

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED LITTLETON WIND FARM, CO. TIPPERARY

Volume 2 - Main EIAR

Chapter 4 - Description of the Proposed Development

Prepared for:
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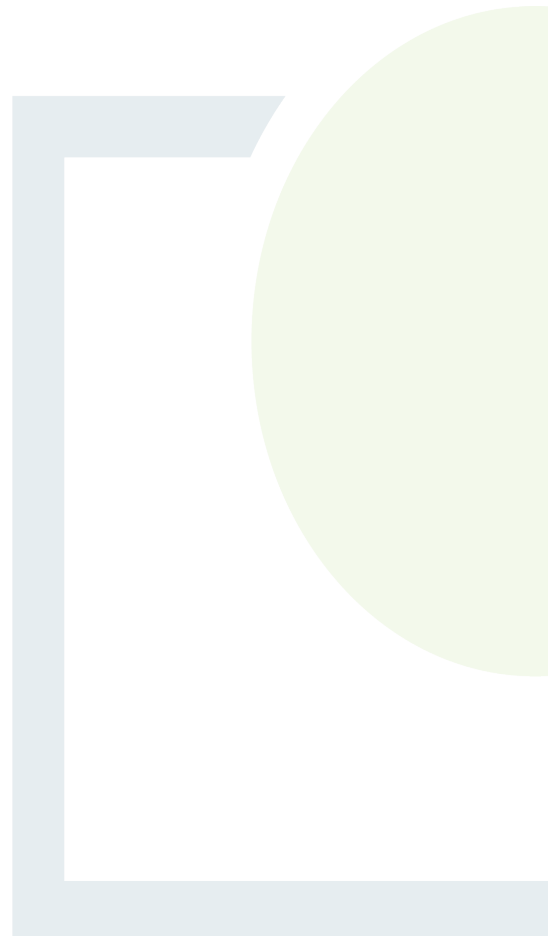


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4. DESCRIPTION OF THE PROPOSED PROJECT

4.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) describes the proposed site location and components of the Proposed Development and provides details on the construction, operation and decommissioning of the Project in compliance with the EIA Directive ((Directive 2011/92 EU on the assessment of the effects of certain public and private projects on the environment (as amended))). This forms the basis of the assessments presented within the EIAR.

This chapter of the EIAR is supported by Figures in Volume 4, Planning Drawings accompanying the planning application and the following Appendix documents provided in Volume 3:

- Appendix 4.1: Construction Environmental Management Plan (CEMP) including:
 - Traffic Management Plan
 - Surface Water Management Plan
- Appendix 4.2: Abnormal Indivisible Load Route Survey Report (Pell Frischmann)
- Appendix 4.3: Grid Connection Drawings

Common terms and acronyms used throughout this EIAR can be found in Appendix 1.3 of Chapter 1 – Introduction which is contained in Volume 3.

The Proposed Development assessed in this EIAR comprises the following elements:

- The 'Proposed Wind Farm' (also referred to in this EIAR as the '**Site**');
- The 'Proposed Grid Connection' (also referred to in this EIAR as the '**GC**');
- The 'Turbine Delivery Route' (also referred to in this EIAR as the '**TDR**');
- The 'Biodiversity Enhancement and Management Plan Lands' (also referred to in this EIAR as the '**BEMP Lands**');

The location of the Proposed Development is shown in Figure 4.1, contained within Volume 4 of the EIAR. The general layouts of the Proposed Wind Farm, Grid Connection (GC) route and Turbine Delivery Route (TDR) are presented in Figures 4.2 to 4.4, Volume 4.

The proposed GC route, whilst assessed as part of this EIAR, will not form part of this planning application. If the Proposed Development is permitted, the GC route will be subject to a separate planning application.

4.2 Overview of the Proposed Development

The Proposed Development consists of an 11 no. turbine wind farm and associated infrastructure including internal access tracks, hard standings, additional amenity trails, an onsite borrow pit, peat deposition areas, a permanent meteorological mast, an onsite 110kV substation and associated grid connection infrastructure, internal electrical and communications cabling, temporary construction compounds, drainage infrastructure, biodiversity management and enhancement measures, temporary accommodation works along the Proposed Turbine Delivery Route and all associated works related to the construction of the Proposed Development.



