2. DESCRIPTION OF PROPOSED PROJECT

2.1 INTRODUCTION

This chapter of the EIAR describes the proposed project and provides details on the construction, operation and decommissioning phases of the wind farm and associated infrastructure.

The proposed project comprises:

- The wind farm site to include a wind farm of 10 no. turbines, an onsite 110 kilovolt (kV) substation and ancillary infrastructure;
- Grid Connection Options (GCO) (two options being considered); and
- Works along the proposed Turbine Delivery Route (TDR).

The proposed project (see Figure 1-1) is the subject of two separate planning applications. The first application is for the proposed wind farm and on-site 110 kV substation along with the works on private lands along the proposed TDR. The second application is for the proposed grid connection. This EIAR assesses the project as a whole and will be presented with both planning applications which will be submitted in parallel to An Coimisíun Pleanála (see Appendix 1-3 for Strategic Infrastructure Development determinations).

The first planning application will seek permission for the following project elements:

Works at the proposed wind farm site

- Erection of 10 no. wind turbines with a maximum blade tip height range from 170 m-180 m inclusive, a rotor diameter range from 149 m-163 m inclusive, and a hub height range from 95 m-105.5 m inclusive (see Appendix 1-3 for An Coimisiún Pleanála design flexibility opinion), and all associated foundations and hard-standing areas respective of each turbine;
- A new site entrance with access onto the Local Road L3417 (referred to as Site Entrance 2 on Drawing 11474-2010 in Appendix 1-1);
- Modifications at one existing site entrance with access onto the Local Road L3417 (referred to as Site Entrance 3 on Drawing 11474-2010 in Appendix 1-1);
- Modifications to two existing site entrances with access onto the Local Road L7499 (referred to as Site Entrance 1 and Site Entrance 5 on Drawing 11474-2010 in Appendix 1-1);
- Modifications at one existing site entrance with access onto Local Road L3424 (referred to as Site Entrance 4 on Drawing 11474-2010 in Appendix 1-1);
- A temporary road crossing location to allow turbine delivery along the Local Road L3417 (refer to Drawing 11474-2010 in Appendix 1-1);
- A temporary crossing location to allow turbine delivery along the Local Road L7499 (refer to Drawing 11474-2010 in Appendix 1-1);
- A temporary crossing location to allow turbine delivery along the Local Road L3424 (refer to Drawing 11474-2010 in Appendix 1-1);
- Construction of 2 no. temporary construction compounds with associated temporary site offices, parking areas and security fencing;
- Three no. temporary deposition areas;
- Construction of 5 no. clear span bridges;

- Installation of 1 no. permanent meteorological mast up to a height of 100 m with a lightning finial extending above the mast;
- Two no. borrow pits;
- Construction of new internal site access roads and upgrade of existing site roads, to include passing bays and all associated drainage;
- Two no. temporary construction stage Moby Dick type wheel wash systems (with over ground settlement tank);
- Construction of drainage and sediment control systems;
- Construction of 1 no. permanent 110 kilovolt (kV) Air Insulated Switchgear (AIS) Electrical Substation with associated compound. The substation will be configured as either a tail-fed design or a loop-in design, depending on the final grid connection arrangement. The substation compound will include:
    - 1 no. EirGrid Control Building containing, a Relay Room, Battery Room, Generator Room, Messroom, WC, and Workshop/ Store Room;
    - 1 no. Independent Power Producer (IPP) Control Building containing a Switchgear Room, Control Room, Office, Messroom, WC, Control Room, and Store Room;
    - Lightening Masts;
    - A Telecommunications mast;
    - Parking;
    - Security Palisade Fencing;
    - Electrical Plant and Infrastructure and Grid Ancillary Services Equipment;
    - Drainage Infrastructure;
    - All associated and ancillary works;
- All associated underground electrical and communications cabling connecting the wind turbines to the proposed wind farm substation;
- All related site works and ancillary development including berms, landscaping, ecological enhancement and soil excavation; and
- Ancillary forestry felling to facilitate construction and operation of the proposed project.

Turbine Delivery Route Works

The proposed project also comprises works on the public road network and at private properties to accommodate the delivery of turbine components and oversized loads (see Appendix 2-1). Four private locations (locations 10, 13, 14 and 15) require works to facilitate turbine and oversize load deliveries. The Preliminary Route Assessment which details the required TDR works at each location for the project is presented in Appendix 2-1.

The second planning application will seek permission for the following project elements:

Grid Connection

Two options for the grid connection are considered to connect the proposed project to the national grid.

Grid Connection Option (GCO) One proposes to install a 110 kV underground cable from the proposed onsite substation to the consented Castlebanny Wind Farm 110 kV substation 12 km to the north.

GCO Two will connect the onsite substation with the existing 110 kV Great Island-Kilkenny overhead line which crosses 2.3 km to the east of the proposed wind farm site (including two 110 kV underground cable circuits, comprising approximately 4.6 km of cabling).

A single grid connection will be constructed for the proposed project and will become a permanent component of the Irish national grid network. The GCO constructed will be determined by the grid connection offer received following EirGrid/ESBN post planning system studies.

A summary of the project elements associated with the proposed grid connection, under section 182A of the Planning and Development Act 2000, as amended, is as follows:

GCO One: Grid connection to the consented Castlebanny Wind Farm substation:

- 12 km long 110 kV underground cable grid connection to the consented Castlebanny Wind Farm substation.
- All related site work, horizontal directional drilling, drainage and ancillary works.

GCO Two: Proposed loop-in grid connection to existing Great Island-Kilkenny 110 kV overhead line:

- Removal of an existing 110 kV pole set on the Great Island-Kilkenny overhead line.
- Two new 110 kV overhead line cable interface masts.
- Two circuits of 110 kV underground cable from line cable interface mast to the proposed Ballyfasy 110 kV substation.
- An access road to allow permanent access to the underground cable from the line cable interface mast to the onsite substation.
- All related site works, drainage and ancillary works.

Further details on the project grid connection options are shown on planning drawings (see Appendix 1-2) and in the Construction Methodology Reports (see Appendix 2-2)

A 35-year operational life from the date of full commissioning of the wind farm is being sought for all works (other than temporary and permanent works specified above), and the subsequent decommissioning. The onsite substation and grid connection will remain permanent infrastructure and form part of the Irish national grid network. Planning permission is being sought for a period of 10 years. The full proposed project has been considered and has been assessed as part of this EIAR.

2.2 Statement of Authority

This chapter was prepared Allison Murphy who is an Associate Director in TOBIN. Allison has twenty years' postgraduate experience in environmental consultancy. Allison is a Chartered Environmentalist and holds an MSc in Environmental Resource Management. Allison has considerable experience in project managing renewable energy developments and carrying out associated impact assessments. It was also reviewed by Orla Fitzpatrick, Technical Director in TOBIN. Orla has twenty years' experience working in the delivery of EIA projects in

environmental consultancy. She holds a BSc in Geophysics and MSc in Environmental Consultancy and has considerable experience as technical approver of environmental deliverables for major infrastructure projects.

2.3 THE SITE OF THE PROPOSED PROJECT

The proposed wind farm site is located in the southern portion of County Kilkenny between the villages of Listerlin to the northeast, Mullinavat to the west, Glenmore to the southeast, and Slieverue to the south.

The study area assessed will be separately defined within each EIAR 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, GCO One and Two and the proposed TDR.

Wind Farm Site

The proposed wind farm site is located in the townlands of Ballywairy, Bishopsmountain, Knockbrack, Ballymartin, and Ballyfasy Upper in County Kilkenny.

The proposed wind farm site borders between the L3417, L7499 and L3424 local roads. It is located approximately 4 km east from the M9 motorway at Mullinavat.

The landscape of the proposed wind farm site is largely agricultural with areas of coniferous forestry occurring. The ground levels of the site vary from around 140 m Ordnance Datum (OD) to 220 mOD. The highest points are found in the north-east areas, while the southwest corner has the lowest elevation. Two watercourses traverse through the proposed wind farm site; the Smithstown 15 Stream (tributary to the Arrigle River) and the Smartcastle Stream.

GCO

Two GCOs are included as part of the proposed project (see Figure 1-1). The grid connection options are within the townlands of Ballyfasy Upper, Ballywairy, Ballymartin, Bishopsmountain, Smithstown, Ballymackillagill, Glenpipe, Mullennakill, Coolnahau, Cappagh and Castlebanny, Co. Kilkenny.

GCO One will be laid within approximately 8.45 km of public road and approximately 3.55 km of third party lands. GCO Two will be laid within approximately 2.3 km of third party lands.

Location of Works on the TDR

The proposed TDR works are located in the townlands of Rathpatrick, Granny, Garrandarragh, Ballynoony West, Ballymartin, Smithstown and Bishopsmountain, County Kilkenny.

2.4 POWER OUTPUT

The proposed wind turbines will have an assumed rated electrical power output of between 5.7 - 7.2 MW. This will be determined as a result of procurement of the final turbine type, power output and turbine development over the period leading up to construction. 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 57 MW–72 MW.

Based on the above, the proposed project has the potential to produce up to between 179,755 and 227,059 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: 36%
- C is the rated output of the wind farm: minimum 57 MW, maximum 72 MW.

The capacity factor of a wind farm takes into account the intermittency of the wind and is based on average wind speeds. The capacity factor of 36% is based on the average wind generation capacity for Ireland as detailed in an EirGrid study of wind and solar energy from December 2021[1].

