2.0 DESCRIPTION OF THE PROPOSED PROJECT

2.1 INTRODUCTION & BACKGROUND

This section of the EIAR describes the overall site and the main components of the proposed project and provides details on the construction, operation and decommissioning of the wind farm and associated infrastructure.

FuturEnergy Scart Mountain Designated Activity Company (DAC) proposes to develop the proposed project in Co. Waterford, located approximately 4 km northeast of Cappoquin and approximately 13 km northwest of Dungarvan. It is proposed to supply the power from the proposed project to the Irish electricity network via tail-fed 110kV underground cables (approximately 15.5 km total cable length of which approximately 13.3 km is on the public road corridor) to the existing Dungarvan 110kV substation in the townland of Killadangan, Co. Waterford.

A summary of the overall proposed project is as follows:

- Erection of 15 no. wind turbines with an overall blade tip height range from 179.5 m to 185 m inclusive, a rotor diameter range from 149 m to 163 m inclusive, a hub height range from 102.5 m to 110.5 m inclusive, and all associated foundations and hard-standing areas in respect of each turbine;
- Permanent upgrade to the existing forest entrance onto the L5055 local road in the townland of Lackenrea to be used as a construction entrance. It will also be used for operational phase access for HGVs only;
- Construction of 6 no. permanent site entrances to form 3 no. local road crossing points to enable site access during construction (on the L5054, L5055 and L1026 in the townlands of Moneygorm, Knocknasheega and Tooranaraheen respectively). The entrance associated with the crossing point on the L5054 will also function as an operational phase access for light vehicles only;
- Temporary improvements and modifications to 1 no. location at the junction of the N72 and the L1027 (known as Boheravaghera Cross or Affane Cross) to facilitate delivery of oversized loads and turbine delivery, in the townland of Crinnaghtaun West, Co. Waterford;
- Construction of 2 no. temporary construction compounds located within the northern and southern ends of the site, with associated temporary site offices, parking areas and security fencing;
- Erection of 1 no. Meteorological Mast of 100 m above existing ground level for the measuring of meteorological conditions, with a lightning finial extending above the mast;
- 2 no. temporary borrow pits;
- Permanent construction of approximately 12 km new internal site access roads and upgrade of approximately 7.2 km existing internal site roads, to include passing bays and all associated drainage, all within the wind farm site;
- Construction of temporary and permanent drainage and sediment control systems;
- Construction of 1 no. permanent 110kV electrical substation including:
    - 1 no. EirGrid control building containing worker welfare facilities and equipment store;
    - 1 no. Independent Power Producer control building containing high voltage switch room, site offices, kitchen facilities, storeroom and toilet amenities;
    - All electrical plant and infrastructure and grid ancillary services equipment;
    - Parking;
    - Lighting;
    - Security Fencing;

  - Wastewater holding tank;
  - Rainwater harvesting equipment;
  - All associated infrastructure and services including site works and signage.

- All related site works and ancillary development including signage, berms, landscaping, and soil excavation;
- Forestry felling (both permanent and temporary) to facilitate construction and operation including biodiversity enhancement measures, of the proposed project and any onsite forestry replanting;
- All associated underground electrical and communications cabling connecting the wind turbines to the proposed wind farm substation.
- Temporary improvements and modifications to 4 no. locations adjacent to the public road to facilitate delivery of oversized loads and turbine delivery in the townlands of Crinnaghtaun West, Ballyduff East and Rathpatrick;
- Permanent widening of sections of the L5055 within the road corridor (to 4.5 m running width) to facilitate delivery of oversized loads/turbines and construction of 9 no. passing bays along the border between the townlands of Crinnaghtaun West, Lacken, Cluttahina, Turbeha, Belleville and Lackenrea;
- All works associated with the connection of the proposed wind farm to the national electricity grid, which will be via a permanent tail fed 110 kV underground cable connection (approximately 15.5 km cable length of which approximately 13.3 km of which will be in the public road corridor) to the existing 110 kV Dungarvan Substation in the townland of Killadangan, Co. Waterford. There are 4 no. watercourse crossings on the proposed grid connection route (GCR) (of which 3 are classed as rivers and 1 is a stream);
- Forestry felling (both permanent and temporary) to facilitate construction and operation of the proposed project and any onsite forestry replanting

A 35-year operational life from the date of full commissioning of the entire wind farm is being sought for all works (other than temporary and permanent works specified above), and the subsequent decommissioning. Permission is being sought for a period of 10 years. The full proposed project has been considered and has been addressed as part of this EIAR.

Planning Applications

The proposed project will be the subject of two main planning applications as follows:

The Proposed Wind Farm with onsite substation and ancillary infrastructure

The first planning application will be to An Bord Pleanála under section 37E of the Planning and Development Act 2000 as amended for everything on the above list (in Section 2.1) with the exception of the proposed grid connection works. This application will include the proposed onsite 110kV substation, as well as the works at Affane Cross that are associated with the oversize load (turbines) delivery.

Proposed Grid Connection Route (GCR)

A second separate application will be made to An Bord Pleanála for the proposed GCR as it comprises development comprising or for the purposes of electricity transmission, under section 182A of the Planning and Development Act 2000, as amended (i.e. all works connecting the proposed onsite substation to the existing Dungarvan substation over approximately 16 km).

Any works being carried out within the public road corridor (i.e. localised road widening or works to facilitate delivery of components to the site) are not included in these two applications but are assessed as part of the overall proposed project.

The proposed project extent, as shown in Figure 1-1 of this EIAR, is being assessed in this EIAR. Any references to the "proposed project" in the EIAR would equally relate to the entire project (i.e. wind farm, GCR, all temporary/permanent works along the proposed turbine delivery route (TDR) unless otherwise stated. The proposed wind farm site layout and onsite 110 kV substation are presented in Figure 2-1. Any reference to the "TDR Route works areas" refers to the areas where works are required to allow the delivery of oversize loads as shown in Figure 2-3. References to the GCR relate to the route for the proposed cable between the proposed onsite substation and the existing electrical substation near Dungarvan (see Figure 2-6). Where the text refers to the "proposed wind farm site", this relates only to the site of the wind farm, excluding the above individual ancillary/associated elements (See Figure 1-2 of this EIAR).

A 10-year planning permission and 35-year operational life from the date of commissioning of the entire wind farm is being sought for the proposed project. The proposed grid infrastructure will remain as a permanent part of the national infrastructure, which will be operated by the Transmission System Operator, EirGrid and owned by ESB the Transmission System Owner.

2.2 THE SITE OF THE PROPOSED PROJECT

The study area assessed will be separately defined within each chapter as required, but where this is not the case, it refers to the areas outlined in Figure 1-1 of this EIAR, which includes the proposed wind farm site, the GCR and the location of works on the TDR.

Wind Farm Site

The proposed wind farm site (as presented in Figure 1-2 of this EIAR) is located between Cappoquin, Bellinamult and Millstreet, in Co. Waterford. The site of the proposed wind farm is located approximately 4 km northeast of Cappoquin, and approximately 13 km northwest of Dungarvan. Throughout this EIAR, reference may be made to the study area within each technical chapter.

The site of the proposed wind farm (Figure 1-2 of this EIAR) has an area of approximately 981.4 ha and comprises an elongated land parcel approximately 8 km long in the north/south direction and is approximately 1.9 km wide in an east/west direction at the widest point. The site lies between the R671 and the R669, on the southeastern side of the Knockmealdown Mountains.

The land use/activities on the site of the proposed wind farm are primarily commercial forestry, with some areas of open peatland that is grazed. The surrounding landscape is a mixture of agricultural land with some forestry and pockets of peatland (Plate 2-1). A mixture of shallow peaty soils and peat was encountered on Knocknanask during ground investigation works undertaken in preparation of this EIAR. Historical peat cutting in the area has removed the majority of peat with any remaining peat in dry condition and generally shallow depth (<0.5 m). No deep peat was found to the south of the site (to the east of the Glenshelane valley).

Plate 2-1: Existing Wind Farm Site (view north west from Knocknasheega towards Knocknanask)

The landscape is predominately hilly to mountainous in the wider area, with the proposed wind farm being located on an elevated area beside the Glenshelane river valley with a topography of between 130m and 486 m OD. The Knockmealdown Mountains to the north and northwest of the site are also elevated and are the most significant landscape features in the surrounding area.

The proposed wind farm is located within the townlands of Knocknanask, Tooranaraheen, Knocknasheega, Scartmountain, Coolagortboy, Toor, Moneygorm, Moneygorm East, Moneygorm West, Lackenrea Co. Waterford.

GCR

The proposed grid connection is located within the townlands of Scartmountain, Newtown, Coolroe, Staigbraud, Graigue Beg, Carrigaun (Hely), Graigue More, Scart (Hely), Scart (Sergant), Vicarstown South, Glen Lower, Glen Upper, Lisroe, Carrowgarrif Beg, Colligan More, Colliganmountain, Colliganwood, Ballymacmague North, Inchindrislawood, Inchindrisla, and Killadangan Co. Waterford.

Location of Works on the TDR

The proposed project works to allow for delivery of oversize components to the site are located in the townlands of Crinnaghtaun West, Ballyduff East and Rathpatrick, with sections of minor widening of the L5055 local road and construction of 9 no. passing bays where it borders Crinnaghtaun West, Lacken, Cluttahina, Turbeha, Belleville and Lackenrea. Minor additional works such as hedgerow

trimming and temporary demounting of some signage, etc. will also be required at various locations along the route.

2.3 POWER OUTPUT

The proposed wind turbines will each have an assumed rated electrical power output of between 5.7 – 7.2 MW. This will be determined following a competitive procurement process.

For the purposes of this EIAR, a minimum rated output of 5.7 MW and a maximum rated output of 7.2 MW has been used to calculate the power output of the proposed wind farm, which will result in an estimated installed capacity of between 85.5-108 MW.

Based on the above, the proposed wind farm has the potential to produce up to between 262,143 and 331,128 MWh (Megawatt hours) of electricity per year, based on the following calculation:

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

- A is the number of hours in a year: 8,760 hours;
- B is the capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc: 35%;
- C is the rated output of the wind farm: minimum 85.5 MW, maximum 108 MW.

The capacity factor of a wind farm takes into account the intermittency of the wind and is based on average wind speeds[1].

The 229,950 to 331,128 MWh of electricity produced by the proposed project will be sufficient to supply the equivalent of between 45,598 and 65,661 Irish households with electricity per year[2].

2.4 COMMUNITY BENEFIT PROPOSAL

The proposed project has the potential to bring significant positive benefit to the local community. The project will contribute between €896,000 to €1.056 million in annual rates to Waterford City and County Council and a community benefit fund will be put in place for the lifetime of the project to provide direct funding to areas surrounding the project.

The RESS Terms and Conditions[3] were published in February 2020 and provide details on the Government requirements for community benefit funds for renewable energy projects that participate in the scheme. A significant annual community benefit fund of 540,000 per year for the first 15 years of the project 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. For the remaining lifetime of the wind farm, FuturEnergy Ireland commits to contributing an additional €1/MWh, which is estimated to be €270,000 per year. Therefore, over the expected 30-year lifetime of proposed project, the Community Benefit Fund will be in the order of €12 million.

1 The capacity factor of 35% is based on an EirGrid study of wind and solar energy in the region of the proposed project, classed as Region K in the study, from December 2022 (https://www.eirgridgroup.com/site-files/library/EirGrid/ECP-2-2-Solar-and-Wind-Constraints-Report-Area-K-v1.0.pdf).

2 This is based on the Sustainable Energy Authority of Ireland *"Energy in Ireland 2022 Report"* from December 2022, which details domestic consumption values for electricity customers in 2021. This report updates the average annual dwelling electricity consumption figure to 5,043 kWh per annum. (https://www.seai.ie/publications/Energy-in-Ireland-2022.pdf).

3 https://www.gov.ie/en/publication/36d8d2-renewable-electricity-support-scheme/ [Accessed January 2023].

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, our first task 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. The fund will be based on the Government of Ireland's Good Practice Principles Handbook for Community Benefit Funds, which will mean that the Fund will deliver initiatives that are in alignment with the UN Sustainable Development Goals[4].

2.5 LAND OWNERSHIP

A large portion of the proposed project is located on lands under the ownership and control of Coillte. The proposed wind farm site measures approximately 981.4 ha, of which approximately 827 ha is owned by Coillte who have consented to the planning applications and proposed project. The proposed project also has a number of third-party private landowners who have consented to the planning applications and proposed project.

2.6 ON-SITE WIND RESOURCE

The layout of the proposed wind farm has been designed to minimise the potential environmental impacts of the wind farm, while at the same time optimising energy production by utilising the natural wind resource across the site. Available wind speed is a key factor in determining the economic viability of potential wind energy locations. In 2003, the Sustainable Energy Authority of Ireland (SEAI) produced a Wind Atlas with information on wind speed modelled at 50 m, 75 m and 100 m height above the ground. With turbine technology innovation, turbine models can now capture more of the wind current and have bigger rotors that radically change the economic viability of wind power. This has been reflected in the updated SEAI 2013 Wind Atlas which re-modelled wind speed data for a much wider range of 30 m-150 m height above ground level. The 2013 SEAI Wind Speed Atlas identifies the site as having a wind speed of between approximately 6.5 m/s and 8.8 m/s at 100 m above ground level. This indicates that the site has a suitable wind resource for a commercial wind energy development.

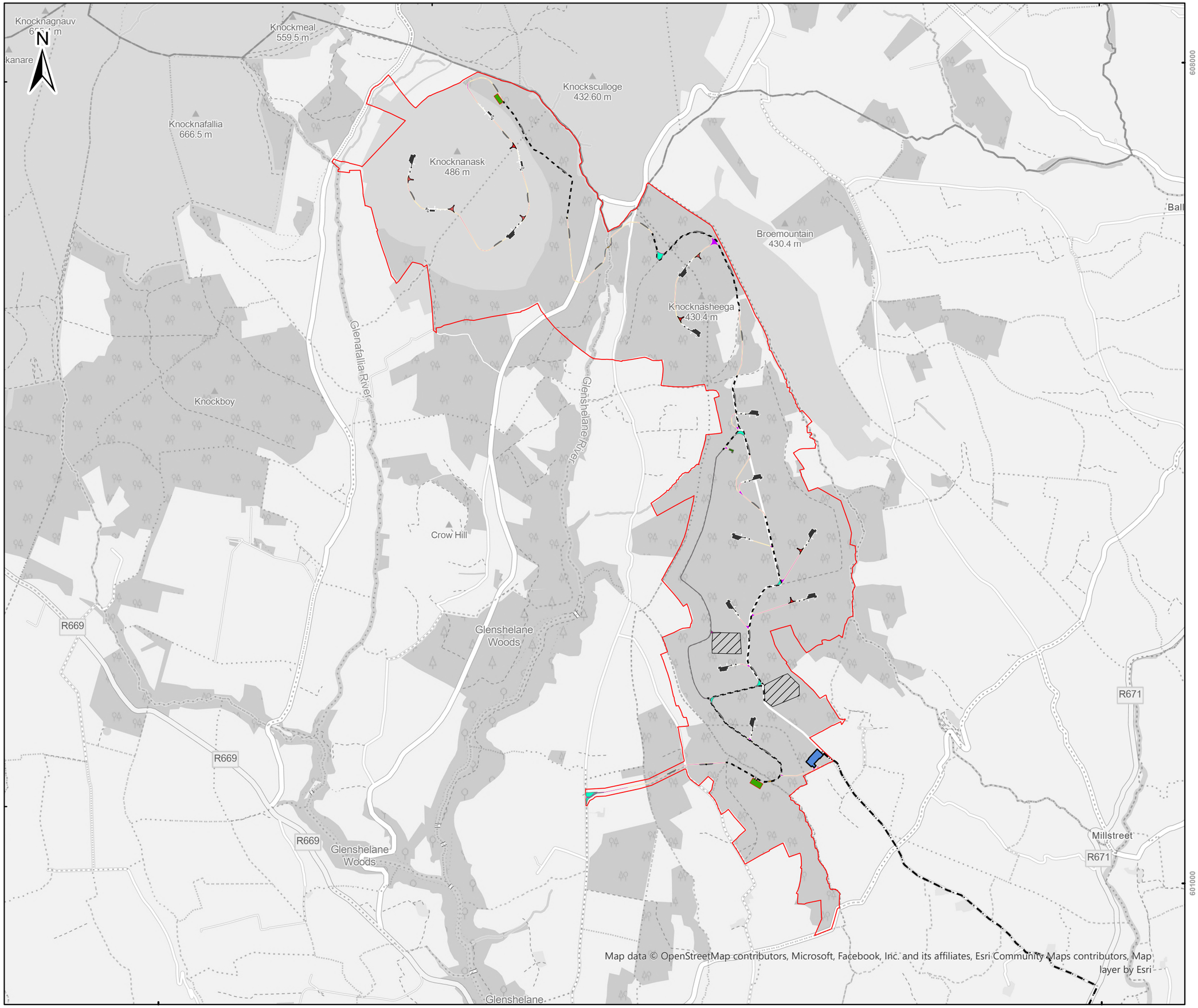
2.7 PROPOSED PROJECT LAYOUT

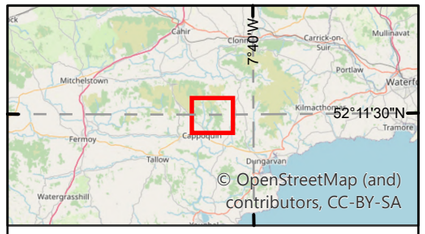
The overall layout of the proposed wind farm is shown in Figure 2-1. This figure shows the proposed locations of the wind turbines and associated hardstanding areas, passing bays, electrical substation, meteorological mast, temporary construction compounds, borrow pits, internal access roads and the main site entrance. Site layout drawings of the proposed project are included as Appendix 1-1 of this EIAR.

