stone is sourced off-site, HGVs entering the Site carrying stone will be covered to prevent dust generation. A road sweeper will be made available for use in case of any mud or debris making it onto the public road network.

3.4.6 Construction Hours

The Development will have 123 to 147 construction workers during the construction phase. Working hours for construction will be from 07:00 to 19:00 throughout the week, with reduced working hours at weekends. It should be noted that during the turbine erection phase, operations

will need to take place outside those hours to facilitate turbine foundation construction and so that lifting operations are completed safely. Hours of working for turbine foundation construction will be agreed with Waterford City and County Council prior to the commencement of turbine foundation construction. A detailed Traffic Management Plan ("TMP") will be put in place for the construction phase, which shall be agreed during the planning compliance stage with the Planning Authority so that strict controls are in place with all suppliers coming to the Site.

3.4.7 Construction Compound and Temporary Works Area

The temporary construction compound will be set up upon commencement of the construction phase. The proposed location for the temporary construction compound is southwest of T04 as shown in Figure 2.1 and the layout is shown in Figure 2.11. The compound will be 25m by 35m and approximately 2m in depth 875m² / 1,750m³. The compound will be used as a secure storage area for construction materials and to contain temporary site accommodation units for sealed type staff welfare facilities. The compound will contain cabins for offices space, meeting rooms, canteen area, a drying room, parking facilities, and similar personnel facilities.

An area within the compound will be used for the storage of fuel and oils and this will be suitably bunded. The bund will be lined with an impermeable membrane in order to prevent any contamination of the surrounding soils, vegetation and water table. Double protection containers / equipment will be used along with drip trays. Full details will be included in the final CEMP.

During the construction phase, water will be supplied by water bowser. The maximum wastewater production is estimated to be the same as the maximum water consumption (4,920- 5,880 litres per day). The project will include an enclosed wastewater management system at the temporary compound capable of handling the demand during the construction phase with 123 to 147 construction workers on site at peak. A holding tank is proposed for wastewater management. Wastewater will be removed off-site and disposed at an appropriate licenced facility.

3.4.8 Construction of Crane Hardstands and Foundations

The construction method for all the crane hardstands will be via excavated approach. Each crane hardstand will be 97m by 35m. Foundations will be taken down to competent bearing strata by excavating through the soil, subsoil, and rock if necessary.

The method of construction for turbine foundation is also described below:

- Install temporary drainage around perimeter of excavation area;
- Excavate soil and rock;
- Form a level working area to build foundation;
- Install formwork and reinforcement;
- Pour concrete;
- Cure concrete;
- Once the concrete has set and the earthing system is in place, backfill the foundation with stone and excavated soil deposits;

- Use retained excavated soil deposits to build up the area around the turbine base.

3.4.9 Turbine Assembly

Once on Site, the wind turbine components will be routed according to a specific detailed route plan to minimise manoeuvring. Components will be placed on turbine hardstands prior to assembly. A *'just in time'* delivery strategy will be in place for turbine blades to reduce the need for temporary set down areas. One large crane will be required for erecting the turbines, assisted by smaller cranes. Similar cranes will also be required for maintenance during the operational phase. As with all other vehicles, refuelling of cranes will be carried out in accordance with site procedures to minimise the risk of spillage or pollution.

The towers will be delivered in sections, and work on assembly will not start until a suitable weather window is available. Three methods can be used to attach the blades:

The blades can be attached to the nacelle and hub on the ground. The hub and blades are then lifted as one:

1. The hub can be attached to the nacelle and the two blades attached to the hub while the nacelle is on the ground – the "*bunny lift*". The nacelle is then lifted into position and the third blade lifted into place separately. This requires manoeuvring of several components on the ground and usually the repositioning of cranes;
2. Lifting the nacelle and hub as one unit, as described above and then attaching the blades one at a time, rotating the hub between lifts. The blade lifting operations do not require repositioning of the crane;

3. The most appropriate method will be decided by the lifting contractor and the turbine manufacturer, prior to turbine erection.

3.4.10 Construction Traffic

It is estimated that during civil construction, approximately 5,944 loads will be delivered to Site. This breaks down to approximately 297 loads per month or an average of 83 per day ranging between 3 to 141 loads (per day) excluding Sundays and bank holidays. The peak number of deliveries per day will occur during the concrete pour for Turbine Foundation construction. An estimated 102, depending on the capacity of the concrete truck (6 or 7m3), concrete truck deliveries will be required per turbine foundation. Some other materials will also be delivered on such days, so a realistic estimation of peak deliveries is approximately 141 deliveries per day (for at least 20 separate days in the construction programme when the Turbine Foundations will be poured).

3.4.11 Reinstatement and Monitoring

Following completion of construction, all plant and machinery will be removed from the Site. The temporary works areas needed for the construction period such as blade laydown areas, will be reinstated using the original spoil material removed and stockpiled close to the location from where it was excavated. The grid connection route will be reinstated to its original condition.

The on-site installed drainage network will be left in place where considered beneficial to do so. This will be periodically monitored to see that it is operating to its stated design purpose. Water monitoring on nearby natural watercourses will be undertaken during and post construction to determine if any pollution has migrated off-site, and if so, implement measures to rectify the impact.

3.4.12 Construction Supervision and Monitoring

The construction activities will be monitored by a geotechnical engineer, a qualified archaeologist and an ecological clerk of works (ECoW). The geotechnical engineer will be contracted for the detailed design phase and their services retained throughout the construction and reinstatement phases. The geotechnical engineer will oversee all earthworks and excavation activities and monitor for issues such as ground stability, water ingress into excavations etc.

The ECoW will be employed prior to the commencement of the construction phase and will monitor the working corridor and review the pollution control measures and working practices

during construction and have input into site remediation. The ECoW will have stop work authority if, for example, there is potential for a sensitive habitat features to be encroached upon or there is the possibility of silt/pollution runoff to natural watercourses. The archaeologist will have responsibility for ensuring that potential archaeological features are protected and will also have stop work authority should any be discovered during excavations. If any potential archaeological features are discovered, the archaeologist will inform the National Monuments Service (NMS).

An inspection and maintenance plan will be developed for the planned site drainage prior to commencement of construction. Regular inspections of the installed drainage system will be undertaken, especially after heavy rainfall events, to check blockages and see that there is no build-up of standing water in any part of the system where is it not designed to be.

Excess build-up of silt at check dams, attenuation/settlement ponds or any other drainage feature will be removed.

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 close to the site, and specifically following heavy rainfall events (i.e. weekly, monthly and event based).

The CEMP for the project will set out the proposed site organisation, sequencing of works, methodologies, mitigation measures (including these outlined above) and monitoring measures.

Daily monitoring of excavations by the geotechnical engineer will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken.

The local road network near the Site used to transport construction materials will be monitored during construction, so that any damage caused by construction traffic associated with the project can be identified and repaired. Any required monitoring programme will be agreed with the local authority, prior to the commencement of any construction works. Ready mix concrete and rock will be sourced from local quarries and monitoring may also be undertaken on the route as required.

3.4.13 Construction Sequencing

It is envisaged that the following will be the sequence of construction for the Development:

- Contractor compound and welfare facilities
- Site preparation
- Site roads
- Crane hardstandings
- Turbine foundations
- Internal cable ducting
- Installation of the grid connection
- Erection of wind turbines
- Commissioning and energisation

The 110 kV substation will be constructed in parallel with turbine hardstands, foundations and ducting. The first step will be to construct the Temporary Construction Compound and Welfare Facilities. Access to the area will be Site Entrance 1. The next step will be to prepare the areas of the site where site infrastructure is to be located by marking out the construction works corridor and the relevant environmental buffer zones as needed.

Following the site preparation, the site roads will be constructed according to the specifications of the chosen turbine manufacturer. The next step will involve construction of the crane hard-standing areas for the 12 no. turbines according to the specifications of the chosen turbine manufacturer. The 12 no. turbine foundations can then be excavated, and foundations constructed using rebar and imported concrete. Following the construction of the turbine foundations, internal cable ducting from the turbine locations to the on-site 110 kV substation will be laid in trenches along the constructed Access Roads.

The grid connection will be installed in trenches within the national road network infrastructure from the Site to the 110kV substation located in Dungarvan.

The last step will be to erect the 12 no. wind turbines on the previously constructed foundations using two cranes. Commissioning and testing of the turbines can then proceed.

3.4.14 Construction Employment

It is estimated that 123 to 147 construction workers will be employed on-site during the peak period of turbine foundation construction.

3.5 COMMISSIONING

Wind farm commissioning can take in the region of 2 months to complete from the erection of the final turbine to the commercial exportation of power to the national grid. It involves commissioning engineers working through an entire schedule of SCADA (Supervisory Control and Data Acquisition) and electrical and mechanical testing and control measures to check that the wind farm will perform and export power to the national grid, as designed.

3.6 OPERATION AND MAINTENANCE

During the operation of the wind farm, the turbine manufacturer, the Transmission System Operator (TSO) (EirGrid), the operator, or a service company will carry out regular maintenance of the turbines. In addition, operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link. Routine inspection and preventative maintenance visits will be necessary to provide for the smooth and efficient running of the wind farm.

3.7 DECOMMISSIONING

The Applicant is applying for a consent for a period of 40 years. Cranes of similar size to those used for construction will disassemble each turbine using the same crane hardstands. The towers, blades and all components will then be removed from site and reused, recycled, or disposed of in a suitably licenced facility. The turbine transformers will also be removed from site. There is potential to reuse turbine components, while others can be recycled.

Underground cables will be removed while the ducting will be left in-situ. The foundations will remain in-situ.

Hardstand areas will be remediated to match the existing landscape as closely as possible. Access Roads will be left for use by the relevant landowner(s).

Any structural materials suitable for recycling will be disposed of in an appropriate manner. The financial costs of decommissioning, at current material values, will be more than met by the recycling value of the turbine components.

Prior to wind turbine removal, due consideration will be given to any potential impacts arising from these operations. Some of the potential issues could include:

- Potential disturbance by the presence of cranes, HGVs, and personnel on-site.
- On-site temporary compound would need to be located appropriately.
- Time of year and timescale (to be outside sensitive periods).

Prior to the decommissioning work, a comprehensive plan will be drawn up that takes account of the findings of this EIAR and the contemporary legislative requirements and best practice at that time, to manage and control the component removal and ground reinstatement.

3.8 COMMUNITY BENEFIT

The Project has the potential to bring significant positive benefits to local communities. It will support sustainable local employment; it will contribute annual rates to the local authority and it will provide opportunity for local community investment in the project in line with the new Renewable Energy Support Scheme (RESS). A community benefit fund will be put in place for the lifetime of the Project to provide direct funding to those areas surrounding the Project.

Two important areas of Government policy are in development which will have a bearing on the establishment of future community benefit funds, the updated Wind Energy Guidelines and the

Renewable Energy Support Scheme (RESS-2)[1] has been updated in 2022 and provides the Government requirements on future community benefit funds for renewable energy projects.

A significant annual Community Benefit Fund will be established in line with Government policy which will include funding for both wider community initiatives and a Near Neighbour scheme focused on houses in close proximity to the Project.

3.8.1 Fund Usage and Administration

The Community Benefit Fund belongs to the local community. The premise of the fund is that it should be used to bring about significant, positive change in the local area. To make this happen, the first step will be to form a benefit fund development working group that clearly represents both the closest neighbours to the Project as well as nearby communities. This group will then work on designing the governance and structure of a community entity that will administer the Community Benefit Fund.

3.8.2 Community Investment

Under the current Renewable Energy Support Scheme (RESS) renewable energy project proposals must enable local communities in a meaningful way by means of direct capital investment for communities in close proximity to renewable energy projects, each year for the duration of the support scheme. The Developer is committed to working with external agencies to develop workable models of Community Investment under any incoming renewable energy support schemes that succeeded the existing scheme.

3.9 LOCATION OVERVIEW

The proposed wind farm Development is located in the townlands of Ballynaguilkee Upper, Broemountain, Corradoon, Dyrick, Lickoran, Lickoranmountain, Lisleagh, Lisleaghmountain,

[1] gov.ie - Renewable Electricity Support Scheme 2 (RESS 2) (www.gov.ie) **[Accessed 6th January 2022]**

Lyrattin and Scartmountain. The Site is located 43km west of Waterford City, 55km northeast of Cork City, and 12.9km northwest of Dungarvan.

The proposed grid connection passes through the townlands of Broemountain, Lyrattin, Farnane Lower, Farnane Upper, Castlequarter, Mountaincastle South, Carrigaun (Mansfield), Langanoran, Sleadycastle, Knockaunnaglokee, Garryduff, Colligan More, Garryclone, Colliganwood, Ballymacmague North, Ballymacmague South and Killadangan.

Temporary works will be required to accommodate the delivery of the turbine components. These temporary works are located in the townlands of Ballynaguilkee Lower, Kilcooney, and Lisleagh Gorteens, Kilmurry, Rathpatrick, Ballyduff East, Joulterspark and Burgery.

The redline boundary extends to 463ha, and comprises a mixture of farmland, forestry and upland heath. Much of the lands are in private, third-party ownership, while a portion of the site is shared land (commonage).

3.10 TOPOGRAPHY

The proposed Site is located beyond the south-eastern extent of the Knockmealdown Mountains mountain range. The topography of the Site is variable, and it is broadly surrounded by or is partially overlapping three elevated areas. These include Knocknasheega (428m) west of the Site boundary, Broemountain (429m) in the northern extent of the site and Dyrick Hill (286m) within the southern central portion of the site. The western, northern and southern peaks of the site are more elevated than the central and eastern extents of the Site which are relatively flat with lower elevations ranging from between 130m to 190m. The Site is generally topographically elevated in the north / north-west and generally topographically low lying in the south and east with the exception of Dyrick Hill (286) near the southern extent of the site. The steepest incline across the Site occurs at the northern extent of the Site near the proposed T8 position.

3.11 SOILS & GEOLOGY

The Site is located across land which is predominantly underlain by sandstone rock and brown podzolic or podzol soils of coarse loamy drift with siliceous stones of the Knockmealdown, Knockboy and Ballycondon series. According to the Soil Information System National Soils Map, pockets of peat exist at the north-western extent of the site. However, no peat has been identified

at the site during the geotechnical surveys of the site (EIAR Chapter 8: Lands, Soils and Geology) and it is likely that the areas mapped as pockets of peat on the National Soils Map correspond to areas of heathland habitat occurring in the commonage area of Broemountain.

Forestry and agricultural land uses, including dairy and sheep farming are the predominant land uses within the study area. Forestry plantations border the western extent of the proposed Site on an area of commonage land. Additional areas of forestry exist within the central, north-eastern and southern extents of the proposed Site. The Site is intersected by Broemountain Road (L5058) which is a narrow local secondary road. The Farnane River, which is a tributary of the Finisk River, rises near the north-western extent of the Site and flows along the western extent of the Site. The Lisleagh Stream, which is also a tributary of the Finisk River, rises in the central portion of the Site and flows in a south-easterly direction until it merges with the Finisk River, north of the townland of Woodhouse. The Aughkilladoon Stream, another tributary of the Finisk River rises at the south-eastern extent of the Site and flows in a south-easterly direction until it merges with the Finisk River, east of the townland of Woodhouse

3.12 HYDROLOGY

The proposed wind farm Site, and current grid connection route are located within the Blackwater (Munster) and Colligan Mahon catchment areas in Hydrometric Areas 18 and 17 respectively. The proposed wind farm Development and grid connection to Dungarvan Substation at Killadangan are located within three WFD sub-catchments. These include the Blackwater (Munster) (SC_140), Finisk (SC_010) and Colligan (SC_010) subcatchments

The National Soils Hydrology Map classifies the majority of the site as being poorly drained, particularly in the western and northern areas. The remainder of the site is classified as being well drained with the majority of these areas being located in the eastern and southern areas of the Site.

The Farnane River, the Lisleagh Stream and the Aughkilladoon Stream are the main surface water bodies that drain the site. All of these surface waters are tributaries of the Finisk River which flows to the east and south-east of the proposed Site. The site is also drained by a network of artificial drainage ditches, many of which are located adjacent to field boundaries, particularly in the central and western extents of the Site. A number of small natural and artificial drains also exist at the western commonage area of the proposed Site.

To the western extent of the site is the Farnane River which rises to the east of an area of upland forestry between Knocknasheega and Broemountain at an altitude of 290m. Two small unnamed streams merge with the Farnane River from both the east and west near the townland of Graigueavurra, approximately 1.3km southeast of the Site boundary. An additional small unnamed stream merges from the west of the Farnane River at Graigueavurra, approximately 2km southeast of the Site boundary. The total length of the Farnane River and its tributaries is 9.1km and it covers a catchment area of 8.1km^2. The Farnane River flows in a south-easterly direction near parallel to the western Site boundary and then continues further to the south-east until it merges with the Finisk River at Millstreet, County Waterford.

The Lisleagh Stream rises near the central extent of the Site in an area mapped as a potential wetland to the northwest of the proposed T4 position. According to the EPA maps for the area, an unnamed stream is located immediately west of the proposed T04 position which is mapped as flowing in a north-easterly direction for approximately 390m until it merges with the Lisleagh Stream. However, during all site survey visits, there were no indications that this stream was present. It was initially suspected that this stream could be ephemeral, however it was not visible at the site even after periods of heavy rainfall. It could also be the case that land drainage practices, or the construction of an unpaved road near the stream, have resulted in its removal or alteration of its course over time. The Lisleagh Stream flows in a south-easterly direction from its source for approximately 1.8km kilometres where it merges with a small unnamed stream that rises near the townland of Corradoon, approximately 1.5km north of this confluence. To the northeast of the proposed T05, at the north-eastern Site boundary, an additional unnamed stream flows in an easterly direction for approximately 660m until it merges with the unnamed stream mentioned above which ultimately merges with the Lisleagh Stream.

At the south-eastern extent of the Site, the Aughkilladoon Stream rises in the townland of Lickoranmountain. The Aughkilladoon Stream flows along the south-eastern site boundary and continues in a south-easterly direction for approximately 2km until it merges with the Finisk River, east of the townland of Woodhouse. Beyond the northern site boundary, five small unnamed streams flow in a north-easterly direction and merge with the Boolahallagh River. The Boolahallagh River flows along the boundary of Counties Waterford and Tipperary until it merges with the Aughavanlomaun Stream at Priestown Bridge, approximately 1.7km north-east of the Site. Beyond the western site boundary, to the west of Knocknasheega, the Glenshelane River rises to the east of Knocknanask. The Glenshelane River flows in a southerly direction between Knocknansk and Knocknasheega until it merges with the Blackwater River south of Cappoquin.

Northeast of Coolagortboy and north of Scarthmountain, an unnamed stream rises approximately 670m west of the Site boundary and flows in a south-westerly direction until it merges with the Glenshelane River.

Two wetlands exist at the site located east and west of the proposed T4 position. The Map of Irish Wetlands (2021) identifies these locations as "Other/Unsurveyed". It was notable that highly saturated ground was evident at these locations during the site surveys.

There are no lakes within the site boundary with the closest being a small reservoir north of Mt. Melleray Monastery, approximately 5Km west of the proposed Site boundary.

3.13 BIODIVERSITY

3.13.1 Designated Sites

The proposed wind farm Site is not located within any designated sites. The grid connection route and the proposed haul route intersect the Blackwater River SAC and pNHA. The Dungarvan Harbour SPA and pNHA are located approximately 500m to the south of the proposed haul route and 600m to the south of the proposed grid route.

All other designated sites are located at more remote distances from the project.

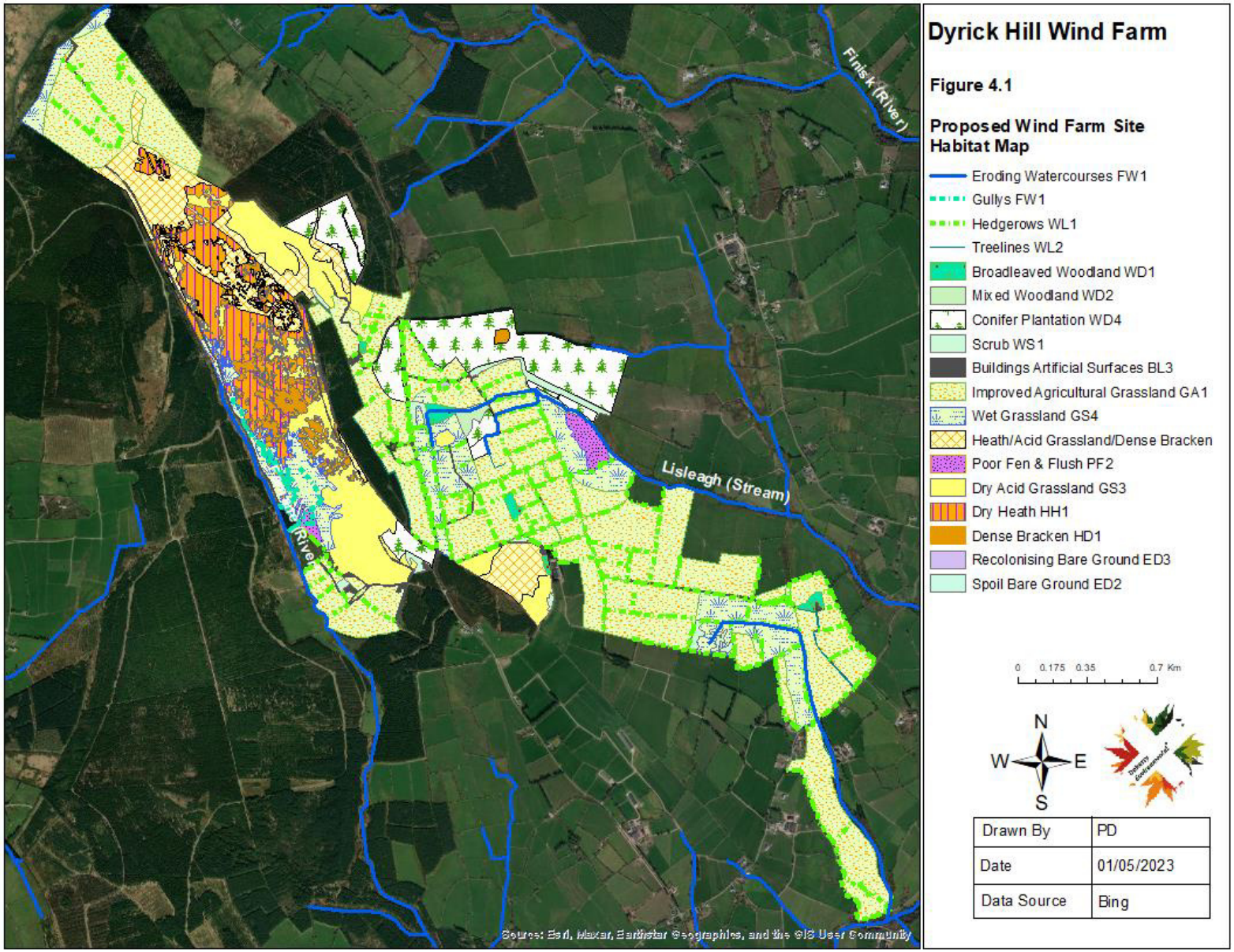
3.13.2 Habitats

3.13.2.1 Proposed Wind Farm Site

A habitat map of the proposed wind farm Site is presented as Figure 4.1 below. The habitats occurring in the centre and eastern section of the proposed wind farm Site are dominated by enclosed improved agricultural grassland with hedgerow field boundaries. The western side of the proposed wind farm Site is dominated by unenclosed land cover used as commonage. The habitats occurring here include acid grassland, wet grassland and dry heath, whilst improved agricultural grassland also occurs towards the northwestern limit of the site. Conifer plantation occurs along the northern boundary of the Site. Smaller areas of poor fen and flush and non-calcareous spring habitat also occur within the project Site.