The 179,755 and 227,059 MWh of electricity produced by the proposed wind farm will be sufficient to supply the equivalent of between 40,313 and 50,922 Irish households with electricity per year. This is based on the Sustainable Energy Authority's residential figures for 2022 which notes in 2022 the average home used 17.15 MWh of energy - split into 74% from direct fuel (non-electric) and 26% (4,459 MWh) from electricity.[2]

2.5 Community Benefit Proposal

The proposed project will establish a Community Benefit Fund in line with industry best practice, which is the Government's Renewable Electricity Support Scheme (RESS). Some of the fund will be designated for Near Neighbour payments and will benefit those living in close proximity. However, it is important that broader community benefits apply as well.

The scheme mandates all RESS projects to establish a Community Benefit Fund worth €2/MWh (megawatt hour) of generated electricity for the RESS contract period. If the project does not qualify for RESS, Manogate Ltd pledges to match these contributions.

Fund usage and administration

The Community Benefit Fund belongs to the local community. The premise of the fund is that it will be used to bring about significant, positive change in the local area. To make this happen, the 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 aligned with the Government of Ireland's Good Practice Principles Handbook for Community Benefit Funds[3], which sets out how the funds will be used and managed.

2.6 Landownership

The footprint of the proposed wind farm infrastructure will require approximately 53 hectares (ha). Approximately 20 ha of the required footprint are owned by Coillte and approximately 33 ha are under third party land ownership. All landowners involved in the proposed wind farm site development have consented to the planning applications and proposed project.

[1] https://www.eirgridgroup.com/site-files/library/EirGrid/ECP-2-1-Solar-and-Wind-Constraints-Report-Area-I-v1.0.pdf (Accessed 08/09/25).
[2] https://www.seai.ie/data-and-insights/seai-statistics/residential (Accessed 08/09/25).
[3] 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 (Accessed 08/09/25).

All private landowners along the TDR have signed easements to allow the necessary works to enable turbine and oversize loads (e.g. substation components) delivery.

GCO One predominantly follows the public road network, however, 3 km crosses through Coillte and private third party lands as it approaches Castlebanny substation. GCO Two crosses 2.3 km of lands owned by Coillte and private landowners. All landowners involved have consented to the planning applications and proposed project.

2.7 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 8.1 m/s and 8.6 m/s at 100 m above ground level. This indicates that the site has a suitable wind resource for a commercial wind energy development.

2.8 Proposed Site Layout

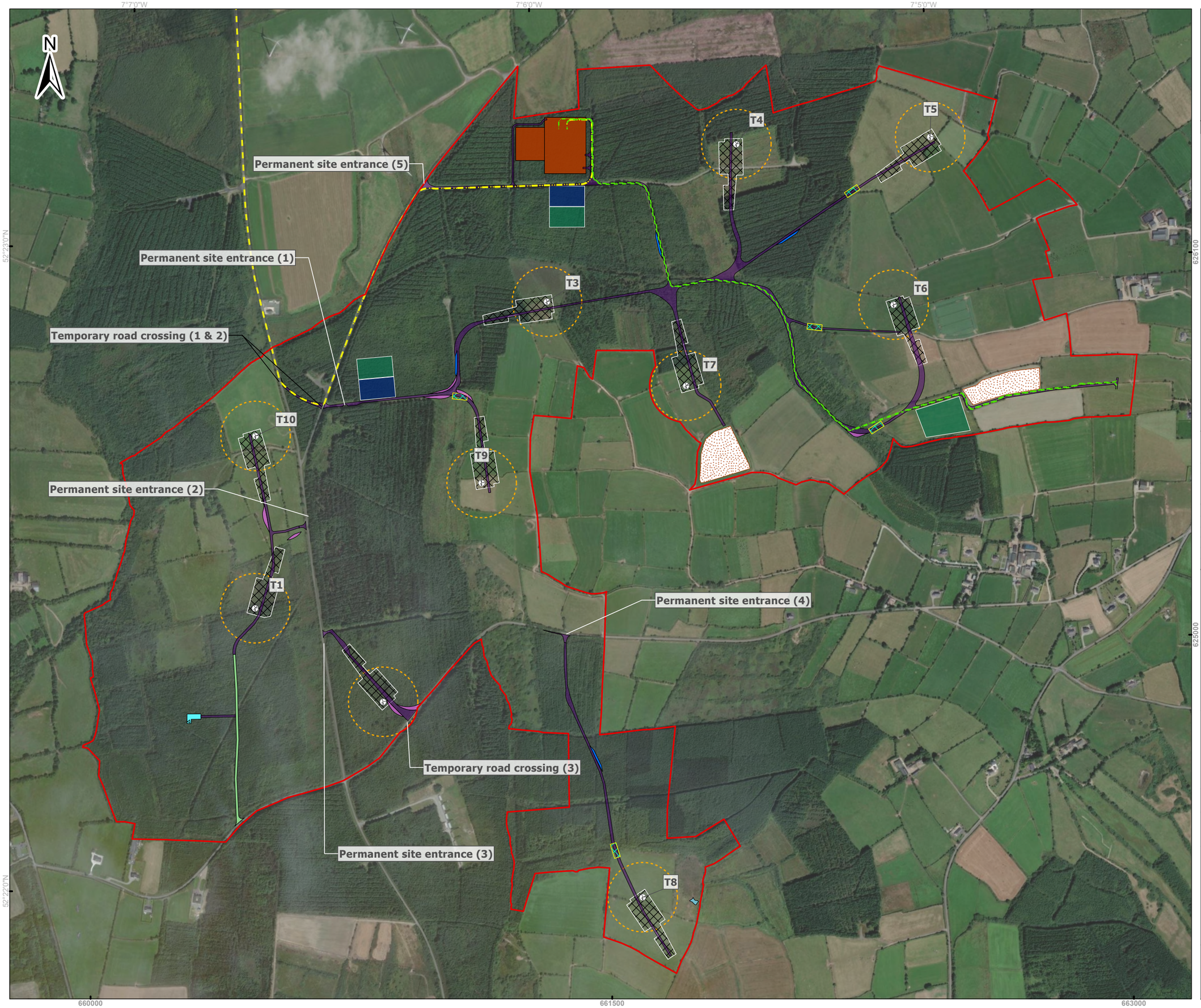
The overall layout of the proposed wind farm is shown in Figure 2-1 (and illustrated on the Planning Drawings in Appendix 1-1). This figure shows the proposed locations of the wind turbines and associated hardstanding areas, passing bays, electrical substation, meteorological mast, temporary construction compounds, clear span bridges, borrow pits, internal access roads and the site entrances.

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.

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

Turbine ID	Easting's (m)	Northing's (m)
T1	660473.2	625075.7
T2	660474.3	625571.0
T3	660841.2	624806.8
T4	661312.3	625957.2
T5	661856.9	626410.1
T6	662414.2	626430.7
T7	662309.1	625948.5
T8	661712.5	625715.4
T9	661587.6	624244.8
T10	661124.4	625435.9



Legend

- Wind Farm Study Area

Grid Connection Options

- Option 1
- Option 2

Site Layout

- Turbine locations
- Bat Buffer
- Hardstand
- Substation
- Compounds
- Met Mast Location
- Borrow Pits
- Proposed Permanent Access Roads
- Proposed Passing Bay
- Existing Road
- Clear Span Bridges
- Proposed Deposition Area
- Oversail Area
- Proposed Pond

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	17/10/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 2-1:
Proposed Wind Farm Site Layout

Scale @ A3: 1:10,000

Prepared by:	Checked by:	Date:
S.Pezzetta	A.Murphy	October 2025

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Map Ref: 11474-013-LAY.INFR-P.App.BO-TOB-A

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

Table 2-2: Proposed Turbine Parameters

Proposed Turbine Parameters	
Turbine	
Blade Height	170 - 180 m
Rotor Diameter	149 - 163 m
Hub Height	95 – 105.5 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	1543 m^3
Turbine Hardstand Areas	
Turbine hardstands	105 m in length and 68.5 m in width*

*excluding assist crane pads and boom assembly hardstands – approximately 100 m length to be added to include these. See Planning Drawings in Appendix 1-1 for further information.

2.8.1 Wind Turbine Specification

The proposed turbines will have a tip height of between 170 m – 180 m inclusive. 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 in Table 2-2 (i.e. overall blade tip height of between 170 m – 180 m inclusive, a rotor diameter of between 149 m – 163 m inclusive, a hub height of between 95 m – 105.5 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. 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 (see Chapter 10);
- 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 (180m) 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 720 m.

2.8.1.1 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; and
- 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.

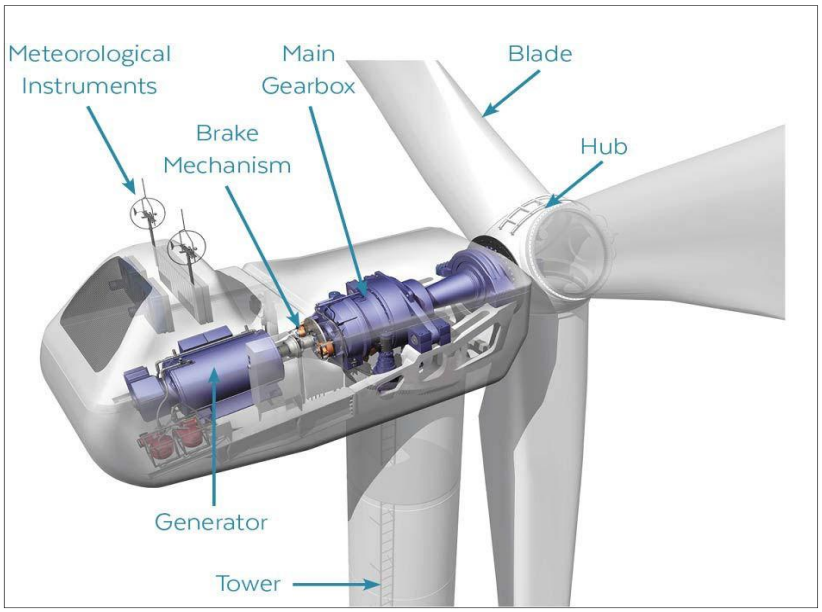


Figure 2-2: Turbine nacelle and hub components

2.8.1.2 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 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 (see 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.