The layout reflects the outcome of the iterative design process. Further detail on the design philosophy, constraints and alternative turbine layouts and dimensions considered is detailed in Chapter 3 (Consideration of Reasonable Alternatives) of this EIAR.

The Grid Reference co-ordinates (ITM) of the proposed turbine locations are listed in Table 2-1 below.

4 Renewable Electricity Support Scheme *Good Practice Principles Handbook for Community Benefit Funds* (2021) https://www.gov.ie/pdf/?file=https://assets.gov.ie/140382/b5198da9-c6c7-4af2-bbb5-2b8e3c0d2468.pdf#page=null





Legend

- Proposed Wind Farm Site
- Proposed Grid Connection Route

Proposed infrastructure footprint within the proposed wind farm site

- Proposed Site Roads
- Bridges
- Construction Compound
- Existing Site Roads
- Hardstands
- Met Mast Location
- Non turbine access roads
- Proposed Passing Bay
- Temporary Overrun Area
- Turning Bays
- Wheelwash
- Proposed Substation
- Borrow Pits

0 0.75 1.5
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	13/12/2024	First issue	S.P	J.S

Client: FuturEnergy Ireland

Project: Scart Mountain Wind Farm

Title: Figure 2-1: Proposed wind farm site layout

Scale @ A3:	1:30,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Staunton	December 2024

TOBIN
Tel: +353-(0)1-8030406
Email: info@tobin.ie
www.tobin.ie

Map Ref: 11303-033-LAY.INFR-S.BO-TOB-A

Draft: A

Table 2-1: Turbine Location Details (ITM Co-ordinates)

Turbine ID	Easting's (m)	Northing's (m)
T1	611349.8	606732.2
T2	611213.2	607202.6
T3	611905.4	607543.9
T4	612163.4	607102.6
T5	612049.9	606510.4
T6	613520.7	606182.6
T7	613662.9	605693.6
T8	614156.7	605019
T9	614179.6	604477.3
T10	613959.3	603954.6
T11	614631.4	604010
T12	614644.2	603463.7
T13	613905.2	603387.9
T14	613851.2	602819.8
T15	614116.2	602400.4

The proposed project turbine parameters which are assessed as part of this EIAR are summarised in Table 2-2 and detailed in Sections 2.7.1.

Table 2-2: Proposed Turbine Parameters

Proposed Turbine Parameters	
Turbine	
Blade Height	179.5-185 m
Rotor Diameter	149-163 m
Hub Height	102.5-110.5 m
Colour	White/ Light Grey
Number of blades	Three bladed
Tower type	Tubular tower with horizontal axis
Turbine Foundations	
Diameter	28 m
Volume of concrete required	1000m^3
Turbine Hardstand Areas	
Turbine hardstands	109 m in length and 61 m in width*

*excluding assist crane pads and boom assembly hardstands – approximately 75m length to be added to include these. See Drawing 11303-2016 in Appendix 1-1 for further information.

2.7.1 Wind Turbine Specification

The proposed turbines will have a tip height of between 179.5-185 m inclusive. Detailed drawings, which accompany the planning application, available as Appendix 1-1 of this EIAR, show the parameters of the turbine that is proposed. The exact make and model of the turbine will be dictated by a competitive tender process of the various turbines on the market at the time, and will have dimensions within the parameters set out within the development description (i.e. overall blade tip height of between 179.5-185 m inclusive, a rotor diameter of between 149-163 m inclusive, a hub height of between 102.5-110.5 m inclusive).

A drawing showing the size envelope of the proposed wind turbine parameters is shown in the detailed drawings in Appendix 1-1 of this EIAR.

Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics with only minor cosmetic details differentiating one from another.

The wind turbines that will be installed on site will be conventional three-blade turbines, geared to ensure that the rotors of all turbines rotate in the same direction at all times. Each discipline within this EIAR has assessed the proposed turbine parameters, as presented in Table 2-2, to ensure all scenarios have been assessed. The exact combination of rotor diameter and hub height will be dictated by the final selection of the turbine make and model at turbine selection stage/pre-construction. New turbine models or variants may be available, due to advancements in technology, that were not on the market at the pre-planning / EIA stage, but which will fit within the parameters assessed.

The design is in line with the Wind Energy Development Guidelines (2006), which are currently in force and are also the subject of a targeted review. The current design is capable of operating in compliance with the 2019 draft Guidelines, in particular in relation to:

- Shadow flicker – it is proposed to have near-zero shadow flicker;
- Electrical grid connection – grid connection cables are proposed to be underground; and
- Proximity to sensitive receptors – a minimum turbine set-back of 4 times the maximum tip height (185m) is provided.

Further to this, the proposed layout has achieved a high level of separation between dwellings and turbines by providing a minimum separation distance of >800m.

2.7.1.1 Turbine Blades and Nacelle

The turbines will be three bladed, tubular tower model with horizontal axis. The rotor blades are bolted to the central hub, which is connected to the nacelle. The nacelle holds the following turbine components:

- Generator;
- Electrical components;
- Aviation lighting to Irish Aviation Authority specifications.

The blades of modern turbines are made of fibreglass or carbon fibre reinforced polyester and are aerodynamically shaped to improve efficiency and lower noise production. The blades on this site will be fitted with serrated edges, an additional noise reduction mechanism.

A turbine blade begins generating electricity at wind speeds of 2 to 4 m/s with optimum power generation at wind speeds of approximately 9 to 16 m/s . Generation plateaus between 16 and 25 m/s and turbines shut down at wind speeds greater than 25 m/s in order to protect themselves from excessive wear, although some turbines are designed to operate at up to 30 m/s. Modern turbines turn at between 3 and 20 revolutions per minute (rpm) depending on wind speed and design of turbine.

The entire nacelle (shown in Figure 2-2) and rotor are designed to rotate, or 'yaw', in order to face the prevailing wind. A wind vane located on the nacelle of the turbine controls the yaw mechanism. Rotors of all the proposed turbines will rotate in the same direction. A control unit is located at the base of the turbine and an internal ladder or lift leads up to the nacelle where the shaft, gearbox and generator are located.

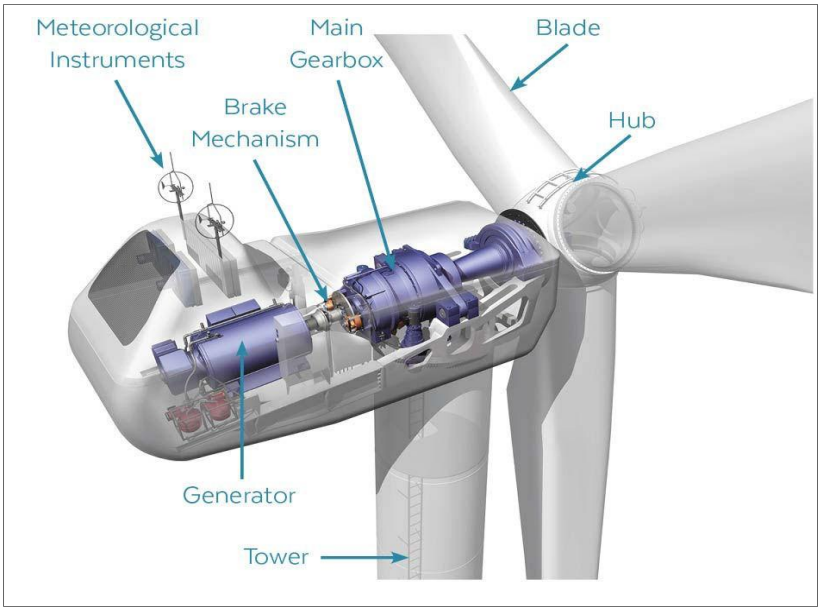


Figure 2-2 Turbine nacelle and hub components

2.7.1.2 Turbine Tower

The turbine tower is a conical steel tube with multiple-layer paint finish. Modern tower design also provides for the use of concrete sections. Towers generally comprise a steel ring at the base of the tower which is assembled on top of the concrete foundations using locally supplied concrete and then pre-stressed. The tower is delivered to site in three to six sections. The first section is bolted to the steel base, which is cast into the concrete foundation. The base of the tower is around 5 m in diameter, tapering to approximately 2-3 m where it is attached to the nacelle (Figure 2-2). The tower is accessed by a galvanised steel hatch door, which will be kept locked except during maintenance. The nacelle dimensions can vary depending on the final hub height and the model which is used. The exact details of the turbine tower will be dictated by final selection of the turbine make and model, but will be within the proposed turbine parameters assessed, see Table 2-2.

2.7.1.3 Turbine Transformer

When operating, the rotational energy of the blades is utilised to drive the wind turbine generator. The generated power is in the form of low voltage (approximately 660 volts) and connected via low voltage cables to the wind turbine transformer located within the tower or in the turbine nacelle. This transformer steps up the generated low voltage to medium voltage (approximately 33kV) which supports a reduction of electrical losses when transmitting power over large distances. The medium voltage from the wind turbine transformers connects to the proposed on-site substation which again will be stepped up to high voltage for connection to the transmission system.

2.7.1.4 Turbine Foundations

Construction of the turbine bases will require excavation of the surrounding soil from the foundation and crane hardstanding area to founding level with access being provided from adjacent roads at or near the surrounding ground level. The soil will be replaced with granular fill where required.

Each wind turbine will require a reinforced concrete foundation comprising a base slab bearing onto rock or other competent substrata with a central upstand to support the tower. The foundations for each turbine will be designed by the appointed Civil Designer. The exact size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process, but will be within the proposed turbine parameters of approximately 28 m in diameter with thickness of 5 m at the collar, tapering towards the edge. Different turbine manufacturers use different shaped turbine foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. For the purposes of assessing the proposed turbine parameters for this EIAR, a maximum volume of 1000 m^3 of concrete has been assumed.

The turbine foundation transmits any load on the wind turbine into the ground. After the foundation level of each turbine has been formed, the bottom section of the turbine tower or "can" is levelled (Plate 2-2 below). Reinforcing steel is then built up around and through the can (Plate 2-3 below), and the outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete.

Plate 2-2: Levelled turbine tower "can" *Plate 2-3: Steel reinforcement being added*

2.7.1.5 Turbine Colour

The turbines are multi-ply coated to protect against corrosion. Turbines will be of an off-white or light grey colour to blend into the sky background. This minimises visual impact as recommended by the following guidelines on wind energy development:

- Wind Farm Development – Guidelines for Planning Authorities (2006);
- Draft Revised Wind Energy Development Guidelines (2019);
- "The Influence of Colour on the Aesthetics of Wind Turbine Generators" – ETSU W/14/005333/00/2000;
- Onshore wind turbines: planning advice (2014). The Scottish Government;
- Planning Practice Guidelines for Renewable and Low Carbon Energy (2013) Department for Communities and Local Government, Wales Office.

2.7.2 Turbine Delivery Route and Material Haul Route

2.7.2.1 Turbine Delivery Route

It is proposed that the turbine components will be delivered to the site via Belview Port in south County Kilkenny as shown in Figure 2-3. The route heads north from the port on the N29 to the N25 where it turns westwards. The route then continues generally south-westwards on the N25 into County Waterford to the junction with the N72, where it makes a westerly turn in the direction of Cappoquin. The route continues westwards to the Bogheravaghera Cross Roads (also known as Affane Cross) where it turns northwards onto the L1027. It continues northwards, turning onto the L5055 for the final approach to the proposed wind farm site entrance.

An assessment of the route between Belview Port and the site of the proposed wind farm has been carried out. A number of potential pinch points have been identified and assessed (see the Turbine Delivery Route Assessment Drawings as Appendix 2-2 to this EIAR). An assessment was carried out using site visits and Autotrack to determine what, if any, temporary works are required at these pinch points to allow the turbine components to be moved to the site. The outputs of this autotrack assessment are provided in the drawings of Appendix 2-2 Works range from hedgerow trimming/clearing to facilitate oversail of turbine blades to the temporary placement of hardcore to allow the oversize vehicles to pass. Passing bays are also proposed along the narrow local road (L5055).

The current planning applications include the proposed temporary works required for turbine delivery within private lands. A further consenting process will be used to obtain permission for the other works areas along the route (within the public road corridor), as required. These works include:

- Road widening on the L5055 local road approaching the proposed wind farm site entrance in Co. Waterford for the construction phase (9 no. passing bays will also be constructed along here – See Section 2.8.3);
- Hard surfacing and temporary signage demounting at the Carrick Road Roundabout on the N25 (where it intersects the R680) in Co. Waterford;
- Hard surfacing and temporary signage demounting at the Slieverue Roundabout on the N29 (where it intersects the R711) in Co. Kilkenny;
- Hard surfacing and temporary signage demounting at the Luffany Roundabout on the N25 (where it intersects the N29) in Co. Kilkenny;
- Temporary signage demounting at the intersection of the N25 and N72 in Co. Waterford;
- Temporary signage and bollard demounting on the N72 (where it intersects the R672) in Co. Waterford;
- Hedge trimming along the route, in particular on the L1027 and L5055.

All works associated with the route are assessed as part of this EIAR.

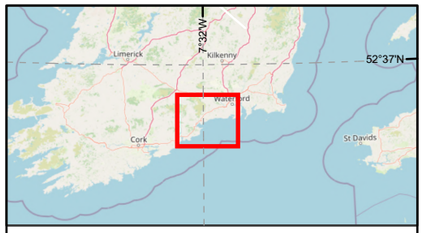
At the end of the construction phase, any areas which were given temporary hardcore surfaces will be reinstated. It is not anticipated that there will be any requirement to use these areas in the operational phase of the proposed project, except in the very unlikely event that a turbine requires a large replacement part such as a blade or tower section. This will need to be agreed with Waterford City and County Council and involved landowners, and relevant consents obtained if required in the unlikely event of such a situation. The decommissioning phase for the project would not require the use of the TDR works areas as the turbine components would be cut up on site to sizes that would fit on standard articulated trucks.