3.13.2.2 Proposed Haul Route Widening Locations

The habitats occurring at the three no. haul route widening locations comprise improved agricultural grassland and hedgerows. Habitat maps for these three locations are presented as Figures 4.2 to 4.4 below.



Dyrick Hill Wind Farm

Figure 4.1

Proposed Wind Farm Site Habitat Map

- Eroding Watercourses FW1
- Gullys FW1
- Hedgerows WL1
- Treelines WL2
- Broadleaved Woodland WD1
- Mixed Woodland WD2
- Conifer Plantation WD4
- Scrub WS1
- Buildings Artificial Surfaces BL3
- Improved Agricultural Grassland GA1
- Wet Grassland GS4
- Heath/Acid Grassland/Dense Bracken
- Poor Fen & Flush PF2
- Dry Acid Grassland GS3
- Dry Heath HH1
- Dense Bracken HD1
- Recolonising Bare Ground ED3
- Spoil Bare Ground ED2

0 0.175 0.35 0.7 Km

N W E S

Drawn By	PD
Date	01/05/2023
Data Source	Bing

3.13.3 Grid Connection Route

The entire stretch of the grid connection route from the proposed wind farm site to the existing ESB substation at Dungarvan will be located within the footprint of existing public road corridors.

Horizontal directional drilling will be used at three locations, two of which will cross watercourses and one will cross under an existing cattle underpass. At these bespoke locations the electrical cable ducts will be drilled underground below the watercourses. The launch and receptor pits required for the horizontal directional drilling will be positioned within the road corridor.

The habitat occurring along the cable route is entirely comprised of road surface which is representative of buildings and artificial surfaces (BL3).

3.13.4 Non-volant mammals

Irish hare was observed at the proposed wind farm site during field surveys and evidence indicating the presence of red deer was also observed. No evidence indicating the presence of badgers was observed during field surveys.

No otter holts or couches were observed along the watercourses draining the proposed wind farm site. The Finisk River provides suitable foraging habitat for otters, whilst other first order streams feeding the Finish River such as the Farnanes, Aughkilladoon and Lisleagh Streams are of low fisheries value and are of limited foraging value for otters. No otter activity was recorded along this stretch of the river during camera trap monitoring.

No evidence of non-volant mammals was recorded at the three proposed widening areas along the haul route.

3.13.5 Bat Species

In general, the landscape that the development is a part of, is of low to moderate suitability for bats where the turbines are located in the upland areas. The landscape is of moderate to high suitability for bats where the turbines are located in the lowland agricultural areas.

Eight species of bats have been recorded as present at the development during the bat surveys. All are listed as ‘Least Concern’ on the Irish Red List, and Annex IV of the EU Habitats Directive.

No lesser horseshoe bats have been recorded at the project Site and the project Site is located outside of the known distribution range of this species in Ireland.

3.13.6 Bird Species

Bird surveys completed for the proposed wind farm site recorded a total of 72 species, ten of which are Red-list status under the BoCCI (Gilbert et al., 2021). These include unidentified eagle[2], golden plover, grey wagtail, kestrel, lapwing, meadow pipit, redwing, snipe, stock dove and swift. A further 11 Amber-listed species were observed. A total of two Annex I species were recorded during hinterland surveys: golden plover and hen harrier.

During hen harrier surveys, a roost was not observed but suitable habitat exists on and near the site. During breeding wader surveys, no waders were observed breeding on site.

Table 3.5 lists the bird species that have been identified as key ornithological receptors for the assessment of ornithological impacts (see EIAR Chapter 7). The sensitivity of species as outlined on Table 3.5 are as per Percival (2003). The key ornithological receptors that are listed as special conservation interest bird species of SPAs and that occur within the zone of influence of the project are highlighted in yellow. These species are golden plover, lapwing and lesser-black backed gull.

Table 3.5: Key Ornithological Receptors

Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Golden plover (red-listed, annex I);	Grey wagtail (red-listed);	Goldcrest (amber-listed);	Buzzard (green-listed);

[2] An unidentified eagle (either a golden eagle or white-tailed sea eagle, both red-listed and Annex I) was observed over 5km from VP1 (outside of the site). This bird was northeast of the VP and heading south easterly towards the Comeragh mountains. Therefore, this species was likely a white-tailed sea eagle, as this species has been observed in the Comeraghs (Roche et al., 2014).

Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Hen harrier (amber-listed, annex I);	Kestrel (red-listed);	Greenfinch (amber-listed);	Great Black-backed gull (green-listed);
Merlin (amber-listed, annex I);	Lapwing (red-listed);	Herring gull (amber-listed);	Great spotted woodpecker (green-listed);
Peregrine (green-listed, annex I);	Meadow pipit (red-listed);	House martin (amber-listed);	Osprey (green-listed);
Red kite (red-listed, annex I)	Red grouse (red-listed);	House sparrow (amber-listed);	Sparrowhawk (green-listed).
	Redwing (red-listed);	Lesser black-backed gull (amber-listed);	
	Snipe (red-listed);	Linnet (amber-listed);	
	Stock dove (red-listed);	Mallard (amber-listed);	
	Swift (red-listed).	Sand martin (amber-listed);	
		Skylark (amber-listed);	
		Spotted flycatcher (amber-listed);	
		Starling (amber-listed);	

Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
		Swallow (amber-listed);	
		Teal (amber-listed);	
		Wheatear (amber-listed);	
		Willow warbler (amber-listed).	

3.13.7 Invertebrates

Invertebrates recorded at the proposed wind farm site include the small heath butterfly which was recorded within the commonage area during field surveys. Other species observed include orange tip, small tortoiseshell, common blue, green-veined white, meadow brown, ringlet and small white. The heath bumblebee *Bombus jonellus* was also recorded in this area of the proposed wind farm site.

No marsh fritillary were recorded at the proposed wind farm site during field surveys. The commonage area of Broemountain is the only area within the proposed wind farm site where the marsh fritillary larval foodplant, *Succisa pratensis*, occurs. This plant species is restricted to areas of wet grassland habitat to the west of the proposed wind farm site layout. This species rarely occurs within the footprint of the proposed wind farm site and no habitat suitable for supporting this species occurs within the layout. Where *Succisa pratensis* does occur it is largely as rare to occasional stands within a tall sward of *Molinia caerulea* wet grassland. The sward here is predominantly greater than 25cm in height making this habitat less suitable for marsh fritillary colonies (Fowles, 2005).

3.13.8 Aquatic Fauna

The three principal watercourses draining the project site are of a similar character and are representative of the Eroding Upland River (FL2) habitats. Each of the watercourses are representative of upland spate rivers characterised by fast water flow and incised banks. Each of the streams are subject to variable flow rates that are dependent on precipitation rates, with spate conditions occurring during periods of higher rainfall and ebb flows resulting during periods of low rainfall or dry conditions. During ebb flows much of the stream bed along these streams can be subject to drying out. The morphology of the Farnanes Stream is representative of high-gradient upland A/B-type zone (Rosgen, 1996) which are characterised by first order stream over high gradients, with steps and pools boulder strewn beds with cobbles and gravels and a straight profile. The Aughkilladoon Stream and the Lisleagh Stream are located in an area of gently sloping ground and are more representative of C-type zone (Rosgen, 1996). Partial shading occuring along the Aughkilladoon Stream and the Lisleagh Stream is caused by adjacent hedgerows. Shading is high along the Lisleagh Stream further downstream owing to the stream passing through an area of linear broad-leaved woodland. The Farnane Stream is more open with little shading occurring along the upper section of the stream to the west of the proposed wind farm site. Further downstream as it passes through conifer plantation shading is excessive.

The habitat rating of each of the three watercourses is provided in **Table 3.6**. This rating has been undertaken in line with the guidance outlined in Department of Agriculture's (Northern Ireland) Fisheries Division Advisory Leaflet "*The Evaluation of Habitat for Salmon and Trout*".

Table 3.6: Assessment of Fishery Habitat

Habitat	Parameter	Farnanes	Lisleagh	Aughkilladoon
Spawning	Flow 300 – 600mm^3/s	Flows recorded at 600l/s (significantly in excess of this guideline.	Flows recorded at 1,200l/s (significantly in excess of this guideline.	Flows recorded at 1,200l/s (significantly in excess of this guideline.
	Water Depth 150 – 700mm	Depths variable depending on weather conditions. Subject to low depths, <150mm.	Depths within this range.	Depths variable depending on weather conditions. Subject to low depths, <150mm.

	70% substrate 30 – 80mm diameter	Substrate within this range.	Substrate within this range.	Substrate within this range.
	Gravel depth 50 – 500mm	Gravel depths within this range.	Gravel depths within this range.	Gravel depths within this range.
	Grade	3	2	2
Nursery	50 – 250mm depth	Depths variable depending on weather conditions. Subject to low depths, <150mm.	Depths within this range.	Depths variable depending on weather conditions. Subject to low depths, <150mm.
	0.5 – 8% Gradient	Gradient outside this range.	Gradient within this range.	Gradient within this range.
	Stable cobble/boulder substrate >70%	Stable cobble boulder <70%.	Cobble within this range.	Stable cobble boulder <70%.
	Adequate cover provided	Adequate cover available.	Limited cover available.	Adequate cover available.
	Grade	3	2	3
Holding	Minimum depth – 1m	Absent	Absent	Absent
	Stable bankside and substrate	Absent	Absent	Absent
	Grade	4	4	4

As outlined in **Table 3.6** above the three primary streams draining the project site support conditions that are overall not representative of optimal spawning or nursery habitat for salmonids. These findings are supported by McGinnity et al. (2003) and Hendry et al. (2003) who note that salmonid watercourse are generally restricted to 2nd order and higher watercourses, whilst 1st order streams are unsuitable for spawning and the early life stage of salmonids. The 1st order nature of these streams along with their propensity for variable flow rates and the drying out of sections of river bed during periods of drier weather conditions are identified as the principal factors reducing the potential to support salmonids.

The Finisk River, downstream of the proposed wind farm site, is representative of a salmonid watercourse and provides suitable spawning, nursery and holding habitat for salmonids. Detailed fish assessments of the Finisk River have been completed by the IFI in 2010 and 2017 and using the results of these surveys the IFI have classified the fish ecological status of the Finisk River at each of the survey sites.

During the 2010 IFI electro-fishing monitoring the Finisk River was surveyed at Modelligo Bridge, downstream of the proposed wind farm site. Riffle and glide habitat were the dominant habitat types present within this section of the watercourse, with cobble and gravel making up the substrate conditions. Macrophyte vegetation present included a number of bryophytes and emergent species as well as filamentous green algae. The fish species recorded during the 2010 monitoring comprised Atlantic salmon, brown trout, eel and lamprey species. The river was classified as a "fast" growth rate river for brown trout. The 2010 fish ecological status of the Finisk River at the survey site was classified as Good.

During the 2017 IFI electro-fishing monitoring the Finisk River was surveyed at five sites: Site 1 to Site 5. Site 1 was located upstream of the proposed wind farm site at Tooraneena, Site 2 was located a short distance downstream of the entrance to the proposed wind farm site at Mountain Castle Bridge; Site 3 was located at Modelligo Bridge (the same site as that used during the 2010 survey; and Sites 4 and 5 were located further downstream. The species recorded at each of the survey sites are listed on **Table 3.7** below.

Table 3.7: Fish species recorded along the Finisk River during IFI 2017 Monitoring

Site No.	**1**	**2**	**3**	**4**	**5**
Species	***Present (Y/N)***	***Present (Y/N)***	***Present (Y/N)***	***Present (Y/N)***	***Present (Y/N)***
Brown trout	Y	Y	Y	Y	Y
European eel	N	N	Y	N	N
Lamprey sp.	N	N	N	N	N
Salmon	Y	Y	Y	Y	Y
Stone loach	N	N	N	N	N
Three-spined stickleback	N	N	N	N	N

Three fish species were recorded at five sites surveyed on the Finisk River in 2017. Brown trout and salmon were the most abundant species captured. Four age classes for brown trout (0+, 1+, 2+ and 3+) and three for salmon (0+, 1+ and 2+) were recorded. Site 3 was surveyed on two previous occasions (during 2010 as described above and also during 2014). Brown trout density was higher in 2017, when compared with 2010 and 2014, however, the opposite was observed for salmon. The IFI assigned one site – Site 4 - a fish ecological status of poor. One site - Site 2 -, which is located a short distance downstream of the proposed wind farm site entrance, was assigned good. Two sites (Sites 1 & 3) were assigned moderate status. A comparison of the 2010 and 2017 results for

Site 3 indicates that the fish ecological status at this site has decreased in the intervening years from Good to Moderate.

4 EUROPEAN SITES

Likely significant effects to six European Sites were identified during the screening for Appropriate Assessment. The potential for likely significant effects to occur to these European Sites is based upon the potential impacts that could arise as a result of the proposed development, the presence of pathways connecting the source of impact to qualifying features of interest of these six European Sites and the sensitivity of these qualifying features of interest to these impacts. The six European Sites identified as occurring within the zone of influence of the project and their qualifying features of interest are listed in Table 5.1 below. The qualifying features of interest of each of these European Sites that are connected via pathways to the proposed development and are located within its zone of influence are highlighted in yellow in Table 5.1

Table 4.1: European Sites and relevant qualifying features of interest (highlighted in yellow) within the zone of influence of the Proposed development

European Sites	Distance	Qualifying features of interest	Pathway	Source
Blackwater River SAC	0km – Intersected by the proposed grid connection route and the proposed haul route	Estuaries [1130]		
		Mudflats and sandflats not covered by seawater at low tide [1140]		
		Perennial vegetation of stony banks [1220]		
		Salicornia and other annuals colonising mud and sand [1310]		
		Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]		
		Mediterranean salt meadows (Juncetalia maritimi) [1410]		
		Floating River Vegetation [3260]	hydrological pathway	Proposed wind farm; proposed grid connection route; proposed haul route

European Sites	Distance	Qualifying features of interest	Pathway	Source
		Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]		
		Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]		
		Margaritifera margaritifera (Freshwater Pearl Mussel) [1029]		
		Austropotamobius pallipes (White-clawed Crayfish) [1092]	hydrological pathway	Proposed wind farm; proposed grid connection route; proposed haul route
		Petromyzon marinus (Sea Lamprey) [1095]	hydrological pathway	Proposed wind farm; proposed grid connection route; proposed haul route
		Lampetra planeri (Brook Lamprey) [1096]	hydrological pathway	Proposed wind farm; proposed grid connection route; proposed haul route
		Lampetra fluviatilis (River Lamprey) [1099]	hydrological pathway	Proposed wind farm; proposed grid connection route; proposed haul route
		Alosa fallax fallax (Twaite Shad) [1103]		
		Salmo salar (Salmon) [1106]	hydrological pathway	proposed grid connection route proposed haul route

European Sites	Distance	Qualifying features of interest	Pathway	Source
		Lutra lutra (Otter) [1355]	hydrological pathway	proposed grid connection route proposed haul route
		Trichomanes speciosum (Killarney Fern) [1421]		
Dungarvan Harbour SPA	11.5km to the southeast of the proposed wind farm site. 600m to the south of the grid connection route. 500m to the south of the N25 section of the haul route. .	Great Crested Grebe (Podiceps cristatus) [A005]	Hydrological pathway	Proposed grid connection route
		Light-bellied Brent Goose (Branta bernicla hrota) [A046]	Hydrological pathway	Proposed grid connection route
		Shelduck (Tadorna tadorna) [A048]	Hydrological pathway	Proposed grid connection route
		Red-breasted Merganser (Mergus serrator) [A069]	Hydrological pathway	Proposed grid connection route
		Oystercatcher (Haematopus ostralegus) [A130]	Hydrological pathway	Proposed grid connection route
		Golden Plover (Pluvialis apricaria) [A140]	Light emission pathway Mobile species pathway Hydrological pathway	Proposed wind farm Proposed grid connection route
		Grey Plover (Pluvialis squatarola) [A141]	Hydrological pathway	Proposed grid connection route
		Lapwing (Vanellus vanellus) [A142]	Light emission pathway Mobile species pathway Hydrological pathway	Proposed wind farm Proposed grid connection route
		Knot (Calidris canutus) [A143]	Hydrological pathway	Proposed grid connection route
		Dunlin (Calidris alpina) [A149]	Hydrological pathway	Proposed grid connection route
		Black-tailed Godwit (Limosa limosa) [A156]	Hydrological pathway	Proposed grid connection route
		Bar-tailed Godwit (Limosa lapponica) [A157]	Hydrological pathway	Proposed grid connection route
		Curlew (Numenius arquata) [A160]	Hydrological pathway	Proposed grid connection route
		Redshank (Tringa totanus) [A162]	Hydrological pathway	Proposed grid connection route
		Turnstone (Arenaria interpres) [A169]	Hydrological pathway	Proposed grid connection route
		Wetland and Waterbirds [A999]	Hydrological pathway	Proposed grid connection route

European Sites	Distance	Qualifying features of interest	Pathway	Source
Ballymacoda Bay SPA	25km southwest	Wigeon (Anas penelope) [A050]		
		Teal (Anas crecca) [A052]		
		Ringed Plover (Charadrius hiaticula) [A137]		
		Golden Plover (Pluvialis apricaria) [A140]		
		Grey Plover (Pluvialis squatarola) [A141]		
		Lapwing (Vanellus vanellus) [A142]		
		Sanderling (Calidris alba) [A144]		
		Dunlin (Calidris alpina) [A149]		
		Black-tailed Godwit (Limosa limosa) [A156]		
		Bar-tailed Godwit (Limosa lapponica) [A157]		
		Curlew (Numenius arquata) [A160]		
		Redshank (Tringa totanus) [A162]		
		Turnstone (Arenaria interpres) [A169]		
		Black-headed Gull (Chroicocephalus ridibundus) [A179]		
		Common Gull (Larus canus) [A182]		
		Lesser Black-backed Gull (Larus fuscus) [A183]	Light emission pathway Mobile species pathway	Proposed wind farm
		Wetland and Waterbirds [A999]		
Ballycotton Bay SPA	35km southwest	Teal (Anas crecca) [A052]		
		Ringed Plover (Charadrius hiaticula) [A137]		
		Golden Plover (Pluvialis apricaria) [A140]		
		Grey Plover (Pluvialis squatarola) [A141]		
		Lapwing (Vanellus vanellus) [A142]		
		Black-tailed Godwit (Limosa limosa) [A156]		
		Bar-tailed Godwit (Limosa lapponica) [A157]		
		Curlew (Numenius arquata) [A160]		
		Turnstone (Arenaria interpres) [A169]		

European Sites	Distance	Qualifying features of interest	Pathway	Source
		Common Gull (Larus canus) [A182]		
		Lesser Black-backed Gull (Larus fuscus) [A183]	Light emission pathway Mobile species pathway	Proposed wind farm
		Wetland and Waterbirds [A999]		
Cork Harbour SPA		Little Grebe (Tachybaptus ruficollis) [A004]		
		Great Crested Grebe (Podiceps cristatus) [A005]		
		Cormorant (Phalacrocorax carbo) [A017]		
		Grey Heron (Ardea cinerea) [A028]		
		Shelduck (Tadorna tadorna) [A048]		
		Wigeon (Anas penelope) [A050]		
		Teal (Anas crecca) [A052]		
		Pintail (Anas acuta) [A054]		
		Shoveler (Anas clypeata) [A056]		
		Red-breasted Merganser (Mergus serrator) [A069]		
		Oystercatcher (Haematopus ostralegus) [A130]		
		Golden Plover (Pluvialis apricaria) [A140]		
		Grey Plover (Pluvialis squatarola) [A141]		
		Lapwing (Vanellus vanellus) [A142]		
		Dunlin (Calidris alpina) [A149]		
		Black-tailed Godwit (Limosa limosa) [A156]		
		Bar-tailed Godwit (Limosa lapponica) [A157]		
		Curlew (Numenius arquata) [A160]		
		Redshank (Tringa totanus) [A162]		
		Black-headed Gull (Chroicocephalus ridibundus) [A179]		
		Common Gull (Larus canus) [A182]		
		Lesser Black-backed Gull (Larus fuscus) [A183]	Light emission pathway Mobile species pathway	Proposed wind farm

European Sites	Distance	Qualifying features of interest	Pathway	Source
		Common Tern (Sterna hirundo) [A193]		
		Wetland and Waterbirds [A999]		
Saltee Island SPA	70km east	Fulmar (Fulmarus glacialis) [A009]		
		Gannet (Morus bassanus) [A016]		
		Cormorant (Phalacrocorax carbo) [A017]		
		Shag (Phalacrocorax aristotelis) [A018]		
		Lesser Black-backed Gull (Larus fuscus) [A183]	Light emission pathway Mobile species pathway	Proposed wind farm
		Herring Gull (Larus argentatus) [A184]		
		Kittiwake (Rissa tridactyla) [A188]		
		Guillemot (Uria aalge) [A199]		
		Razorbill (Alca torda) [A200]		
		Puffin (Fratercula arctica) [A204]		

4.1 BLACKWATER RIVER SAC

The Blackwater River SAC is selected for the occurrence of a range of Annex 1 habitats and Annex 2 species along the length of the river channel and are associated with both instream and riparian areas of the river. The site supports a wide range of habitats, including freshwater lotic habitats, woodlands and coastal habitats.