2.8.1.3 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 33 kV) 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.

2.8.1.4 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. 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 volume of approximately 1543 m^3 of concrete has been calculated based on foundations 6 m deep and 28 m in diameter.

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 (see Plate 2-1). Reinforcing steel is then built up around and through the can (see Plate 2-2), and the outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete.

Plate 2-1 *Levelled turbine tower "can"*

Plate 2-2 *Steel reinforcement being added*

2.8.1.5 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; and
- Planning Practice Guidelines for Renewable and Low Carbon Energy (2013) Department for Communities and Local Government, Wales Office.

2.8.2 Turbine Delivery Route and Material Haul Route

2.8.2.1 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 westwards on the N25 until the junction with the M9 motorway, where it makes a northerly turn in the direction of Mullinavat. The route continues on the M9 for approximately 10.5 km before exiting at Junction 11 and travelling eastwards on the R704 regional road. The route continues on the R704 road for approximately 5 km before turning right (south) at Three Friars Cross. The route continues southwards on the L3417 local road for the final approach to the proposed wind farm site entrances.

An assessment of the route between Belview Port and the site of the proposed wind farm has been carried out. Thirteen pinch points have been identified and assessed (see Appendix 2-1). An assessment was carried out using site visits and Autotrack to determine what, if any, 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 Appendix 2-1. Works range from hedgerow trimming/clearing to facilitate oversail of turbine blades to the placement of hardcore to allow the oversize vehicles to pass.

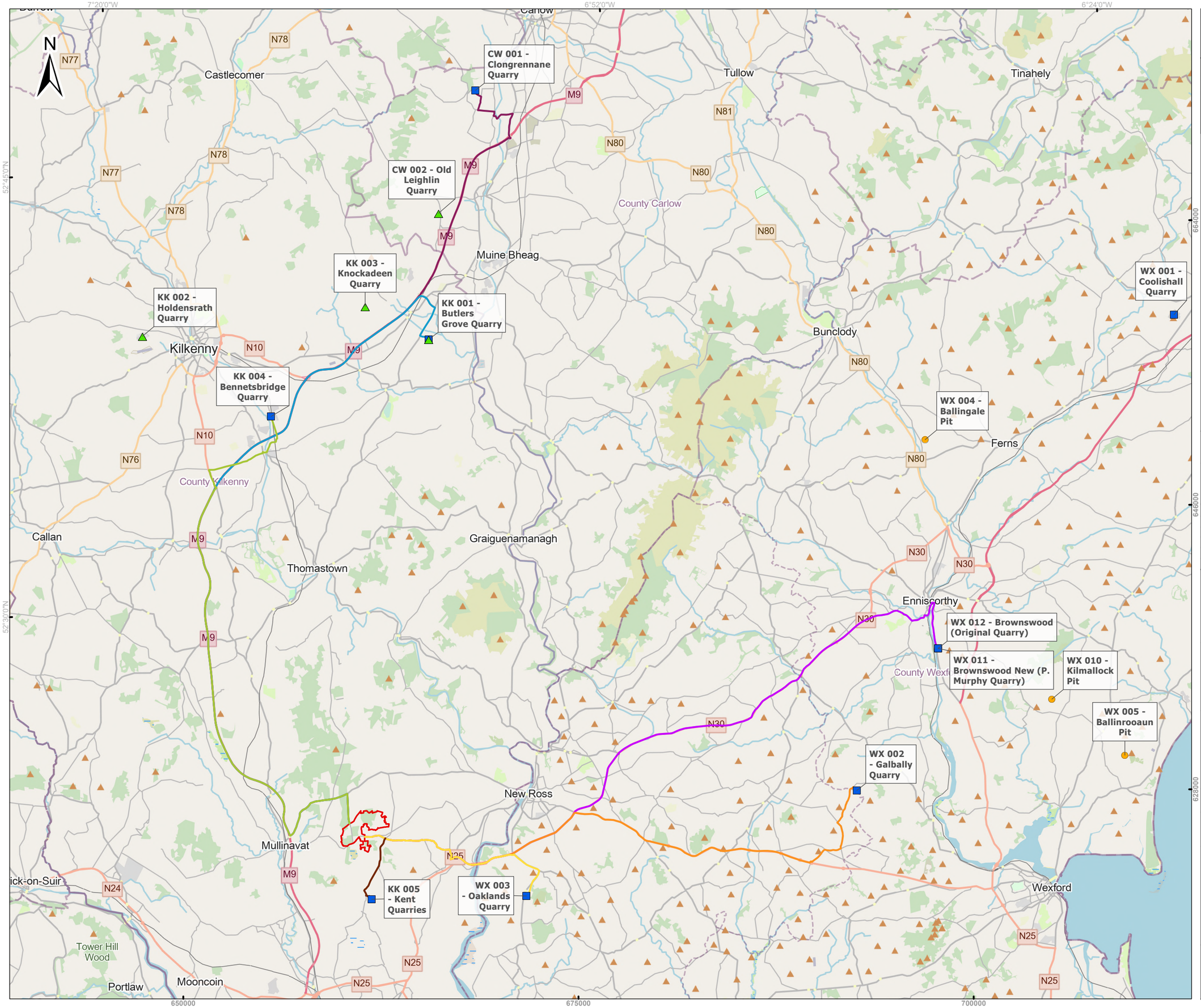
The current planning application includes the proposed works required for turbine delivery within private lands at four locations (i.e. locations 10, 13, 14 and 15, see Appendix 2-1).

All works associated with the TDR 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. These areas may be needed during the operational phase of the proposed project in the very unlikely event that a turbine requires a large replacement part such as a blade or tower section. 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.

2.8.2.2 Material Haul Routes

Two borrow pits will be located on site reducing the requirement for imported materials. Materials sourced in Kilkenny or if necessary Carlow (see Figure 2-3), will approach along the R704 regional road accessing the site entrance from the north via the L3417 road. Materials coming from Wexford will approach from the east via Local Roads L3424 and L3417, see Figure 2-3.



Legend

- Wind Farm Study Area

Quarries

- Crushed Rock - Aggregate & Concrete
- Dimension Stone
- Sand and Gravel

Routes

- CW001
- KK001
- KK004
- WX012-WX011
- WX002
- WX003
- KK005

0 5 10
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	24/11/2025	First issue	S.P	A.M

Client: Manogate Ltd.

Project: Ballyfasy Wind Farm

Title: Figure 2-3: Material Haul Routes

Scale @ A3: 1:220,000

Prepared by:	Checked by:	Date:
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Map Ref: 11474-015-Haul.R-P.App.BO-TOB-A

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2.8.3 Internal Access Roads and Site Entrances

The proposed wind farm, which comprises four separate plots of land, will be accessed by five separate permanent site access points. Modifications required at each of the site entrances can be seen on Drawings 11474 2050-2057 in Appendix 1-1.

Modifications to achieve required sightlines and enable access at two existing site entrances, with access onto the Local Road L7499, will be required (referred to as Site Entrance 1 and Site Entrance 5 on Figure 2-1). Site Entrance 1 will enable access to the main wind farm site. Site Entrance 5 will enable direct access to the proposed substation.

A new site entrance with access onto the Local Road L3417 is also required (referred to as Site Entrance 2 on Figure 2-1) to reach turbines nos. T1 and T10. Modifications at one existing site entrance with access onto the Local Road L3417 is also required (referred to as Site Entrance 3 on Figure 2-1) to reach turbine no. 2.

Modifications at one existing site entrance with access onto Local Road L3424 is also required (referred to as Site Entrance 4 Figure 2-1) to reach turbine no. 8.

Three temporary road crossings are also required to enable turbine deliveries. One site entrance is along the Local Road L3417 is proposed (referred to Temporary Road Crossing 1 on Figure 2-1). From here the TDR crosses over Coillte lands before exiting onto Local Road L7499 (referred to Temporary Road Crossing 2 on Figure 2-1) and into the main wind farm site. This will reduce the use of the public road network and also remove the need for turbine delivery vehicles to manoeuvre a very tight bend from the L3417 onto the L7499. A third temporary crossing is required to allow for turbine delivery along the Local Road L3424 (referred to Temporary Road Crossing 3 on Figure 2-1). Again this reduces the use of the public road network and removes the need for turbine delivery vehicles to manoeuvre a very tight bend from the L3417 onto the L3424.

Permanent construction of 6.5 km of new internal site access roads and upgrade of 2.0 km existing internal site roads, to include passing bays and all associated drainage, will be constructed as part of the initial phase of the construction of the wind farm. Material will be sourced from the proposed on-site borrow pits to provide the required base material of the internal roads. 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. 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 relevant site entrance (site entrance one to five, as described above). Light vehicles will also be permitted to directly access the site from these site entrances.