2.7.2.2 Material Haul Routes

It is proposed that construction materials coming from all directions will approach along the N72 accessing the site entrance from the south via the L1029 and L5055. Material providers will be instructed to only use this route to approach the site, regardless of their source (see Figure 2-4 below).

There will be 9 no. passing bays constructed on the L5055 which will be used to allow safe passing of vehicles on this road through all phases of the project, particularly the construction phase when HGV traffic will be highest. The passing bay design is in accordance with the TII Publication DN-GEO-03031 Rural Road Link Design (May 2023). The passing bays are proposed to be 40 m long (including 10 m tapers) and the overall width including the carriageway to be 6.5 m (maximum). The passing bay locations are presented on Figure 2-5.

7°47'3"W
7°26'38"W
7°6'13"W
52°12'0"N
52°0'0"N
607400
586500
620000
640000
660000
N
N25
N29
N72
L5055
L1027
Kilmeaden Greenway Link
Waterford Bypass
Cappoquin
Dungarvan
Kilmacthomas
Waterford
Portlaw
Mooncoin
Kilmeadan
Glenshelane Woods
Ballinroad
Abbeyside
Villierstown
Clashmore
Youghal
Ardmore
Affane
Dunhill
Rathpatrick Cross Roads
Milepost Village
Ferrybank
Carrigeen
Kilmacow
Fiddown
Goatenbridge
Newcastle
Ballymacarbry
Aglish
Stradbally
Bunmahon
Kilrossanty
Meltray Road
Eire / Ireland
OpenStreetMap © OpenStreetMap (and) contributors, CC-BY-SA



Legend

- Proposed project
- Roads requiring widening works
- Proposed Turbine Delivery Route
- Locations of Proposed Passing Bays

0 5 10
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	13/12/2024	First issue	S.P	J.S

Client: Ireland FuturEnergy

Project: Scart Mountain Wind Farm

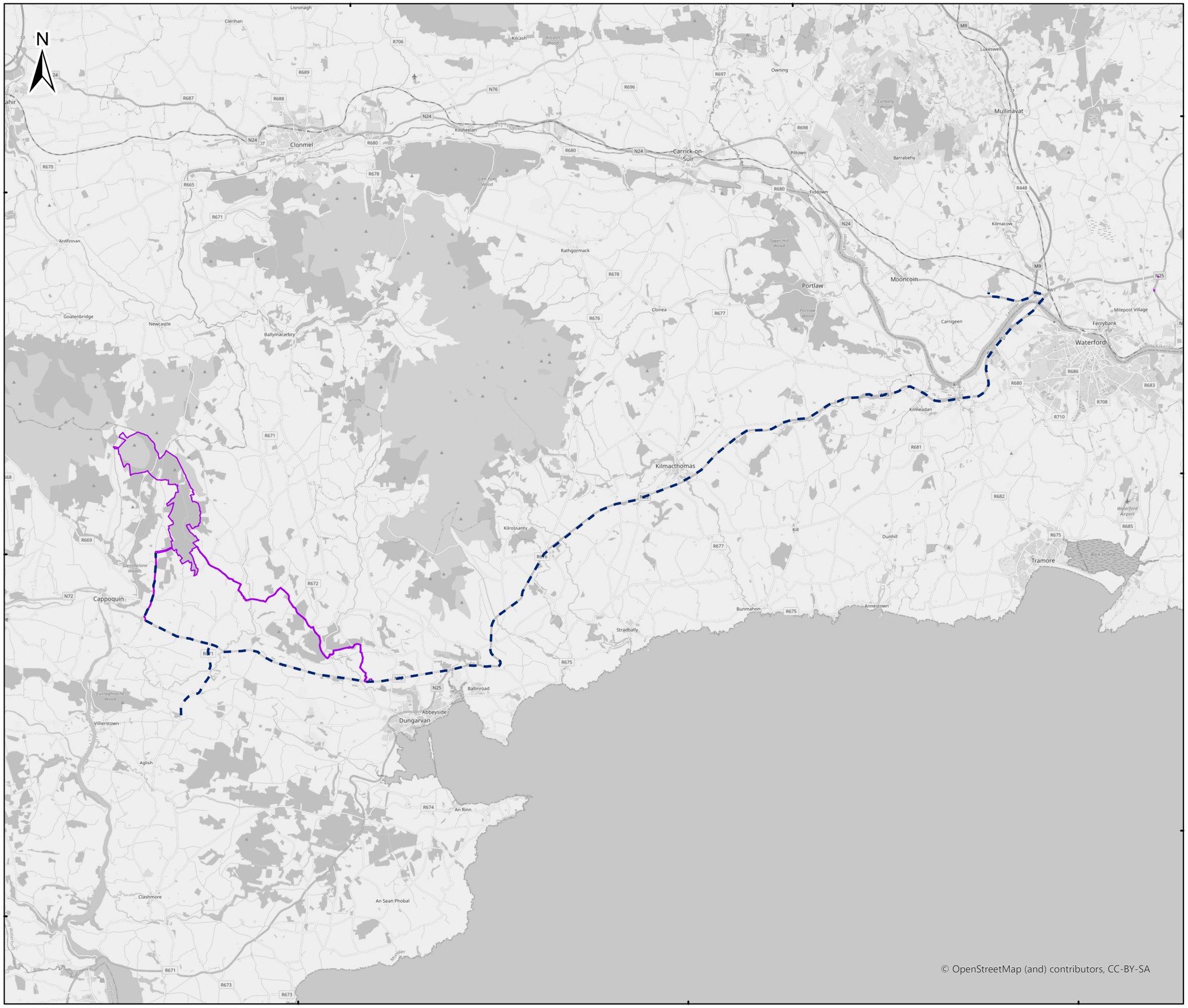
Title: Figure 2-3: Proposed Turbine Delivery Route

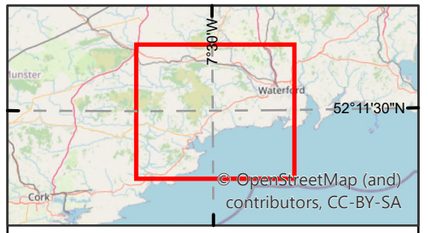
Scale @ A3:	1:180,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Staunton	December 2024

TOBIN
Tel: +353-(0)1-8030406
Email: info@tobin.ie
www.tobin.ie

Map Ref: 11303-005-TDR-S.BO-TOB-A

Draft: A





Legend

- Proposed project
- Construction haul route

0 5 10
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	16/12/2024	First issue	S.P	J.S

Client: FuturEnergy Ireland

Project: Scart Mountain Wind Farm

Title: Figure 2-4 Construction haul route

Scale @ A3: 1:180,000

Prepared by:	Checked by:	Date:
J.Staunton	J.Staunton	December 2024

TOBIN
Tel: +353-(0)1-8030406
Email: info@tobin.ie
www.tobin.ie

Map Ref: 11303-034-Haul.R-S.BO-TOB-A

Draft: A

7°50'0"W

52°10'0"N

601000

N

Crow Hill

Glenshelane Woods

R669

Glenshelane Woods

R669

Glenshelane Woods

N72

St. Athanasius Monastery

Cappoquin

Cappoquin Primary School

Cappoquin Railway Football Club

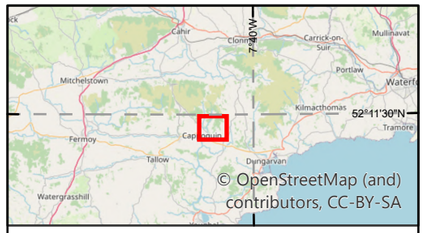
Cappoquin Affane GAA Club

L1018

N72

Hallahan's Bus & Coach Hire

Declan's



Legend

- Proposed project
- Locations of Proposed Passing Bays
- Proposed Turbine Delivery Route

0 500 1,000
Meters

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	13/12/2024	First issue	S.P	J.S
Rev	Date	Description	By	Chkd.

Client: Future Energy Ireland

Project: Scart Mountain Wind Farm

Title: Figure 2-5 Proposed Passing bay Locations on Local Road L5055

Scale @ A3:	1:20,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Staunton	December 2024

TOBIN
Tel: +353-(0)1-8030406
Email: info@tobin.ie
www.tobin.ie

Map Ref: 11303-035-PBAY-L5055-TOB-A

Draft: A

2.7.3 Internal Access Road and Site Entrance

2.7.3.1 Internal Access Roads

The proposed wind farm site will be accessed via the L5055 local road using a single access point (See Figure 2-4). This access point will be the only site access/egress point for the construction phase, as this is the only suitable access point to the existing road network to accommodate construction vehicles.

There are three locations where the public roads within the proposed wind farm site must be crossed by the proposed onsite/internal access roads. These crossing locations will be constructed by building two site entrances opposite each other. The three locations for these crossing points are as follows:

- On the L5054 in the townland of Moneygorm, between the proposed main construction phase access point and main body of the wind farm;
- On the L5055 in the townland of Knocknasheega, between the Knocknasheega Mountain and the Glenshelane River;
- On the L1026 in the townland of Tooranaraheen, between the Glenshelane River and the Knocknanask Mountain.

Construction traffic will not be permitted to enter or exit the proposed wind farm site at these crossing locations, and all traffic will need to use the main wind farm entrance, as described in Chapter 16 (Traffic & Transportation).

Internal access roads of circa 12 km will be constructed as part of the initial phase of the construction of the wind farm. Material will be sourced from the proposed onsite borrow pits to provide the required base material of the internal roads. The final graded surface material will be sourced from local quarries (such as Kereen Quarry and Roadstone Kilmacow Quarry), which are discussed in Chapter 16 (Traffic & Transportation). The internal roads will be permanent (construction/operational) roads. All road-worthy vehicles are not permitted to travel off road within the proposed wind farm site, unless for short distances over bog mats. Only specialised vehicles required for construction are permitted off road.

During the operational phase, all heavy and large vehicles will be required to use the same main site entrance on the L5055, as described above. Light vehicles will also be permitted to directly access the site from the L5054 local road (but not during the construction phase).

New roadways will have a running width of approximately five metres (5.5 m including shoulders), with wider sections (which vary but are up to 10 m) at passing bays, some corners and on the final approaches to turbine hardstands, as shown on the drawings accompanying the application (Appendix 1-1 of this EIAR). At areas with oversail, junctions and a single hairpin bend in the northern part of the wind farm site, additional areas will be hard-surfaced as shown on the application drawings. The proposed new roadways will incorporate passing bays to allow traffic to pass easily while traveling around the site. Soil excavated as part of the construction of the internal access roads will either be sidecast and profiled on either side of the roadway or used to reinstate the borrow pits as detailed in the Spoil and Peat Management Plan (Appendix 2-3 of this EIAR).

All new roadways will be constructed with a 2.5% camber to aid drainage and surface water runoff. A drainage design has been provided for the proposed site roads. Road Construction Details and associated drainage design are included in the drawings of Appendix 1-1 of this EIAR. The roads onsite will be of the excavated road type with a running width of 5m.

Occasional surface maintenance will be required in the operational phase of the proposed project, but this is anticipated to be very minimal and will be dependent on the level of use on any section.

2.7.3.2 Site Entrance

There are two proposed entrances to the wind farm site. One on the L5055 and one on the L5054. The L5055 entrance will be the only access point for the site during the construction and decommissioning phases. During the operational phase it will be used by HGVs only. The entrance on the L5054 will only be used during the operational phase, for light vehicles.

There are three public road crossing points which comprise opposing site entrances on the local roads. Site access will not be permitted from these locations and site traffic will only be permitted to cross the public road network at these points. All site traffic will be instructed to use the appropriate entrance only.

The construction of a new site entrance for the proposed wind farm is located along the L5055 road north of Boheravaghera Cross Roads (also known as Affane Cross). It will utilise an existing Coillte forest entrance, which will be upgraded for the proposed wind farm site. This entrance will be the only construction phase entrance to the site. It will facilitate material deliveries to the site (i.e. delivery of stone, steel, concrete and all materials) and staff access, as well as large oversize components such as turbine blades, tower sections and substation components. For further information see Chapter 16 (Traffic & Transportation) and the Traffic Management Plan (Appendix 2-4 of this EIAR). This entrance will also be used for heavy or large wind farm maintenance vehicles during the operational phase of the proposed project as well as ongoing forestry activities. For light vehicle access during the operational phase of the proposed wind farm, it is proposed to utilise a new entrance from the L5054 (at the proposed crossing point in the townland of Moneygorm).

All site entrances will remain in place during decommissioning as they will form part of the site access infrastructure for ongoing forestry and agricultural activities. The proposed site entrances will have adequate visibility as also discussed in Chapter 16 (Traffic & Transportation) and detailed in Drawing 11303-2020 (Appendix 1-1 of this EIAR).

2.7.4 Hardstands

Hardstand areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate large cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. The size of hardstand assessed for the purposes of this EIAR is detailed in Table 2-2, and it accounts for the proposed range of turbine parameters (Table 2-2). For the sake of simplicity, these measurements include the assembly area hard surfacing. The turbine hard-standing areas are shown on Drawing 11303-2016 in Appendix 1-1 of this EIAR. The hard-standing area is intended to safely accommodate a large 350-750 tonne SWL crane during turbine assembly and erection.

Occasional surface maintenance will be required in the operational phase of the proposed wind farm, but this is anticipated to be very minimal and infrequent. The EIAR assesses the turbine hardstand parameters, as listed in Table 2-2.

2.7.4.1 Assembly Area

Levelled assembly areas will be located on either side of each hard-standing area, as shown on Drawing 11303-2011 in Appendix 1-1 of this EIAR. These assembly areas are required for offloading turbine blades, tower sections and hubs from trucks until such time as they are ready to be lifted into position by cranes. They will be partly surfaced with clause 804 hardcore material or similar and partly cleared of vegetation / levelled. They cover an area of approximately 100 m x 20 m. They are shown on drawings in Appendix 1-1 of this EIAR.

2.7.4.2 Crane Pads

The hardstand area also includes two secondary crane pads, located on the opposite end of the hardstand to the turbine. These are areas of compacted hardcore material, similar to the main hardstand and measure approximately 10 m x 15 m each. They are shown on drawings in Appendix 1-1 of this EIAR.

2.7.5 Onsite Electricity Substation

It is proposed to construct one onsite 110kV electricity substation, as shown on Figure 2-1 and the site layout Drawing 05725-DR-110 in Appendix 1-1 of this EIAR. This will provide a connection point between the proposed wind farm and the proposed grid connection point at the existing 110kV Dungarvan substation (via approximately 15.5 km of cables – see Figure 2-6 to see this route).

The construction and electrical components of the on-site substation will be to EirGrid and ESB specifications within the parameters assessed in the application[5]. The dimensions of the proposed substation compound will be 145 m in length by 85 m in width. The substation footprint will include one control building and electrical components necessary to export generated power from the wind to the transmission system. A second smaller building will be required for switching procedure with site offices and welfare facilities.

The main control building will measure 18 m by 25 m and 7.5 m in height. A second smaller switchgear building will measure approximately 20.1 m by 10.6 m, and approximately 9.9 m in height. Layout drawings of both buildings are shown in the planning drawings in Appendix 1-1 of this EIAR.

The substation and compound will be surrounded by steel palisade fencing which will be 2.6 m in height. Internal fences will also be provided to segregate different areas within the main substation compound. Lighting will be required on site and this will be provided by lamp standards located around the substation and exterior wall mounted lights on both buildings which will have sensors. The lights would normally remain off and be controlled by a switch at the gate when entered the compound.