The qualifying features of interest of this SAC that have been identified as occurring within the zone of influence of the proposed development are:

- 3260 Floating River Vegetation
- 1095 sea lamprey
- 1096 brook lamprey

- 1099 river lamprey
- 1106 Atlantic salmon
- 1355 otter
- 10922 white-clawed crayfish

A hydrological pathway connects elements of the project to the Floating River Vegetation habitat and the above listed freshwater fish populations and otter populations of this SAC. These qualifying features are sensitive to downstream surface water quality impacts.

4.2 DUNGARVAN HARBOUR SPA

Dungarvan Harbour SPA is located in south-west Co. Waterford and includes Dungarvan Harbour as far east as Ballynacourty Point and west to include the tidal sections of the River Brickey. Three rivers flow into Dungarvan Harbour - the Colligan River, which runs south from the Comeragh Mountains, enters the bay by Dungarvan town, the River Brickey, which flows into the harbour from the west, and the Glendine River which enters from the north. The Colligan River is crossed by the proposed grid connection route and this crossing establishes a pathway along the river between the proposed grid connection route and this SPA. The absence of a large river entering the SPA means that the bay is essentially a marine habitat, although it dries out at low tide to give extensive mud and sand flats. The inner bay is extremely sheltered, being almost closed off by the linear Cunnigar spit to the east.

Given the presence of the pathway between the proposed grid connection route and this SPA, all special conservation interests of the SPA occur within the zone of influence of this element of the project. In addition, given the location of the proposed wind farm within the foraging range of golden plover and lapwing, both of which have been identified as key ornithological receptors for the wind farm, a mobile species pathway and a light emission pathway (from operational turbines) is also triggered.

4.3 BALLYMACODA BAY SPA

This coastal site stretches north-east from Ballymacoda to within several kilometres of Youghal, Co. Cork. It comprises the estuary of the Womanagh River, a substantial river which drains a large

agricultural catchment. Part of the tidal section of the river is included in the site and on the seaward side the boundary extends to, and includes, Bog Rock, Barrel Rocks and Black Rock.

The special conservation interests of this SPA that have been identified as occurring within the zone of influence of the proposed development are:

- Lesser-Black Backed Gull

Lesser-black backed gull has been identified as occurring within the zone of influence of all elements of the proposed wind farm site. This is due to the wide foraging range of this species and its potential to range from this SPA to areas that include the proposed wind farm site.

4.4 BALLYCOTTON BAY SPA

Situated on the south coast of Co. Cork, Ballycotton Bay is an east-facing coastal complex, which stretches northwards from Ballycotton to Ballynamona, a distance of c. 2 km. The site comprises two sheltered inlets which receive the flows of several small rivers. The southern inlet had formerly been lagoonal (Ballycotton Lake) but breaching of the shingle barrier in recent times has resulted in the area reverting to an estuarine system. The principal habitat within the site is inter-tidal sand and mudflats. These are mostly well-exposed and the sediments are predominantly firm sands. The inter-tidal flats provide the main feeding habitat for the wintering birds. Sandy beaches are well represented. Salt marshes fringe the flats in the sheltered inlets and these provide high tides roosts. A small area of shallow marine water is also included.

The special conservation interests of this SPA that have been identified as occurring within the zone of influence of the proposed development are:

- Lesser-Black Backed Gull

Lesser-black backed gull has been identified as occurring within the zone of influence of all elements of the proposed wind farm site. This is due to the potential wide-ranging foraging distance of this species and its potential to range from this SPA to areas that include the proposed wind farm site.

4.5 CORK HARBOUR SPA

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poulnabibe inlets.

The special conservation interests of this SPA that have been identified as occurring within the zone of influence of the proposed development are:

- Lesser-Black Backed Gull

Lesser-black backed gull has been identified as occurring within the zone of influence of all elements of the proposed wind farm site. This is due to the wider foraging range of this species and its potential to range from this SPA to areas that include the proposed wind farm site.

4.6 SALTEE ISLAND SPA

The Saltee Islands SPA is situated some 4-5 km off the coast of south Co. Wexford and comprises the two islands, Great Saltee and Little Saltee, and the surrounding seas both between them and to a distance of 500 m from them. The bedrock of the islands is of Precambrian gneiss and granite. Both islands have exposed rocky cliffs on their south and east – those on Great Saltee being mostly c. 30 m high, those on Little Saltee about half this height. The northern and western sides of both islands are fringed with shingle and boulder shores, backed by boulder clay cliffs, as well as small areas of intertidal sandflats. Sea caves occur at the base of the cliffs on Great Saltee.

The special conservation interests of this SPA that have been identified as occurring within the zone of influence of the proposed development are:

- Lesser-Black Backed Gull

Lesser-black backed gull has been identified as occurring within the zone of influence of all elements of the proposed wind farm site. This is due to the wider foraging range of this species and its potential to range from this SPA to areas that include the proposed wind farm site.

5 EXAMINATION OF IMPACTS

The following subsections provide an examination of the impacts that could arise as a result of the elements of the proposed development during the construction, operation and decommissioning phases and adversely affect the European Sites and relevant qualifying features of interest occurring within the zone of influence of the proposed development.

5.1 BLACKWATER RIVER SAC

5.1.1 Water Quality Impacts

The proposed wind farm, grid connection route and the haul route widening areas have been identified as the source of potential impacts to Floating River Vegetation habitat, Annex 2 fish species, white-clawed crayfish and otter populations of this SAC. The construction phase of the proposed wind farm and the works associated with the installation of ducts and electrical cabling along the public road and the road widening works for haul route represent the source of potential water quality impacts to these qualifying feature receptors.

The potential impacts that may arise as a result of the proposed development relate to changes in hydraulic loads and the discharge of contaminated surface water during the construction works associated with the installation of the proposed grid connection ducting and cabling and the works associated with the haul route widening.

The type of impacts to water quality that could adversely affect the conservation status of these species are examined in the following subsections.

5.1.1.1 Hydraulic Loading

The proposed wind farm development has the potential to result in increased volumes of runoff during the operational phases of the wind farm relative to baseline conditions. This is a function of the progressive excavation and removal of vegetation cover and replacement with hardstanding surfaces (effectively or assumed impermeable) associated with turbine hardstands and access tracks and the installation of constructed drainage around the wind farm footprint and thus removing the hydraulic absorption/buffer control from areas of hardstand within the project site.

Increased runoff, or an increased hydrological response to rainfall has the potential to exacerbate flooding events and exacerbate flooding and erosion within the boundary of the wind farm site. This in turn will have the potential to generate increased rates of suspended solids within waters draining the project site and for their conveyance downstream to the Blackwater River SAC. Further discussion of the release of suspended solids are set out below.

5.1.1.2 Release of Suspended Solids

Earthworks associated with the construction phase of the wind farm will require the denuding of surface vegetation within the proposed wind farm site. In the absence of an appropriate design and mitigation measures, such activities will have the potential to generate silt-laden runoff from the works area and for this runoff to be discharged via first order streams to the Finisk River section of the Blackwater River SAC.

Runoff contaminated with suspended solids will add turbidity to the receiving surface water body. Nutrients that are associated with the solids (inorganic nutrients such as phosphorus and organic such as hydrocarbons, and sewage if present) can lead to eutrophication of the water environment.

The degree to which inorganic solids are entrained in runoff is related to the particle sizing of the soil components. Smaller inorganic particles (e.g. clay) will be easily entrained and will remain in suspension for a longer period than larger particles (silt / sand), and will require lower flow rates and longer retention rates to settle out of the water column when given the opportunity.

Release of suspended solids can be attributed to enhanced nutrient enrichment. This is highly dependent on the type of soil, for example; peat released in water will disintegrate and most of the constituents of the peat material (carbon) will eventually dissolve in to the water column and / or be consumed by micro-organisms. However, peat and other soils / subsoils will contribute varying degrees of loading of various compounds and nutrients, including Nitrogen (N) and Phosphorous (P) compounds, which are attributed to Nutrient Enrichment, or excessive loading of N and P in waters leading to eutrophication and potentially profound adverse impacts on ecological attributes

5.1.1.3 Release of Hydrocarbons

Plant equipment and vehicles associated with works to be undertaken at the proposed wind farm site introduce the risk of hydrocarbon (fuel and oil) spillages and leaks, particularly in relation to regular refuelling which in turn implies the requirement of a fuelling station which will likely include fuel storage on site or will be supplied by fuel tanker scheduled to refuel the plant machinery directly.

Similar to suspended solids arising from the activities at the proposed wind farm site described above, hydrocarbons accidentally introduced to the environment will likely be intercepted by drainage features occurring at the wind farm site.

Hydrocarbons are a pollutant risk due to their toxicity to all flora and fauna organisms. Hydrocarbons chemically repel water and sparingly dissolve in water. The majority of hydrocarbons are light non-aqueous phase liquids (L-NAPL's) which means that they are less dense than water and therefore float on the water's surface (whether surface water or groundwater). Hydrocarbons adsorb ('stick') onto the majority of natural solid objects they encounter, such as vegetation, animals, and earth materials such as soil. They burn most living organic tissue, such as vegetation, due to their volatile chemistry. They are also a nutrient supply for adapted micro-organisms, which can then deplete dissolved oxygen at a rapid rate and thus kill off water-based vertebrate such as Atlantic salmon and lamprey species.

Potential incidents or accidental release of contaminants will likely be short lived or temporary, however the potential impacts to downstream receptors such as Floating River Vegetation Habitat, and Annex 2 fish species can be long lasting, or permanent.

5.1.1.4 Release of Construction or Cementitious Materials

The proposed wind farm has the potential to result in the accidental spillage or deposition of construction waste into soils and in turn impact on surface water runoff, or accidental spillages directly intercepted by drainage or surface water networks associated with the wind farm site.

Depending on the material in question, the introduction of such materials can lead to a local change in hydrochemistry and impact on sensitivities such as ecology. For example, the introduction of cementitious material (concrete/cement/lean mix etc.) can lead to changes in soil and water pH, and increased concentrations of sulphates and other constituents of concrete. Fresh or wet concrete

is a much more significant hazard when compared to old or set concrete which is considered inert in comparison, however it should also be noted that any construction materials or non-natural materials deposited, even if inert, are considered contaminants.

Surface water runoff coming into contact with concrete structures will be impacted to a degree. However, water percolating through lean mix will be impacted significantly.

5.1.1.5 Release of Wastewater or Sanitation Contaminants

Temporary sanitation facilities will be provided at the temporary construction compound during the construction phase. The presence of these facilities will introduce the potential for the accidental leakage of wastewater or sanitation chemicals associated with wastewater sanitation onto soils, and into the local receiving sub-catchment and downstream to the Finisk catchment during the construction phase of the project.

Wastewater and wastewater sanitation chemicals are pollutant risks due to their potential impact on the ecological productivity or chemical status of surface water systems, and toxicity to water-based flora and fauna.

The level of risk posed by such facilities is dependent on the condition and upkeep of the facilities that are put in place, and the chemical agents used if applicable.

The potential impacts associated with wastewater sanitation is the potential for sanitation chemicals, particularly related to porta-loos, accidentally spilling or leaking and being intercepted by surface water drainage features and in turn surface water networks associated with the proposed development.

5.1.1.6 Surface water Crossings

The proposed wind farm will comprise one crossing of natural stream along the proposed Access Track. This will entail crossing comprise a clear span bridge and will not result in any modifications to the watercourse channels at the crossing locations. In addition, no instream works will be required during the construction of this watercourse. As such there will be no direct physical impacts to watercourses as a result of the proposed wind farm.

Notwithstanding the absence of instream works, potential impacts on hydrology and water quality associated with the construction or upgrading of water course crossings include:

- Alteration of flow regime potentially leading to erosion and/or flooding and
- Harmful discharges during construction and operation, in particular the release of suspended solids.

Unmitigated, the alteration of watercourse crossings poses a high level of risk and potentially profound adverse, potentially permanent impacts on the quality and flow characteristics of the receiving surface water feature.

5.1.1.7 Horizontal Directional Drilling of 2 No. Watercourses

Horizontal directional drilling will be required to cross two watercourses along the proposed grid connection route. These will be along the Finisk River and the Ballykerin Upper Stream. Launch pits and receptor pits will be established along the existing public road corridor to facilitate the horizontal directional drilling. During horizontal directional drilling fluid is pumped down the drill bore under pressure. The drilling fluid to be used during horizontal directional drilling for the project will be Clearbore. Clearbore is a polymer-based product that is designed to instantly break down and become chemically destroyed in the presence of small quantities of calcium hypochlorite. The product is not toxic to aquatic organisms and is biodegradable.

The drilling fluid will become mixed with material drilled in the borehole to form a drilling mud. As the drilling is completed under pressure any blockages in the pilot-hole during the pilot drill or reaming can result in the inadvertent breakout of drilling mud within the pilot-hole. Such breakouts can occur where an alternative path of less resistance through the overburden is present during a blockage. The breakout of drilling mud can result in contamination in the vicinity of the breakout. The locations where a breakout would present the greatest risk to the Blackwater River SAC is during drilling under the main channel of the Finisk River. Populations of the Atlantic salmon and white-clawed crayfish are known to occur along this river. Atlantic salmon and white-clawed crayfish are also likely to occur in the Ballykerin Upper Stream tributary of the Finisk River crossed by the proposed electrical cable route. The breakout of drilling muds to the main channel of the Finisk Riveror the Ballykerin Upper Stream crossed by the proposed electrical cable route will have the potential to undermine the status of instream habitats within these watercourses with resultant adverse effects to populations of these species.

Furthermore, the release of such material to the Munster River catchment will have the potential to result in a deterioration in conditions for otters, white-clawed crayfish and lamprey which are known to occur in the Munster River catchment.

5.1.2 Implication of Water Quality Impacts for Relevant Qualifying Features of Interest

5.1.2.1 Qualifying Fish Species

The negative impacts of silt-laden runoff to fish species such as Atlantic salmon include:

- The settlement of silt on spawning redds resulting in the infilling of intra-gravel voids and the smothering of eggs and newly hatched fish.
- The settlement of silt on river beds can smother and displace macroinvertebrates, reducing the prey resource for fish species.
- Suspended solids can settle in pool and riffle habitats resulting in a reduction in the availability and quality of rearing habitat for fish.
- Silt-laden runoff can result in a reduction in transparency, impairing the ability of fish and otters to find food.
- Suspended solids can abrade or clog salmonid fish gills. Whilst high concentrations of suspended solids are required to clog fish gills, small concentrations can result in abrasion to gills and create the potential for infection.

The negative impacts of silt-laden runoff to otters include a reduction in suitable foraging habitat and prey availability.

Inputs of suspended solids can also contribute to nutrient enrichment in receiving waters as a result of the release of nutrient bound to sediments following mobilisation (Sharpley et al., 1992; Ballatine et al. 2006). The degree to which sediment loss contributes to nutrient enrichment is dependent on the type of soil, for example; peat released in water will disintegrate and most of the constituents of the peat material (carbon) will eventually dissolve in to the water column and/or be consumed by micro-organisms. However, peat and other soils/subsoils will contribute varying degrees of loading of various compounds and nutrients, including Nitrogen (N) and Phosphorous

(P) compounds, which are attributed to nutrient enrichment, or excessive loading of N and P in waters. The release of such sediment in silt-laden surface water runoff from works at locations along the proposed grid connection route and at the haul route widening locations noted above will have the potential to contribute to nutrient inputs to watercourse that are sensitive to nutrient inputs, increases in primary productivity and ultimately the adverse effects of eutrophication.

5.1.2.2 White-clawed Crayfish

The threats and pressures to white-clawed crayfish in Ireland relate to the spread of pathogens and invasive crayfish species (NPWS, 2019b). The NPWS (2019b) do not list negative impacts to water quality of freshwater bodies as a pressure or threat to this species. However, they do include water quality as an attribute defining the favourable conservation status of this species and have set a biological water quality target of a minimum of Q3-4 for the white-clawed crayfish population of the Blackwater River SAC. Demers & Reynolds (2002) suggested that white-clawed crayfish can occur in water that is rated as moderately polluted, while Holdich (2003) pointed to poor water quality as a limiting factor in achieving the favourable conservation status of this species. Overall, it is considered that any perturbations to water quality as a result of the proposed development will have the potential to undermine the favourable conservation condition of crayfish within the Finisk River and the Blackwater River SAC downstream.

5.1.2.3 Otters

The main pressure affecting this species in Ireland is pollution, particularly from organic pollution resulting in fish kills and accidental deaths as a result of road traffic and fishing gear (NPWS, 2019b). The NPWS also list diffuse and point source pollution of freshwaters as a likely indirect impact to otters through changes in prey abundance. However, the NPWS conclude that these threats are considered to produce local impacts only and are not of significance for the national otter population. Nevertheless, such impacts have the potential to be of local significance in the context of a population supported by an SAC river catchment. As such, in the event of pollution arising from construction activities migrating to suitable otter foraging habitat downstream of the project, the potential will exist for indirect impacts to the conservation status of otters within the SAC, by way of reductions in the abundance of prey species.

No otter breeding sites are located in the vicinity of the proposed grid connection route crossings of the Finisk River and, given the low levels of noise and vibration predicted to be generated during the installation of the electrical cables within the existing road and bridge formations, there will be no potential for significant disturbance to otters during this element of the project.

5.1.2.4 Floating River Vegetation

Examples of Floating River Vegetation are likely to occur downstream of the site along the Finisk River and within the Blackwater River SAC.

The instream Floating River Vegetation habitat generally requires conditions along stream beds to be low in silt content, except for localised deposits at channel margins and along the channel bed where macrophytes can take root (Hatton-Ellis et al. 2003). High concentrations of suspended solids can also reduce transparency in the water column and perturb photosynthesis and plant growth (Mainstone et al. 2000).

5.2 DUNGARVAN HARBOUR SPA

5.2.1 Water Quality Impacts

A hydrological pathway has been identified between the proposed grid connection route and the Dungarvan Harbour SPA via the Colligan River. The Colligan River will be crossed by the proposed grid connection route approximately 1.8km upstream of the SPA. The electrical cable for the grid connection route will be installed in ducts within the formation of the existing N72 road and bridge that crosses the N72.

As the proposed grid connection route follows along existing public roads there will be no potential for this element of the proposed development to result in an increase in the rate of surface water runoff to the Colligan River.

The potential impacts that may arise as a result of the works associated with the installation of the grid connection ducting and cabling relate to the generation and discharge of contaminated surface water during these construction works. The contaminants that could be generated during these works comprise suspended solids and hydrocarbons.

5.2.1.1 Release of Suspended Solids

Earthworks and excavations associated with the grid connection route crossing of the Colligan River will have the potential to generate particulate/silt-laden surface waters from the works area and for this to be discharged via runoff or existing roadside drains to the Colligan River and on downstream to the wetland habitats of the Dungarvan Harbour SPA.

5.2.1.2 Release of Hydrocarbons

Plant equipment and vehicles associated with excavation, material transport, and construction activities introduce the risk of hydrocarbon (fuel and oil) spillages and leaks, particularly in relation to regular refuelling which in turn implies the requirement of a fuelling station or y supply by fuel tanker scheduled to refuel the plant machinery directly. Similar to suspended solids arising from excavation activities, hydrocarbons accidentally introduced to the Colligan River during works associated with the grid connection route crossing will be conveyed downstream to the wetland habitats of the Dungarvan Harbour SPA.

Hydrocarbons are a pollutant risk due to their toxicity to all flora and fauna organisms, including the special conservation interest bird species of this SPA. Potential incidents or accidental release of contaminants will likely be short lived or temporary, however the potential impacts to downstream receptors such as wetland habitats and special conservation interest bird species can be long lasting.

5.2.2 Impacts Resulting from Interaction with the Proposed Wind Farm

Two species, namely golden plover and lapwing, that are special conservation interest bird species of the Dungarvan Harbour SPA have been identified as key ornithological receptors for the proposed wind farm. As the proposed wind farm is located within the foraging range of these two species, a precautionary approach has been adopted for this examination, and the population of these two species recorded at and in the vicinity of the proposed wind farm site are considered to form part of the Dungarvan Harbour SPA populations.