Site entrances one to five will remain in place following 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 discussed in Chapter 16 (Traffic & Transportation).

Site access roads will have a running width of approximately five metres (5.5 m including shoulders), with wider sections which vary at road bends and passing bay locations, and on the final approaches to turbine hardstands, as shown on the planning drawings accompanying the

application (see Appendix 1-1 of this EIAR). 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 side cast and profiled on either side of the roadway or used to reinstate the borrow pits.

All site access roads will be constructed with a 2.5% camber to aid drainage and surface water runoff. A drainage design has been provided for the proposed wind farm site roads. Road construction details and associated drainage design are included in the planning drawings in Appendix 1-1 of this EIAR.

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.

2.8.3.1 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 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. This hardstand can accommodate the proposed range of turbine parameters. For the sake of simplicity, these measurements include the assembly area hard surfacing. The turbine hard-standing areas are shown on the planning drawings in Appendix 1-1 of this EIAR. The hard-standing area is intended to safely accommodate a large 350-750 tonne Safe Working Load (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.

2.8.3.2 Assembly Area

Levelled assembly areas will be located on either side of each hard-standing area. 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 the planning drawings in Appendix 1-1 of this EIAR.

2.8.3.3 Crane Pads

The hardstand area also includes space for ancillary crane pads (see planning drawings in Appendix 1-1 of this EIAR).

2.8.4 On-site Electricity Substation

It is proposed to construct one on-site 110 kV Air Insulated Switchgear (AIS) substation, as shown on Figure 2-1 and presented on the planning drawings in Appendix 1-1 of this EIAR. This onsite substation will provide a connection point between the proposed wind farm and the proposed grid connection point at either the consented 110 kV Castlebanny Wind Farm

substation (via GCO One) or via a loop in connection to the Great-Island to Kilkenny 110 kV overhead line which passes over the east of the proposed wind farm site (via GCO Two).

The construction and electrical components of the on-site substation will be to EirGrid and ESB specifications within the parameters assessed in the application[4]. The layout and dimensions of the proposed substation compound are shown on the planning drawings and presented in Appendix 1-1. The construction methodology of the substation is detailed in Section 5-2 of Appendix 2-2.

The substation and compound will be surrounded by steel palisade fencing. Lighting will be required on site and this will be provided by lamp columns located around the substation. The lights would normally remain off and be controlled by a switch at the gate when entering the compound.

The main control building and smaller switchgear building will include the Independent Power Producer 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 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 on-site 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 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 Coimisiún 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

4 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 (Accessed 08/09/25).

wastewater away from the site. It is envisaged (and for the purposes of this EIAR assumed) that any such contractor will access the site via the M9, R704, L3417 and L7499 roads.

2.8.5 Electrical Grid Connection

2.8.5.1 Grid connection

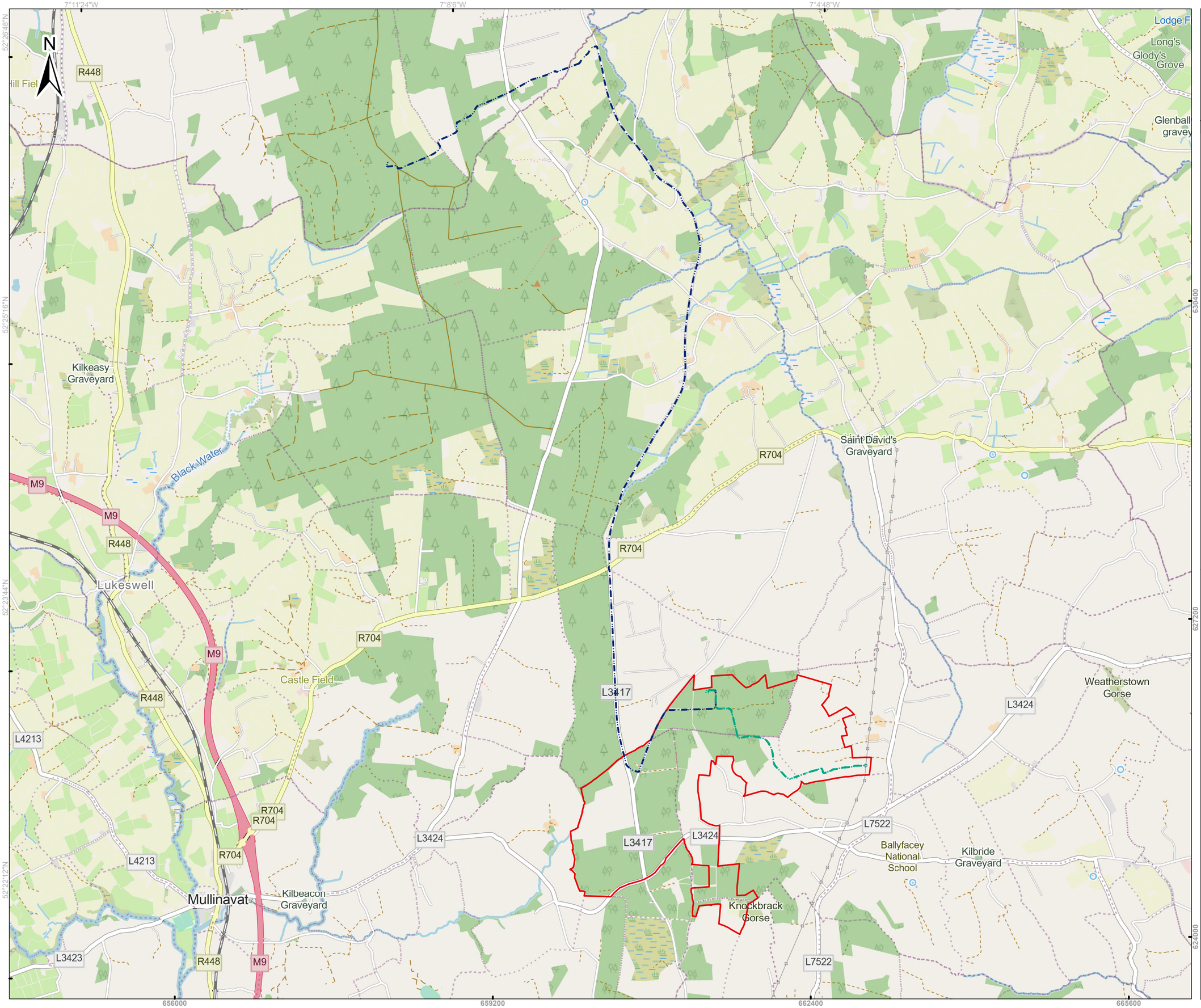
Connection will be sought from the grid system operator by application to EirGrid. It is proposed that the proposed on-site substation will connect via 110 kV underground cable to one of two options. Figure 2-5 illustrates the two GCOs.

- GCO One will connect the on-site substation to the Castlebanny Wind Farm 110 kV substation 12 km to the north. This cable is located in 8.45 km of the public road corridor with 3.55 km being laid within Coillte and other private lands.
- GCO Two will connect the on-site substation to the existing Great-Island to Kilkenny 110kV overhead line which passes to the east of the site 2.3 km from the on-site substation (including two 110 kV underground cable circuits, comprising approximately 4.6 km of cabling). This option is fully located within the proposed wind farm site.

There will be a temporary construction stage compound located adjacent to the L3418 road within Coillte lands, using an existing forestry entrance, to enable GCO One grid works. The grid connection construction methodology is described in Section 2.8.5, and detailed construction methodology reports for each option are provided as Appendix 2-2.

The cables will be laid in trenches as per EirGrid Specification (see Appendix 1-2 and Appendix 2-2).

There will be six watercourse crossings along GCO One and one watercourse crossing along GCO Two. No instream works are proposed for any natural watercourse. Further information on the grid connection watercourse crossings can be found in Section 2.8.6 and Appendix 2-2.



Legend

- Wind Farm Study Area

Grid Connection Options

- Option 1
- Option 2

0 1 2
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	24/11/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 2-4:
Proposed Grid Connection Options

Scale @ A3: 1:35,000

Prepared by:	Checked by:	Date:
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Map Ref: 11474-017-PGCR.Opt-P.App.BO-TOB-A

Draft: A

2.8.5.2 Joint Bays

Joint bays are pre-cast concrete chambers where individual lengths of cables are joined to form one continuous cable. Joint bays will be provided to meet the requirements of standard cable drum lengths and/or as required to limit cable pulling forces. Joints bays are to be installed as shown on the grid design drawings (see Appendix 1-2) and approximately every 650 m – 850 m along the cable option to facilitate the jointing of two No. lengths of grid cabling. The joint bays will be 6 m x 2.5 m x 2.05 m pre-cast concrete structures installed below finished ground level.

In line with the 'Interim Guidance to Road Authorities regarding the proposed placement of Medium or High Voltage electricity assets, including ducts, cables, and associated infrastructure under public roads', joint bays will be installed at a minimum of 600 mm below finished road level and shall have a precast concrete cover installed prior to backfilling back up to road level.

In association with joint bays, communication chambers will be installed at each joint bay location to facilitate communication links between the proposed Ballyfasy Wind Farm substation and the 110 kV substation at Castlebanny. The communications chambers will be 1.3 m x 1.03 m x 1.294 m pre-cast concrete structures.

Earth sheath link chambers will also be installed at every joint bay along the cable route. Earth sheath links are used for earthing and bonding cable sheaths of underground power cables, so that the circulating currents and induced voltages are eliminated or reduced. The Earthing sheath link chambers will be 1.75 m x 1.25 m x 1.2 m pre-cast concrete structures.