The main control building and smaller switchgear building will include the Independent Power Producer and ESB control room, as well as an office space and welfare facilities for staff during the operational period. Toilet facilities will be installed with a low-flush cistern and low-flow wash

5 EirGrid specification for the underground cabling can be accessed at: https://www.eirgridgroup.com/site-files/library/EirGrid/10-110-kV-Underground-Cable-Functional-Specifications.pdf

basin. Due to the specific nature of the proposed project, there will be a very small water requirement for occasional toilet flushing and hand washing. It is proposed to install a rainwater harvesting system as the source of water for this, with all potable water being brought onsite in bottles.

It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off-site by a permitted waste collector to a wastewater treatment plant. It is not proposed to treat wastewater on-site, and therefore the guidelines and legislation surrounding that do not apply.

Such a proposal for managing the wastewater arising on site has become standard practice on wind farm sites, which are often proposed in areas where finding the necessary percolation requirements for on-site treatment would be challenging. Although the soil at this location is generally mineral based, it is shallow and the water volumes being produced are very small, so therefore the sealed waste water tank is the most suitable method, This approach has been accepted by numerous Planning Authorities and An Bord Pleanála as an acceptable proposal. The collection period for the tank will be agreed with the permitted waste collector on installation. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system will be submitted to the Planning Authority in advance of any works commencing on-site.

The wastewater storage tank alarm will be integrated with the on-site electrical equipment for alarm notification that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the site. It is anticipated that this material will be collected by an existing waste collector near Cork City, Waterford City or Clonmel. It is envisaged (and for the purposes of this EIAR assumed) that any such contractor will access the site via the N72, L1029 and L5055.

2.7.5.1 Internal Underground Cabling

Each turbine will be connected to the proposed on-site substation at proposed wind farm site via underground MV cables. 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 onsite substation compound will be run in cable ducts approximately 1.5 m below the ground surface within the proposed internal roads and/or their verges (or within bridge decks where a watercourse is required to be crossed). Existing forestry/ field drainage ditches will be culverted under new road and cable crossings.

2.7.6 Electrical Grid Connection

2.7.6.1 Grid Connection Route

Connection will be sought from the grid system operator by application to EirGrid. It is proposed that the proposed onsite substation will connect via 110kV underground cable to an existing substation near Dungarvan.

The proposed route of the GCR is provided in Figure 2-6. The overall length of the grid connection between the proposed substation and the existing substation is approximately 15.5 km, most of which is located within the public road corridor with a short section being within the proposed wind farm site, and the remainder being located within Coillte and other private lands.

The grid connection construction methodology is described in Section 2.8.5 below, and a detailed report is provided as Appendix 2-5.

The cables will be laid in trenches as per EirGrid Specification (See Trench Bedding Details in Appendix 2-6). There will be three watercourse crossings along the GCR. No instream works are proposed for any natural watercourse. Further information on the grid connection stream crossings can be found in Section 2.8.5 below.

7°50'0"W
7°45'0"W
7°40'0"W
52°13'20"N
52°10'0"N
52°6'40"N
608000
601000
594000
609050
617100
625150

Legend

- Proposed Wind Farm Site
- Proposed infrastructure footprint within the proposed wind farm site
- Proposed Grid Connection Route

0 1.5 3
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	13/12/2024	First issue	S.P	J.S

Client: FuturEnergy Ireland

Project: Scart Mountain Wind Farm

Title: Figure 2-6 Proposed Grid Connection Route

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Staunton	December 2024

TOBIN
Tel: +353-(0)1-8030406
Email: info@tobin.ie
www.tobin.ie

Map Ref: 11303-006-PGR-S.BO-TOB-A

Draft: A

2.7.6.2 Joint Bays

Joint bays are pre-cast concrete chambers where individual lengths of cables are joined to form one continuous cable. Joint bay locations have been selected to maximise the lengths of cables, following consideration of cable detailed design issues, the space requirements for cable drums and cable pulling equipment as well as the impact on local residents and road users. The joint bays will be located at various points along the ducting route as specified by EirGrid requirements and as shown in the drawings of Appendix 1-1 of this EIAR.

A joint bay will be constructed in a pit. The bay will measure approximately 6 m x 2.5 m x 2 m deep as shown in the drawings of Appendix 1-1 of this EIAR. A reinforced concrete base and sides will be constructed in the bay to accommodate the jointing enclosure.

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

2.7.6.3 Watercourse Crossings

There are four watercourse (stream and river) crossings on the proposed GCR. The locations of these crossings are shown on Figure 2-7. Section 2.8.5 below provides further details on the methods proposed to cross each location.

The internal site cabling for power and communication cables will be in trenches within the internal access roads, and where river/stream crossings are required they will be built into the bridge deck formation or attached to it, avoiding any in-stream works.

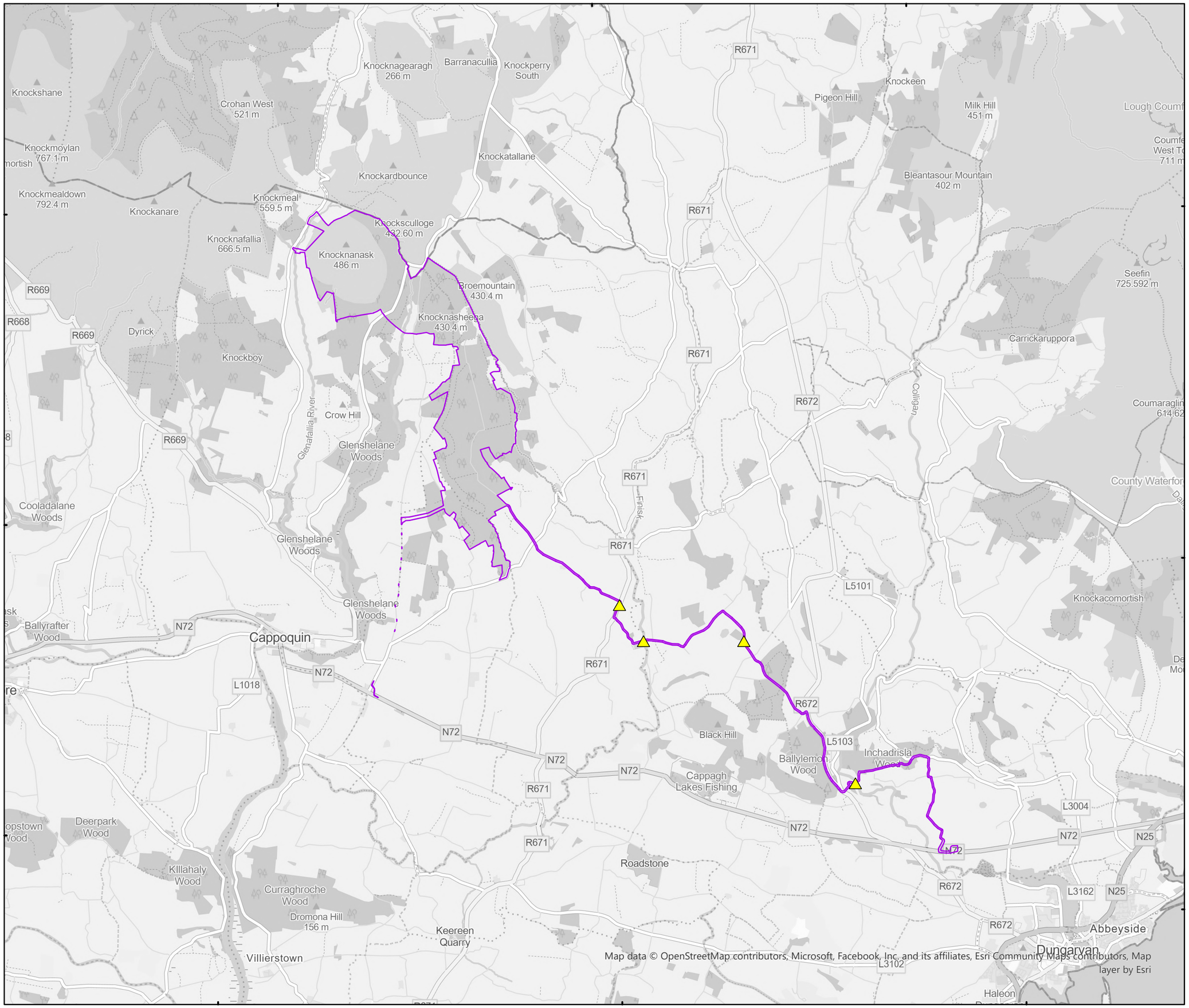
2.7.7 Local Electricity Supply

As part of the proposed project, a local electricity supply will be required as a power supply to the proposed substation for light, heat and power purposes, and to the proposed met mast. The local supply will be designed and constructed by ESB Networks.

No significant works are anticipated for this (placement of local poles with cable from a nearby power line), as it will be similar to what normally occurs for new house connections. Should permission be granted the details (regarding the exact location of each pole) of the connection route and works will need to be determined by ESB Networks prior to construction, but as it will be a local electrical connection, the works will be minimal in nature. Currently, there is a live electricity supply <300 m to the southeast of the proposed substation location, with mostly improved agricultural grassland and a road being present in between, with a small section of forestry immediately around the proposed substation location. The route will utilise existing clearances in the forest (or those being made for the proposed wind farm infrastructure) to get to the substation, and no additional felling will be required. It will also utilise existing road/field boundaries to get to the substation to avoid placing poles in an open field.

2.7.8 Meteorological Mast

One meteorological mast is proposed. The mast will be equipped with wind monitoring equipment at various heights. The mast will be located as shown on the site layout drawing in Figure 2-1 and will be a slender, free-standing lattice structure of 100 m in height, as shown in Drawing 11303-2016 of Appendix 1-1 of this EIAR.



Legend

- Proposed project
- Watercourse Crossings

0 2 4
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	13/12/2024	First issue	S.P	J.S

Client: FuturEnergy Ireland

Project: Scart Mountain Wind Farm

Title: Figure 2-7 Watercourse crossings

Scale @ A3:	1:70,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Staunton	December 2024

TOBIN
Tel: +353-(0)1-8030406
Email: info@tobin.ie
www.tobin.ie

Map Ref: 11303-036-WC-S.BO-TOB-A

Draft: A

The mast will be constructed beside a hardstanding area of 10 m x 10 m which will be used to erect the mast.

2.7.9 Forestry

A large portion of the proposed wind farm is located within an area which is currently planted with forestry. Some of this area is located within Coillte lands, while some is located within private lands. There will be a requirement to fell some of this forestry in the areas immediately around the footprint of the wind farm infrastructure. The total area of forestry to be felled is estimated to be between 91.6 ha – 99.7 ha, as shown in Appendix 2-7. As a commercial crop, this forestry is scheduled to be felled in the future regardless of the proposed project being constructed or not.

2.7.10 Borrow Pits

It is proposed that two borrow pits will be constructed, in order to provide a source for the majority of stone material requirements within the site itself. These are located north of T14 and northeast of T15, with each covering an area of 175 m x 235 m (or approximately 4.3 ha) and 210 m x 330 m (or approximately 5.7 ha) respectively. The locations of these borrow pits can be seen on the site layout drawings in Appendix 1-1. Having 2 no. borrow pits onsite will significantly reduce materials transport to site and will minimise the depth to which the borrow pit excavations will be required.

The proposed borrow pits will be at locations with very gently sloping terrain, and any peat excavated as part of the proposed project will be used to reinstate them. There will be no requirement for any retaining structures to be built in order to do this, as the peat volume on site is very small, and it will be possible to store it all below the lowest point of the borrow pit edges (i.e. it will be entirely contained within the borrow pits and therefore slippage out of them will not be possible). Their reinstatement will also utilise mineral soil and stone excavated as part of the proposed project. See the Spoil & Peat Management Plan (Appendix 2-3) for further details.

Further details of the site investigations that were carried out and the stone type/suitability are provided in Chapter 8 (Land, Soils & Geology).

2.7.11 Temporary Construction Compounds

Two temporary compound areas will be constructed to provide office space, welfare facilities, car parking and hardstands for storing materials. One will be located at the southern end of the site, while the second will be at the northern end. These will measure approximately 100x50 m and 40x85 m respectively, and the 2 no. locations are shown on Figure 2-1 and site layout drawings (Appendix 1-1 of this EIAR).

2.8 CONSTRUCTION METHODOLOGIES

2.8.1 Turbine Hardstand, Foundations and Erection

The topsoil will be stripped where development of the hardstands are proposed. The hardstands will be built up to create a level base which will be <0.5 m above existing ground level.

Ground investigations in the form of trial pitting, probing, and use of augers have been carried out along the proposed turbine locations and hardstanding locations to inform the depth of excavation and upfill required (See Appendix 2-9 (Site Investigation Report)). Following site visits

and site design, volume calculations provide an estimation of fill required for the hardstands. This is predicted to be approximately 110,000 m^3 of stone material. This material volume will be obtained primarily from the onsite borrow pits with only the surface 150 mm layer to come from local quarries which are within reasonable proximity to the site. Each turbine foundation will require between 550-1,000 m^3 of concrete which will be sourced from off-site suppliers. No batching of concrete will occur on site.

The geotechnical investigations indicate that the foundations at the proposed wind farm will be excavated. Piling is not anticipated to be required.

Each of the turbines to be erected on site will have a reinforced concrete base. Overburden will be stripped off the foundation area to a suitable formation using a 360º excavator and will be stored as detailed in the Construction and Environmental Management Plan (CEMP) (Appendix 2-8), Section 2.9.4.8 and in the Peat and Spoil Management Plan (Appendix 2-3). The sides of the excavated areas will be sloped sufficiently (2:1 for mineral soil, 1:1 for rock) to ensure that slippage does not occur. Excavations will be approximately 4 m deep.

In the case of gravity foundations, if the formation level is reached at a depth lower than the depth of the foundation, the ground level will have to be raised with clause 804 hardcore material and/or lean mix concrete, compacted in layers as required. An interceptor drain will be formed around the upgradient perimeter of the turbine and hardstand to divert the clean water away from the works. This will outfall out at the lowest point level to a spreader. Water within the excavation will be treated via a settlement pond and level spreader. If the water has a heavy silt load, then an additional measure such as a siltbuster will be employed.

An embankment approximately 600 mm high and a fence will be constructed around the perimeter of each turbine base to prevent construction traffic from driving into the excavated hole and also to demarcate the working area. All necessary health and safety signage will be erected to warn of deep excavations etc. Access to and from excavated bases will be formed by excavating a gangway to a standard 1:12 grade, thereby allowing safe passage into/out of the foundation area.

Approved lifting equipment will be used to unload reinforcing steel to required areas. The bottom mat of steel will be fixed prior to the tower cans, if used, being lifted into position and reinforcing steel will be positioned and fixed in accordance with the turbine suppliers' requirements.

Formwork to concrete bases will be propped/supported sufficiently to prevent failure by compacting stone around the outside of the forms in addition to straps to prevent expansion. Concrete for bases will be poured using a concrete pump. After a period of time when the concrete has set sufficiently, the top surface of the concrete surface is to be finished with a power float.

Once the base has sufficient curing time it will be filled with suitable fill (i.e. hardcore) up to existing ground level. The working area around the perimeter of the foundation will be backfilled with suitable material (hardcore). These hardstand areas around the turbines will be levelled, compacted and finished with a suitable surface material for traffic (clause 804 or similar) as per the site access tracks and remainder of the hardstand areas.

Turbines will be erected in suitable weather windows (i.e. low wind speed).Following crane setup, the turbine tower sections will be delivered by truck and hoisted into place. This is followed by the nacelle and finally each blade. In accordance with an agreed lifting plan, turbine sections will be lifted by crane into place. Wind speeds will be monitored at all times during lifting operations. Turbine

sections will be fitted together by workers within the structure. Following erection of the turbine, lightning protection, lighting and other ancillary components will be installed on the turbine and commissioned.

The turbines will be decommissioned using a similar methodology as the construction except in reverse.