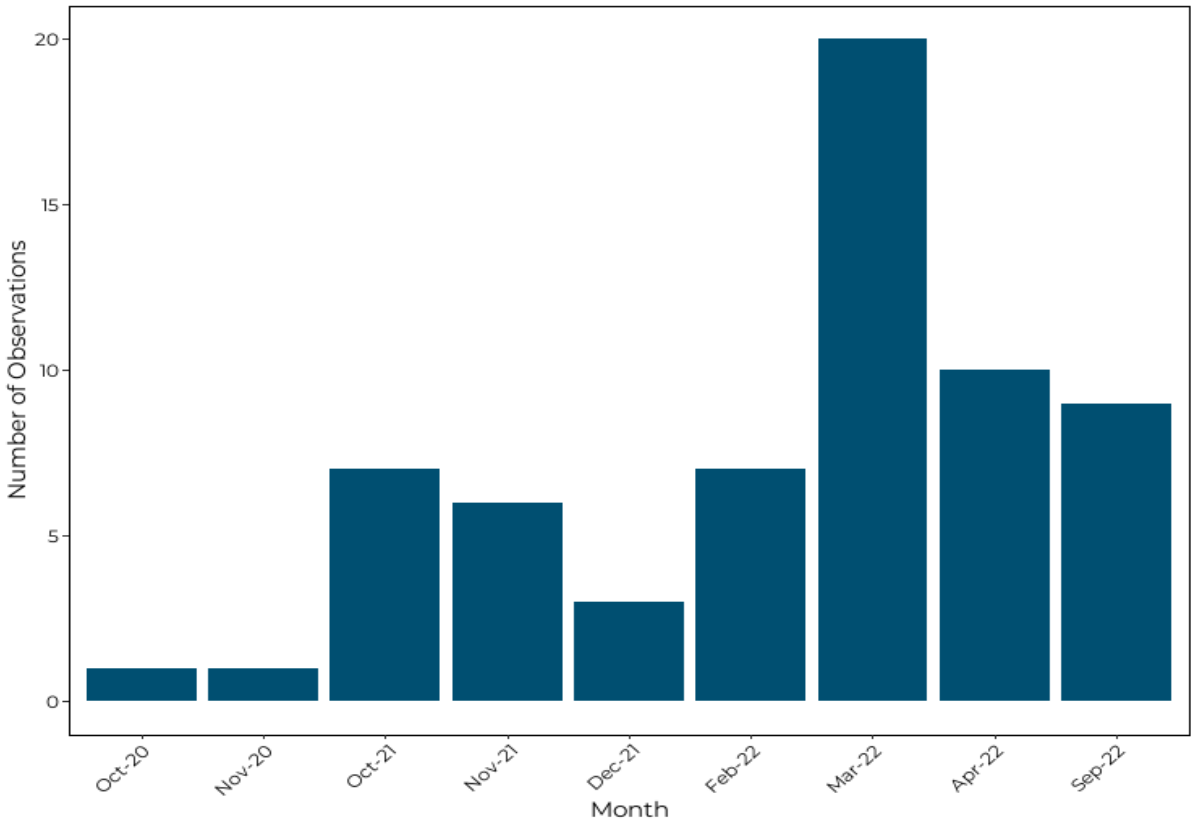
5.2.3 Golden plover

Golden plover was recorded on 19 occasions during breeding season vantage point surveys completed for the proposed wind farm. These records are associated with migrating flocks on passage north during spring in April and south during autumn in September. All summer records refer to birds either on the cusp of migrating north in spring (records only occur between the 9th and 24th April) or having just arrived back after the breeding season (records only occur between and 16th and 29th September). Numbers of birds involved varied from four birds recorded from VP3 on the 29th September 2022, with a peak of 125 birds from VP1 on the 9th April 2022, and an overall average of 53.21 birds. No golden plover were noted breeding at or in the vicinity of the proposed wind farm site during bird surveys.

This species was recorded on 45 occasions over the two non-breeding season (2020/21 & 2021/22) vantage point surveys. There were only two observations of golden plover during the winter 2020/21 season both from VP2. On the 6th of October 2020, 27 golden plover were recorded flying in the height band 50 – 100m for a total time of 75 seconds. The birds were noted as flying in a northerly direction in a tight flock formation, circling back at times and calling. The second and final record of the species during the first winter of surveys was recorded on the 21st of November 2020. A flock of 60 birds was observed for 60 seconds circling frequently and gradually moving northwards. Neither of these two sightings involved the species landing within the site.

During the second winter season 2021/22 golden plover was recorded on 43 occasions from all VPs, with the majority (23) from VP1. Golden plover were recorded across all months during VP surveys with the exception of January 2022. The highest number of observations was recorded in March 2022 (20 observations), with 7 observations each in October 2021 and February 2022, 6 observations in November 2021 and 3 in February 2022 (see Graph 5.15.1). Over the winter period 28 observations were of flocks of golden plover in flight while 15 observations involved the species on the ground, roosting, or foraging. These included 8 sightings in March, no. 3 each in October and November with one sighting of a flock of 500m birds landing on heath / acid grassland in Broemountain. The core foraging and roosting area for the species at Broemountain is indicated on Figure 5.1. The area is made up of 17.63 hectares of dry acid grassland and dry heath habitat with intermittent stands of dense bracken. Dense bracken which is present as monoculture stands dominated by the species and as part of mosaics with other habitat does not provide suitable roosting or foraging habitat for the species. Removing monoculture stands dominated with bracken (total area 1.18 hectares) from the total area provides a conservative estimate of 16.45 hectares of potential habitat for the species.

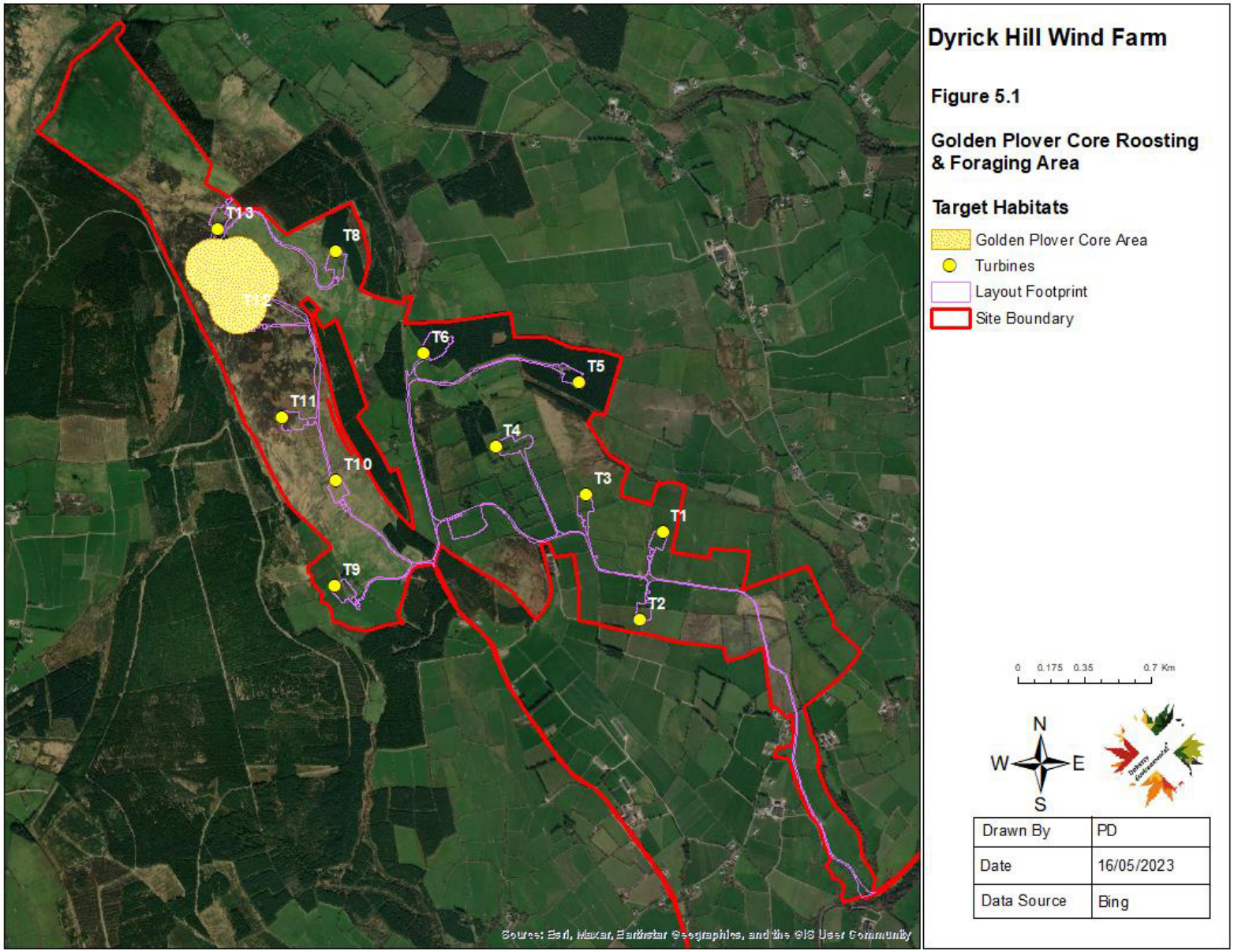
Across both seasons numbers varied from one bird to 500, with an average of 146.5 birds (stdev +/- 160.78). The largest number recorded during surveys were a flock of 500 birds recorded in flight from VP1 on the 22nd of February 2022.



Graph 5.1: Number of observations of golden plover per month[3] during vantage point surveys.

The zone of sensitivity for golden plover, which is underpinned by this species' wintering foraging distance, used as part of this examination is circa 12km. The circa 12km distance is sourced from Gillings & Fuller (1999) who reported winter season foraging flights of up to 12km for golden plover. The circa 12km golden plover foraging range results in an overlap between the SPA population and the boundary of proposed wind farm site. It is noted that all proposed turbine

[3] Months where no observations were recorded have been omitted from the graph.


T13
T8
T12
T6
T5
T11
T4
T10
T3
T1
T9
T2
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Dyrick Hill Wind Farm
Figure 5.1
Golden Plover Core Roosting & Foraging Area
Target Habitats
Golden Plover Core Area
Turbines
Layout Footprint
Site Boundary
0 0.175 0.35 0.7 Km
N
W
E
S
Drawn By PD
Date 16/05/2023
Data Source Bing

locations are situated outside the 12km buffer distance from this SPA, with the nearest turbine, T1 being located approximately 12.3km from the SPA boundary. The nearest point of the commonage area of Broemountain, which represents the area of the proposed wind farm site where golden plover were recorded foraging, is located approximately 13.5km from the nearest point of the Dungarvan Harbour SPA and as such is outside of the circa 12km foraging range recorded by Gillings & Fuller (1999). However, in addition to the maximum foraging distance of circa 12km quoted by Gillings & Fuller (1999), they also identify the extremely mobile nature of golden plover within the winter non-breeding season. They describe how golden plover flocks may use one or two particular areas for several weeks before moving to another area, which may be several kilometres away. Given that Dungarvan Harbour represents the closest area of suitable coastal intertidal foraging habitat to the proposed wind farm site, it is considered likely that the flocks recorded at Broemountain may also rely on the intertidal habitats at Dungarvan Harbour during the winter season. Such movements of golden plover between Dungarvan Harbour and the upland areas surrounding the proposed wind farm are also supported by direct observations made during vantage point surveys. For instance a flock of 27 golden plover were observed on the 6th October 2020 flying towards the proposed wind farm site from the Dungarvan direction. In light of the above, and adopting a precautionary approach, the golden plover flocks recorded at the Broemountain commonage area are considered to form part of the Dungarvan Harbour SPA golden plover population.

The potential impacts posed by the proposed wind farm to golden plover arise during the construction and decommissioning phase and the operation phase. These are considered in the following sub-sections.

5.2.3.1 Habitat Loss during the Construction Phase

The construction phase will have the potential to result in habitat loss or alteration for bird species including golden plover. Habitat loss can be direct through land take of foraging habitats for key species or indirect such as effective habitat loss through avoidance of lands that are subject to disturbance by construction activities. The core foraging and roosting area for the species within the ps is located within the Broemountain commonage area as shown on Figure 5.1. Adopting a worst-case scenario, there will be a direct and indirect loss of 16.45 Ha of suitable habitat for golden plover.

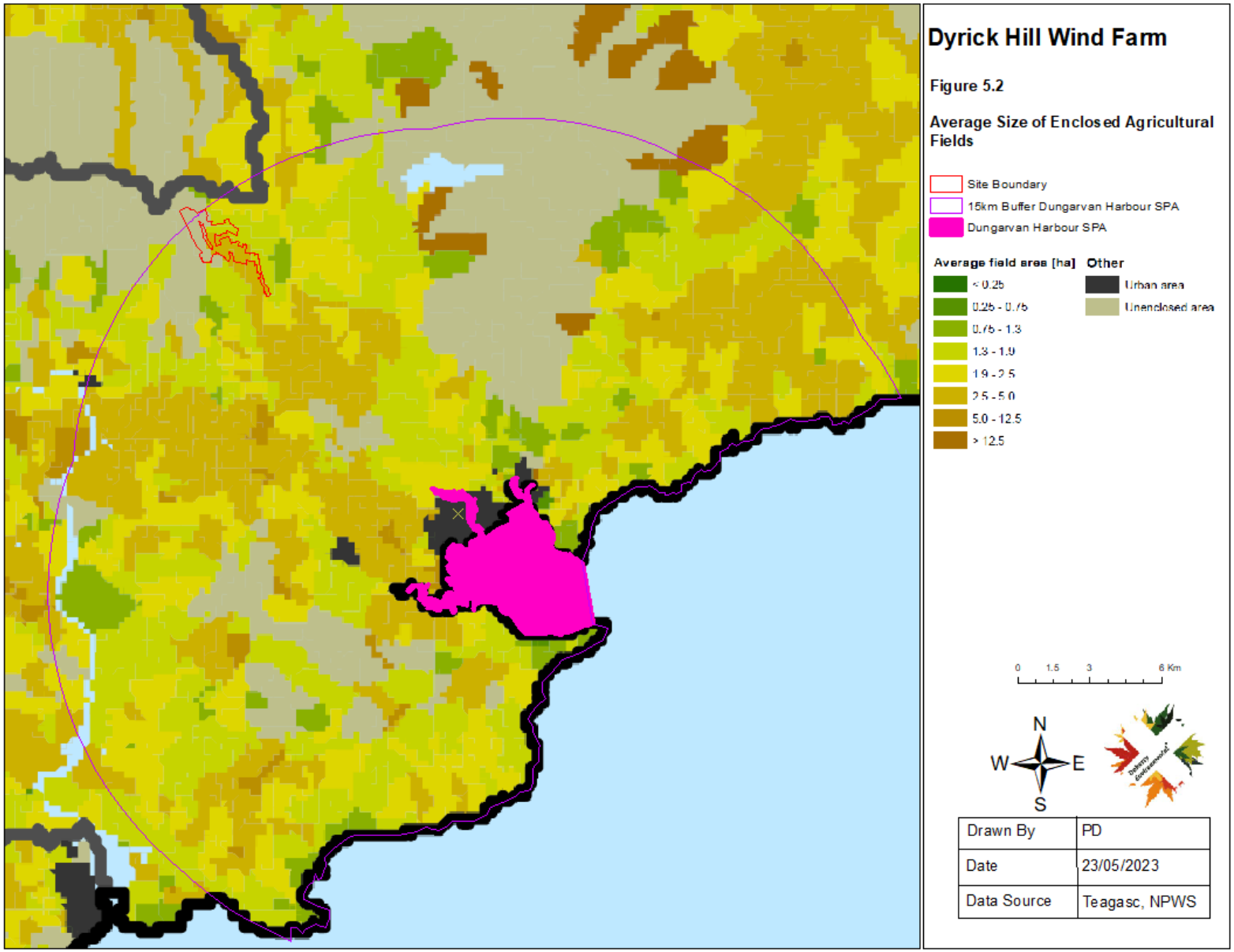
During bird surveys golden plover were observed foraging and roosting in a core area at Broemountain (see Figure 5.1) but were also recorded in and over improved agricultural grassland. Golden plover are considered to be representative of a “terrestrial wader” where they typically

forage across grassland and use tidal flats primarily for roosting. The Dungarvan Harbour SPA Conservation Objectives Supporting Documentation (NPWS, 2011) noted an absence of terrestrial foraging by golden plover during detailed non-breeding season baseline surveys of the SPA in 2010/2011 but goes on to state that this species is likely to occur in suitable fields around the site that are not included within the SPA.

The terrestrial foraging habitat preferences of golden plover have been studied by Fuller & Youngman (1979), Barnard & Thompson (1985), Gregory (1987), Milsom et al. (1998), Gillings & Fuller (1999), Gillings et al. (2007). These studies have identified arable land in the form of cereal stubble and harrowed tillage and grassland pasture as the preferred terrestrial habitat of golden plover during the non-breeding season. In pasture grassland settings golden plover have been found to be closely associated with low sward grassland whilst avoiding tall sward grassland. Pasture with swards heights of less than 10cm were found to be selected by golden plover, whilst avoiding pasture characterised by taller swards (Gregory, 1987; Milsom et al.,1998; Gillings & Fuller,1999). Large open fields are also preferred by golden plover (Milson et al., 1998; Gillings et al., 2007), with hedgerow removal and field amalgamation being cited as examples of farm intensification that may have enhanced golden plover foraging habitat. It is noted that the wider landscape surrounding the project site is characterised by large unenclosed upland moorland and areas of intensive agricultural where field size is average[4] to above average. Figure 5.2 shows the average field size in the 15km buffer zone surrounding the Dungarvan Harbour SPA. As can be seen on Figure 5.2 large areas of the land cover occurring within the 15km buffer zone surrounding the Dungarvan Harbour SPA are characterised by large field size patterns. Golden plover have also been found to respond to suitable foraging habitat availability (Gillings et al., 2007).

Given these habitat requirements for non-breeding golden plover, GIS analysis was completed to estimate the area of potentially suitable habitat occurring within the wider area surrounding the Dungarvan Harbour SPA. This analysis was completed in order to establish a baseline estimate of the potential suitable habitat for the Dungarvan Harbour SPA golden plover population against which the loss of suitable habitat for golden plover arising from the proposed wind farm could be considered. The landcover within a 15km buffer area surrounding the Dungarvan Harbour SPA

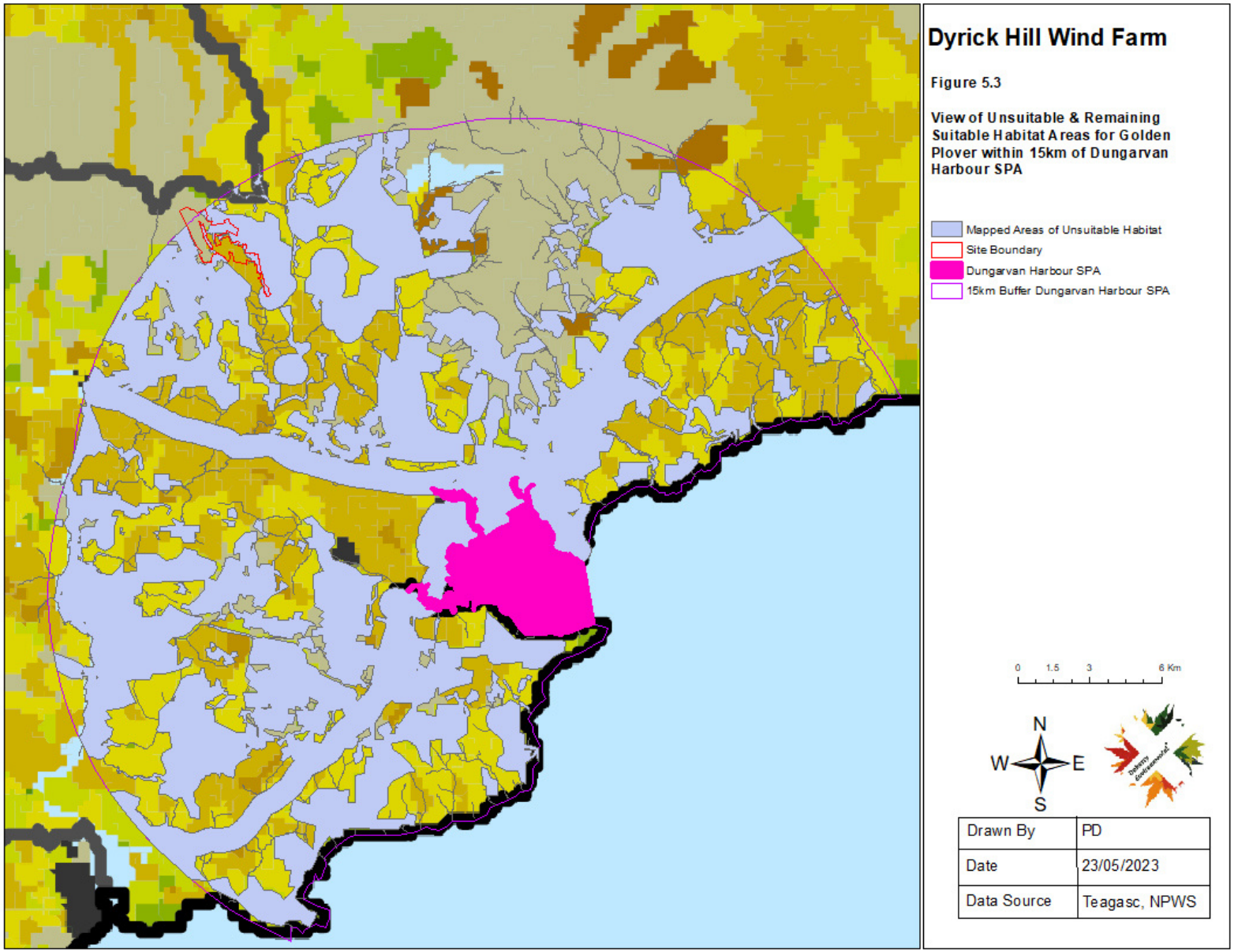
[4] National average field size is 2.5Ha (Zimmermann, 2018)


Dyrick Hill Wind Farm
Figure 5.2
Average Size of Enclosed Agricultural Fields
Site Boundary
15km Buffer Dungarvan Harbour SPA
Dungarvan Harbour SPA
Average field area [ha]
< 0.25
0.25 - 0.75
0.75 - 1.3
1.3 - 1.9
1.9 - 2.5
2.5 - 5.0
5.0 - 12.5
> 12.5
Other
Urban area
Unenclosed area
0 1.5 3 6 Km
N
W
E
S
Drawn By
PD
Date
23/05/2023
Data Source
Teagasc, NPWS

was examined so that the area of potentially suitable habitat could be estimated. A 15km buffer distance was used as a precautionary basis in line with the considerations set out above. Larger areas of unsuitable habitat such as the Blackwater River, other river and stream corridors, conifer plantation, and built land in the form of buildings and artificial surfaces were mapped and the area of cover was calculated. Areas of small than average field size as per Figure 5.2 above were also included in the area mapped as unsuitable habitat for golden plover. A total area of c. 72,000 Ha of terrestrial land occurs within a 15km buffer zone of the Dungarvan Harbour SPA. Of this approximately 32,000 Ha has been mapped as unsuitable habitat for golden plover (e.g. river corridors, conifer plantation, buildings and artificial surfaces (including a 500m buffer zone around urban areas and national roads[5])). The area mapped as unsuitable habitat is shown on Figure 5.3. Other areas of buildings and artificial surfaces land cover in the form of regional and local roads and rural residential dwellings etc. have not been mapped as part of the GIS. As such a conservative estimate a further 10,000 Ha is included to account for this land cover. This amounts to approximately 42,000 Ha of unsuitable habitat.