Earth sheath link chambers and communication chambers will be located in close proximity to joint bays with a minimum distance of 2.3 m and a max distance of 10 m from the centre of the joint bay to the centre of the chambers. Earth sheath link chambers and communication chambers will be pre-cast concrete structures with an access cover at finished surface level.

2.8.5.3 Watercourse Crossings

There are six watercourse crossings on the proposed GCO One. The locations of these crossings are shown on Figure 2-6. There is one watercourse crossing on GCO Two. No instream works will occur and a 50 m works buffer will be in place. Horizontal directional drilling (HDD) will be used to cross these watercourses.

2.8.5.4 Internal Underground Cabling

Each turbine will be connected to the proposed on-site substation at the 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 on-site substation compound will be run in cable ducts 1.5 m below the ground surface within the proposed internal roads and/or their verges. There will be five no. watercourse crossings by the internal cables via horizontal directional drilling under the watercourse or within the clear span bridge decks crossing the watercourse.

2.8.5.5 Horizontal Direction Drilling

The internal cabling on site will form part of the detailed design of the project. As noted above, internal cables are required to cross watercourses at five onsite locations. Horizontal Directional Drilling or HDD may be the preferred method selected as part of the detailed design of the project. HDD is a steerable trenchless method of installing underground pipe, conduit, or cable in a shallow arc along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area. If it often used to cross under watercourses.

2.8.5.6 Clear span bridges

As noted above, five clear span bridges are proposed on the wind farm site to enable access across watercourses and may be crossed by internal cabling. The location of the proposed clear span bridges is shown on Figure 2-1 and detailed in Appendix 1-1.

The clear-span bridges will comprise of a precast reinforced concrete bridge bed, placed on foundations either side of the watercourse with a gravel access road located on either side. The bridge deck will be a precast concrete slab bridge deck. This will have a gentle slope across the bridge. A 100m ACO drain incorporated into the concrete slab and will be located on the lower side of the bridge along its edge under the railing. This will be connected to a gravel soakaway area located a minimum 4m from the bridge. There will be a slope along the drain towards the gravel soak away. This will ensure the drain is effective, machinery cannot cause discharge of material from the deck bridge to enter the river below and also ensure surface water runoff does not enter the watercourse. There will be a supporting timber post and rail fence placed on the bridge deck with a galvanised chain link fence placed on the inside of the fence. The railing will be 1.1m high from the base of the concrete slab. The timber posts will be 150mm x 150mm and supported by galvanised shell shoes and bolted into the primary sheet beams. The timber barrier will be constructed away from the watercourse. The foundation will be made of retaining stone gabion with the front face filled with decorative stone. There will be raised edging on the crossing of the bridge.

2.8.5.7 Local Electricity Supply

A local electricity supply will be required as a power supply to the proposed substation for light, heat and power purposes. 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 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.

2.8.6 Meteorological Mast

An existing meteorological mast is operational in the townland of Ballyfasy Upper and is 80 m in height. This lattice type meteorological mast is fixed to the ground mounted anchors by guy wires and includes associated instruments to measure local meteorological conditions. This mast is currently permitted by Kilkenny County Council (Planning Ref. 23/60360) until October 2028 and will remain in place until then.

A new permanent meteorological mast is included within this planning application for permission in the townland of Bishopsmountain, Co Kilkenny. This meteorological mast will be 100 m in height and include associated instruments to measure local meteorological conditions (see Figure 2-1).

2.8.7 Forestry

A portion of the proposed wind farm is located within an area which is currently planted with commercial forestry. Some of this is located within Coillte lands, while some is located within private lands. There will be a requirement to fell some of this commercial forestry in the areas immediately around the footprint of the wind farm infrastructure. The total area of forestry to be felled is 18 ha, as detailed in Appendix 2-3.

2.8.8 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 south of T7 and southeast of T6, with each covering an area of 130m x 145 m (or approximately 1.5 ha) and 220 m x 60 m (or approximately 1.3 ha) respectively. The locations of these borrow pits can be seen on Figure 2-1. Having two borrow pits on-site will significantly reduce the materials which need to be transported to site and will minimise the depth to which the borrow pit excavations will be required.

Once the required rock has been extracted from each borrow pit, they will be reinstated using any suitable material from the site. See the Spoil Management Plan (see Appendix 2-4) 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) and in Appendix 2-5.

2.8.9 Temporary Construction Compounds

Two onsite 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 northern end opposite the substation site and a second one will be located in close proximity to site entrance one. These two locations are shown on Figure 2-1 and site layout drawings (see Appendix 1-1 of this EIAR).

2.8.10 Deposition Areas

There are three proposed deposition areas located throughout the wind farm site (see Figure 2-1). These areas will be temporary storage areas during the construction phase until materials can either be deposited into the borrow pits areas, reused on site (e.g. berms) or the material is removed off site to a permitted facility.

2.9 Construction Methodologies

2.9.1 Turbine Hardstand, Foundations and Erections

The topsoil will be stripped where development of the hardstands is proposed. Hardstands will be constructed flat at a level close to existing ground level where possible, with the exception of areas where existing site topography requires the hardstand to be constructed in an area of cut or fill for construction and / or turbine delivery purposes.

Ground investigations in the form of trial pitting, probing, and use of augers have been carried out at the proposed turbine locations and hardstanding locations to inform the depth of excavation and upfill required (see Appendix 2-5). Following site visits and site design, volume calculations provide an estimation of fill required for the hardstands. This is predicted to be approximately 70,000 m^3 of stone material. This material volume will be obtained primarily from the on-site 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 1543 m^3 of concrete which will be sourced from off-site suppliers. No batching of concrete will occur on site. Further site investigations will be undertaken pre construction to inform the site detailed design and all works will be monitored by a geotechnical engineer.

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 360° excavator and will be stored as detailed in the Construction and Environmental Management Plan (CEMP) (see Appendix 2-6). 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.

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 silt buster 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 roads 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.

2.9.2 Turbine Delivery Accommodation Works Area

Where works are needed along the public road corridor(see Appendix 2-2) 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 where a vehicular surface is needed for the proposed TDR (see Appendix 2-1), 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/side cast for later use in local reinstatement or used for borrow pit reinstatement on-site. It will be taken to a local licensed/permitted waste facility if found to contain any contaminants such as bitumen.

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. 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.

2.9.3 Internal Access Roads and Site Entrances

Site roads will be constructed to each turbine location, and to all proposed site infrastructure, as shown in Figure 2-1 and site layout drawings of Appendix 1-1 of this EIAR. Passing bays will be included along roads strategically, as indicated in Figure 2-1. 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 in Appendix 1-1 of this EIAR.

2.9.3.1 Excavated New Roads

Tracked excavators will be used to carry out excavations. Surplus excavated material will be dealt with as set out in theCEMP in Appendix 2-6 and the Spoil Management Plan in Appendix 2-4.

When the topsoil has been removed and/or the formation layer (bedrock/firm subsoils) has been reached, stone from the on-site 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 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. They will be used for forestry (and agricultural) purposes after decommissioning of the wind farm.

2.9.3.2 Upgrade of Existing Site Roads

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 the same steps as described in the new road construction above will be followed (without excavating the existing road material). 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[5].

Tracked excavators will be used to construct this road type. When the topsoil has been removed and/or the formation layer has been reached, stone from the on-site 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.

2.9.3.3 Site Entrances

As detailed in Section 2.1 and Figure 2-1, there are five permanent site entrances proposed for this project. Four of these are existing entrances which will require modifications. The fifth is a new entrance to facilitate two turbines. There are also three temporary road crossings proposed for this project to enable turbine delivery and reduce the impact on the public road network.

2.9.3.4 Clear Span Bridges

Five clear span bridges are required on site to enable access across watercourses. The site access roads will be constructed as far as possible to allow easy access to the works area. 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 watercourse bed or banks.

[5] Forestry Standards and Procedures, January 2015. Forest Service, Department of Agriculture, Food and the Marine. (Accessed 08/09/25).

Retaining stone gabion will be placed in the foundation and a concrete base placed on top. Suitable stone fill material (clause 804 or similar) will then 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. This will be put into place by a crane that will be positioned a minimum of 10 m from the watercourse. There will be no requirement for large-scale casting of wet concrete. Following this, barriers will be attached to the sides of the bridge structure.

The construction method will ensure that there is no requirement for in-stream works. This will be sufficiently high off the watercourse to allow unrestricted flow of water beneath. The installation of these bridges will not alter or move the existing watercourse. The bridges will be laid in a manner that will not affect or impede on the existing profile of the watercourse. The foundations and abutments will be constructed without damaging the riparian zone of the watercourse or existing profile. No alteration of the hydraulic characteristics, scouring, deposition or erosion of the watercourse upstream or downstream will occur due to the implementation and operation of the clear span bridges.

The clear span design will maintain the channel profile and not alter the rivers gradient by retaining the natural stream bed and gradient. The water velocity will not be changed and they will be designed to maintain the normal stream width. The foundations of the clear span bridges will be positioned at least 2.5 m away from the edge of the river bank. No damage will occur to the riparian habitat as a result of the installation of the span bridges within 2.5 m of the river.