2.8.2 Turbine Delivery Accommodation Works Area

Where works are needed along the public road corridor to facilitate deliveries to site, they will be agreed in advance with the local authority and carried out to the appropriate road design standard (TII, purple book, etc.) to ensure they will be safe and durable in design.

At the locations (described in Section 2.7.2) where a temporary surface is needed for the proposed TDR, works will start with the clearing of vegetation (grass, hedgerows and scrub), and the topsoil will be stripped and either used locally for landscaping purposes/sidecast for later use in local reinstatement or used for borrow pit reinstatement onsite. Where local use for landscaping does occur it will be smoothed off with the back of a bucket and seeded with a suitable grass seed mix. Silt control curtains will also be employed within 50 m of a surface watercourse. It will be taken to a local licensed/permitted waste facility if found to contain any contaminants such as bitumen. Suitable fill material (broken stone and clause 804) will be used to create a firm running area for the passage of turbine delivery vehicles. The areas will be fenced off when the delivery is not occurring. After the delivery of turbines to site, the site will be re-instated to the original condition with removal of the temporary surface, and any removed vegetation will be reseeded/replanted with a similar native species composition.

2.8.3 Wind Farm Site Roads (including passing bays)

Site roads will be constructed to each turbine location, and to all proposed site infrastructure as shown in the Figure 2-1 and site layout drawings of Appendix 1-1 of this EIAR, with a proposed running width of 5m. Passing bays will be included along roads strategically, as indicated in Appendix 1-1 of this EIAR. There are two road construction methodologies; upgrading of existing site roads and excavated new road. These are described below in further detail.

Sections of new roads and upgraded roads are shown on Drawing 11303-2024 in Appendix 1-1 of this EIAR. Where required, the road widths will be increased to a maximum of 9.5 m to form the indicated passing bays, as shown in Figure 2-5 and drawings in Appendix 1-1 of this EIAR.

2.8.3.1 Excavated New Road

Tracked excavators will be used to carry out excavations. Surplus excavated material will be dealt with as set out in the CEMP, within the spoil management section (Appendix 2-8) and the Peat & Spoil Management Plan – Appendix 2-3). The excavated roads will be constructed as per Drawing 11303-2013 of Appendix 1-1 of this EIAR.

When the topsoil has been removed and/or the formation layer (bedrock/firm subsoils) has been reached, stone from the onsite borrow pits will be placed to form the road foundation. The sub grade will be compacted with the use of a roller or other similar approved compaction method. The top dressing will be added to the roads at this point. As a final measure to ensure long term stability of the road this layer will be checked and repaired as required after all turbine bases have beenpoured (i.e. after the heavy wearing traffic is largely finished).

All on-site roads will be maintained for the duration of the construction and operational phases of the project . They will be used for forestry (and agricultural) purposes after decommissioning of the wind farm.

2.8.3.2 Upgrade of Existing Site Road

The site of the proposed project has an existing network of site roads present which have been incorporated into the proposed design as much as possible.

Where an existing road needs to be widened, it will be carried out on both sides, and the same steps as described in the new road construction above will generally be followed (without excavating the existing road material) – see cross section Drawing 11303-2013 in Appendix 1-1 of this EIAR. There are no significant known constraints running alongside the roads to be upgraded, but where forest or roadside drainage channels are located alongside the road (as they occur frequently through the site), they will be moved as required during dry weather periods where there is no moving water present within. The replacement drain will be constructed as per best practice for forestry drains[6].

Tracked excavators will be used to construct this road type. Surplus excavated material will be dealt with as set out in Section 2.9.4.8. When the topsoil has been removed and/or the formation layer has been reached, stone from the onsite borrow pits will be placed to form the road foundation. The foundations of the new and existing sections of the road will be built up to the required level. The sub grade will be compacted with the use of a roller or other similar compaction method. The top dressing will be added to the roads at this point. As a final measure to ensure long term stability of the road this layer will be checked and repaired as required after all turbine bases have been poured (i.e. after the heavy wearing traffic is largely finished).

All on-site roads will be maintained for the duration of the construction and operational phases of the project.

Further details of the construction methodology for upgrading existing site roads is provided in the CEMP in Appendix 2-8 and further detail is provided in the Peat and Spoil Management Plan, provided as Appendix 2-3.

2.8.3.3 Wind Farm Site Roads – Proposed Clear Span Bridges & Culverts

There are three proposed river/stream crossing as shown on the site layout drawings (Appendix 1-1 of this EIAR). The crossing method of a clear span bridge will avoid in-stream works entirely at the SAC crossing location (Glenshelane River), the other two crossings will require bottomless culverts.

At the Glenshelane crossing, the site access tracks will firstly be constructed to allow easy access to the works area (as described in the previous section), as there are currently no access roads at this location. The sediment control measures such as the triple silt fence will be installed before the works occur within 50 m of the river (see Section 2.9.3 below, Chapter 9 of this EIAR (Hydrology and Hydrogeology) and Appendix 2-8 of this EIAR (CEMP). Following this, the topsoil will be stripped from the foundation footprint on either side of the watercourse, taking care to avoid disturbing any part of the river/stream bed or banks. Material will be removed immediately

[6] Forestry Standards and Procedures, January 2015. Forest Service, Department of Agriculture, Food and the Marine.

using dumpers travelling on the newly constructed roads. Only tracked machines will be permitted to travel off the road surface. No excavations will be permitted within the river channel or within 3m of it at the nearest point. Suitable stone fill material (clause 804 or similar) will be added in layers and compacted to form the base of the foundation. The precast clear-span bridge will be placed onto this either as one or more pieces using a mobile crane. There will be no requirement for large-scale casting of wet concrete. The construction work (in particular the initial excavation and stone compaction) will only take place in periods of low rainfall or dry periods (<10mm/24hr period). Following the bridge construction, barriers will be attached to the sides of the bridge structure, and the site access tracks will be constructed over the structure. Further detail relating to water management is provided in

The second proposed river/stream crossing relates to a single upgrade needed for an existing piped culvert to the east of the proposed southerly construction compound, on the Boherawillin stream (see Section 9.4 of Chapter 9 (Hydrology and Hydrogeology). The existing culverts will remain in place to avoid stream disturbance and the additional bottomless culvert will be added to extend this. Access is easily possible using the existing forest track. The final stream crossing relates to a new crossing of a small stream near the proposed substation. Construction methods will be similar to above with installation of a bottomless culvert. There is currently no road access to this location, so the proposed site roads will be constructed to the location first.

These two minor stream crossings will be crossed using bottomless culverts which will be over-sized (>0.7 m) for the expected water flow rates Construction for these two stream crossings will take place during periods of dry weather/low flow. The sediment control measures such as the silt fence will be installed before the works occur within 50 m of the stream (see Section 2.9.3 below, Chapter 9 of this EIAR (Hydrology and Hydrogeology) and Appendix 2-8 of this EIAR (CEMP). The topsoil will be stripped from the foundation footprint on either side of the watercourse, taking care to avoid disturbing any part of the river/stream bed or banks. Suitable stone fill material (clause 804 or similar) will be added in layers and compacted to form the base of the foundation. The bottomless culvert will be placed onto this either as one or more pieces. There will be no requirement for large-scale casting of wet concrete. See Drawing 11303-2015, Appendix 1-1 of this EIAR for details.

Where plastic or concrete culverts are required for forest /field drainage ditch crossings by new or upgraded roads, they will be installed with a minimum gradient of 1%. The pipe will be placed into the drain bed, and some of the underlying material will be placed within the pipe to benefit biodiversity (for further information see Section 6.4.3 of Chapter 6 of this EIAR (Biodiversity). The use of corrugated culverts will aid in the retention of sediment, thereby naturalising the culvert bed. Large stones will be placed at the culvert outfall to dissipate any flow and reduce the potential for erosion. The culverts will be inspected regularly to ensure they do not become blocked.

2.8.4 110 kV Substation and Electrical Works

The proposed substation has been designed and constructed to meet all the required EirGrid/ESB standards. An area will be levelled and built to the required level with stone fill material, capped by high quality compacted stone. Two control buildings will be constructed using traditional techniques for constructing small buildings (i.e. concrete block walls, timber and slate tile roof). Foundations will be built for all of the proposed electrical infrastructure. All the electrical equipment will be installed to EirGrid/ESB requirements. Perimeter fencing will be constructed around the substation compound for security and safety purposes. Further information and drawings of the substation and electrical infrastructure are provided in Appendix 1-1 of this EIAR, while the associated construction methodologies provided in Appendix 2-5.

A local electricity supply will be made from the nearest suitable power lines at the time of construction in the same way that residential houses are connected. Standard overhead electricity poles and cables will be installed avoiding sensitive habitats and using a minimal footprint. See Section 2.7.7 for further information.

Internal cables connecting the wind turbines to the onsite substation will be laid within or immediately adjacent to the onsite access roads. All cables will be laid in underground ducts. Ducts will be installed by open trenching. Information on trench construction methodology is provided in Section 2.8.4.

2.8.5 Grid Connection Route (GCR)

As stated above, the proposed wind farm will connect to the existing national grid via an underground grid connection. The onsite substation and associated grid connection has been assessed in this EIAR, along with the required works to allow connection to the grid at the existing Dungarvan substation.

Once fixed into position, the internal site cabling (between turbines and the substation), the substation and the electrical grid connection will all be commissioned. They will remain powered off until the turbines are being commissioned and the wind farm enters into service, as shown in Figure 2-1.

Full details of the description of the proposed GCR, and the construction methodologies for each element including watercourse crossings are provided in Appendix 2-5. The construction methodologies for the various elements of the proposed GCR are summarised below.

2.8.5.1 110kV Underground Cable Trenches

The number and layout of cables is an important consideration in the design of the proposed wind farm site and GCR. Minimum safety distances and angles etc. must always be maintained. This has been a fundamental consideration in determining the final location of the substation buildings and electrical infrastructure. Further information and drawings of the underground 110kV cable trenches are provided in Appendix 1-1 of this EIAR, while the associated construction methodologies are provided in Appendix 2-5. A copy of the EirGrid 110 kV cable installation specifications are provided as Appendix 2-6.

The 110kV cables will be installed mainly within the internal access roads in the proposed wind farm site and within the existing public road corridor as described in Section 2.7.6 above. A section of the route (approximately 1.8 km) will be located off road at the Colligan River crossing as well as adjacent to the Dungarvan substation and within the proposed wind farm site. A service/maintenance access track will be put in place over the entire route. It should be noted that works within the public road corridor will also be subject to further consents/agreements with local authorities, for example a Road Opening Licence as appropriate.

A Traffic Management Plan has been prepared for the proposed project and is included as Appendix 2-4. This is a living document and will be updated ahead of construction to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by An Bord Pleanála, in the event planning permission/approval is granted. Also, a confirmatory survey of road condition, including the condition of all road water crossings on the route, will be carried out along the proposed GCR in advance of any works.

All cables will be laid in underground ducts. Ducts will be installed mostly by open trenching. The sequence of operations for installing ducts in trenches is to firstly strip off the ground material and topsoil (if present). A trench is then formed to the required depth and width. The ducts are generally laid on a bed of Cement Bound Granular Mixture (CGBM)and surrounded with CGBM. Where contaminants are found (or where bitumen-based materials are present) in excavated material, it will be removed from site by a licensed operator and disposed at an appropriately licenced facility. The top of the trench will generally be finished at ground level with stone as per EirGrid/ESB specifications (or in the case of trenches within public roads, it will be finished in a suitable road surface (at a minimum to the pre-existing standard) that will be agreed with the local authority in advance of works. The use of stone in this instance (off the public road corridors) will ensure the track is permeable and eliminate the potential for surface water runoff, as well as allowing vehicular access on the rare occasion it might be required.

The 110kV underground cable required to facilitate the grid connection will be laid beneath the ground surface and/or public road using the following methodology:

- The area where excavations are planned will be the subject of a confirmatory survey, prior to the commencement of works, with a cable locating tool and all existing underground services will be identified;
- A verification condition survey will be carried out for all parts of the route within the public road. Details of this survey will be agreed with the local authority in advance of the survey.
- Traffic management will be put in place before any works on public roads;
- A trench will be opened using an excavator to accommodate the required depth and width;
- The excavated material will be cast to the side to be reused as backfilling material where appropriate. This material will not be stored in the vicinity of any watercourse and will be smoothed with the back of an excavator bucket to minimise runoff. It will be cast on the upgradient side of the trench, so if any runoff did occur it will run into the down gradient trench. Excess material will be used on the site of the proposed wind farm for borrow pit reinstatement and local landscaping. In the case of any material deemed as contaminated, a licenced waste carrier will transfer to an appropriate waste facility;
- Silt fences will be installed alongside the road/works areas as required near streams;
- Clay dams/plugs will be installed at regular intervals (depending on the gradient) to prevent conduit flow of water within the trench. These utilise low porosity clays over the full depth of the trench at regular intervals to prevent water moving along the trench;
- Works will not be carried out during periods of heavy precipitation. In the event that some surface water does accumulate in the trench, this will be allowed to percolate into the ground naturally where possible. Where dewatering is required, it will be carried out via silt bags onto vegetated areas away from watercourses (>50m);
- The trench will be surfaced in accordance with the road surface specifications of the local public road, or (in the case of off-road section) an EirGrid/ESB specification gravel access track to allow very occasional access for maintenance vehicles if required;
- Cable joint pits are normally located at regular intervals as shown in the site layout drawings (Appendix 1-1 of this EIAR). Each joint pit will be approximately 2.5 m x 6 m in size with a communications chamber and an earth link box in close proximity to the joint pit as shown in the detail drawing (Appendix 1-1 of this EIAR). They will be constructed off narrow sections of the public road where this is possible (i.e. before/after it enters the road corridor, in lay-bys, etc.). A temporary surface is provided over these for safety and to allow easy access until the cables are pulled, after which time the area will be permanently

reinstated/surfaced as appropriate. The location of these joint pits are provided on site layout drawings in Appendix 1-1 of this EIAR;

- It is anticipated that construction will be carried out by a single team (with plant items likely to include excavators and dumpers) along the route, but there is a possibility to use two separate teams to speed up the construction. It is expected that each team will lay approximately 50 m of the route per day.

Further details on the design for the grid connection cable trenches are provided in Appendix 1-1 of this EIAR, while the associated construction methodologies are provided in Appendix 2-5.

2.8.5.2 Stream Crossings

The proposed grid connection contains four stream/river crossings. These are shown in Figure 2-7 and the site layout drawings in Appendix 1-1. Table 2-3 below details the proposed methodologies for crossing the given watercourses.

Table 3-3: Watercourse crossing details

Watercourse Crossing No.	Crossing details	Proposed crossing methodology	In Stream works required?
1	**Stream**	Directional Drilling	No
2	**River**	Directional Drilling	No
3	**River**	Directional Drilling	No
4	**River**	Directional Drilling	No

The construction methodologies for the crossings are provided below. The route also contains minor forestry/field/road drains which are usually dry, and only contain water during periods of heavy rainfall. These will be crossed using open trench crossings during dry periods.

2.8.5.3 Crossing Methodology Directional Drilling

A launch and reception pit is required for directional drilling, with each measuring approximately 1 m wide, 2 m long and 1 m deep. Two ducts will be required at each crossing location. A specialised directional drill machine will be anchored to the ground and will drill at a suitable shallow angle to allow it to achieve the required depth for the bore. If ground conditions are unfavourable, the drilling process will need to be repeated using progressively larger drill heads until the required size is achieved. The drilling process involves pumping a drilling fluid through the drill head which is inert, natural and biodegradable (e.g. Clear Bore™). This fluid will be used sparingly and only as required to avoid an excess and will be appropriately stored offsite in a sealed container >50 m from watercourses when not in use. This fills voids locally around the drill head and enables the drill to progress without the hole collapsing. Should any excess drilling fluid occur, it will be contained and removed for disposal at a licensed waste facility. The duct will be positioned, and the launch and reception pits will be refilled.