The remaining land cover of c. 30,000 Ha occurring within the 15km buffer area surrounding the Dungarvan Harbour SPA is dominated by pasture grassland along with arable land and upland moorland. These land cover types are representative of potentially suitable habitat for supporting wintering golden plover. As noted above sward height and field size in these land cover types are key factors in their suitability to support golden plover. Field size has already been taken into consideration in the calculation of unsuitable/suitable habitat with all areas of less than average field size being identified as unsuitable habitat. In terms of sward height, current agricultural advise for pasture management recommends the maintenance of low autumn swards to the end of the growing season at heights of 3.5 – 4.5cm (i.e. less than 10cm) (see Teagasc "Managing your Grass", O'Donovan & McEvoy; O'Riordan). Therefore the majority of the grassland occurring within the 15km buffer zone of the Dungarvan Harbour SPA is likely to be representative of low sward grassland suitable for golden plover. Sward height in upland moorland is likely to be variable

[5] a 500m buffer has been applied to areas of high human activity comprising national roads and urban centres. A 500m zone at which golden plover can be sensitive to disturbance is included as per recommendations by NatureScot, 2022.


Dyrick Hill Wind Farm
Figure 5.3
View of Unsuitable & Remaining Suitable Habitat Areas for Golden Plover within 15km of Dungarvan Harbour SPA
Mapped Areas of Unsuitable Habitat
Site Boundary
Dungarvan Harbour SPA
15km Buffer Dungarvan Harbour SPA
0 1.5 3 6 Km
N
W E
S
Drawn By PD
Date 23/05/2023
Data Source Teagasc, NPWS

with higher swards in areas of heather dominated habitat. However, as recorded at the proposed wind farm site, this habitat type provides suitable roosting habitat for golden plover. Much of the arable land occurring within the buffer zone is likely to be representative of harrowed tillage or stubble during the winter months. Notwithstanding the likelihood that the majority of the pasture and arable land in terms of sward height is likely to be representative of potentially suitable foraging habitat, whilst the upland moorland is likely to be representative of potential suitable roosting habitat, a conservative approach is again adopted when assessing the potential impact of the 16.45 Ha habitat loss resulting from the proposed wind farm site. Adopting this approach, only 50% of the area of pasture, arable and upland moorland within the 15km buffer zone of the SPA is identified as being of potential suitable habitat for golden plover. This equates to approximately 15,000 Ha. When assessed again this area of potentially suitable golden plover habitat within a 15km buffer zone of the Dungarvan Harbour SPA, the loss of 16.45 Ha will equate to a loss of c. 0.1% of potentially suitable golden plover habitat. Such a loss is representative of a negligible impact and an effect of slight significance over the long-term for golden plover. Such an effect is not representative of an adverse effect to the population trends of golden plover supported by the Dungarvan Harbour SPA as, whilst it may cause a noticeable change in the character of the environment it will not affect its sensitivities (EPA, 2022) (i.e. the favourable conservation condition of the golden plover of the Dungarvan Harbour SPA).

5.2.3.2 Collision during the Operation phase

Langston and Pullen (2003) categorised Golden plover as being sensitive to operational wind farms. However, since then, published studies indicate that Golden plover populations are not sensitive to operational wind farms. McGuiness *et al.*, (2015) noted that waders, such as golden plover, are considered to be at low risk of collision with operating turbines due to their low flight paths and high manoeuvrability. Krijgsveld *et al*. (2009) completed collision monitoring at three wind farms in the Netherlands where Golden plover were active and recorded no fatalities. Golden plover have also been recorded in low numbers as collision fatalities at wind farms by Hoetker *et al.*, (2006) and Grunkorn (2011). Pearce-Higgins *et al*. (2012) undertook post-construction monitoring at 15 operational wind farms and found no significant declines in Golden plover numbers. Douglas *et al*. (2011) also found no decline in Golden plover populations during three years of monitoring at an operational wind farm in the UK.

The SNH guidance (SNH, 2018) does not provide a specific avoidance rate for golden plover, but states that for species not covered by the guidance "*we recommend a default value of 98%*". However 3 years of post-construction monitoring sites included in the Collision Risk Model

(CRM) (see EIAR Appendix 7.2, Jennings O'Donovan, 2023) indicates a much higher avoidance rate should be applied for non-breeding golden plover populations. The studies had robust survey methodologies and were carried out at wind farm sites with high levels of golden plover flight activity. The review considers that an avoidance rate of 99.8% is a suitable precautionary estimate for winter golden plover. This high micro-avoidance rate is also supported by the results described by Krijgsveld *et al*. (2009) referred to above. Golden plovers were not recorded breeding within the 500 m turbine envelope during the survey period which reduces magnitude. The predicted number of collisions, assuming a 99.8% avoidance, is 6.21[6] per year. This is equivalent to 0.12% of the local population[7] and 0.008% of the national population (based on a national, All-Ireland population of 92,060 (Lewis *et al*., 2019). This is representative of a population loss of well below 1% of the Dungarvan Harbour SPA population and is representative of a negligible magnitude effect and an impact of low significance for the golden plover population. The population-level consequences of predicted collision risks can be assessed by considering the additional mortality that would be caused (assuming that the collision risk is non-additive) relative to the SPA population. The predicted 0.12% increase in annual mortality for the golden plover population of the SPA indicates that collision mortality will not have a significant impact at the SPA level for golden plover. Given that the potential collision risk posed by the project is classified as slight effect, it is not representative of an adverse effect to the population trends of golden plover supported by the Dungarvan Harbour SPA as, whilst it may cause a noticeable change in the character of the environment it will not affect its sensitivities (EPA, 2022) (i.e. the favourable conservation condition of the golden plover of the Dungarvan Harbour SPA).

[6] Based on the 99.8% avoidance rate reflecting the high micro-avoidance rate of the species Gittings, (2022) rather than the SNH 2018 default avoidance rate of 98%.

[7] Golden plover population figure for the Dungarvan Harbour SPA is 4980 taken from the Dungarvan Harbour SPA - Population Site (europa.eu) - https://biodiversity.europa.eu/sites/natura2000/IE0004032 accessed May 2023

5.2.3.3 Indirect Effects resulting in Disturbance & Barriers to Movement during the Operation Phase

Possible disturbance during winter months from feeding or roosting locations in the Broemountain Commonage Area.

Literature suggests differences in densities pre- and post-construction of wind farms is significant (Pearce-Higgins et al., 2012); displacement is not significant but may occur up to distances between 175 m (Hötker et al., 2006) and 400m (Sansom et al., 2016), whilst Goodship and Furness (2022) cite a distance of 500m over which golden plover are susceptible to disturbance. Such disturbance during the operation phase and associated loss of wintering will represent a long-term imperceptible effect to golden plover.

Lighting associated with the operation phase of turbines has been considered as a potential impact to bird species in the ornithological assessment for the proposed wind farm (see EIAR Chapter 7). The colour, mode, intensity, and density of lighting has been shown to influence the degree to which birds (specifically, nocturnally migrating passerines) are attracted to wind turbines at night. Studies have shown that red lighting is more attractive to birds, and that steady burning lights are more attractive than flashing ones, while structures with no lighting were the least attractive (Kerlinger *et al*., 2010; Gehring *et al*., 2009). The directional intensity of lighting is also a factor in reducing the attraction of birds. Whilst the effects of lighting associated with the proposed turbines have not been identified as having the potential to impact conservation objectives for golden plover population of this SPA (see Table 5.3) mitigation measures to avoid potential adverse effects of lighting to birds, including common gulls, are set out in Section 7 below.

In terms of barriers to movements Krijgsveld *et al*., (2009) noted high avoidance rates of wind farms and changes in densities within wind farms post construction, as described by Pearce-Higgins *et al*., 2012, and suggests that wind farms act as significant barriers to golden plover. Barriers to movement of golden plover will have the potential to result in to result in energy expenditure that could in turn have significant effects to this species during migrating flights in spring and autumn. The presence of a barrier to daily movements will also represent an impact of long-term moderate significance for golden plover.

5.2.4 Lapwing

Lapwing was recorded on one occasion during non-breeding season vantage point surveys completed for the proposed wind farm. A single bird was noted flying for 19 seconds at a height of 20 – 30m within the flight activity survey area, which is defined by an area of 500m circular buffers around the location of proposed turbines, as per SNH (2017) guidance. No lapwing were recorded during the breeding season and this species was not recorded breeding within or in the vicinity of the proposed wind farm site.

The zone of sensitivity for lapwing, which is underpinned by this species' wintering foraging distance, used as part of this examination is circa 12km. The circa 12km distance is sourced from Gillings & Fuller (1999) who reported winter season foraging flights of up to 12km for lapwing. The circa 12km lapwing foraging range results in an overlap between the SPA population and the boundary of proposed wind farm site. It is noted that all proposed turbine locations are situated outside the 12km buffer distance from this SPA, with the nearest turbine, T1 being located approximately 12.3km from the SPA boundary. However, in addition to the maximum foraging distance of circa 12km quoted by Gillings & Fuller (1999), they also identify the extremely mobile nature of lapwing flocks within the winter non-breeding season. They describe how lapwing flocks may use one or two particular areas for several weeks before moving to another area, which may be several kilometres away. Given that Dungarvan Harbour represents the closest area of suitable coastal intertidal foraging habitat to the proposed wind farm site, it is considered likely that the lapwing recorded at the wind farm site may also rely on the intertidal habitats at Dungarvan Harbour during the winter season. In light of the above, and adopting a precautionary approach, the individual lapwing recorded at the proposed wind farm site is considered to form part of the Dungarvan Harbour SPA lapwing population.

The potential impacts posed by the proposed wind farm to lapwing arise during the construction and decommissioning phase and the operation phase. These are considered in the following sub-sections.

5.2.4.1 Direct Habitat Loss during the Construction Phase

The construction phase will have the potential to result in habitat loss or alteration for bird species. Habitat loss can be direct through land take of foraging habitats for key species or indirect such as effective habitat loss through avoidance of lands that are subject to disturbance by construction activities. For direct effects during construction, land take of potential foraging habitat is the

primary effect. Suitable breeding, foraging and roosting habitat for lapwing occur within the proposed development site. However, given that lapwing were observed only on one occasion during all bird surveys and that this species was not observed relying on habitats occurring within the wind farm site for breeding, foraging or roosting, the loss of habitat will represent a long-term imperceptible effect. Such an effect will not be significant for the future conservation of the lapwing population of the Dungarvan Harbour SPA and is not representative of an adverse effect to the population of this species supported by the SPA.

5.2.4.2 Indirect Habitat Loss Arising from Disturbance during the Construction Phase

Given the observation of only one flight record for lapwing during surveys and the absence of any records indicating this species using or relying upon habitats within the proposed wind farm site for breeding, foraging or roosting, construction works will not have the potential to result in disturbance to this species.

5.2.4.3 Collision during the Operation phase

Collision can result in the direct mortality or lethal injury of birds and can result not only from collisions with wind turbine blades but also with other structures associated within wind turbines such as towers, nacelles etc. The SNH avoidance rate for lapwing is set at 98%. European Commission guidelines have previously identified lapwing as a species of potential risk or impact as a result of collision within wind farms. However Pearce-Higgins *et al.* (2012) found little evidence that the operation phase of wind farms included in their study resulted in population declines of lapwing and other breeding bird species suggesting that collisions are not significant at the local population level.

A collision risk assessment for lapwing with the proposed wind farm has been completed (see EIAR Appendix 7.2, Jennings O'Donovan, 2023) and resulted in a predicted number of zero collisions per year. The magnitude of this potential collision effect is negligible (<1% population lost), whilst the overall effect significance is imperceptible. Such an effect is not considered to have the potential to result in a decline in the long-term population trend of lapwing at the Dungarvan Harbour SPA and as such will not represent a potential adverse effect to the population of lapwing supported by this SPA.

5.2.4.4 Indirect Effects Resulting from Disturbance, Displacement & Barriers to Movement during the Operation Phase

Hötker *et al*. (2006) found 18 cases of negative effects on density of birds post construction during the breeding season, with 11 cases of no negative effects. During the non-breeding season, 29 cases of negative effects were found, with 12 cases of no negative effects. Hötker *et al*. (2006) found six cases of non-habituation in the breeding season, with two cases of habituation. During the non-breeding season, they found three cases of habituation and two cases of non-habituation. A number of other studies have investigated the potential for displacement of lapwing as a result of the presence of operating wind turbines. Pearce-Higgins *et al*. (2012) showed little change in the densities of lapwing at a wind farm site during a before-after control-impact study. Similarly Ketzenberg *et al*. (2002) found no statistical evidence for displacement of shorebirds, including lapwing, breeding on wet grassland in the vicinity of a wind farm site in Germany. Steinborn & Reichenbach (2011) also described results of low levels of displacement of breeding lapwing from turbines (with displacement effects limited to up to 100m) and found that other parameters such as agricultural land use, distance from hedgerows and vegetation structure had more influence on lapwing than distance to the nearest turbine. Furthermore Langston *et al.* (2003) described lapwing nesting closer to turbines on study sites and attributed this finding to the possible presence of more suitable sward heights, with lower vegetation, around turbines. Given the summary of published research outlined above along with the very low levels of lapwing activity recorded during bird surveys, the potential for indirect effects to lapwing as a result of disturbance/displacement will be negligible and will not result in adverse effects to the population of lapwing supported by the Dungarvan Harbour SPA.

Lighting associated with the operation phase of turbines has been considered as a potential impact to bird species in the ornithological assessment for the proposed wind farm (see EIAR Chapter 7). The colour, mode, intensity, and density of lighting has been shown to influence the degree to which birds (specifically, nocturnally migrating passerines) are attracted to wind turbines at night. Studies have shown that red lighting is more attractive to birds, and that steady burning lights are more attractive than flashing ones, while structures with no lighting were the least attractive (Kerlinger *et al.*, 2010; Gehring *et al.*, 2009). The directional intensity of lighting is also a factor in reducing the attraction of birds. Whilst the effects of lighting associated with the proposed turbines have not been identified as having the potential to impact conservation objectives for the lapwing population of this SPA (see Table 5.3) mitigation measures to avoid potential adverse effects of lighting to birds, including common gulls, are set out in Section 7 below.

In terms of barriers to movements, such an effect for lapwing has been shown in five cases of out six (Hötker *et al*., 2006). However, given the very low levels of lapwing flight activity at the proposed wind farm site the potential for indirect effects to lapwing as a result of barriers to this species movement will be negligible and will not result in adverse effects to the population of lapwing supported by the Dungarvan Harbour SPA.

5.3 OTHER SPAS

Four other SPAs, the Ballymacoda Bay SPA, Ballycotton Bay SPA, Cork Harbour SPA and Saltee Island SPA have been screened in for examination as part of this Natura Impact Statement. These have been screened in due to the identification of lesser-black backed gull as a key ornithological receptor of the proposed wind farm; the extensive foraging range of this species, which is up to 70km; and the overlap of this foraging range from the above four SPAs with the proposed wind farm site.

Lesser-black backed gull was recorded on 47 occasions from all vantage points (see Graph 5.2) during breeding season vantage point surveys completed for the proposed wind farm. A peak count of 227 birds were recorded for this species during surveys in July 2022. This sighting occurred outside the study area for the wind farm bird surveys. Of the 47 records for lesser-black backed gull during the breeding season, 32 occurred within the flight activity survey area.

During the 2020 breeding season there were two observations of the species including one on the 16th of June of a single bird flying over the southern section of the site. In 2021, there were a total of 17 observations of the species. The first sightings were recorded in late July with two observations on the 22nd of July 2021 both of single birds in flight. The species was observed subsequently in early August on seven separate occasions (one on the 8th of August 2021 and six observations on the 9th of August 2021). During this period 6 individuals were recorded on three occasions, 1 bird on three occasions and 2 birds on one occasion. The remining eight observations were recorded on the 4th and 16th of September 2021.

Of the 17 observations in total during the summer 2021 season, 12 were of birds in flight and the remaining 5 observations were of the species on the ground. Feeding was observed on two occasions in low numbers (1 and 2 birds), with one observation each in the months of August and September. There were two observations of the same 6 birds roosing and preening on the 9th of August 2021 as grass cutting finished in a field in the south eastern corner of the site approximately

400m east of Turbine 1. On the same day there was also a separate observation of two gulls briefly landing on the ground in the site at 12:15 in the middle of the day but both were gone by 12:30.

During the summer 2022 surveys there were 28 separate observations of the species across every month of surveys: April 1 observation, May 3 observations, June 4 observations, July 9 observations, August 6 observations and September 5 observations. Of the 28 occasions the species was observed 24 of these occasions were of single birds. Three birds were recorded on two occasions, with a single sighting each of 5, 133 and 227 birds. The largest count of 227 birds was observed on the morning of the 27th of June 2022 outside and to the east of the site (outside of the 500m buffer surrounding turbines). The species was observed to be roosting, preening, foraging and drinking from a cattle trough. The flock had reduced to 133 birds by 11:36 later that morning. On the 25th of July 2020 there were five further sighting of lone individuals roosting, preening, foraging on the ground outside the site. On the 11th of August 5 birds were observed to be roosting at 07:29 in the morning outside of and to the east of the site with two single sightings of individuals on the ground outside the site later that day. On the 8th of September there were three further sightings of the species (two of 1 individual and one of 3 individuals) feeding in agricultural fields outside the site. The remaining records were of the species in flight all single individuals. Breeding was not observed within the site over the 3 years of surveys.

Lesser-black backed gull was recorded on 33 occasions during the non-breeding season with numbers ranging from one to 25 birds.

The species was recorded twice during the winter 2020/2021 season once on the 6th of October (flight inside the site) and once on the 21st of November 2020 (outside the site). During the winter 2021/2022 season there were 31 individual observation of the species including 3 in late September, 21 in October, 3 in November, 2 in December and one in February. There were no sightings in January or March 2021.

Of the 33 observations in total during the winter 2021/2022 season, 21 were of birds in flight, whilst the remaining 12 observations were of the species on the ground. Feeding was observed on five occasions with low numbers (1 to 19) on three dates in October (the 10th, 20th and 21st of October). One of these observations on the 10th of October also exhibited roosting and preening behaviours in an agricultural field outside of the site. Roosting behaviour was also recorded on the 21st of October, with 11 birds recorded on the ground to the east of that site (outside the 500m buffer around turbines) at the start of the VP at 08:48. By 08:55 later that morning, 5 gulls had

departed, heading south. Roosting behaviour was also noted on the 17th of October 2021 when 6 birds were recorded in an agricultural field east of and within the 500m buffer of turbine 5. There were two observations of the same 6 birds roosing and preening on the 9th of August 2021 as grass cutting finished in a field in the south eastern corner of the site approximately 400m east of Turbine 1. One the same day there was also a separate observation of two gulls briefly landing on the ground at the site 12:15 in the middle of the day but both were gone by 12:30. On the 20th of October 3 gull were recorded feeding in a field inside the site near turbine 1.

The remaining five observations were of birds on the ground, one concerning 5 individuals on the 19th of September and the remainder during the month of October with numbers varying between 2 and 11 individuals. On the 10th of October there was one record inside (11 birds east of T1) and one outside of the site (3 birds east of the site). On the 20th of October 2 birds landed briefly (10 seconds) in an agricultural field inside the site east of T1. The following day 2 birds were recorded in another agricultural field outside the site for a large portion of the VP (2,045 seconds).

The potential impacts posed by the proposed wind farm to lesser-black backed gull arise during the construction and decommissioning phase and the operation phase. These are considered in the following sub-sections.

5.3.1.1 Direct Habitat Loss during the Construction Phase

The construction phase will have the potential to result in habitat loss or alteration for bird species. Habitat loss can be direct through land take of foraging habitats for key species or indirect such as effective habitat loss through avoidance of lands that are subject to disturbance by construction activities. For direct effects during construction, land take of potential foraging habitat is the primary effect. Lesser-black backed gull was not recorded breeding at or in the vicinity of the proposed wind farm site and there is no suitable breeding habitat for this species occurring at or surrounding the wind farm site. Habitats on site are also largely unsuitable for foraging birds, alothough foraging by this species in ploughed or slurried land is a common occurrence (although it is very much an opportunistic occurrence during a very small-time frame, when ploughing and slurrying works are being undertaken) and, as such, there is limited potential for suitable foraging habitat to occur. Seasonal flooding in fields may also provide foraging habitat for the species, but again this is not a permanent fixture in the landscape. It is worth noting that improved agricultural grassland is abundant in the area as is slurrying/ploughing and thus any habitat lost or disturbed is amply available in the surrounding landscape. Adopting a worst-case scenario, there will be a loss of 17.51 Ha of suitable habitat which equates to 6.12% of total available suitable habitat for the

species in the site boundary. However, the species was predominantly observed outside the site utilising agricultural field to the east of the site that will remain unaffected by the project. Therefore a percentage range of habitat loss of 1-5% provides a conservative range for this species locally. In the wider regional context and the context of the 4 SPAs occurring at significant distance from the project site as well as the wide-ranging foraging distance of this species (i.e. up to 70km as per Thaxter et al., 2012) the loss of 17.51 Ha of suitable habitat will represent a loss within a percentage range at least an order of magnitude below (i.e. habitat loss of 0.01 – 0.5%) the conservative local estimate. The overall loss of habitat to the proposed wind farm will represent an impact of very low significance for this species and result in an imperceptible effect. Such an effect will not result in adverse effects to the population of lesser-black backed gull supported by the 4 SPAs designated for the protection of this species in the wider regional area.