The bridges will be designed to allow surface water to drain away from the watercourse. The AMO drain will be installed on the lower section of the bridge to ensure the machinery cannot cause discharge of material from the bridge deck into the waters below and will prevent all surface water run to enter the river from the bridge. The water will discharge at a downward slope along the drain to a gravel soak away located >4 m from the bridge. The bridges will not prevent the maintenance of the channel and existing gradient and will have the capacity to convey the full range of river flows including flood flows likely to be encountered without the crossing being over topped. Adequate light will be able to penetrate the river and not cause a reduction in primary production.

2.9.4 110 kV Substation and Electrical Grid Connection Works

The proposed substation has been designed and will be 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 on the associated construction methodologies provided in Appendix 2-2.

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.

Internal cables connecting the wind turbines to the on-site substation will be laid within or immediately adjacent to the on-site access roads. All cables will be laid in underground ducts. Ducts will be installed by open trenching. Where there is a requirement for internal cables to cross watercourses, these will be built into the clear span bridge deck formation or attached to it, or HDD, avoiding any in-stream works.

2.9.4.1 Grid Connection Options

The proposed wind farm will connect to the existing national grid via a 110 kV underground grid connection. The on-site substation and associated grid connection has been assessed in this EIAR, along with the required works to allow connection to the national grid at either the consented Castlebanny Wind Farm substation or on-site loop in to the existing Great Island – Kilkenny overhead line which crosses the east of the wind farm site.

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.

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

2.9.4.2 110kV Underground Cable Trenches

The number and layout of cables is an important consideration in the design of the proposed wind farm site and both GCOs. 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 110 kV cable trenches are provided in Appendix 1-2 of this EIAR, while the associated construction methodologies are provided in Appendix 2-2.

The 110 kV cables will be installed mainly within an internal access road in the proposed wind farm site, within public roads and across some third party lands. Cable ducts will be placed within a trench with a typical depth of 1315 mm and width of 825 mm.

A service/maintenance access road will be put in place over the entire cable option. It is 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 16-2. 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 Coimisiún 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 GCO in advance of any works.

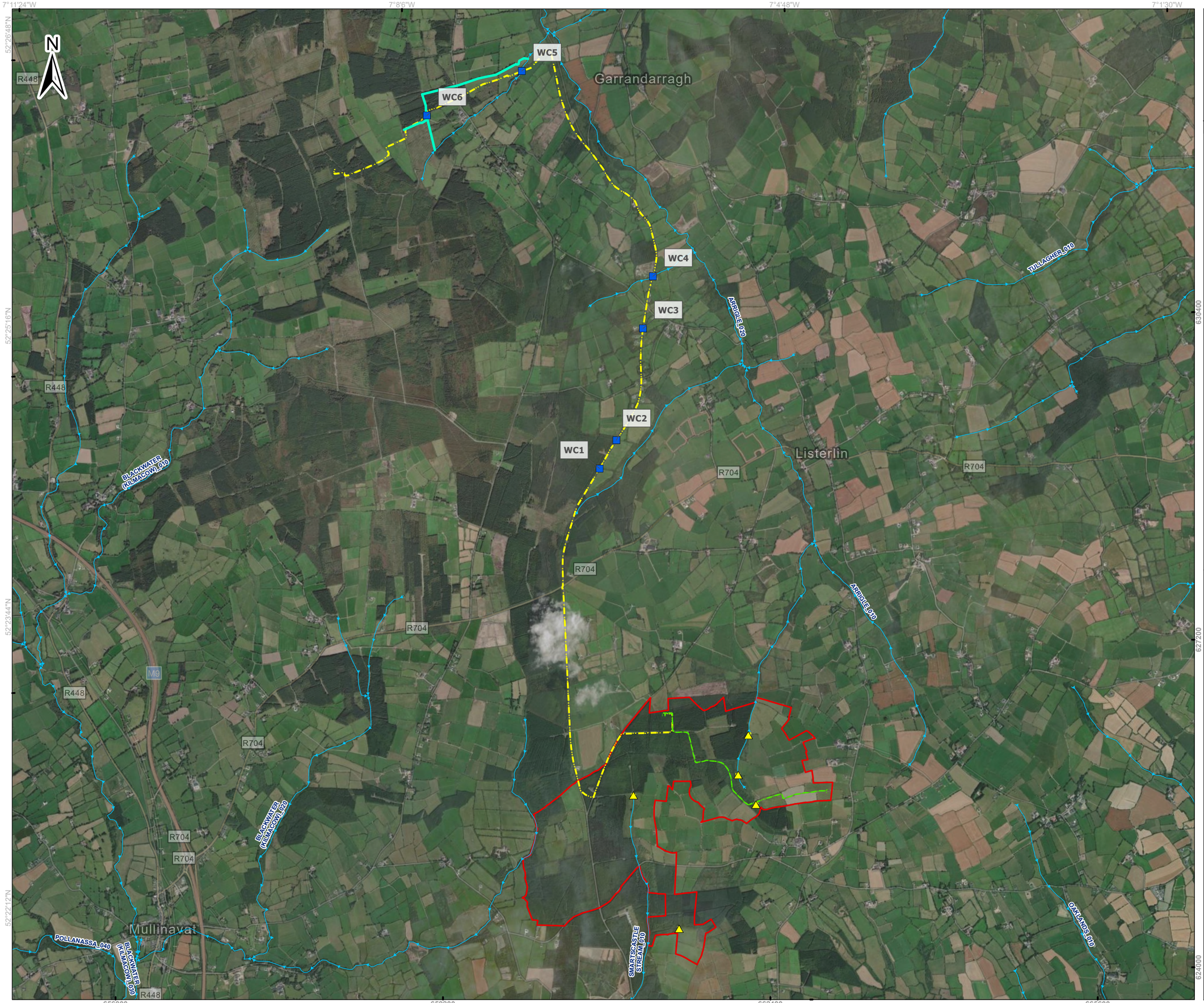
See Section 5 and Section 6 in Appendix 2-2 for further details on the construction methods for the grid connection cables.

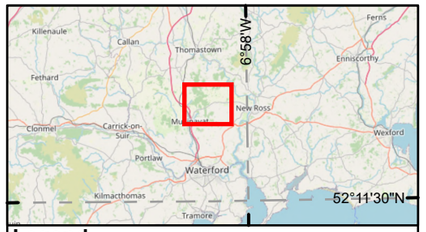
2.9.4.3 Watercourse crossings

Table 2-3 details the proposed methodologies for crossing the given watercourses involved in the wind farm site and grid connection. These crossings are shown in Figure 2-5.

Table 2-3: Watercourse crossing details

Watercourse Crossing No.	Project detail	Proposed crossing methodology	In Stream works required?
1	Grid Connection Option One	Horizontal Directional Drilling	No
2	Grid Connection Option One	Horizontal Directional Drilling	No
3	Grid Connection Option One	Horizontal Directional Drilling	No
4	Grid Connection Option One	Horizontal Directional Drilling	No
5	Grid Connection Option One	Horizontal Directional Drilling	No
6	Grid Connection Option One	Horizontal Directional Drilling	No
7	Grid Connection Option Two (and construction access into T6, borrow pit and deposition area)	Horizontal Directional Drilling	No
8	Internal access road south west of T5	Clear Span Bridge	No
9	Internal access road between T9 and Site Entrance 1	Clear Span Bridge	No
10	Internal access road between T8 and Site Entrance 4	Clear Span Bridge	No
11	Internal access road from T6 into main site for operational maintenance	Clear Span Bridge	No





Legend

- Wind Farm Study Area
- Watercourse crossings
- Clear Span Bridges
- Unmapped stream

Grid Connection Options

- Option 1
- Option 2

0 0.75 1.5
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	17/10/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 2-5:
Watercourse Crossings

Scale @ A3: 1:34,000

Prepared by:	Checked by:	Date:
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Map Ref: 11474-018-WCX-P.App.BO-TOB-A

Draft: A

2.9.4.4 Crossing Methodology Directional Drilling

A launch and reception pit is required for directional drilling. Two ducts will be required at each crossing location. There will be a 50 m buffer area maintained either side of the watercourse between the watercourse and works area. 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 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 1-2 of this EIAR, while the associated construction methodologies are provided in Appendix 2-2.

2.9.4.5 Clear Span Bridges

As detailed above, five clear-span bridges will be used for watercourse crossings on the proposed wind farm site to avoid the requirement for in-stream works. Therefore, there will be no direct effect on the watercourses at the proposed crossing locations and downstream. The clear-span bridge will be sufficiently above the stream to allow unrestricted flow of water beneath. The proposed clear-span bridge locations are shown on Figures 2-1 and 2-5.

2.9.5 Permanent Meteorological Mast

An 100 m meteorological mast will be constructed to the west of the site in the townland of Bishopsmountain (see Figure 2-1). A small stone crane pad will be constructed in front of the proposed mast location. General construction methods for the hard standing will match those described for wind farm hard standings.

The foundation will be excavated followed by shuttering, steel fixing and finally concrete pouring by a ready mix truck. Excavation and concrete operations will be carried out in accordance with the CEMP (see Appendix 2-6). 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 into place by crane. 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.

2.9.6 Forestry Felling

For the footprint of the infrastructure and associated felling buffers, there will be full tree removal.

A report detailing the forestry felling is provided as Appendix 2-3. It is noted that the clear-felling of trees in the State requires a felling licence. The associated afforestation of

alternative lands equivalent in area to those lands being permanently clear felled 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 the proposed 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 proposed 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 2-7.

2.9.7 Borrow Pits

Material will be extracted from the two on-site 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. Further detail on the construction of the borrow pits is provided in Chapter 8 (Land, Soils and Geology).