An Coimisiún Pleanála (formerly An Bord Pleanála) issued a letter dated 24 March 2026 which confirmed that they deemed the Proposed Development to be Strategic Infrastructure Development (SID) by way of a notice served under section 37B(4)(a) of the Planning and Development Act 2000 (as amended) and the application is being made directly to the Commission (SID Pre-Planning Case Ref. 311587-21) in accordance with Section 37E of the Planning and Development Act 2000, (as amended). The Commission are the competent authority for the purposes of the Environmental Impact Assessment (EIA).

A 10-year planning permission and 35-year operational life from the date of commissioning of the Proposed Wind Farm (including the meteorological mast) is being sought. This reflects the lifespan of modern-day turbines.

A permanent planning permission is being sought for the substation as this will become an asset of the national grid under the management of EirGrid and ESB Networks and will remain in place upon decommissioning of the Proposed Wind Farm.

Presented hereunder are the elements of the Proposed Development for which development consent is being sought and all other associated project components subject to EIA but for which planning consent is not being sought within the current application.

4.2.1 Elements of the Proposed Development for which Development Consent is Being Sought

The Proposed Development for which consent is being sought will consist of the following:

- Construction of 11 no. wind turbines with a blade tip height of 200 m, a hub height of 119 m and a rotor diameter of 162 m.
- Construction of permanent turbine foundations and crane pad hard standing and assembly areas including associated drainage infrastructure;
- Construction of 15.45 km of new internal access tracks and associated drainage infrastructure;
- Upgrading of 2.95 km existing tracks and associated drainage infrastructure;
- Creation of 3 no. new site accesses (2 no. on the Local Road L4114 and 1 no. on the Regional Road R639) to serve as construction and operation accesses to the Proposed Wind Farm Site
- Upgrading of 3 no. existing site entrances (1 no. on the L2201 and 2 no. on the Local Road L4153) to serve as construction and operation accesses to the Proposed Wind Farm Site;
- Installation of new pipe culverts within the Proposed Wind Farm Site where proposed infrastructure crosses existing drains;
- All associated drainage and sediment control including interceptor drains, cross drains, sediment ponds and swales;
- Development of 1 no. on-site construction borrow pit and associated ancillary drainage;
- 5 no. temporary construction site compounds and associated ancillary infrastructure including parking,
- 2 no. temporary security cabins;
- Erection of 1 no. permanent meteorological mast to a height of 120 m above ground level, with an approximately 1 m long lightning protection rod protruding above this;
- Construction of 1 no. permanent onsite 110 kV electrical substation to EirGrid specifications, including an associated compound and ancillary infrastructure comprising:
 - Control buildings, equipment storage and welfare facilities
 - Electrical infrastructure



- 10no. Car Parking spaces (of which 4no. are EV Parking with chargers)
- 2 no. Wastewater holding tanks
- 2 no. Rainwater harvesting tanks
- 2 no. Water supply bored wells
- Telecommunications tower to a height of 36m (with an approximately 1 m long lightning protection rod protruding above this) and associated fencing, foundation and hard-standing area
- Lightning masts and lighting poles
- Security fencing and stock proof fencing
- Installation of medium voltage underground electrical and communication cabling connecting the wind turbines to the proposed on-site substation and associated ancillary works;
- All associated infrastructure, services and site works including excavation, earthworks, peat and spoil management;
- Creation of 6 no. dedicated peat and spoil deposition areas and berms for the management of peat and spoil within the Site;
- Vegetation clearance to facilitate construction and operation of the proposed development;
- Provision of onsite recreation and amenity facilities to include a 4km walking/cycling trail and associated car park;
- Biodiversity enhancements measures to include tree planting, drain blocking, wetland retention, ponds, eucalyptus removal, nest boxes, log piles, refugia / hibernacula, calcareous grassland and Marsh Fritillary habitat within the Wind Farm Site.

Permission is being sought for a period of 10 years for the Wind Farm and an operational life of 35 years from the date of full commissioning. Permission is sought in perpetuity for the operation of the Substation as this will become an asset of the national grid under the management of EirGrid and ESB Networks and will remain in place upon decommissioning of the Proposed Wind Farm.

Whilst consent is not being sought as part of this application for the proposed GC route to facilitate a connection to the national transmission grid network at Ballyragget, Co. Kilkenny, it is assessed as part of this EIAR. Consent for the Proposed Grid Connection will be sought through a separate planning application.

Certain temporary accommodation works associated with the TDR are subject to this EIA but do not require planning consent. Details on the temporary works to facilitate the delivery of turbine components to the Site are contained in Appendix 4.2 and include hedge or tree cutting, relocation of powerlines/poles, lamp posts, signage and temporary local road widening. For these locations, works have been identified and assessed in the EIAR, however, permission for these works will be sought separately with the local Planning Authority through road opening licenses as necessary.