5.3.1.2 Indirect Habitat Loss Arising from Disturbance during the Construction Phase

Habitats on site are also largely unsuitable for foraging birds, although foraging by the species in ploughed or slurried land is a common occurrence (although it is very much an opportunistic occurrence during a very small time frame) and as such there is potential for limited foraging habitat to occur. Seasonal flooding in fields may also provide foraging habitat for the species but, again, this is not a permanent fixture in the landscape. Roosting and feeding occurred largely outside of the site to the east with only occasional short-term instances of low numbers of birds landing on the ground inside the site. It is worth noting that improved agricultural grassland is abundant in the area as is slurrying/ploughing and thus any habitat lost or disturbed is amply available in the surrounding landscape. This point is further reinforced by the species foraging range of up to 70km and the access afforded by this range to similar foraging habitat in the wider landscape. In light of these factors the construction phase of the project will not have the potential to result in significant disturbance effects and consequent indirect loss of habitat for lesser-black backed gull. As such the project will not have the potential to result in adverse effects to the population of lesser-black backed gulls associated with the four SPAs in the wider region that are designated for the protection of this species.

5.3.1.3 Collision during the Operation phase

A published review of 46 European wind farms (Hoetker *et al*., 2006) found 45 fatalities across wind farms. However, the published avoidance rate (SNH, 2010) is 98%, suggesting birds exhibit a high level of micro-avoidance.

Predicted number of collisions (assuming avoidance) is 0.22 per year equating to 0.003% of the national population or 0.08% of the local population[8].

The potential population loss arising from a predicted number of 0.22 collisions per year, in the context of the 5-year and 10-year mean population for each of the four SPAs is set out in Table 5.1 below.

Table 5.1: SPA lesser-black backed gull population & equivalent Percentage Loss

Population	Ballymacoda Bay SPA		Ballycotton Bay SPA		Cork Harbour SPA		Saltee Island SPA	
	Pop.	% Loss	Pop.	% Loss	Pop.	% Loss	Pop.	% Loss
5-yr Mean	733	0.03	664	0.03	164	0.13	164	0.13
10-yr Mean	1627	0.01	1165	0.02	137	0.16	164	0.13

The percentage population loss for all four SPAs arising from a predicted collision of 0.2 birds per year is well below the 1% threshold for each of the SPA populations and is representative of a negligible magnitude effect and an impact of low significance for the associated lesser-black backed gull populations. Such an effect is considered to be imperceptible and not representative of an adverse effect to the population trends of lesser-black backed gull supported by these SPAs as it will be representative of an effect which is capable of measurement but without significant consequences (EPA, 2022) to the population.

5.3.1.4 Indirect Effects Resulting from Disturbance, Displacement & Barriers to Movement during the Operation Phase

Given the wide foraging range of up to 70km by this species, its generalist and opportunistic foraging characteristics, the operation phase of the project will not have the potential to result in significant disturbance effects and consequent indirect loss of habitat for lesser-black backed gull. As such the project will not have the potential to result in adverse effects to the population of

[8] Population figure taken from the Dungarvan Harbour SPA - Population Site (europa.eu) - https://biodiversity.europa.eu/sites/natura2000/IE0004032 accessed May 2023

lesser-black backed gulls associated with the four SPAs in the wider region that are designated for the protection of this species.

Lighting associated with the operation phase of turbines has been considered as a potential impact to bird species in the ornithological assessment for the proposed wind farm (see EIAR Chapter 7). The colour, mode, intensity, and density of lighting has been shown to influence the degree to which birds (specifically, nocturnally migrating passerines) are attracted to wind turbines at night. Studies have shown that red lighting is more attractive to birds, and that steady burning lights are more attractive than flashing ones, while structures with no lighting were the least attractive (Kerlinger *et al*., 2010; Gehring *et al*., 2009). The directional intensity of lighting is also a factor in reducing the attraction of birds. Whilst the effects of lighting associated with the proposed turbines have not been identified as having the potential to impact conservation objectives for lesser-black backed gull population of these SPAs (see Table 5.3) mitigation measures to avoid potential adverse effects of lighting to birds, including common gulls, are set out in Section 7 below.

In terms of barriers to movement, given the remote distance between the proposed wind farm site and the four SPAs designated for supporting lesser-black backed gulls in the wider region and the wide foraging range of this species, the proposed wind farm will not represent a barrier to the movement of this species in the wider landscape. In light of this the proposed wind farm will not result in adverse effects to the populations of lesser-black backed gull supported by these SPAs, in the context of posing a barrier to their movement in the wider landscape.

5.4 IN-COMBINATION EFFECTS

5.4.1 In-Combination Effects During the Construction Phase

Past land use practices have resulted in negative impacts to heathland habitats within and adjacent to the Site. Dry heath and acid grassland habitats have been subjected to historical overgrazing which has led to damage and erosion to heath and grassland habitats to the west of the Site. The presence of extensive forestry to the east and north of the Site has also resulted in the conversion of heathland habitats and the loss of areas of heath habitat.

In the absence of future habitat management measures the project will have the potential to combine with these historical land use activities to result in further loss of heath habitats within the proposed development site. In addition, the risks to receiving waterbodies posed by the project

will also have the potential to combine with existing land use activities such as forestry plantation and intensive agricultural activity to result in cumulative pollution loss to Finisk River sub-catchment and the River Blackwater downstream with associated pressures to water quality and the freshwater ecology supported by this catchment.

In terms of other projects there are no recent significant projects permitted in the vicinity of the Site. Those that do occur within the area surrounding the proposed development relate to small scale projects associated with amendments to residential dwellings and the construction of residential dwellings.

Other specific live or recently approved projects in the vicinity of the Site, that are considered to be minor in scale, are listed below and an examination of potential cumulative effects between these other projects and the Development is provided for each.

Planning Reference No. 22822: planning permission for the erection of overground electronic communications infrastructure. A screening for Appropriate Assessment and EIA for this project was completed by the Planning Authority and it was determined that this project, alone or in-combination with other plans or projects, would not have the potential to result in likely significant effects to European Sites or the environment. Given this determination, the Development will not combine with this project to result in cumulative adverse effects to downstream European Sites.

Planning Reference No. 221047: planning permission for the erection of overground electronic communications infrastructure. A screening for Appropriate Assessment and EIA for this project was completed by the Planning Authority and it was determined that this project, alone or in-combination with other plans or projects, would not have the potential to result in likely significant effects to European Sites or the environment. Given this determination, the Development will not combine with this project to result in cumulative adverse effects to downstream European Sites.

Planning Reference No. 221046: planning permission for a new dwelling. A screening for Appropriate Assessment and EIA for this project was completed by the Planning Authority and it was determined that this project, alone or in-combination with other plans or projects, would not have the potential to result in likely significant effects to European Sites or the environment. Given this determination, the Development will not combine with this project to result in cumulative adverse effects to downstream European Sites.

Planning Reference No. 211167: planning permission for internal modifications to a thatched cottage. A screening for Appropriate Assessment and EIA for this project was completed by the Planning Authority and it was determined that this project, alone or in-combination with other plans or projects, would not have the potential to result in likely significant effects to European Sites or the environment. Given this determination, the Development will not combine with this project to result in cumulative adverse effects to downstream European Sites.

Planning Reference No. 19541: planning permission for a new dwelling. A screening for Appropriate Assessment and EIA for this project was completed by the Planning Authority and it was determined that this project, alone or in-combination with other plans or projects, would not have the potential to result in likely significant effects to European Sites or the environment. Given this determination, the Development will not combine with this project to result in cumulative adverse effects to downstream European Sites.

The ornithological assessment for the proposed development (EIAR Chapter 7) examined the potential for cumulative impacts to bird species to arise during the construction phase of the proposed development. This assessment examined the potential for the proposed development to combine with other wind farms within a 20km distance to result in cumulative impacts. This 20km distance is considered to be adequate for the purposes of this Natura Impact Statement and the examination of the potential for the proposed wind farm to combine with other wind farm sites in the wider surrounding area to result in cumulative adverse construction phase impacts.

The wind farms identified in this 20km area are listed in Table 5.2.

Table 5.2: Consented & Operational Wind Farms within 20km of the proposed wind farm

Wind Farm	Status	No. of Turbines	Approximate Distance to the Site Boundary	Direction from the Development
Coumnagappul Wind Farm	Pre-planning	11	7.1km	East
Tierney Single Turbine	Operational	1	3.5km northeast of site	Northeast
Woodhouse Wind Farm	Operational	8	10.8km south of site	South

Wind Farm	Status	No. of Turbines	Approximate Distance to the Site Boundary	Direction from the Development
Knocknamona Wind Farm	Consented	8	11.6km south of site	South
GSK Single turbine	Consented	1	14.5km southeast of site	Southeast
Barranafaddock Wind Farm	Operational	12	19.3km west of site	West
Ballycurreen Wind Farm	Operational	2	20km	Southeast

Of the three bird species (golden plover, lapwing and lesser-black backed gull) that are special conservation interest bird species of SPAs in the wider area, only golden plover has been identified as a receptor at other wind farm site listed above. The other wind farm sites where golden plover has been identified as a receptor are the Barranafaddock Wind Farm and the proposed Coumnagappul Wind Farm. The Barranafaddock Wind Farm is located over 30km from the Dungarvan Harbour SPA and as such is located outside the foraging range of the golden plover associated with the Dungarvan Harbour SPA. As the golden plover supported by the Dungarvan Harbour SPA will not overlap with the Barranafaddock Wind farm there will be no potential for the proposed Dyrick Hill Wind Farm to combine with this wind farm to result in cumulative adverse effects to the golden plover population of any SPA.

The proposed Coumnagappul Wind Farm is located a similar distance from the Dungarvan Harbour SPA as the proposed Dyrick Hill Wind Farm. As such the golden plover population of the SPA will overlap with the Coumnagappul Wind Farm site as well as the proposed Dyrick Hill Wind Farm. It is considered that, given the overlap between these locations, any loss of suitable golden plover habitat arising during the construction phase of both proposed wind farms, will have the potential to result in cumulative habitat loss for golden plover population associated with the Dungarvan Harbour SPA. The extent of habitat loss (direct as a result of construction and indirect as a result of displacement during both the construction phase and operation phase) associated with the Coumnagappul Wind Farm has yet to be finalised for this proposed wind farm. However adopting a conservative approach a similar level of habitat loss (both direct and indirect during both construction phase/operation phase) to the area applied for this wind farm has been used to calculate the total cumulative loss of suitable golden plover habitat. This will amount to c. 33 Ha

of suitable golden plover habitat loss across both wind farms. In the context of the c. 15,000 Ha of suitable golden plover habitat occurring within the 15km buffer distance of Dungarvan Harbour SPA (see Section 5.2.3.1 above), the loss of 33 Ha will represent a percentage loss of c. 0.22%. Such a loss is representative of a negligible impact and an effect of slight significance over the long-term for golden plover. Such an effect is not representative of an adverse effect to the population trends of golden plover supported by the Dungarvan Harbour SPA as, whilst it may cause a noticeable change in the character of the environment it will not affect its sensitivities (EPA, 2022) (i.e. the favourable conservation condition of the golden plover of the Dungarvan Harbour SPA).

5.4.2 In-Combination Effects During the Operation Phase

It is anticipated that, in the absence of mitigation, the key cumulative impacts upon European Sites during the operation of the proposed development will relate to the European Sites and relevant receptors occurring downstream of the proposed development. In the absence of an adequate operational phase drainage design, the drainage at the wind farm site could contribute towards water quality pressures downstream along the Blackwater River SAC. Under such a scenario the potential will exist for the operation phase of the proposed development to combine with other sources of water pollution in the surrounding sub-catchment areas to result in adverse effects to the conservation status of the Annex 1 habitat Floating River Vegetation and the Annex 2 qualifying species supported by the SAC.

The ornithological assessment for the proposed development (EIAR Chapter 7) examined the potential for cumulative impacts to bird species to arise during the operation phase of the proposed development. This assessment examined the potential for the proposed development to combine with other wind farms, as listed in Table 6.2 above, to result in cumulative impacts.

Of the three bird species (golden plover, lapwing and lesser-black backed gull) that are special conservation interest bird species of SPAs in the wider area, only golden plover has been identified as a receptor at other wind farm site listed above. The other wind farm site where golden plover has been identified as a receptor are the Barranafaddock Wind Farm and the proposed Coumnagappul Wind Farm. The Barranafaddock Wind Farm is located over 30km from the Dungarvan Harbour SPA and as such is located outside the foraging range of the golden plover associated with the Dungarvan Harbour SPA. As the golden plover supported by the Dungarvan Harbour SPA will not overlap within the Barranafaddock Wind farm there will be no potential for

the proposed Dyrick Hill Wind Farm to combine with this wind farm to result in cumulative adverse effects to the golden plover population of the SPA.

The proposed Coumnagappul Wind Farm is located a similar distance from the Dungarvan Harbour SPA as the proposed Dyrick hill Wind Farm. As such the golden plover population of the SPA will overlap with the former wind farm site as well as the proposed Dyrick Hill Wind Farm. It is considered that given the overlap between these locations and habitat loss as a result of displacement surrounding turbine positions will contribute to the loss of suitable golden plover habitat arising from the Dyrick Hill Wind farm and result in a combine loss of suitable habitat for the Dungarvan Harbour SPA golden plover population. As set out in Section 5.4.1 above the combine loss from both wind farms is estimated to be 33 Ha. Such a loss is representative of a negligible impact and an effect of slight significance over the long-term for golden plover. Such an effect is not representative of an adverse effect to the population trends of golden plover supported by the Dungarvan Harbour SPA as, whilst it may cause a noticeable change in the character of the environment it will not affect its sensitivities (EPA, 2022) (i.e. the favourable conservation condition of the golden plover of the Dungarvan Harbour SPA).

In terms of collision risk, the Coumagappul Wind Farm will have the potential to combine with the Dyrick Hill Wind Farm to result in a higher cumulative collision risk to the local golden plover associated with the Dungarvan Harbour SPA. The cumulative collision risk will have the potential to increase the county population loss by 0.03%, thus increases the percentage of the population at risk of mortality from 0.12% to 0.15%. This is representative of a population loss of well below 1% of the Dungarvan Harbour SPA population and is representative of a negligible magnitude effect and an impact of low significance for the golden plover population. Such an impact is considered to be slight over the long term and is not representative of an adverse cumulative effect to the population trends of golden plover supported by the Dungarvan Harbour SPA as, whilst it may cause a noticeable change in the character of the environment it will not affect its sensitivities (EPA, 2022) (i.e. the favourable conservation condition of the golden plover of the Dungarvan Harbour SPA).

5.4.3 In-Combination Effects During the Decommissioning Phase

Given that the decommissioning phase of the proposed development will not take place until the termination of the operation phase of the proposed wind farm it is not possible at this time to identify other plans or projects with which activities associated with the decommissioning phase could combine to result in adverse effects to European Sites. Notwithstanding this, it is noted that

the activities associated with the decommissioning phase will be similar to those that will be required for the construction phase and will have the potential to result in similar impacts. With respect to the European Sites occurring in the zone of influence of the proposed development, these impacts will relate to pollution of receiving watercourses and qualifying Annex 1 Floating River Vegetation habitat occurring downstream of the proposed wind farm site. The potential effects of pollution derived from construction phase and decommissioning phase activities have been set out in Section 6.1. In the event that other land use activities occurring within the local receiving sub-catchments are known to, or have the potential to, result in threats or pressures to this catchment during the decommissioning phase, then the potential will exist for this phase of the proposed development to combine with these other sources of pollution to result in cumulative adverse effects to the conservation status of the Blackwater River SAC downstream of the proposed wind farm. It is noted that mitigation measures are set out in Section 7 below and their full implementation will provide safeguards such that the decommissioning phase of the proposed wind farm site will not have the potential to combine with other land use activities that pose a threat/pressure to the water quality of the local receiving sub-catchments catchment and the Blackwater River SAC during this phase of the proposed development.

5.5 DECOMMISSIONING PHASE

Decommissioning effects are likely to be of a similar or lower magnitude to the construction phase effects, with potential for works to combine with other land use activities over a the temporary timeframe of decommissioning works.

5.6 EXAMINATION OF EFFECTS TO CONSERVATION OBJECTIVES

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Favourable conservation status of a habitat is achieved when:

- its natural range, and the area it covers within that range, are stable or increasing, and
- 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, and

- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved 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.

A NIS is required to assess the potential for impacts to the integrity of a European Site, with respect to the site's structure and function and its Conservation Objectives. The structural and functional elements of a European Site to maintain the favourable conservation status of qualifying features of interest are embedded into the list of detailed site-specific conservation objectives (SSCO) attributes and targets for each of the site's interest features. As such, a European Sites' SSCOs represent the parameters against which a project's potential to adversely affect the integrity of a European Sites should be considered.

Table 5.3 lists the Conservation Objectives attributes and targets for each of qualifying features of interest of the six European Sites occurring within the zone of influence of the proposed development and examines how the project, in the absence of mitigation, will have the potential to result in adverse effects to these attributes and targets.

Site-specific conservation objectives have been published for the 6 European Sites that are examined in this Natura Impact Statement and these are used in Table 5.3 below.

Table 5.3: Examination of Potential Impacts to the Conservation Objectives of qualifying features of interest/special conservation interests

No. Ref	Attribute	Target	Assessment	Mitigation Required
Floating River Vegetation of the Blackwater River SAC				
1	Habitat area	Area stable or increasing, subject to natural processes	Any adverse effects to the water quality of the Finisk River sub-catchment will have the potential to result in a reduction in the extent of suitable riverine habitat within the SAC to support this qualifying habitat.	Mitigation measures provided in Section 6
2	Habitat distribution	No decline, subject to natural processes.	For the reasons outlined for Attribute no. 1 the project will have the potential to result in a decline in the distribution of this habitat within the Finisk River sub-catchment and the main channel of the River Nore.	Mitigation measures provided in Section 6
3	Hydrological regime: river flow	Maintain appropriate hydrological regimes	The project will not result in any instream works however the project will result in a change in surface from vegetation ground cover to made ground as a result of wind farm infrastructure. This will have the potential to result in an increase in hydraulic loading with consequent effects for erosion and sedimentation downstream.	Mitigation measures provided in Section 6
4	Hydrological regime: tidal influence	Maintain natural tidal regime	The project will not have the potential to influence the tidal regime of this SAC.	No
5	Hydrological regime: freshwater seepages	Maintain appropriate freshwater seepage regimes	The project will not have the potential to influence input of freshwater seepage to examples of tall herb habitat occurring upstream and downstream of the project site.	No

No. Ref	Attribute	Target	Assessment	Mitigation Required
6	Substratum composition: particle size range	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub‐type (frequently sands, gravels and cobbles)	The release of silt during the construction phase from the project site to the Finisk River sub-catchment will have the potential to undermine the quality of substratum in watercourse downstream of the project to support this habitat. As noted under Attribute No. 33 the potential for the discharge of sediment fines to river beds to result in the abundant growth of commonly occurring and species poor stands of crowfoot vegetation has been identified by the NPWS (NPWS, 2019a)	Mitigation measures provided in Section 6
7	Water quality: nutrients	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	Any inadvertent discharge of pollutants to the Finisk River sub-catchment during construction will have the potential to undermine this target.	Mitigation measures provided in Section 6
8	Vegetation composition: typical species	Typical species of the relevant habitat sub‐type should be present and in good condition	Any emission of pollutants to the Finisk River sub-catchment as a result of the project will have the potential to undermine this target.	Mitigation measures provided in Section 6
9	Floodplain connectivity	The area of active floodplain at and upstream of the habitat should be maintained	The project will not result in any changes to the existing river floodplain habitat within the Finisk or Blackwater River catchment downstream .	No
10	Riparian habitat	The area of riparian woodland at and	No riparian woodland occurs in the vicinity of the project. No semi-natural riparian habitats will be adversely affected by the project.	No

No. Ref	Attribute	Target	Assessment	Mitigation Required
		upstream of the bryophyte-rich sub-type should be maintained		
Otters of the Blackwater River SAC				
11	Distribution	No significant decline	Adverse effects to water quality in receiving Finisk River downstream of the project will have the potential to affect the distribution of otters.	Mitigation measures provided in Section 6
12	Extent of terrestrial habitat	No significant decline	The proposed development will not result in the loss of any terrestrial habitat used by otters.	No
13	Extent of freshwater habitat (river)	No significant decline	As per attribute no. 11 above adverse impacts to water quality during either the construction, operation or decommissioning phase will have the potential to undermine the potential for waterbodies downstream of the project site to support otters.	Mitigation measures provided in Section 6
14	Extent of freshwater habitat (lakes)	No significant decline	The proposed development is not connected to any lake habitat and will not result in the loss of any lake habitat used by otters.	No
15	Couching sites and holts	No significant decline	No breeding or resting sites for otters occur at or in the vicinity of the proposed development. As such the project will not have the potential to undermine this target.	No
16	Fish biomass	No significant decline	As per attribute no. 11 above the proposed development will have the potential to undermine water quality downstream and within waterbodies likely to be used by the SAC's otter population. Any	Mitigation measures

No. Ref	Attribute	Target	Assessment	Mitigation Required
			adverse impacts to these waterbodies could result in a decrease in fish biomass (i.e. through mortalities resulting from a major pollution event) and undermine the target for this attribute.	provided in Section 6
Atlantic salmon of the Blackwater River SAC				
17	Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary	The proposed development does not involve any instream works and in light of this it will not have the potential to result in barriers to the movement of Atlantic Salmon.	No
18	Adult spawning	Conservation Limit (CL) for each system consistently exceeded	Suitable spawning habitat for Atlantic salmon occurs downstream of the proposed development. In the event that the project results in the release of polluted surface water to the surrounding sub-catchment, during either the construction, operation or decommissioning phase, the conditions of these spawning habitats could be undermined with adverse effects for achieving the target of this attribute.	Mitigation measures provided in Section 6
19	Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value.	In the event that the proposed development results in the release of polluted surface water downstream, during either the construction, operation or decommissioning phase, it could result in excessive sedimentation within suitable spawning habitat. Any negative impacts to spawning habitat within the lower stetches of watercourses downstream of the proposed development elements will, over time, have a resultant effect on the abundant of salmon fry.	Mitigation measures provided in Section 6