Further details of this crossing method are provided in Appendix 1-1 of this EIAR, while the associated construction methodologies are provided in Appendix 2-5.

2.8.6 Permanent Meteorological Mast

The met mast installation works will be carried out by a small crew and are described as follows. An access track will be extended towards the mast location from the existing forestry track. The access track will be 3.5 m in width. Associated drainage infrastructure will be extended also. A small stone crane pad will be constructed in front of the proposed mast location. General construction methods for the above access track and hard standing will match those described for wind farm access tracks and hard standings.

The foundation will be excavated followed by shuttering, steel fixing and finally concrete pouring by ready mix truck. Excavation and concrete operations will be carried out in accordance with the CEMP (Appendix 2-8). The foundation will be 10 m x 10 m x 1.8 m in size. Following crane setup, the mast sections will be delivered and unloaded by truck. In accordance with an agreed lifting plan, mast sections will be lifted by crane into place. Wind speeds will be monitored at all times during lifting operations by the lead climber and crane operator. Mast sections will be bolted together by climbers.

Following erection of main mast sections, lightning protection and other ancillary components will be fixed to the mast. The mast will be decommissioned using a similar methodology as the construction except in reverse.

2.8.7 Forestry Felling

For the footprint of the infrastructure and associated felling buffers, there will be full tree removal. There will also be felling in an area within the wind farm site for biodiversity enhancement. Due to the fact there are many age classes that are to be felled i.e. commercial and non-commercial timber, it is envisaged that any commercial timber will be removed from the site for haulage to a timber sawmill. For the purposes of the EIAR it is assumed that the timber will go to one or more of the following sawmills:

- Glennon Brothers, Fermoy, Co. Cork;
- O'Keefe Sawmills, Lismore, Co. Waterford;
- Patrick Sheehan Sawmills Ltd., Ballyporeen, Co. Tipperary;
- Richard White Sawmills Ltd., Co. Kilkenny.

All of these will utilise the L5055, L1029 and the N72 to leave the site, and will utilise mostly the national road network to reach the sawmill location.

A report detailing the forestry felling is provided as Appendix 2-7. It should be noted that the clearfelling of trees in the State requires a felling licence. The associated afforestation of alternative lands equivalent in area to those lands being permanently clearfelled is also subject to licensing ('afforestation licensing'). The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing.

In light of the foregoing and for the purposes of this project, the Applicant commits that the location of any replanting (alternative afforestation) associated with the project will be greater than 10 km from the proposed wind farm site and also outside any potential hydrological pathways of connectivity i.e. outside the catchment within which the proposed project is located. On this basis, it is reasonable to conclude that there will be no more than imperceptible indirect or in-combination effects associated with the replanting. In addition, the Applicant commits to not commencing the project until both felling and afforestation licences are in place and this ensures the afforested lands are identified, assessed and licensed appropriately by the relevant consenting authority.

Detailed consideration of the approach to afforestation requirements associated with the project is attached in Appendix 2-11. Offsite forestry replanting is considered within cumulative assessments through the EIAR.

2.8.8 Borrow Pits

Material will be extracted from the borrow pits, to avoid the need for large stockpiles of material. There will be some small stockpiling of material as rock is broken/crushed, but these will be kept to a minimum. In general, construction will start from the south of the site and work northwards, and the first borrow pit will be used for the construction of the infrastructure in the southern half of the site (i.e. where there are extremely limited peat deposits).

As construction moves to the northern half of the site (where the vast majority of the peat is located, albeit still shallow) then the second borrow pit will be used. The extant first borrow pit will at that stage act as a confined cell for the direct placement of any peat that is excavated while the second borrow

pit is in operation (only one will operate at a time). Therefore, there will be no unconfined stockpiling of peat, and no confining structure will need to be constructed for peat. The second borrow pit will be reinstated with any mineral soils that have been temporarily stockpiled on site, or any spoil remaining once landscaping works have been completed. Further detail on the construction of the borrow pits is provided in Chapter 8 (Land, Soils and Geology).

There is an absence of notable peat at the borrow pit locations, so any soils/subsoils removed from here to open up the borrow pits will not have a significant slippage risk if temporarily stockpiled in accordance with best practice. During the extraction of the first borrow pit, removed spoil will be stored in a temporary stockpile with appropriate gradient (i.e. 1:2) and appropriate mitigation will be used to ensure the protection of downgradient watercourses (i.e. the use of silt fences, collector drains, siltbusters, etc. as described in Section 2.9.3 below). All of the spoil temporary stockpiles will be confined to within the boundary of the two borrow pits, which cover relatively flat areas with the exception to where material is side cast from small/narrow pieces of infrastructure.

Once the required rock has been extracted from each borrow pit, they will be reinstated using any suitable material from the site (including peat) and made secure using permanent stock proof fencing.

Rock and fill material will need to be extracted from a number of proposed turbine foundation locations. In that case, this material will be used where possible to replace the material requirements from borrow pits, meaning the figures above are likely to be lower than mentioned. It is proposed that the onsite borrow pits will be used for the permanent storage of peat which is excavated around the site.

The borrow pits will be excavated into the ground and on completion of reinstatement they will be no higher than existing ground level. The borrow pits are both located on relatively flat ground with only very gentle slopes. As the borrow pit excavation will be below ground, there will be no requirement for construction of berms or any retaining features for spoil, and slippage of peat will not be possible from the excavation (i.e. the peat will be stored below the lowest edge of the borrow pit rim so it cannot leave under gravity). Therefore, there will be no peat stability risks associated with storage.

2.8.8.1 Rock Extraction Methods

The rock will be extracted from the proposed borrow pits using two main methods: Rock breaking and rock blasting. Both methods would be suitable for use on this site considering the geology and soil conditions there, and it is proposed to use a combination of both. The absence of notable peat depths near the proposed borrow pits means that there will be no implications for peat stability around the borrow pits.

2.8.8.2 Rock Breaking

Rock breaking can be used to extract rock in many situations and is particularly suitable for any brittle rock and rock near the surface. A hydraulic rock breaking attachment is fitted to the arm of a large tracked excavator, and this breaks large pieces of rock from the ground. These large rocks are broken down into smaller pieces using these hydraulic rock breaking attachments, until they are small enough for use or to fit into a rock crusher. At that point, a large loader feeds them into a mobile rock crusher, where they are crushed, graded into various sizes, and removed by the loader (and trucks) for use on site. They will be removed as they are produced, and as such there

will be no stockpiling apart from the area within the borrow pits adjacent to the crusher. Stockpiles will build up under the conveyor belts of the crusher for use on site. The potential noise impacts of rock breaking have been assessed in Chapter 12 (Noise & Vibration).

2.8.8.3 Rock Blasting

Rock blasting is an effective way to produce a large volume of broken stone in a very short time, as the blasts only last a number of milliseconds. All parts of the blasting process from drilling to explosives handling to execution of the blast itself will be designed and carried out/overseen by a specialist engineer. In order to carry out a blast, a number of holes are drilled into the rock over several days. Once these are prepared, the required amount of explosives will be brought to the site and installed in the holes. The explosive material will not be stored on site, and the transport and handling of the material, as well as the carrying out of the blast will be carried out with agreement and supervision of An Garda Siochána. The charges will be set, the area will be cleared and the blast carried out by a specialist engineer. After a blast, the rock will be able to be loaded into a crusher with a loader and processed for use on site.

Based on site investigations undertaken within the proposed project site, rock blasting will be required due to the strength and low fracture density of the underlying bedrock. In the event blasting is required, local residents (all located >450 m from a borrow pit or >800 m from a turbine location) and noise sensitive locations (such as local schools) will be notified of the upcoming blast. Blasting will only occur occasionally on site as required with the frequency depending on what stage construction is at. The vibration will not have any effect on peat stability due to the absence of peat on much of the site and shallow peat elsewhere. The potential noise and vibration impacts of blasting have been assessed in Chapter 12 (Noise & Vibration).

2.8.8.4 Stone and Fill Requirements

A significant amount of stone and aggregate fill material will be required during construction. This will be used under and around key infrastructure including the turbines, substation, site roads, hardstands and construction compounds. The following are the approximate estimates of the material requirements at the various main infrastructure locations:

- Internal Access Tracks – 38,000 m^3 is required, of which 26,000 m^3 for the initial base layer (i.e. the first thick layer on the ground) will come from onsite sources with the remaining final surface material being sourced from offsite quarries;
- Substation and Construction Compounds – 9,260 m^3 of which 3,500 m^3 for the initial base layer will come from onsite sources, with the remaining material being sourced from offsite quarries;
- Turbines and associated hard stand areas – 66,500 m^3 of which 25,500 m^3 for the initial base layer will come from onsite sources, with the remaining material being sourced from offsite quarries; and
- Backfill around cables – 10,000 m^3 from external/offsite source.

By sourcing the majority of the required stone volume from the onsite borrow pits as described above, the volume of traffic that will occur on public roads in the area will be significantly reduced. Stone from offsite sources will be used for surface dressing, while stone sourced onsite will be used for the initial capping layer. Further information on the proposed traffic volumes and impacts are discussed in Chapter 16 of this EIAR (Traffic & Transportation), while further information on the offsite/external sources being considered is provided in Section 2.9.4.4.

Hardstands and site roads will be constructed to be above the existing ground level. The lower layer (approx. 450 mm) of this will be lower grade stone, with the top 150 mm being high quality compacted aggregate. Internal cable trenches which connect each turbine to the proposed onsite substation will be 1500 mm deep, with the first 600 mm being backfilled with sand. The excess excavated material will be used for backfilling of the borrow pits to the surface.

2.8.9 Temporary Construction Compounds

At the commencement of the construction phase, a temporary compound area will be constructed. At a later stage of the site development (when the construction works reach the northern Knocknanask end of the site) a second compound area will be constructed there as per the proposed site layout to provide additional facilities onsite. Any mineral soils removed during construction will be stored for later use in reinstatement At the end of the construction phase, the compounds will be removed, with any stone being used towards reinstatement of the nearest onsite borrow pits. After removal of the compound, the area will be recovered in soil and replanted with forestry as described in Appendix 2-7.

2.9 CONSTRUCTION MANAGEMENT

2.9.1 Construction Phase Monitoring and Oversight

The requirement for a CEMP to be prepared in advance of any construction works commencing on any wind farm site and submitted for agreement to the Planning Authority is now well-established.

A CEMP has been prepared for the proposed project and is included in Appendix 2-8. The CEMP will be updated prior to commencement of development to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the planning authority for written approval.

The construction contractor will be responsible for implementing the mitigation measures specified in the EIAR and CEMP and for communicating the requirements with all staff on-site. Their implementation of the mitigation measures will be overseen by the supervising site staff, including the Environmental Manager, Ecological Clerk of Works (ECoW), site supervisor, archaeologists and/or geotechnical engineers, as appropriate.

The surface water drainage system will require weekly and daily inspections depending on the construction phase works to ensure that it is working optimally. Settlement ponds will require regular inspection and cleaning where sediment collects. The drainage and treatment system for the proposed wind farm monitored more frequently during/after heavy rainfall events during the construction phase. A programme of inspection and maintenance will be designed and dedicated construction personnel assigned to manage the inspection programme. This is discussed further in the CEMP (Appendix 2-8).

A CEMP is included as Appendix 2-8 of this EIAR. The CEMP will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment are implemented. The commitments in the EIAR will be fully complied with by the contractor. In the event that planning permission/approval is granted any condition(s) relating to a CEMP which may be attached by An Bord Pleanála to such an permission/approval, will be implemented in accordance with the requirements of the condition

2.9.2 Construction Activities and Timing

It is anticipated[7] that 87-116 persons will be employed during the peak construction period (See Chapter 5 (Population and Human Health)) and it is estimated that the construction phase will take approximately 24 months from starting onsite to completion of commissioning of the turbines. With the exception of commercial forestry felling, vegetation clearance will commence outside the breeding birds season, which runs from the 1st of March to the 31st of August. If any minor clearance or trimming is required within those dates, or if the initial vegetation clearance extends past the 1st of March due to unsuitable weather conditions, the works will be preceded by an ecological survey (from a qualified and suitably experienced ecologist) to ensure there are no sensitivities associated with the action.

The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations will generally be restricted to between 7:00 hrs and 19:00 hrs Monday to Friday (excluding public holidays) and between 07:00 hrs and 14:00 hrs on Saturdays.

However, during the following critical periods longer hours will be required:

- Concrete pours for turbine foundations;
- During turbine installation when the weather is suitable (i.e. light winds);
- Delivery of oversized loads;
- In the unlikely event of an emergency (this is unlikely - see Chapter 17 (Major Accidents and Natural Disasters)).

Any such out of hours working will be agreed in advance with Waterford City and County Council apart from in the case of an emergency and in line with the Schedule of Mitigation requirements of this EIAR (Chapter 19).

Due to the volume of concrete required for each turbine foundation, and the requirement for the concrete pours to be continuous, deliveries are often carried out outside normal working hours. Such activities are limited to the day of turbine foundation concrete pours, which are completed in a single day per turbine (can take >12 hours). Because of the scale of the main concrete pours that will be required to construct the proposed wind farm, the main pours will be planned weeks in advance, and refined in the days leading up to the pour. Concrete pours are required for 15 no. wind turbines so they will require 15 days of longer working hours. A similar number of days with longer working hours would be needed for installation of the turbines during a period of calm weather (this is mostly limited to onsite activity).

To accommodate delivery of large turbine components along public routes it could be necessary on occasion to work outside of the core hours, with delivery of these oversized loads typically late evenings. It is expected 24-40 delivery events will be needed on a maximum of 24-40 days for delivery of these oversized loads which usually travel in convoys of 3-5 vehicles with a Garda escort.

The construction phase can be broken down into 5 no. main phases as follows (there will be overlap between these):

- 18 months – Civils (including forestry felling and vegetation clearance, drainage, construction of site roads, hardstands, turbine foundations);
- 9 months – Electrical grid connection/substation installation and commissioning;

7 http://www.ewea.org/fileadmin/files/library/publications/reports/Wind_at_work.pdf

- 12 months – Site electrical (installing between turbines and substation, pulling cables);
- 4 months – Turbine deliveries and erection;
- 2 months – Commissioning.

The phasing and scheduling of the main construction task items are outlined in Figure 2-8, where January 2027 has been selected as an arbitrary start date for construction activities (based on likely timeframe to secure planning consent, complete pre-construction design and tendering work, etc.). Where there is overlap between phases, this reflects the anticipated progression of work through the site, with different areas within the site at different stages of completeness.