Once the required rock has been extracted from each borrow pit, they will be reinstated using any suitable material from the site. 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. The borrow pits will be excavated into the ground and on completion of reinstatement they will be no higher than existing ground level.

There is an absence of 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 because they will be 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 and appropriate mitigation will be used to ensure the protection of downgradient watercourses (e.g. the use of silt fences).

2.9.7.1 Rock Extraction

The rock will be extracted from the proposed borrow pits by rock breaking. Rock breaking is suitable considering the geology and soil conditions there (see Chapter 8 (Land, Soils and Geology)). 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.

2.9.7.2 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 Roads – 22,500 m^3 is required;
- Substation and Construction Compounds – 26,691 m^3 is required; and
- Turbines and associated hard stand areas – 108,217 m^3 is required.

By sourcing the majority of the required stone volume from the on-site borrow pits, 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 on-site will be used for the initial capping layer. Further information on the proposed traffic volumes and impacts are discussed in Chapter 16 (Traffic & Transportation) of this EIAR.

Hardstands and site roads will be constructed to be above the existing ground level. The lower layer (approximately 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 on-site 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.

2.9.8 Temporary Construction Compounds

Two onsite temporary construction compound areas will be developed on the wind farm site to provide office space, welfare facilities, car parking and hardstands for storing materials. The locations are shown on Figure 2-1 and site layout drawings (see Appendix 1-1 of this EIAR). These two compounds will be developed simultaneously.

A third temporary construction compound area will be developed adjacent to the L3418 road within Coillte lands should GCO One be constructed. This compound will be developed to provide parking, welfare facilities, hardstands for storing construction materials and space for excavated road materials to be stored until collected by a permitted facility.

Any mineral soils removed during construction of compounds will be stored for later use in reinstatement on the wind farm site. At the end of the construction phase, the compounds will be removed, with any stone being used towards reinstatement of the on-site borrow pits. After removal of the compounds, the two areas on the wind farm site will be recovered in soil and planted with native trees. The compound along GCO One will be recovered in soil and returned for Coillte use.

2.10 Construction Management

2.10.1 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 2-6. 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 will be 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 (see Appendix 2-6).

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 Coimisiún Pleanála to such an permission/approval, will be implemented in accordance with the requirements of the condition.

2.10.2 Construction Activities and Timing

It is anticipated that approximately 74 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 on-site 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 to protect any active bird nests and chicks. 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 a confirmatory ecological survey (carried out by a qualified and suitably experienced ecologist) to ensure there are no active bird nests within the vegetation involved. If active bird nests are identified, works will stop and consultation will be undertaken with the National Parks and Wildlife Service (NPWS).

The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations will be restricted to between 07:00 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; and
- 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 Kilkenny County Council apart from in the case of an emergency and in line with the Schedule of Mitigation Measures of this EIAR (Chapter 19 (Schedule of Mitigation Measures)).

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 10 no. wind turbines so they will require 10 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 on-site 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 in late evenings (see Chapter 16 Traffic and Transportation). Oversized loads 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;
- 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 2-6 where January 2028 has been selected as a potential start date for construction activities. 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 clear span bridges, 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	

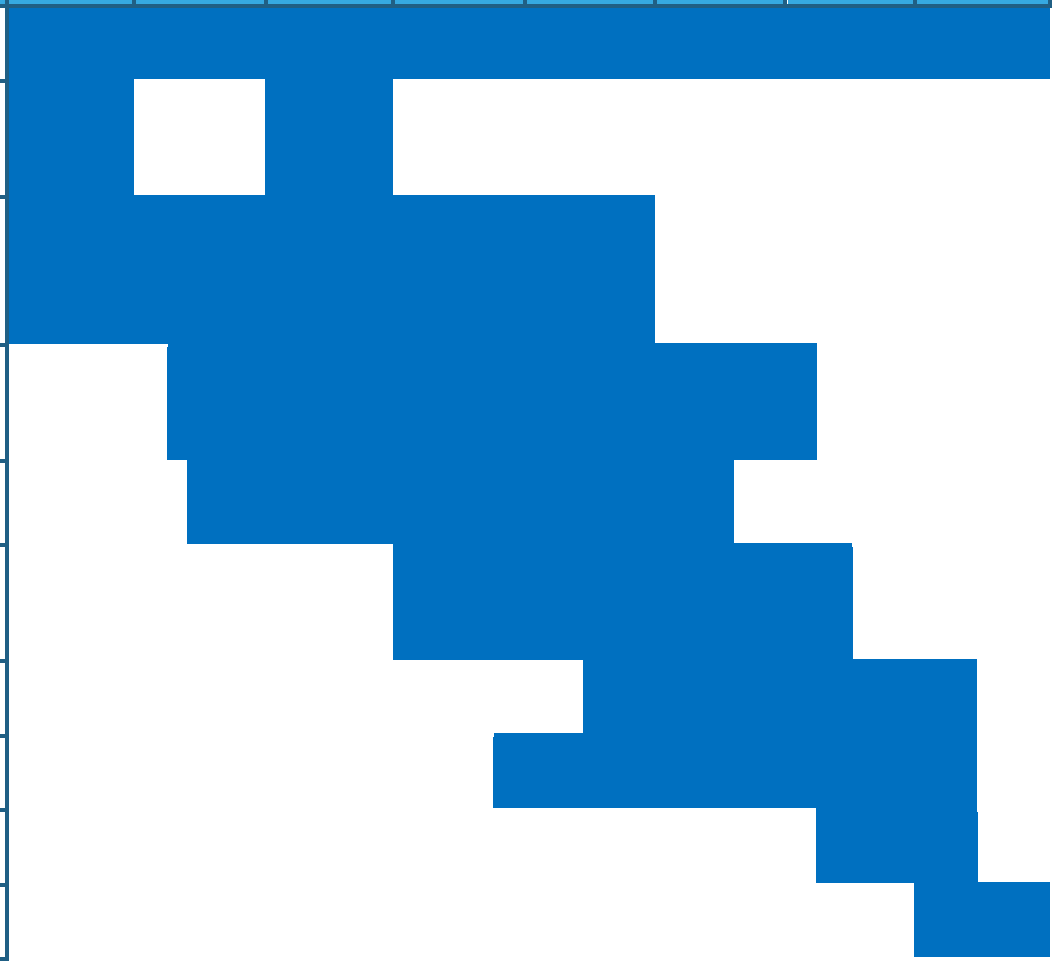

Figure 2-6: Indicative Construction Schedule

2.10.2.1Wind Farm Construction Sequencing

It is proposed that works will start from the west through upgrade of Site Entrance One and development of the adjacent temporary construction compound and progress east wards. The borrow pit south of T7 will be utilised first with the second borrow pit utilised when required. T3, T4, T5, T6, T7 and T9 will be completed first within the central plot of the wind farm site, with subsequent plots at T1, T10, T2 and T8 to follow. The substation site construction works will be completed simultaneously with direct access to this area from Site Entrance Five (see Figure 2-1).

2.10.3 Surface Water Management

2.10.3.1Existing Site Drainage

The proposed wind farm site is located within the Suir and Nore Water Framework Directive catchments (hydrometric areas 15 and 16) in Kilkenny. These catchments are further subdivided into sub-catchments with the site located within the Arrigle_SC_010 and Blackwater Kilmacow SC_020 WFD sub-catchments.

Two watercourses traverse through the proposed wind farm site; the Smithstown 15 Stream (a tributary to the Arrigle River) and the Smartcastle Stream. The source of the Smithstown 15 Stream occurs in the north, and flows in a northerly direction for approximately 2.6 km before forming the Arrigle River. The Smartcastle Stream, which is situated towards the south, flows in a southerly direction.

The proposed wind farm site and adjacent lands also include man-made agricultural and forestry drains which flow into the watercourses mentioned above. These are primarily used to assist in the drainage of forestry and agricultural land-use.

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

2.10.3.2Drainage 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 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 (see Appendix 2-8). 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. Examples of proprietary silt control measures are illustrated on Plate 2-3.

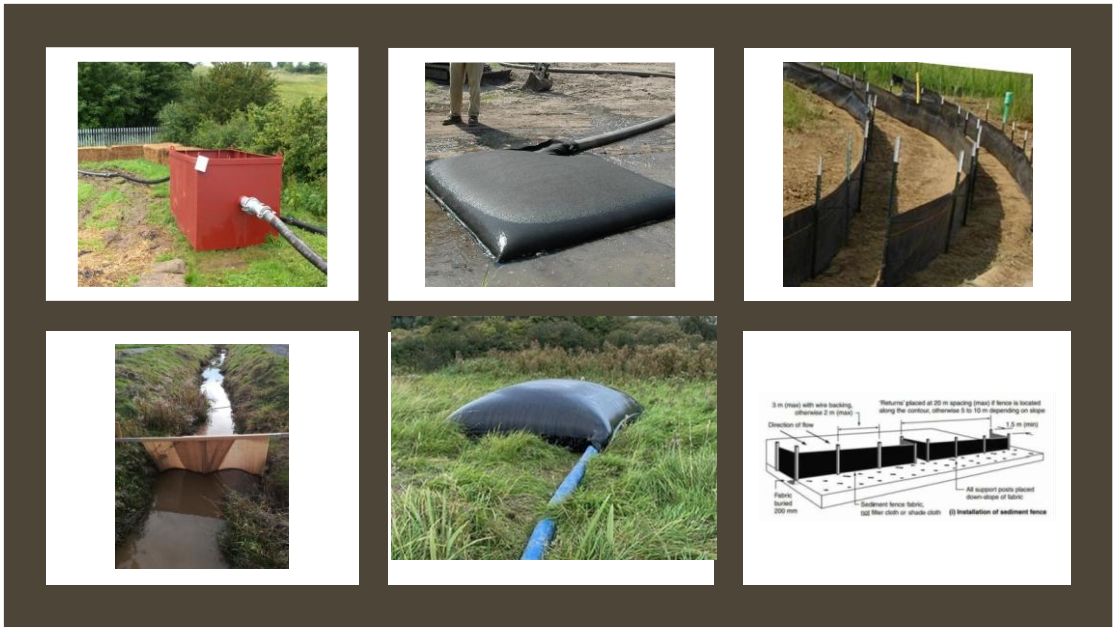

Plate 2-3 Examples of Proprietary Silt Control measures

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 to be used across the proposed wind farm site during the construction phase is provided in Plate 2-4.