No. Ref	Attribute	Target	Assessment	Mitigation Required
20	Out-migrating smolt abundance	No significant decline	In the event of a decrease in suitable spawning habitat as a result of the potential impact identified in attribute no. 18 & 19 above, there will be a potential population effect such that in subsequent years the number of smolt within the catchment could decrease.	Mitigation measures provided in Section 6
21	Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes	For reasons outlined for attribute no. 18 & 19 above the project will have the potential to undermine this conservation objective.	Mitigation measures provided in Section 6
22	Water quality	At least Q4 at all sites sampled by EPA	In the event that the project results in the release of polluted surface water to watercourses, during either the construction, operation or decommissioning phase, the resulting pollution could cause a negative impact to biological water quality status downstream within the surrounding sub-catchments.	Mitigation measures provided in Section 6
Lamprey Species of the Blackwater River SAC				
23	Distribution (extent of anadromy for sea lamprey) &/or barriers to movement	Access to all watercourses down to first order streams for brook lamprey. Greater than 75% of main stem length of rivers accessible from the estuary.	Activities associated with the construction, operation and decommissioning phase of the wind farm will not have the potential to undermine this attribute. The proposed development will not result any barriers to the movement of lampreys throughout the Blackwater River SAC. Given the absence of any physical interactions with watercourses of this catchment there will be no potential for the proposed development to result in a	No

No. Ref	Attribute	Target	Assessment	Mitigation Required
			reduction in the distribution of lamprey species within the Blackwater River SAC.	
24	Population structure of juveniles	At least three age/size groups present	The preferred spawning habitat for lamprey is gravel-dominated substratum typical of eroding watercourses in the upper reaches of catchments. After hatching, the larvae swim or are washed downstream and settle in areas of preferred juvenile habitat. The juvenile stage of the lifecycle of lamprey species is generally restricted to depositing freshwater and estuarine environments where the substratum supports areas of sandy silt. Suitable spawning habitat for lamprey species does occur downstream of the proposed wind farm site along the lower Blackwater River, which provides suitable juvenile habitat for lamprey species. In the event of negative effects to instream habitats downstream as a result water quality impacts, the potential will exist for indirect impacts to the juvenile stage of this species.	Mitigation measures provided in Section 6
25	Juvenile density in fine sediment	Mean catchment juvenile density of at least 2/m^2 for brook lamprey and 1/m^2 for sea lamprey	As set out for attribute no. 24 above, in the event of negative effects to juvenile lamprey habitat, the potential will exist for impacts to the density of juveniles occurring within suitable juvenile habitat downstream.	Mitigation measures provided in Section 6

No. Ref	Attribute	Target	Assessment	Mitigation Required
26	Extent and distribution of spawning habitat	No decline in distribution and extent of spawning beds.	Suitable spawning habitat for lamprey species occurs downstream of the proposed development, along the Finisk River. In the event of negative effects to instream habitats downstream as a result water quality impacts, the potential will exist for impacts to the extent of spawning habitat available for this species along the Finisk River.	No
27	Availability of juvenile habitat	More than 50% of sample sites positive	Suitable juvenile habitat occurs downstream along the main channel of the Blackwater River and any deleterious inputs to this watercourse could have adverse implications for the status of juvenile habitats.	Mitigation measures provided in Section 6
White-clawed crayfish of the Blackwater River SAC				
29	Distribution	No reduction from baseline.	In the event that the proposed development causes or contributes to pollution in the Finisk River and Blackwater River downstream, it could undermine the status of these waterbodies to support crayfish.	Mitigation measures provided in Section 6
30	Population structure: recruitment	Juveniles and/or females with eggs in all occupied tributaries.	In the event that the construction phase of the proposed development causes or contributes to pollution in the Finisk River and Blackwater River downstream it will have the potential to undermine the population structure of crayfish occurring within these waterbodies downstream.	Mitigation measures provided in Section 6

No. Ref	Attribute	Target	Assessment	Mitigation Required
31	Negative indicator species	No alien crayfish species.	The proposed development will not have the potential to result in the introduction of alien crayfish species. The proposed development will not result in any instream works or the use of any machinery, watercraft etc instream that could result in the spread of these non-native invasive species.	No
32	Disease	No instances of disease.	As per attribute no. 31 the project is not predicted to have the potential to result in the spread of crayfish disease within the catchment.	No
33	Water quality	At least Q3-4 at all sites sampled by EPA.	In the event that the construction phase of the proposed development causes or contributes to pollution in the Finisk River and Blackwater River downstream, it will have the potential to adversely affect water quality downstream.	Mitigation measures provided in Section 6
34	Habitat quality: heterogeneity	No decline in habitat heterogeneity or habitat quality.	In the event that the construction phase of the proposed development causes or contributes to pollution in the Finisk River and Blackwater River downstream, it will have the potential to undermine crayfish habitat heterogeneity.	Mitigation measures provided in Section 6
Lesser-black backed gull of the Saltee Island SPA				
35	Breeding population abundance: apparently occupied nest (AONs)	No significant decline	Lesser-black backed gulls have not been recorded breeding at the proposed development site and do not rely upon it for foraging. The nearest point of the Saltee Island SPA is approximately 70km to the east, at the limit of the foraging range of this species. Given this separation distance and the findings of the ornithological	No

No. Ref	Attribute	Target	Assessment	Mitigation Required
			assessment with respect to habitat loss, disturbance, displacement and barrier effects, the proposed development will not have the potential to affect the number of apparently occupied nest sites for this species.	
36	Productivity rate	No significant decline	As per the examination provided for attribute no. 35 above and as set out in the ornithological assessment for the proposed development, the proposed development will not have the potential to result in a significant decline in the productivity rate of lesser-black backed gull.	No
37	Distribution breeding colonies	No significant decline	As per the examination set out above for attribute no. 35 no breeding colonies of lesser-black backed gull occur at the proposed development site and it is buffered from the nearest point of this SPA by a distance of 70km. As such the proposed development will not have the potential to result in a significant decline in the distribution of breeding colonies of this species.	No
38	Prey biomass available	No significant decline	As set out in the ornithological assessment and summarised in Section 6.3 above, the proposed development site is not relied upon by lesser-black backed gull as a foraging habitat and the habitat occurring at the proposed development site is considered to be sub-optimal for these species. In light of these findings the project will not have the potential to result in a significant decline in the availability of prey biomass for these bird species.	No

No. Ref	Attribute	Target	Assessment	Mitigation Required
39	Barriers to connectivity	Number. Location, shape, area	The potential for the proposed wind farm site to result in a barrier effect to lesser-black backed gull has been examined as part of the ornithological assessment and the conclusions of this assessment are described in Sections 6.3 above. The assessment has concluded that the proposed wind farm site will not represent a barrier to the movement of these species in the wider region or in the wider area surrounding this SPA.	No
40	Disturbance at the breeding site	Level of impact	No breeding sites for lesser-black backed gull occur at the proposed development site. The nearest point of this SPA to the proposed development site is approximately 70km to the east at the limit of this species' foraging range. Given this separation distance there will be no potential for the proposed development to result in disturbance to the breeding sites of these bird species.	No
Lesser-black backed gull population of the Ballymacoda Bay SPA; Ballycotton Bay SPA; Cork Harbour SPA				
41	Population trend	Long term population trend stable or increasing	A collision risk assessment has been completed for the project and it has been found that the project, alone or in-combination with other plans or projects, will have the potential to result in 0.22 collisions per year with lesser-black backed gull. This will result in a loss of approximately 0.03; 0.03; and 0.13 of the respective 5-year mean populations lesser-black backed gull supported by the Ballymacoda Bay SPA, Ballycotton Bay SPA and Cork Harbour SPA. This is representative of a de-minimise effect that will not	No

No. Ref	Attribute	Target	Assessment	Mitigation Required
			have the potential to result in changes to the population trend of lesser-black backed gull supported by this SPA.	
42	Distribution	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation	The project is located at a remote distance from this SPA and will not have the potential to result in a change in the distribution of lesser-black backed gull within the SPA.	No
Golden plover population of the Dungarvan Harbour SPA				
43	Population trend	Long term population trend stable or increasing	A collision risk assessment has been completed for the project and it has been found that the project will have the potential to result in 7.56 collisions per year with golden plover, in-combination with the proposed Coumagappul Wind Farm. This will result in a loss of approximately 0.29% or 0.31% of the respective 10-year and 5-year mean population for golden plover at Dungarvan Harbour. This is representative of a de-minimise effect that will not have the potential to result in changes to the population trend of golden plover supported by this SPA.	No
44	Distribution	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that	The project is located at a remote distance from this SPA and will not have the potential to result in a change in the distribution of golden plover within the SPA.	Mitigation measures provided in Section 6

No. Ref	Attribute	Target	Assessment	Mitigation Required
		occurring from natural patterns of variation	The potential for the construction to result in disturbance and displacement of golden plover from habitat relied upon by this species at Broemountain commonage area has been identified in Section 6.2.3 above.	
Lapwing population of the Dungarvan Harbour SPA				
45	Population trend	Long term population trend stable or increasing	A collision risk assessment has been completed for the project and it has been found that the project, alone or in-combination with other plans or projects, will have the potential to result in zero collisions per year with lapwing. As such it will not have the potential to undermine the targets for the population trend for this species.	No
46	Distribution	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation	The project is located at a remote distance from this SPA and will not have the potential to result in a change in the distribution of golden plover within the SPA.	No
All Special conservation interest bird species & Waterbirds of the Dungarvan Harbour SPA				
73	Population trend	Long term population trend stable or increasing	Potential water quality impacts to Dungarvan Harbour SPA have been set out in Section 6.2.1 above. In the event that the construction or decommissioning of the proposed grid connection route results in pollution to the Colligan River, it will have the	Mitigation measures provided in Section 6

No. Ref	Attribute	Target	Assessment	Mitigation Required
			potential (given the presence of a hydrological pathway) to contribute towards a diminution of the wetland habitat conditions at Dungarvan Harbour required to sustain special conservation interest bird species and waterbird populations.	
74	Distribution	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation	The project is located outside of this SPA and will not have the potential to result in a change in the distribution of special conservation interest bird species or wetland birds within the SPA.	No
Wetlands of the Dungarvan Harbour SPA				
75	Habitat area	The permanent area occupied by the wetland habitat should be stable	Potential water quality impacts to Dungarvan Harbour SPA have been set out in Section 6.2.1 above. In the event that the construction or decommissioning of the proposed grid connection route results in pollution to the Colligan River, it will have the potential (given the presence of a hydrological pathway) to contribute towards a diminution of the wetland habitat supported by Dungarvan Harbour SPA.	Mitigation measures provided in Section 6

6 MITIGATION MEASURES

The mitigation measures required to safeguard European Site qualifying features of interest from adverse effects have been identified in Section 5 above and relate to mitigating the potential for the proposed development to result in perturbations to water quality and downstream effects to qualifying feature receptors. Whilst the examination of the potential impacts posed by the proposed development to the conservation objectives of special conservation interests (see Table 6.3) did not identify the potential for lighting emissions from proposed turbines to adversely affect specific conservation objectives, the potential for lighting effects to birds has been identified in Sections 6.2 and 6.3 above. As such mitigation measures are also outlined for the operation phase of the proposed wind farm site with respect to the lighting design to be provided.

Targeted mitigation measures are provided to safeguard against the potential adverse effects to the Annex 1 habitats and the Annex 2 species identified as requiring mitigation in Table 5.3 above. The measures to be implemented to protect the water quality, in stream and coastal habitats and associated fauna populations downstream of the proposed development and within European Sites are outlined in the following sub-sections. These measures shall be implemented by the contractor appointed for the construction and decommissioning phase, in consultation with the appointed Ecological Clerk of Works (ECoW) so that the sensitive receptors of these European Sites are safeguarded and pathways connecting the project site to these receptors are eliminated as potential impact pathways.

The Ecological Clerk of Works (ECoW) will be appointed to supervise the works and to ensure that all biodiversity receptors are protected during the construction and decommissioning phase. The ECoW will be appointed to ensure that habitat restoration and enhancement activities are implemented as planned, and to advise on any environmental or ecological aspect of the works. The ECoW will inspect habitat and ditches/water courses during the construction phase and during habitat restoration works and will be in charge of water quality monitoring throughout the construction phase. The ECoW will be the first point of contact with the Planning Authority, namely Waterford County Council for all matters relating to ecology and biodiversity.

All operation phase mitigation measures will be required to be implemented by site management during the operation phase of the proposed development. A project ecologist will be appointed for the operation phase to supervise the ongoing implementation, management and monitoring of peatland habitat management and enhancement measures. These measures are set out in Dyrick

Hill Wind Farm Habitat Management Plan (provided as part of the EIAR) and will be implemented throughout the lifetime of the proposed wind farm.

6.1 WIND FARM SITE EARTHWORKS

Mitigation measures to avoid the potential for adverse impacts arising from earthworks and management of spoil will comprise:

- Management of excavated material will adhere to the measures related to the management of temporary stockpiles as set out in Section 6.2 below.

- No permanent or semi-permanent stockpiles will remain on the Site during the construction, decommissioning or operational phase of the Development. Any surplus spoil remaining at the end of the construction phase will be taken off site and disposed of at a licence waste facility.

- Construction activities will not be carried out during periods of sustained heavy rainfall events[9], or directly after such events. This will allow sufficient time for work areas to drain excessive surface water loading and discharge rates to be reduced.

- Following heavy rainfall events, and before construction works recommence, the Site will be inspected to confirm that conditions are suitable for construction activities to recommence.

- An emergency response plan (ERP) has been prepared as part of the CEMP and SWMP for the project, both of which are provided under separate cover as part of the planning application documentation associated with the EIAR. All measures outlined in the ERP will be implemented throughout the construction phase of the project. This plan

[9] As per the Met Office National Meteorological Library and Archive Fact Sheet 3 – Water in the atmosphere (Met Office, 2012) a heavy rainfall event for: rain (other than in showers) is assigned to an event where rates of accumulation are greater than 4mm/hour; and for rain showers is assigned to an event where rates of accumulation are >10mm/hour.

includes for 24-hour advance meteorological forecasting linked to a trigger-response system. When a pre-determined rainfall trigger level is exceeded such as a very heavy rainfall at >25mm/hr, planned responses will be undertaken. These responses will include cessation of construction until the storm event, including storm runoff has ceased.

- Sediment fencing will be erected along proximal and paralleling areas of watercourses, such as along the Lisleagh Stream and Aughkilladoon Stream and other first order tributaries occurring within the proposed wind farm site, channels and drains spanned by the works to reduce the potential for sediment laden run-off to reach sensitive receptors.

- No direct flow paths between stockpiles and watercourses will be permitted at the Site.

- Excavated material will be backfilled and transported to the spoil storage area as soon as is reasonably practicable to prevent long duration storage at the Site which increases the risk of adverse effects on aquatic environments.

- All mitigation measures related to surface water quality will be implemented before excavation works commence.

6.2 TEMPORARY STOCKPILE MANAGEMENT FOR WIND FARM SITE WORKS

Whenever possible, soil and rock will be re-used on the Site immediately, thereby reducing the need for double handling, which will also reduce the requirement to stockpile soils. Generally excavated rock will be used immediately for Site Access Track construction. Whenever possible stockpiles will be avoided. Where stockpiling is required it will be stored in the designated temporary spoil stockpile area located to the east of the proposed turbine T9. This location for stockpiling has been selected due to its location on relatively flat ground that is well buffered (in excess of 100m) from any surrounding watercourses or drains and the presence of low value habitats in the form of intensively managed improved agricultural grassland.

6.3 EXCAVATION REQUIREMENTS FOR THE PROPOSED GRID CONNECTION ROUTE

The following mitigation measures will be implemented during excavations for the proposed grid connection route:

- The timing of grid connection cable laying will be carried out during metrologically dry seasons/periods.
- An Ecological Clerk of Works (ECoW) will be onsite in order to lessen environmental disruption and ensure site integrity is maintained. The ECoW will also be responsible for routine environmental monitoring and report writing.
- excavated material will be temporarily stockpiled adjacent to the section of trench, with appropriate material used as backfill.
- Excess/unsuitable material will be immediately removed and disposed of at a licenced waste disposal facility.
- Appropriate siltation measures, as per the measures set out in the subsequent sections below will be put in place prior to excavations.
- Stockpiles will be temporarily stored a minimum of 25m back from rivers/streams on level ground with a silt barrier installed at the base.
- For all grid connection trenching along the local road, any unsuitable backfill material excavated will be immediately taken away from the works area in trucks and disposed of under license to an authorised waste disposal facility. This will prevent any contaminated run-off to roadside drains during heavy rainfall.

6.4 EXCAVATION DEWATERING REQUIREMENTS FOR THE WIND FARM SITE

The following mitigation measures will be implemented for dewatering activities at the wind farm site:

- Areas of subsoils to be excavated will be drained ahead of excavation works. This will reduce the volumes of water encountered during excavation works and will therefore reduce the volume of water that is required to be dewatered whilst excavations are being carried out.

  Engineered drainage and attenuation features outlined in the Surface Water Management Plan in the CEMP presented in the appended to the EIAR (Jennings O'Donovan, 2023) in **Appendix 2.1** These will be established ahead of excavation works.

- Dewatering pumping rates will be controlled by an inline gate valve or similar infrastructure which will facilitate a reduction of loading on the receiving environment, thus enhancing the attenuation and settlement of suspended solids.

- The direct discharge of dewatered loads to surface waters will not be permitted under any circumstances.

- All dewatering will follow a strict procedure of pumping to a settlement tank and then to a dewatering bag, or settlement ponds prior to discharging to receiving environment for overland flow.

- Geofabric lined settlement ponds will buffer the run-off discharging from the drainage system which will reduce the hydraulic loading to watercourses. Settlement ponds will be designed to reduce flow velocity to 0.3 m/s at which velocity silt settlement generally occurs. In areas of the Site where the placement of settlement ponds is not feasible, other mitigation measures described below will be implemented

- Check Dams will be constructed across drains and will reduce the velocity of run-off which will, in turn, promote settlement of solids upstream of potential surface water receivers. An additional benefit of check dams is that they will reduce the potential for erosion of drains. Rock filter bunds may be used for check dams, wood or hay bales can also be used if properly anchored. It is recommended that multiple check dams are installed, particularly in areas immediately down gradient of construction areas.

- Overland flow paths of the final dewatered discharge will be maximised to the greatest practical extent to avoid prematurely draining to drainage channels or surface waters. This approach will allow for enhanced settling out of suspended solids entrained in the run-off.

- All pumps, tanks, settlement ponds, dewatering bags and check dams used in the dewatering process will be regularly inspected and maintained as necessary to ensure surface water run-off is appropriately treated.

- Sediment fencing will be installed up gradient of water courses which may receive the final overland flow.

- The final treated dewatered discharge will be directed towards heavily vegetated areas to allow for further natural filtration of suspended solids.

- A programme of water quality monitoring will be implemented during the construction phase which is outlined in detail in CEMP presented in the appended to the EIAR (Jennings O'Donovan, 2023) in **Appendix 2.1**.

- No extracted or pumped water will be discharged directly to the surface water network associated with the Site (this is in accordance with Local Government (Water Pollution) Act 1977 as amended).

- Any discharges of sediment treated water will meet the requirements of the Surface Water Regulations 2009, as amended.

6.5 WATERCOURSE CROSSINGS

6.5.1 Wind Farm Site

At the wind farm site, one new watercourse crossing will be constructed. The required crossing will be a crossing of a small stream that are headwaters of the Finisk River: the location of the proposed crossing and proposed designs are mapped on Figure 9.7 in Volume III of the Dyrick Hill Wind Farm EIAR (Jennings O'Donovan, 2023). The following measures provide for the planning and consideration of this watercourse as part of the overall approach to watercourse crossing to ensure potential impacts are adequately mitigated.

A confirmatory assessment in terms of bridge or culvert design will be carried out that will have cognisance to the crossing location including the characteristics of water flow at both locations. The proposed crossing location will be situated relatively near the headwaters of this small stream. As a result, bridge or culvert specification and construction are envisaged to be of relatively low significance in terms of expected flow and culvert diameter. As per details set out above the following design measures have been implemented for the watercourse crossing to ensure any potential impacts of the proposed watercourse crossing are minimised:

- The design of the proposed crossing and a method statement for the proposed construction will be agreed in advance with Inland Fisheries Ireland (IFI)

- Crossings have been designed to minimise, in so far as practical, the disturbance or alteration of water flow, erosion and sedimentation patterns and rates

- Vehicles and plant used in the construction of the proposed crossing will only be refuelled at the Site's bunded and designated refuelling area, no refuelling will be permitted within 50m of any watercourse at the Site

- To mitigate against the potential risk of accidental leaks or spillages from plant and equipment the following measures will be implemented: Multiple spill kits will be maintained on the Site at all times within the cabs of vehicles and placed strategically at environmentally sensitive locations across the Site. Spill kits will be routinely inspected to ensure that they are fully stocked with oil absorbent booms and pads at all times. Oil absorbent booms will be installed downstream of channel crossing work areas within 25m of the works location prior to the commencement of works.

6.5.2 Grid Connection Route

The proposed grid connection route includes the construction of 3 no. watercourse crossings. The crossings will be via horizontal directional drilling at two locations, and one via the existing bridge formation.

The following mitigation measures will be implemented during the installation of the grid connection route over existing the 1 no. existing bridge formation:

- Excavated road and soil will be stored in an area at least 10m from the crossing structure and watercourse, and preferably down gradient of the watercourse crossing but up-gradient of the excavated trench so that, after rainfall, material in run-off is contained in the trench.

- Silt fencing and silt capture structures such as straw bales will be deployed along either side of a watercourse crossing beyond the full width of the pipe, culvert or bridge structure. Silt fencing will be installed so that the wooden posts and attached fence is buried at least 300mm below the surface of road-side vegetation.