ID	Task Name	Task Description
1	Site Health and Safety	
2	Site Compounds	Forestry felling & vegetation clearance (avoid Mar – Aug), Construct site compounds, site access, fencing, gates
3	Site Roads	Forestry felling & vegetation clearance, construct roads, install drainage measures, install culvert, install water protection measures
4	Turbine Hardstands	Forestry felling & vegetation clearance , excavate base, construct hardstanding areas
5	Turbine Foundations	Fix steel, erect shuttering, concrete pour
6	Substation Construction & Electrical Works	Construct substation and grid connection, underground cabling between turbines
7	Backfilling & Landscaping	
8	Turbine Delivery and Erection	
9	Substation Commissioning	
10	Turbine Commissioning	

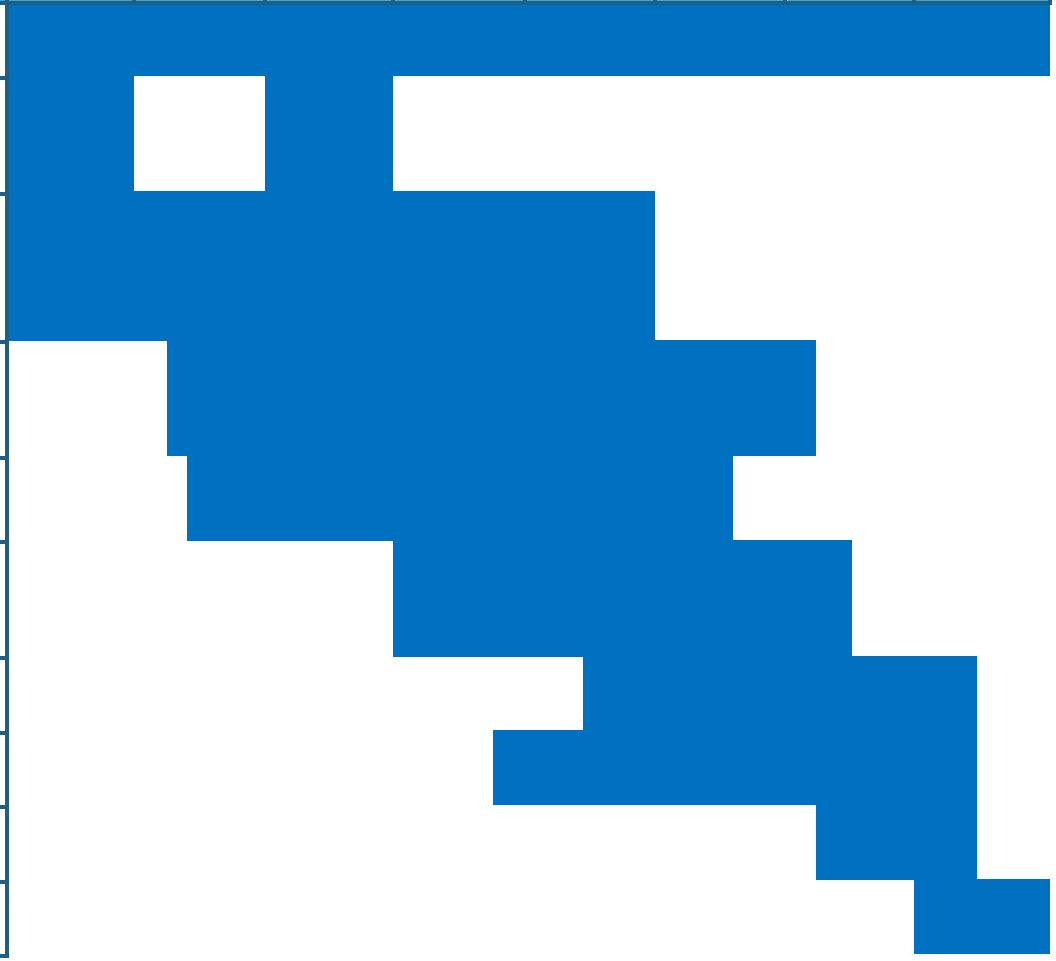


Figure 2-8: Indicative Construction Schedule

2.9.2.1 Wind Farm Construction Sequencing

It is proposed that works will start at the southern end of the proposed wind farm site, where peat is either absent or extremely shallow, and the topography is flattest. In this part of the site, side-casting will be appropriate in most locations (apart from within 50 m of watercourses). One borrow pit will be used to source stone material for the southern half of the site, while the other borrow pit will be used to temporarily deposit excess inorganic soils. As the construction moves to the northern half of the proposed wind farm site where the topography is steeper and there is slightly more peat in some locations (albeit still shallow at mostly <0.5m), the second borrow pit will be utilised as a source of stone after any temporarily stock-piled material is transferred to the first borrow pit. Any peat that is stripped at this stage will then be deposited straight into the first borrow pit, below ground level avoiding the potential for any slippage.

2.9.3 Surface Water Management

2.9.3.1 Existing Site Drainage

The proposed wind farm site is located within the Blackwater (Munster) Water Framework Directive catchments (hydrometric area) in west Waterford. These catchments are further subdivided into sub-catchments with the site located within the Blackwater(Munster)_SC_140 WFD sub-catchment and the Finisk_010 WFD river sub-basin (see Figure 9-2 of Chapter 9 in this EIAR) .

These waters are of moderate to steep gradient near the proposed wind farm site, representing natural watercourses typical eroding/upland rivers, that are actively eroding, where there is little or no deposition of fine sediment. The Glenshelane River flows in a southerly direction through the north-westerly part of the proposed wind farm site. Streams mostly flow in a general north to south direction, ultimately flowing into the River Blackwater. There are no lakes identified on the proposed wind farm site.

The site and adjacent lands also include man-made drains which flow into the watercourses mentioned above. These are primarily used to assist in the drainage of forestry and agricultural land-use. Natural watercourses and drainage ditches on site will be crossed by the proposed access tracks.

Further details on the existing and proposed site drainage are provided in Chapter 9 of this EIAR, Hydrology & Hydrogeology.

2.9.3.2 Drainage and Silt Control

The proposed surface water drainage system utilises sustainable drainage devices and methods. Surface water management on wind farm construction sites utilises well-established and well-understood techniques. These management methods are standard ones in the industry and they have a long-term record of a high level of efficacy. Wind farm construction has been ongoing in Ireland for over 30 years, and where the mitigation and methods are correctly implemented, water quality is generally not a significant issue over that period. The measures outlined in this project have been developed based on the CIRIA (Construction Industry Research and Information Association) C648 (Control of water pollution from linear construction projects) guidance, and that guidance has itself been developed based on site experience in Ireland and the UK over recent decades.

A Surface Water Management Plan (SWMP) has been prepared (Appendix 2-10). The purpose of this plan is to ensure that all works are conducted in an environmentally responsible manner so as to minimise any potential adverse impacts from the proposed project on surface water quality. The plan incorporates the following specific objectives:

- Provide overall surface water management principles and guidelines for all phases of the proposed project;
- Address erosion, sedimentation and other water quality issues; and
- Present measures and management practices for the prevention and/or mitigation of potential downstream impacts.

Construction Phase

During the construction phase, all run-off from construction areas will be controlled and treated to reduce suspended solids concentration prior to being discharged into the existing drainage network or overland.

Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. These flows will discharge diffusely overland, within the buffer zone before entering any watercourse. Regular cross flow and energy dissipation devices will be installed to divert overland flows and prevent these flows from entering the borrow pits. An overview of the surface water drainage system is provided below (Image 1).

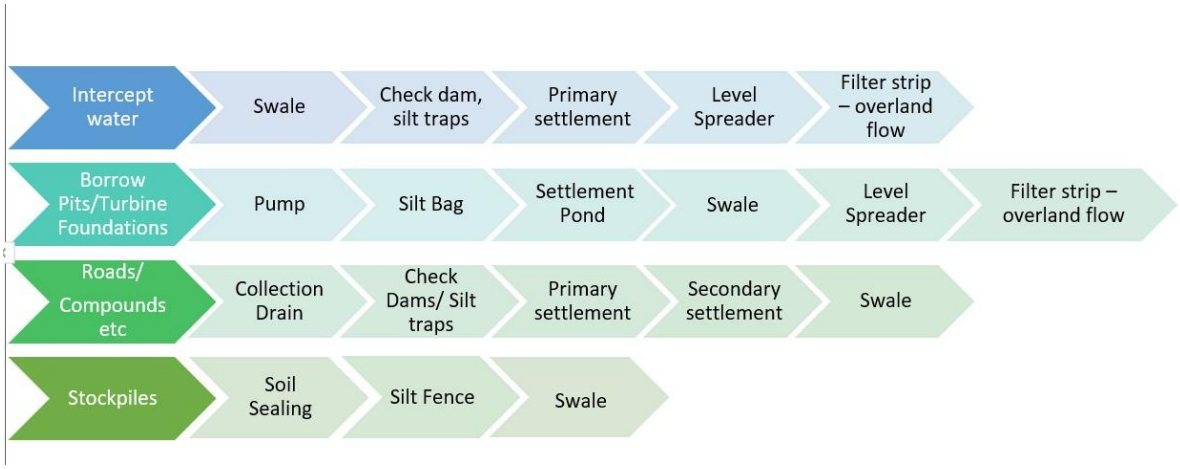


Image 1 Treatment train

A number of temporary settlement ponds will be established during the construction phase along roadways and in areas of high construction activity (adjacent to turbine foundations, borrow pits, construction compounds etc) to minimise silt laden run-off entering the drainage network. The settlement ponds will be designed to provide sufficient retention time and a low velocity environment to allow suspended solids to fall out of suspension prior to allowing the water to outfall to the receiving environment. Further information on the runoff calculations and site drainage is provided in Chapter 9 (Hydrology & Hydrogeology). The proposed locations of the permanent and temporary settlement ponds, and details of same are shown on site layout drawings in Appendix 1-1 of this EIAR.

Surface water runoff from hardstanding areas will be collected and discharged to associated settlement ponds adjacent to the proposed infrastructure. It will then be managed by gravity

flow at greenfield runoff rates (i.e. the runoff of the site at natural rates without development). These level spreaders/diffusers will be used where overland discharge of water is carried out. The level spreader will prevent soil erosion at these locations by spreading out and slowing down the water, see Image 2-2.

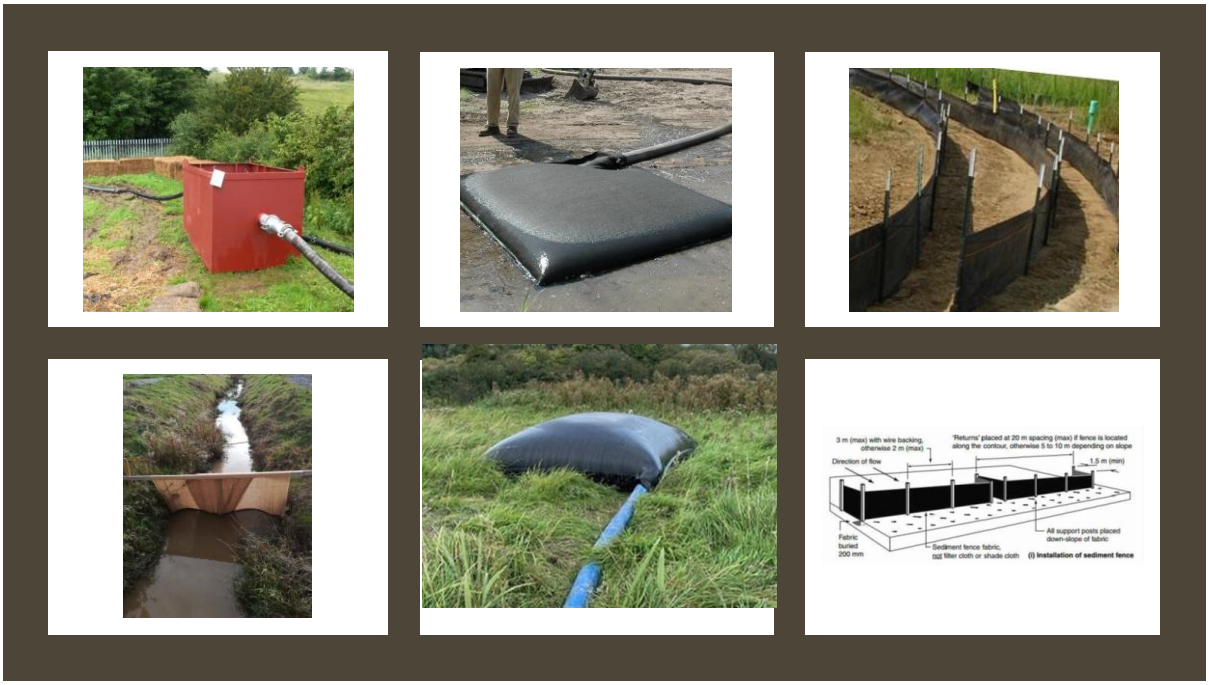


Figure 2-9: Examples of Proprietary Silt Control measures

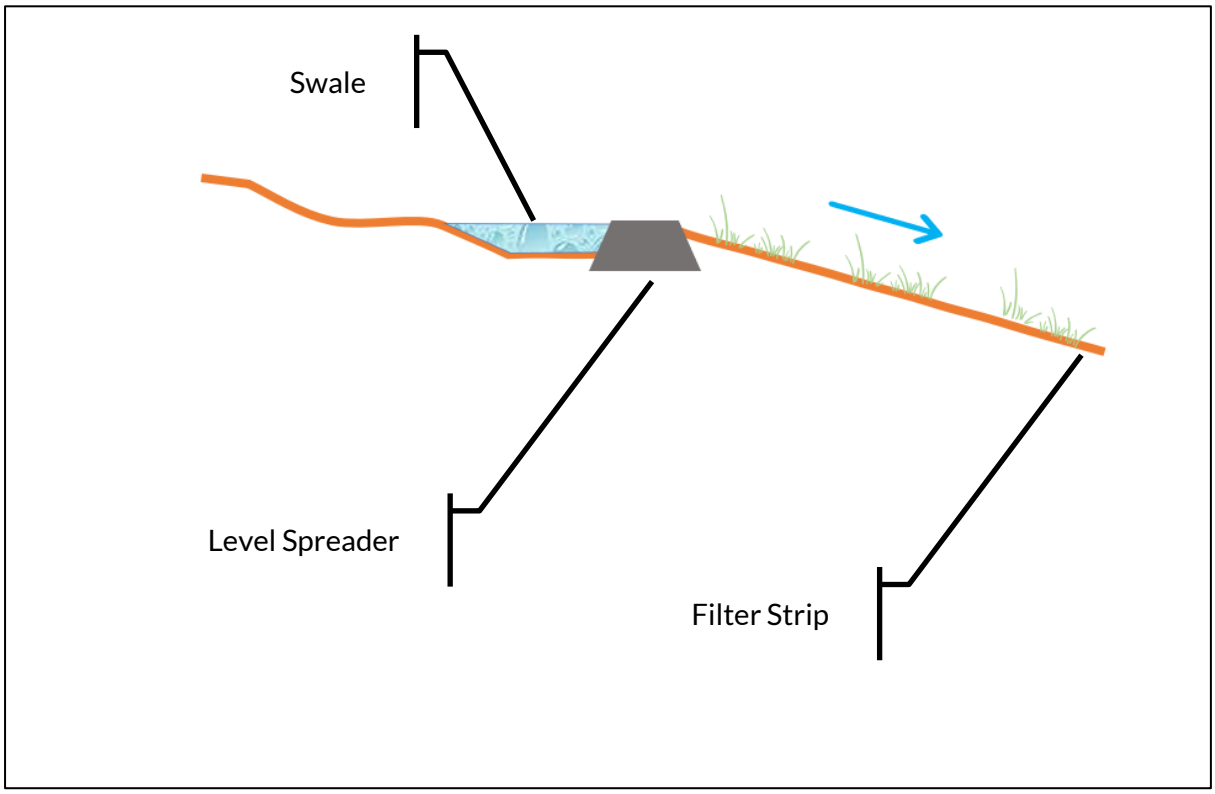


Image 2-2 Conceptual Level Spreader and Filter Strip

Operational Phase

The drainage layout for the operational stage of the proposed project has been designed to collect surface water run-off from roads, crane pads and hardstanding areas for treatment and to maintain the existing site discharge rates. Run-off arising from the proposed project will discharge into settlement ponds specifically constructed for managing surface water from the wind farm. Temporary settlement ponds for the construction phase (i.e. borrow pits, construction compounds) will be removed at the end of the construction phase upon reinstatement of those features. Details and locations of the proposed settlement ponds are shown on the drawings of Appendix 1-1 of this EIAR.

Once treated in the settlement pond the treated surface water will then be allowed to spread across the adjacent vegetated lands via a level spreader /diffuser which will minimise any risk of soil erosion and allow further filtration of any remaining sediment particles. Level spreaders and existing vegetation will help slow and distribute runoff evenly. This treated water will ultimately percolate to ground or travel over-ground through vegetation and be assimilated into a drain or stream onsite at appropriate greenfield run-off rates (i.e. the runoff of the site at natural rates without development). There will be no direct discharges from the wind farm. The measures outlined for this project are based on the CIRIA C648 (Control of water pollution from linear construction projects) guidance, and that guidance has itself been developed based on site experience in Ireland and the UK over recent decades.