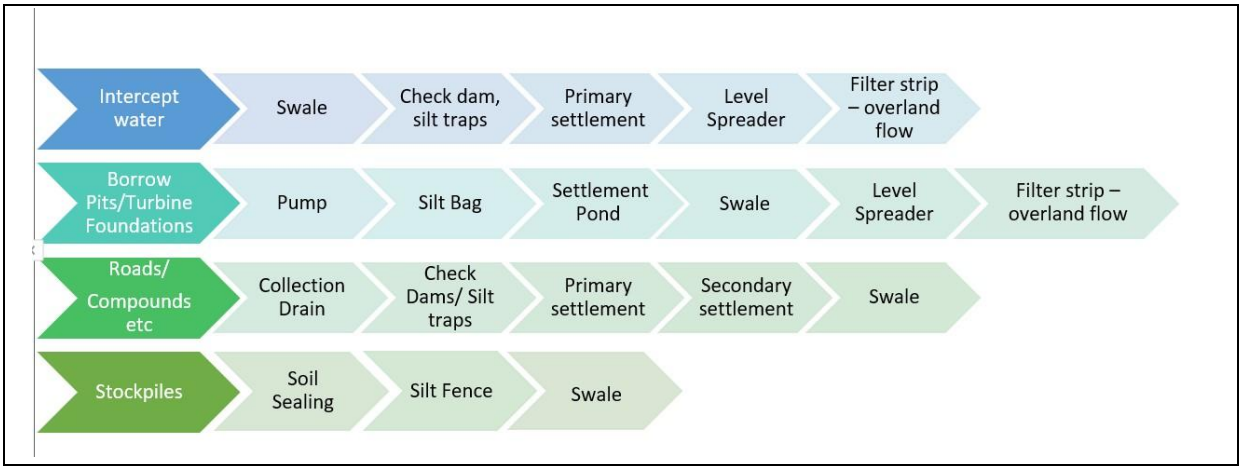

Plate 2-4 Treatment train

A number of temporary settlement ponds will be established during the construction phase along the proposed internal access roads 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).

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 Plate 2-5.

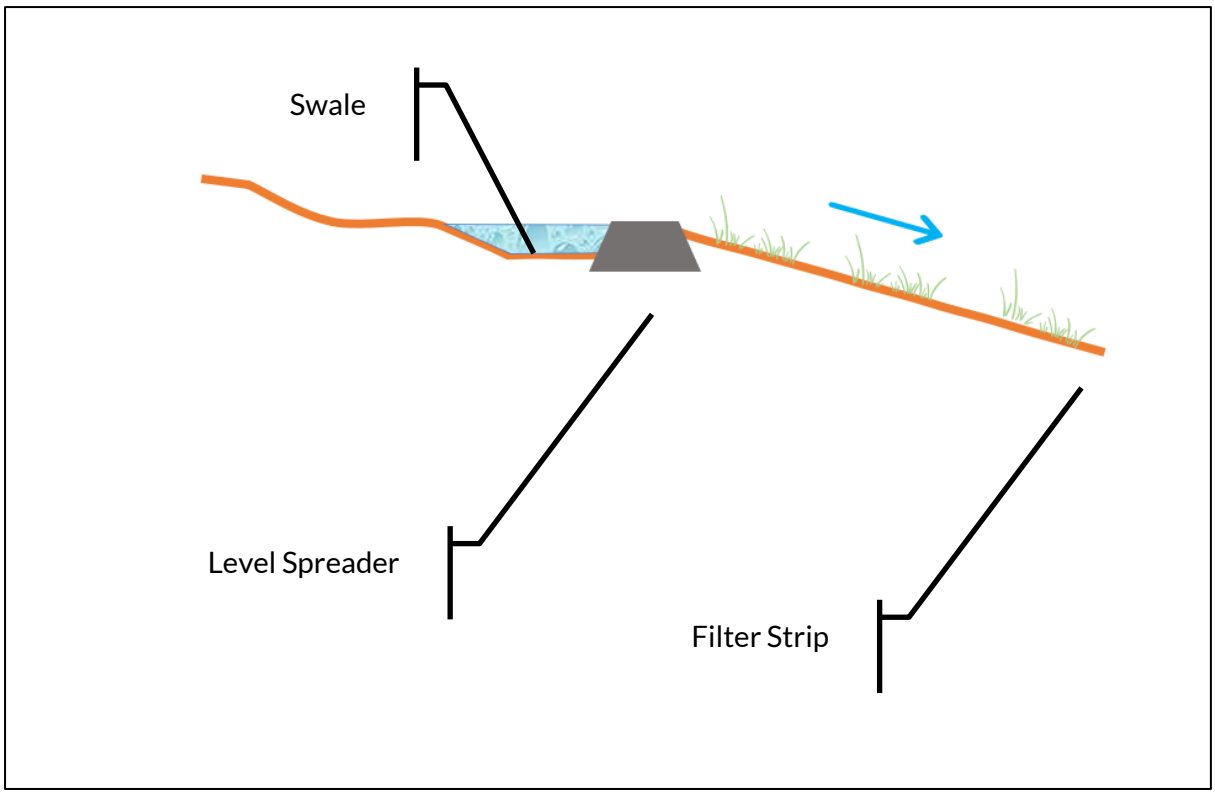

Plate 2-5 Conceptual Level Spreader and Filter Strip

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.

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 on-site 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 internal 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 (Hydrology & Hydrogeology) of this EIAR and the SWMP (see Appendix 2-8).

2.10.3.3 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.

The use of a clear-span bridges will be used for vehicles crossing the Smartcastle Stream and Smithstown 15 Stream (tributary to the Arrigle River). Therefore, there will be no direct effect on these streams at each proposed crossing location and downstream. Each clear-span bridge will be sufficiently above the stream to allow unrestricted flow of water beneath. The proposed clear-span bridge locations are shown on Figure 2-1 and the design details are provided in Appendix 1-1 of this EIAR.

2.10.4 Environmental Management

2.10.4.1Concrete deliveries and pouring

Primarily ready-mixed concrete will be used during the construction phase, with all concrete being delivered from 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. 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 site entrance one 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 Plate 2-6.

Plate 2-6 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 (see Appendix 2-6) provides further details of best practice and environmental considerations in relation to concrete deliveries and concrete pouring.

2.10.4.2Refuelling

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 watercourse. 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. The CEMP (see Appendix 2-6) provides further details of best practice and environmental considerations in relation to this.

2.10.4.3Dust 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 (see Appendix 2-6) provides further details of best practice and environmental considerations in relation to this.

2.10.4.4Waste Management

The CEMP (see Appendix 2-6) 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 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. This includes any waste produced along GSO One (if constructed) from works occurring in the existing public road. They will also ensure that all parts of the Waste Management Plan will be implemented.

2.10.4.5 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 2-3).

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.

2.10.4.6 Vehicle Washing

Wheels or vehicle underbodies will be 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 accordance with 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. See Appendix 1-1 of this EIAR for details and proposed locations of the proposed self-contained wheel-wash systems 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 (see Appendix 2-6) provides further details of best practice and environmental considerations in relation to this.

During the operational phase, the on-site access roads will be maintained in good condition, and any vehicles that need to access the site will be 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 or decommissioning.

2.10.4.7Major 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 (Major Accidents and Natural Disasters) of this EIAR.

2.10.4.8Spoil 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 on-site.

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 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 side cast 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 information on the spoil management is provided in Appendix 2-4.

Where side-casting is not possible, topsoil and sub-soil will be stockpiled separately. Turves will be stored turf side up and will not be allowed to dry out. Stockpiles will 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 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.

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.

2.10.4.9Traffic Management

As described further in Chapter 16 (Traffic and Transport) of this EIAR, 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, operational and decommissioning phases of the proposed project in order to minimise the effects of the additional traffic generated. A Traffic Management Plan for the construction phase of the proposed project is included as Appendix 16-2.

2.11 HEALTH & SAFETY

The proposed project will be constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation as described in the CEMP (see Appendix 2-6).

Aspects of the development that have potential to present health and safety issues which have been considered and addressed through the CEMP are: :

- 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) will 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 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 (see Appendix 2-6).

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.

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.

2.12 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 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. 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 20-26 jobs in operation and maintenance (based on 0.36 jobs per MW[6]).

6 https://opus.lib.uts.edu.au/bitstream/10453/43718/1/Rutovitzetal2015Calculatingglobalenergysectorjobsmethodology.pdf (Accessed 08/09/25).

2.12.1 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 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 proposed 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 110 kV 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.

2.13 REFERENCES

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