- Gullies that lead directly to a watercourse either side of a structure are key pathways for run-off conveyance and these will be blocked to ensure that the direction of potential run-off is conveyed to vegetated verges to allow for infiltration and trapping.

- A pre-emptive site drainage management plan will be applied to take account of predicted rainfall so that large excavations adjacent to watercourse crossing can be suspended or scaled back when heavy rain is forecast.

These measures will prevent the run-off of excess sediments via the key watercourses intersecting the cable route to key adjoining downstream watercourses that connect the crossing points to European Sites and sensitive aquatic receptors. The mitigation measures also will apply to any small drains that represent a pathway for conveyance of sediment to watercourses and qualifying habitats of the Blackwater River SAC and the Dungarvan Harbour SPA downstream of this watercourse crossing.

6.6 HORIZONTAL DIRECTIONAL DRILLING

The following mitigation measures to reduce potential impacts associated with horizontal directional drilling (HDD) will be implemented:

- Clearbore, which is not toxic to aquatic organisms and is biodegradable will be the drilling fluid used.

- Mud mixing will be monitored to suit the ground conditions encountered.

- The drilling fluids will be constantly monitored, any changes required to the mix will be performed on site by a specialised HDD Contractor upon consultation with the drilling fluid supplier and Environmental Clerk of Works.

- Mud testing equipment will be available at all times during drilling operations to monitor key mud parameters.

- All equipment will be carefully checked on a daily basis by the Site Supervisor prior to use to ensure plant and machinery is in good working order with no leaks or potential for spillages.

- Spill kits, including an appropriate hydrocarbon boom will be available on the site in the event of any unforeseen hydrocarbon spillages and all staff shall be trained in their use.

- All plant, materials and wastes will be removed from site following the HDD works.

- The launch pit will be reinstated to the original land surface condition and the normal duct trench will continue from this point.

- Should any dewatering be required, it will be carried out in accordance with the CEMP which is appended to the EIAR (Jennings O'Donovan, 2023) in **Appendix 2.1**.

- Test pits and boreholes will not be located directly on, or extend through, the proposed alignment, as these weak points may serve as conduits where inadvertent fluid returns or frac outs could occur. At least a 3m offset will be provided between the boreholes and pipe alignment.

6.7 RELEASE & TRANSPORT OF SUSPENDED SOLIDS

The following mitigation measures will be implemented at the wind farm site during the construction and decommissioning phase to prevent the release and transport of silt-laden surface water runoff:

- Collector drains and soil berms will be implemented to direct and divert surface water runoff from construction areas such as temporary stockpiles into established settlement ponds, buffered discharge points and other surface water runoff control infrastructure. This planning and placement of these control measures will be of fundamental importance, especially for the areas where works within the 50m buffer zone of surface waters and significant drainage features.

- Sediment control fences will be implemented significantly upgradient of potential receiving waters and as part of the drainage network. Sediment control fences will also be established upgradient of the Site's pre-existing natural and artificial drains in addition to degraded areas of peat that are likely to receive surface water runoff. This practice will reduce the potential for elevated suspended solids entrained in surface water runoff to discharge to surface waters.

- Multiple silt fences will be used in drains discharging to the surface water network. This will be especially important for the areas where works occur within the 50m buffer zone of surface waters and significant drainage features.

- A dedicated silt fence will be established along all sections of the wind farm access track that are within the 50m buffer zone of the Finisk River and its upper tributaries such as the Lisleagh Stream, Aughkilladoon Stream and Farnanes Stream.

- The drainage, attenuation and other surface water runoff management systems will be installed prior to the commencement of construction activities. Whenever possible, drainage and attenuation control measures will be installed during seasonally dry conditions to limit the potential for sediment laden run-off to discharge to surface waters during the installation of these measures.

- Surface water runoff will be discharged to land via buffered drainage outfalls that will contain hardcore material of similar composition to the geology of the bedrock at the Site. This mitigation measure will promote the capture and retention of suspended sediment.

- Buffered drainage outfalls also promote sediment percolation through vegetation in the buffer zone, reducing sediment loading to adjacent watercourses and avoiding direct discharge to the watercourse.

- Buffered drainage outfalls will be placed outside of the 50m buffer zone and will not be positioned in areas with extensive erosion and degradation.

- A high number of discharge points will be established to decrease the loading on any one particular outfall. Discharging at regular intervals mimics the natural hydrology by encouraging percolation and by decreasing individual hydraulic loadings from discharge points.

- A CEMP has been developed which will mandate regular inspections and maintenance of pollution control measures. Contingency measures outlining urgent protocols to repair or backup any breaches of designed mitigation measures are also incorporated into the CEMP appended to the EIAR (Jennings O'Donovan, 2023) in **Appendix 2.1**.

- In the event that mitigation measures are failing to reduce suspended solids to acceptable levels, construction works will cease until remediation works are completed.

- Fine solids or colloidal particles are very slow to settle out of waters. Therefore, coagulant or flocculant will be used as appropriate to promote the settlement of finer solids prior to discharging to surface water networks. Flocculant gel blocks can be placed in drainage channels. These are passive systems that are self-dosing, self-limiting and are environmentally friendly. Flocculant gel blocks bind elevated levels of silt and associated contaminants into masses that are easily separated, captured and then removed from the water.

- Surface water runoff controls will be checked and maintained on a daily basis. Check dams and settlement ponds will be maintained and emptied prior to the build-up of excessive sediment. The frequency of maintenance and emptying will be dictated by levels of sediment accumulation.

The adoption of precautionary principles and the implementation of mitigation measures listed above will ensure that the risk of elevated suspended solids to surface waters is low. This in turn

will ensure that potential risks to sensitive receptors is also low. Nevertheless, should a significant discharge of suspended solids to surface waters occur, the absence of immediate proximity to designated sites and the assimilative capacity of the localised surface waters will act as a natural hydrological buffer in terms of suspended solids loading. Should such a discharge occur, the dilution and retention time of suspended solids in the localised surface water network will reduce potential impacts on highly sensitive downstream designated sites. It should be noted that this natural mitigation measure is not to be adopted as a first principle and will not be relied upon to prevent adverse impacts on designated sites.

A detailed design of required drainage, collector drainage, stilling ponds and other listed mitigation infrastructure is contained in the Surface Water Management Plan contained in the CEMP is appended to the EIAR (Jennings O'Donovan, 2023) in **Appendix 2.1**.

6.8 RELEASE OF HYDROCARBONS

The following mitigation measures will be implemented during all construction and decommissioning phase works for the proposed development to prevent the release and transport of hydrocarbons to receiving surface waters:

- Refuelling of vehicles will be carried out off site to the greatest practical extent. This refuelling policy will mitigate the potential for impacts by avoidance. Due to the remote location nature of the Site, it is unlikely that implementation of this refuelling policy will be practical in all circumstances. In instances where refuelling of vehicles on Site is unavoidable, a designated and controlled refuelling area will be established at the Site. The designated refuelling area will enable low risk refuelling and storage practices to be carried out during the works. The designated refuelling area will contain the following attributes and mitigation measures as a minimum requirement:
    - The designated refuelling area will be located a minimum distance of 50m from any surface waters or Site drainage features.
    - The designated refuelling area will be bunded to 110% volume capacity of fuels stored at the Site.
    - The bunded area will be drained by an oil interceptor that will be controlled by a pent stock valve that will be opened to discharge storm water from the bund.

- Management and maintenance of the oil interceptor and associated drainage will be carried out by a suitably licensed contractor on a regular basis.

- Any oil contaminated water will be disposed of at an appropriate oil recovery plant or licensed tip site.

- Any minor spillage during this process will be cleaned up immediately.

- Vehicles will not be left unattended whilst refuelling.

- All machinery will be checked regularly for any leaks or signs of wear and tear.

- Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure will be put in place with all staff properly briefed. Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner.

Notwithstanding the management of refuelling and fuel storage at the designated refuelling area, the potential risk of hydrocarbon spills from plant and equipment or other general chemical spills at other areas of the Site remains. To mitigate against potential spills at other areas of the Site, the following mitigation measures will be implemented:

- Oil absorbent booms and spill kits will be available adjacent to all surface water features associated with the Development. The controls will be positioned downstream of each construction area and at principal surface water drainage features. Oil booms deployed will have sufficient absorbency relative to the potential hazard.

- Spill kits will also be available at construction areas such as at turbine erection locations, the temporary site compound, on-site substation, spoils storage areas and met mast location etc.

- Spill kits will contain a minimum of oil absorbent pads, oil absorbent booms, oil absorbent granules, and heavy-duty refuse bags for collection and appropriate disposal of contaminated matter.

- Should an accidental spill occur during the construction or operational phase of the Development, such incidents will be addressed immediately. This will include the cessation of works in the area of the spillage until the issue has been resolved.

- Spill kits will be kept in each vehicle at the Site and will be readily available to all operators.

- No materials, contaminated or otherwise will be left on the Site.

- Suitable receptacles for hydrocarbon contaminated materials will also be available at the Site.

- A detailed spill response plan is provided as part of the CEMP.

Implementation of the above mitigation measures will significantly reduce the risk of hydrocarbon contamination being released to the surface water network. Nevertheless, the potential risk cannot be entirely eradicated. Therefore, precautionary measures and emergency response protocols have been prepared and are provided as part of the CEMP.

6.9 RELEASE OF CEMENTITIOUS MATERIALS

The following mitigation measures will be implemented during all construction and decommissioning phase works for the proposed development to prevent the release and transport of cementitious material to receiving surface waters:

- The procurement, transport and use of any cement or concrete will be planned fully in advance and supervised by appropriately qualified personnel at all times.

- Vehicles transporting cement or concrete to the Site will be visually inspected for signs of excess cementitious material prior to being granted access to the Site. This will prevent the likelihood of cementitious material being accidentally deposited on the Site Access Tracks or elsewhere at the Site.

- Drivers of such vehicles will be instructed to ensure that all vehicles are washed down in a controlled environment prior to the departure of the source site, such as at concrete batching plants.

- Precast concrete will be used wherever possible. However, the use of pre-cast concrete is not viable option for large structures such as Turbine foundations and so concrete will be delivered to the Site.

- Concrete will not be poured during periods of rainfall or if any kind of precipitation is forecast. This policy will limit the potential for freshly poured concrete to adversely impact on surface water runoff.

- Raw or uncured waste concrete will be disposed of by removal from the Site.

- Washout of concrete trucks shall be strictly confined to the batching facility and shall not be located within the vicinity of watercourses or drainage channels. Only the chutes will be cleaned prior to departure from Site and this will take place at a designated area at the Temporary Site Compound.

- Spill kits will be readily available to Site personnel, and any spillages or deposits will be cleaned up as soon as possible and disposed of appropriately.

- Pouring of concrete into standing water within excavations will be avoided.

- Excavations will be prepared before pouring of concrete by pumping standing water out of excavations to the buffered surface water discharge systems in place.

- Any surplus concrete will not be stored or deposited anywhere on Site and will be returned to the source location or disposed of appropriately at a suitably licensed facility.

- Any required shuttering installed to contain the concrete during pouring will be fully secured around its perimeter to minimise any potential for leaks.

6.10 HAUL ROUTE WIDENING

All mitigation measures set out in Section 6.7 to 6.9 above with respect to the control of suspended solids, hydrocarbons and cementitious materials will be implemented in full, wherever applicable, during the construction works associated with the widening of the haul route at the three no. locations.

Management of spoil arising at the widening locations will be undertaken in accordance with the approach to spoil management set out for the wind farm site (Section67.1 & 6.2) and grid connection route (Section 6.5), as applicable to the widening location.

6.11 WATER QUALITY MONITORING

The following water quality monitoring will be implemented to mitigate against potential impacts on the surface water receiving environment:

- A programme of water quality monitoring outlining the selected parameters and monitoring frequency will be agreed with Inland Fisheries Ireland and Waterford County Council prior to the commencement of construction.

- In order to assist in the detection of any deviations from the baseline hydrochemistry conditions at the Site, regular periodic monitoring of the Site's surface waters will be carried out prior to and during construction.

- It is proposed that a programme of operational phase water quality monitoring is also implemented at a monitoring frequency agreed with Waterford County Council in order to aid the detection of any potential operational phase impacts on surface water quality.

- As a minimum requirement, field measured parameters such as pH, conductivity, total dissolved solids (TDS), temperature, dissolved oxygen (DO) and turbidity will be included in the water quality monitoring programme. The results will be compared to the applicable EQS to determine if adverse impacts on water quality are occurring.

- Water quality will be monitored for trace metal concentrations prior to, during and after the construction phase.

- Water quality monitoring locations will include both upstream and downstream points relative to the works locations. The locations of the water quality monitoring points will be flexible and will be moved as the construction phase progresses so that monitoring points remain representative of the most likely construction impact receptor points.

- The watercourses within and adjacent to the proposed spoil storage area will be included within the water quality monitoring programme.

- The downstream monitoring locations will be positioned as close as possible downstream of the works location and another positioned further downstream. This approach will allow for an assessment of the dilution of potential contaminations (if present) as the distance from the point of diffuse source location increases.

- Watercourses which do not have year-round flows such as artificial drains, ditches or ephemeral streams will be avoided as water quality monitoring locations.

- During the construction phase, daily visual inspections of excavations, dewatering procedure, settlement ponds, silt traps, buffered outfalls and drainage channels etc. will be carried out by a suitably qualified person. Any excess build-up of sediment at settlement ponds, drains or at any other drainage features that may decrease the effectiveness of the drainage feature will be promptly removed.

- During the construction phase of the Development, all development areas will be monitored on a daily basis for evidence of groundwater seepage, water ponding and wetting of previously dry spots.

- Following the completion of the construction phase, inspection of silt traps, buffered outfalls and drainage channels will be periodically inspected during maintenance visits to the Site when the operational phase water quality monitoring will also be carried out.

- The proposed watercourse crossings discussed in Section **Error! Reference source n ot found.** will be monitored daily during construction and during each Site visit during the operational phase. The water course crossings will be monitored in terms of their

impacts (if any) on the receiving watercourses and in terms of their structural integrity to identify any signs of erosion or potential for sediment release.

- It is proposed that a handheld turbidity meter is available at the Site to accurately measure the quality of water discharging from the Site. The meter will be maintained and calibrated frequently.

- A detailed inspection and monitoring regime to be agreed with Inland Fisheries Ireland and Waterford County Council will be included in the CEMP.

- Any discharges of sediment treated water will meet the requirements of the Surface Water Regulations 2009, as amended.

6.12 AVOIDANCE OF DISTURBANCE TO SPECIAL CONSERVATION INTEREST BIRD SPECIES

The following mitigation measure will be implemented to avoid disturbance to golden plover, lapwing and any other special conservation interest bird species of Dungarvan Harbour SPA or any other SPAs in the wider region, in the event that they are found to rely on the project site prior to or during the construction phase. Pre-construction surveys and ongoing construction phase bird monitoring will be completed to identify the presence of golden plover and any other special conservation interest bird species at the project site. In the event that wintering special conservation interest bird species of the Dungarvan Harbour SPA, such as golden plover are found to rely on the project site during the construction phase, works will be restricted from the areas that are being relied upon by these species. A buffer area of 500m will be established around areas that have been identified as being relied upon by wintering populations of golden plover or any other special conservation interest bird species of this SPA. This 500m buffer distance is line with the maximum buffer distance set out by Goodship & Furness (2022) for golden plover.

6.13 EMERGENCY RESPONSE

Mitigation measures outlined in the previous sections of this chapter will significantly reduce the potential for contamination of surface water or groundwater associated with the Development. Nevertheless, as is the case with all construction projects, a risk of accidental chemical spillages, sediment overloading of control measures or leaks of contaminants from plant or equipment remains a possibility. Emergency response procedures to potential contamination incidents have

been prepared as part of the CEMP and will be implemented at the Site prior to the commencement of the construction phase. The following is a non-exhaustive list of potential emergencies and respective emergency responses:

- Spill or leak of hazardous substances (less than 20 litres);
    - All spill incidents will be dealt with immediately as they arise
    - Spill kits will be prepared and available in vehicles associated with the construction phase of the Development
    - Spill kits will also be prepared and made available at primary work areas such as at proposed turbine, hardstand, substation, met mast and construction compound locations
    - Disposal receptacles for hydrocarbon contaminated materials will also be available at the Site
- Major spill of hazardous or toxic substance off Site or to environmentally sensitive areas:
    - Immediate escalation measures will be implemented for all major spill events
    - Escalation measures may include installation of temporary sumps or drains to control the flow or migration of hydrocarbons or other chemicals
    - Attempts to be made to limit or contain the spill using sandbags to construct a bund wall, use of absorbent material, temporary sealing of cracks or leaks in containers, use of geotextile or silt fencing to contain the spill
    - Excavation and disposal of contaminated material will be immediately carried out following any such incidents
    - Evacuation procedures will be implemented to remove non-essential personnel from the area

- Data gathering and an investigation will commence immediately after the emergency is contained

- If a significant hydrocarbon spillage does occur, the contractor on behalf of the developer will have an approved and certified clean-up consultancy available on 24-hour notice to contain and clean-up the spill

- All major spills of this nature will be reported to Waterford County Council immediately following such instances.

- Flooding of low-lying areas of the Site:

  - Immediately remove all chemicals, fuels and other hazardous substances from low lying areas of the Site

  - Immediately remove plant and equipment from low lying areas

  - Recover materials washed from Site including sediment and other waste

  - Review and address the potential for excess water entering the Site

  - Review and maintain erosion and sedimentation controls.

- Spills of cementitious material:

  - Cement / concrete contamination incidents will be cleaned up immediately as they arise

  - Spill kits will also be established at key construction areas and they will also be readily available in the cabs of plant and equipment

  - Suitable receptacles for cementitious materials will also be available at the Site.

6.14 HYDRAULIC LOADING DURING THE OPERATION PHASE

The proposed wind farm will lead to an increase in impermeable surface area through the construction of hard stand areas within the Site. This in turn will lead to an increase in hydraulic loading by surface water runoff. However, water balance calculations indicate that the worst-case net increase in surface water runoff volumes will be approximately 5,915 m^3/month, or 1.16% relative to the area of the Site. Therefore, this is considered an imperceptible, or not significant impact.

As a consequence of the estimated low significance of the impact of hydraulic loading during the operational phase, mitigation measures to facilitate a reduction in surface water runoff are limited to ensuring that pre-existing and newly established drainage infrastructure is sufficiently maintained for the discharge rates associated with all areas of the Site. Once identified, any and all blockages which may adversely impact upon the drainage regime at the Site will be immediately removed during the operational phase of the proposed Development. No other additional impacts are anticipated during the operational phase of the Development.

6.15 TURBINE LIGHITNG DURING THE OPERATION PHASE

The use of "white lights" on the turbines will be avoided as these can attract night flying birds such as migrants. Certain turbines will be illuminated with medium intensity red obstacle lights of 2000 candelas where required by the IAA. Lighting will be fitted with baffles to ensure that the light is directed skywards and will not be discernible from the ground.

7 EVALUATION OF MITIGATION MEASURES

The mitigation measures and environmental safeguards outlined above for the construction phase of the project are taken from established best practice guidelines that have been successfully implemented for a wide range of project-level infrastructural developments. These measures have undergone extensive and rigorous monitoring for their effectiveness at development sites where they have previously been applied to ensure adverse environmental impacts are avoided.

It is further noted that the range of mitigation measures outlined in this NIS and the associated Dyrick Hill Wind Farm EIAR to avoid impacts to European Site receptors occurring within the zone of influence of the project have been successfully implemented for a range of other wind farm development projects in Ireland.

The results of this monitoring and the proposal of these measures as standard best practice guidelines is based upon their high degree of success in ensuring negative environmental impacts are avoided.

The best practice guidance that have informed the mitigation measures and environmental safeguards proposed in this NIS and that will be adhered to throughout the construction, operation and decommissioning of the proposed development include:

- The Good Practice Guidance notes proposed by EA/SEPA/EHS:
- PPG 1: Understanding your environmental responsibilities - good environmental practices
- GPP 2: Above ground oil storage tanks
- PPG 3: Use and design of oil separators in surface water drainage systems
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer
- GPP 5: Works and maintenance in or near water
- PPG 6: Working at construction and demolition sites
- PPG 7: Safe storage - The safe operation of refuelling facilities
- GPP 8: Safe storage and disposal of used oils
- GPP 8: Safe storage and disposal of used oils
- GPP 19: Vehicles: Service and Repair
- GPP 21: Pollution incident response planning
- GPP 22: Dealing with spills
- GPP 26 Safe storage - drums and intermediate bulk containers
- PPG 27: Installation, decommissioning and removal of underground storage tanks
- CIRIA Environmental Good Practice on Site.
- CIRIA Control of Water Pollution from Construction Sites. Technical Guidance C648.
- CIRIA SuDS Manual Technical Guidance C697.

- Development on Unstable Land. Department of Environment (DOE), UK.

8 CONCLUSION

This Natura Impact Statement presents an analysis of the potential for the project to result in adverse impacts to six European Sites and their relevant qualifying features of interest as set out in Table 5.1 above. An evaluation of the potential impacts that could arise as a result of the project to these qualifying features of interest and their conservation objectives has been completed.

During the evaluation of potential impacts associated with the project it was found that the project will not have the potential to undermine the conservation objectives of four SPAs and their relevant special conservation interests occurring within the zone of influence of the development.

The project has been identified as having the potential to result in adverse effects to the relevant qualifying features of interest of the Blackwater River SAC and Dungarvan Harbour SPA occurring within the zone of influence of the development (see Table 5.1 and Table 6.3).

A range of mitigation measures have been prescribed that, once implemented in full, will remove the risk of adverse effects posed by the proposed development to these qualifying features of interest.

Based upon the information provided in this NIS, it is the considered view of the authors of this NIS that it can be concluded by Waterford County Council that the project will not, alone or in-combination with other plans or projects, result in adverse effects to the integrity and conservation status of European Sites in view of their Conservation Objectives and on the basis of best scientific evidence and there is no reasonable scientific doubt as to that conclusion.

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