Decommissioning Phase

The decommissioning phase will not require any significant works that will impact on the drainage network, as the drainage system will remain in place to serve the access roads.

For each phase of development, the protection of water quality and prevention of pollution events requires a sustained and concentrated input from the Contractor with regard to the provision and maintenance of sediment control structures. The drainage system is described in further detail in Chapter 9 of this EIAR (Hydrology & Hydrogeology) and the SWMP.

2.9.3.3 Culverts & Clear Span Bridges

Culverts will be required where site roads or hardstands cross minor forest drain networks. The use of culverts will only be employed for minor field/forest drains.

There are two small stream crossings required for the proposed site road network, for which the proposed crossing methodology is use of bottomless culverts. The streams on site are <2.5 m wide.

The use of a clear-span bridge will be used for the Glenshelane river crossing to avoid the requirement for in-stream works. Therefore, there will be no direct effect on the stream at the proposed crossing location and downstream. The clear-span bridge will be sufficiently above the stream to allow unrestricted flow of water beneath. The proposed clear-span bridge location and design detail are provided in Appendix 1-1 of this EIAR.

The construction method for these structures is described in Section 2.8.3.3.

Where culverts are required for any smaller drains such as forest drainage ditches, precast concrete or plastic culverts of between 300-900mm in diameter will be provided, a drawing of which is shown in Appendix 1-1 of this EIAR.

2.9.4 Environmental Management

2.9.4.1 Concrete Deliveries & Pouring

Primarily ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in sealed concrete delivery trucks. Localised mixing will be used for small tasks such as blockwork for building the substation. The use of ready-mixed concrete deliveries will eliminate any potential environmental risks from large scale on-site batching. When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. Concrete trucks will be washed out fully at the batching plant, where facilities are already in place. The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area. These residual liquids and solids will be collected by an appropriately licensed waste collector (such Clonmel Waste Disposal Ltd.). Where temporary lined impermeable containment areas are used, such containment areas are excavated and lined with an impermeable membrane. This washout will be located near the site entrance and also at any significant concrete pour locations (e.g. at turbine hardstand during a foundation pour) so that it is easily accessed when departing. An example of a concrete washout is shown in Figure 2-10.

Figure 2-10: Example of a temporary concrete washout facility

Although unlikely to happen any disposal of surplus concrete after completion of a pour will be off-site at the concrete production facility. Localised mixing of concrete for blockwork, etc. will only be carried out as needed, but any small volume of surplus will be disposed of in the concrete washout area.

The CEMP (Appendix 2-8) provides further details of best practice and environmental considerations in relation to concrete deliveries and concrete pouring.

2.9.4.2 Refuelling

Any easily manoeuvrable road-going vehicles (i.e. cars, jeeps, lorries etc) will be refuelled off-site. For any vehicles which are slow moving or tracked or those for whom regular trips off-site to refuel will not be practical, on-site fuelling will be required.

A limited amount of fuel will need to be stored on the site within the construction compounds for this purpose, and this will be within a double skinned and bunded mobile tank which can be moved around the site using a 4x4 vehicle to refuel. This will be stored in the construction compound when not in use.

A spill kit in the form of a supply of fuel absorbent material and mats and a drip tray will be kept with the tank at all times. The drip tray and fuel absorbent mats will be used at all times during refuelling. Similar spill kits will be stored in each construction compound, and at the on-site substation in case of emergency.

No refuelling will be carried out within 50 m of a stream. Only designated trained and competent operatives will be authorised to refuel plant on site.

In the event of an accidental fuel spill, the source of the spill will be fixed, fuel will be contained and cleaned as quickly as possible using the fuel absorbent material in the spill kits. The incident will be reported to the site manager and Environmental Clerk of Works, and appropriate remediation will be carried out (i.e. soil removal for safe disposal at a licensed waste facility by licensed waste collectors such as Clonmel Waste Disposal Ltd.

The CEMP (Appendix 2-8) provides further details of best practice and environmental considerations in relation to this.

2.9.4.3 Dust Suppression

In periods of extended dry weather, dust suppression will be necessary along haul roads and along the site roads to ensure dust does not cause a nuisance to any residential properties long the route. If necessary during a period of extended dry weather, water will be taken from settling ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and site compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this will transfer the pollutants to the haul roads and generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water would lead to increased risk of runoff. The CEMP (Appendix 2-8) provides further details of best practice and environmental considerations in relation to this.

2.9.4.4 Waste Management

The CEMP (Appendix 2-8) provides an overview of the best practice in waste management during all phases of the proposed project, with a view to reducing, reusing, recycling and recovering waste produced, in that order of preference. Waste disposal will be avoided where possible. The Waste Management Plan and waste management practices associated with the proposed project are provided in the CEMP (Appendix 2-8) and will be in accordance with relevant provisions of the Waste Framework Directive (Directive 2008/98/EC on waste), the Waste Management Act 1996 as well as all other Irish and EU legislation.

The main site contractor will appoint an Environmental Clerk of Works who will ensure that all waste contractors have the correct permits for any waste streams they are removing from site, and that they are taking it to the appropriately licensed/permitted waste facilities. They will also ensure that all parts of the Waste Management Plan will be implemented onsite.

2.9.4.5 Vehicle Management

Vehicles will be kept on site access roads for the vast majority of the construction phase, however in the initial construction phases, there will be some requirement for off-road vehicle movements (for forestry felling, ground works, etc.). For forestry felling, standard practices and equipment/vehicles will be used (as described in the Forestry Report – see Appendix 2-7).

For ground works and other off-road activity, the use of specialist vehicles that are tracked or use large low ground pressure tyres or bog mats which distribute their weight evenly across a large surface area will be used. These will minimise ground disturbance, particularly where there is a presence of peat (albeit very shallow on this site) and therefore minimise the risk of sediment entering downstream watercourses.

All vehicles will be restricted to the areas where works are required, and unnecessary off-road movements around the wider site will be avoided. Where there are any sensitive habitats present around a proposed work area, these areas will be marked out so that vehicles will not enter and damage them.

2.9.4.6 Vehicle Washing

Wheels or vehicle underbodies are often washed before leaving sites to prevent the build-up of mud on public (and site) roads. Site roads will be already formed using on-site materials before other road-going trucks begin to make regular or frequent deliveries to the site (e.g. with steel or concrete). The site roads will be well finished with compacted hardcore, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt.

However, in the interest of best practice and to avoid the potential for the transfer of alien invasive plant species into the site, it is proposed to install a self-contained wheel-wash system near the project site entrance. The drawings in Appendix 1-1 of this EIAR include details and proposed location of a proposed self-contained wheel-wash system which will be installed as part of the construction phase of works. Water will be supplied for this using a water bowser.

A road sweeper will be available if any section of the surrounding public roads becomes soiled by vehicles associated with the proposed project.

The CEMP (Appendix 2-8) provides further details of best practice and environmental considerations in relation to this.

During the operational phase, the onsite access tracks will be maintained in good condition, and any vehicles that need to access the site will be generally keeping on these surfaces. As a result of this, and the low volume of traffic expected on site, it is not anticipated that a wheel washing facility would be required during the operational phase.

2.9.4.7 Major Accidents and Natural Disasters

A review of the potential for the proposed project to be a source of hazard or interact with other sources of hazard, and that could result in a major accident and/or disaster during all phases was undertaken. The potential for a major accident or natural disaster to impact on the proposed project was also considered. This is addressed in Chapter 17 of this EIAR (Major Accidents and Natural Disasters).

2.9.4.8 Spoil Management

The use of the borrow pits will be phased. This will allow materials to be permanently placed in the first borrow pit while the second is in use, thereby minimizing the volume of soils requiring temporary storage. In order to further reduce temporary storage requirements, soils and turves will be reinstated around infrastructure as part of restoration and landscaping works. This will be carried out during the construction phase, as soon as is practical after the completion of the works in any one area of the site. Approximately 90,000 m^3 will be excavated from the borrow pits onsite. Peat will be placed at the borrow pits below the existing ground level to ensure containment. A total of 80,000 m^3 will be used to reinstate the borrow pit area as well as for landscaping.

Where the proposed project footprint is located on any mineral-based soil, this material will be side-cast and profiled as close to the excavation areas as practical. In the case of peat, or where other adjacent infrastructure or constraint features might prevent side-casting, it will be used to reinstate the borrow pits. The sides of the excavated areas will be battered/sloped sufficiently to ensure that slippage does not occur (2:1 for mineral soil). The excavated sidecast material will be smoothed with the back of an excavator bucket and surrounded by silt fences to minimise the potential for sediment-laden run-off occurrence. Side-casting will not occur within 50 m of a watercourse. The side-cast material will be used later in backfilling the working area around the turbine foundations, or for landscaping locally or reinstatement elsewhere on site (such as the borrow pits). Further and more detailed information on the spoil management is provided in Appendix 2-3 (Spoil & Peat Management Plan).

Where side-casting is not possible, topsoil and sub-soil are to be stockpiled separately. Turves will be stored turf side up and will not be allowed to dry out. Stockpiles are to be isolated from any surface drains and a minimum of 50 m away from watercourses, and will be located at points with easy access to internal roads within the proposed borrow pit areas which have not yet been extracted. Measures that will be employed will include interceptor ditches around these areas (with sediment traps within these – see Drainage Drawings in Appendix 1-1) deployment of double silt curtains and seeding of the piles will be incorporated to prevent runoff of suspended solids and soil erosion. No permanent spoil or stockpiles will be left on site. No stockpiles will be located on peat areas. Peat material (from Knocknanask in particular) will be used to reinstate the borrow pits (see Section 2.8.8 and Appendix 2-3 for information on sequencing of work).

Where available, vegetative sods/turves or other topsoil in keeping with the surrounding vegetation type will be used to provide a dressing for the final surface. Where sods/turves are not available, some seeding with native species will be carried out. This method for restoration of excavated or disturbed areas is to encourage stabilisation and early establishment of vegetation cover.

To prevent erosion and run-off and to facilitate vegetation reinstatement, any sloped soil embankment will be graded such that the slope angle is not too steep (i.e. 1:3) and that

embankments match the surrounding ground profile. See Section 2.8.9. for further information on sequencing and spoil management.

Management of spoil for the turbine delivery accommodation works and the GCR are discussed in sections 2.8.2 and 2.8.5 respectively.

2.9.4.9 Traffic Management

As described further in Chapter 16 of this EIAR, Traffic and Transport, the successful completion of this project will require significant co-ordination and a comprehensive set of mitigation measures. As outlined in Section 16. of this EIAR, these mitigation measures will be put in place before and during the construction and operational phase of the project in order to minimise the effects of the additional traffic generated by the proposed project. A Traffic Management Plan proposed for the project is included as Appendix 2-4.

2.10 HEALTH AND SAFETY

The proposed project will be constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation as described in the CEMP (Appendix 2-8).

Aspects of the development that will present health and safety issues include:

- Health and safety aspects of construction activities;
- General construction site safety (e.g. slip/trip, moving vehicles etc);
- On site traffic safety (during construction and operational phases) associated with localised high road embankments;
- Traffic safety during the transport of oversized loads to the site;
- Lifting of heavy loads overhead using cranes;
- Working at heights; and
- Working with electricity during commissioning.

The scale and scope of the project requires that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are required to be appointed in accordance with the provisions of the Safety, Health and Welfare at Work (Construction) Regulations. The PSDP role has been performed by TOBIN Consulting Engineers up to the end of the planning stage of the project.

The PSDP and PSCS appointed for the project will be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations as described in the CEMP (Appendix 2-8).

None of the construction, operational or decommissioning phases of the project are anticipated to cause a significant negative impact to safe practice of agricultural, forestry and commercial activities outside the development footprint.

It is not anticipated that the operation of the wind farm will present a danger to the public and livestock. Rigorous safety checks are conducted on the turbines during design, construction, commissioning and operation to ensure the risks posed to staff, landowners and general public are negligible.

Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits.

Signs will be erected at suitable locations across the site as required for the ease and safety of operation of the wind farm. Further details are provided in the CEMP (Appendix 2-8).

The emergence of the Covid-19 virus in Ireland in the early part of 2020 has presented a new human health risk and concern amongst the general public across the country and within the proposed project study area. Proposals relating to Covid-19 (which could apply to similar other pandemics) are discussed in Section 5.3.2 of Chapter 5 (Population and Human Health).

The components of a wind turbine are anticipated to have a useful lifespan of 35 years or more and are equipped with a number of safety devices to ensure safe operation during their lifetime. During the operation of the wind farm regular maintenance of the turbines will be carried out by the turbine manufacturer or appointed service company. A project or task specific Health and Safety Plan will be developed for these works in accordance with the site's health and safety requirements.

2.11 WIND FARM OPERATION

The proposed project has a lifespan of 35 years. This is the anticipated useful lifespan of wind turbines which are being produced for the market today. The lifespan of wind turbines has been increasing steadily in recent years and allowing this duration will improve the overall carbon balance of the development, therefore maximising the amount of fossil fuel usage that will be offset by the wind farm. Leaving the wind turbines in-situ until the end of their useful lifespan would make the most sense from an environmental viewpoint, particularly in relation to carbon savings. During this operational period the wind turbines will generally operate automatically, responding by means of equipment, measuring the speed of wind, and control systems to changes in wind speed and direction.

The wind turbines will be connected together, and data relayed from the wind turbines to a control centre off site. Each turbine will also be monitored off-site by the wind turbine supplier or Operations and Maintenance (O&M) service provider. The monitoring of turbine output, performance, wind speeds, and responses to any key alarms will be monitored at a control centre 24-hours per day.

Each turbine will be subject to a routine maintenance programme involving a number of checks and changing of consumables, including oil changes. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. The electricity substation components and site roads and drainage will also require periodic maintenance in accordance with appropriate operation maintenance plans, procedures and health and safety plans.

Once operational, it is estimated that the wind farm will support 2-3 long term, high quality technical jobs on site in operation and maintenance as well as a more significant number of jobs in ancillary functions (estimated to be a total of between 22-32 jobs between direct and indirect employment based on research[8]). See Chapter 5 (Population and Human Health) for further information.

8 https://opus.lib.uts.edu.au/bitstream/10453/43718/1/Rutovitzetal2015Calculatingglobalenergysectorjobsmethodology.pdf

2.12 WIND FARM DECOMMISSIONING

As stated previously the wind turbines are expected to have a lifespan of 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site will be decommissioned fully, with the exception of the electricity substation and site roads and drainage.

Upon decommissioning of the proposed wind farm project, the wind turbines will be disassembled in reverse order to how they were erected. All above ground turbine components will be separated, cut up to allow them fit on a standard articulated lorry and removed off-site for recycling.

Turbine foundations will remain in place underground and along with hardstands will be allowed to revegetate naturally. Leaving the turbine foundations and hardstands in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete and stone from the ground could result in potentially needless environment nuisances such as noise, dust and/or vibration. There would be no real environmental benefit from removing the foundations, as the concrete is underground, stable and inert if untouched. The site roadways will be in use for additional purposes to the operation of the wind farm (e.g. for forest/agricultural access) by the time the decommissioning of the project is to commence, and therefore it is more appropriate to leave the site roads in situ for future use.

The on-site substation and 110kV grid connection will not be removed at the end of the useful life of the wind farm project as it will form part of the national electricity network. Therefore, the substation will be retained as a permanent structure and will not be decommissioned.

A detailed decommissioning plan will be agreed in advance of works taking place with Waterford City and County Council. A decommissioning plan is contained within the CEMP (Appendix 2-8).