4.3 Proposed Development Location

This section describes the area which makes up the Proposed Development.



The Wind Farm Site is located within the jurisdiction of Tipperary County Council. The majority of settlements closest to the site are situated to the west of the site. Ballinunty is the nearest, c.2 km southeast of the proposed turbine array. The village of Gortnahoe lies c. 2.5 km northeast of the site at its closest point, while New Birmingham is situated c. 2 km to the east. The small centre of population of Ballysloe is also located to the east, at just over 3 km from the nearest turbine. Littleton and Twomileborris are the only settlements within the central study area situated to the west of the site, located c. 2.6 km and c. 2 km from the proposed turbine array, respectively. The village of Killenaule lies c. 4 km southeast of the site and Horse and Jockey is c. 4.7 km to the west.

Urlingford is located c. 6.8 km north of the site and Johnstown c. 10.5 km to the north

The most notable settlements within the area are Thurles and Cashel. Thurles is located c. 9 km west of the site, while Cashel is c. 17 km to the southwest.

The Wind Farm Site is located within a bog group and includes lands in the townlands of Longfordpass North Longfordpass South, Leigh, Bawnreagh, Clonoura, Noard, Derryhogan, Derryvella, Ballybeg, Lanespark, Newhill and Killeen, County Tipperary. Refer to Figure 4.1, contained within Volume 4 of the EIAR, for the location of the Proposed Development.

The BEMP Lands are contained within the Wind Farm Site.

The TDR travels from the port of entry of Foynes in the following route:

- Loads will exit Foynes Port and join the N69 heading east;
- At Limerick, they will join the N18 heading northeast and merge onto the M7;
- Loads will exit at Junction 17 Portlaoise Interchange and perform a U-turn to re-join the M7 heading southwest;
- They will merge onto the M8 and continue southwest;
- At the M8 Junction 4 East Roundabout loads will turn left to join the R693;
- At the following roundabout loads will turn right onto the R639 then drive through Urlingford;
- To the southwest of Urlingford loads will turn left at the proposed site entrance.

The proposed GC route will exit north of the Proposed Wind Farm Site along the Local Road L4114 and traverse the following townlands within County Tipperary: Longfordpass East, Graiguepadeen, Longfordpass North, Fennor and Longfordpass South. The cable then enters County Kilkenny, and traverses the following townland within the public road, terminating at the Ballyragget 110kV Substation: Freshford Lots, Borrisnoe, Killawardy, Clomantagh Upper, Acragar, Moneenaun, Urlingford, Kilrush, Glenreagh, Kilduff, Borrisnafarney, Barnane, Sweethill, Ridge, Balief Lower, Bohernarude, Kilmacuddy, Killoskehan, Cloncannon, Grange, Moatpark, Barna, Ballybeg, Parksgrove, Baunaniska, Ballyconra, Stook, Graigueswood, Clone, Borrisbeg, Borrismore, Gortagarry, Clomantagh (Mt. Garret), Mountfinn, Barnagrotty, Balief Upper, Clomantagh Lower, Tobernapeastia, Darbyshill, Monabrika, Aghnameadle and Blakefield.

4.3.1 Proposed Wind Farm Site Boundary

The Wind Farm Site boundary area comprises a land area of 1,177 hectares (ha) and is shown in Figure 4.1, contained within Volume 4 of the EIAR.



4.3.2 Existing Land Use and Site Context

The Proposed Wind Farm Site boundary extends for approximately 10km from north to south and ranges between 1km (at north end) and 2km (at south end) from east to west. The elevation of the Site ranges from approximately 120-130m altitude above sea level. A large proportion of the Site is regenerating cutaway (heath, scrub, woodland) but includes open areas with large bodies of open water. Areas of remnant high bog occur scattered along the boundaries.

The Site is located on 3 no. bogs, namely Littleton Bog Longford Pass (Popes Bog) and Ballybeg Lanespark Derryvella which covers an area of approximately 1,177ha.

The Wind Farm Site is located in a sparsely populated rural context. There are 101 no. properties (80 no. residential, 16 no. mixed use, and 5 no. commercial) within 2 km of the turbine array as shown in Figure 4.5, Volume 4 of the EIAR. The closest residential receptor is 851 m to T11. The closest residential receptor to the substation is approximately 475m away.

The Tailte Eireann Land Cover database for Ireland (based on interpretation of satellite imagery and national vector mapping data) identifies the following land cover types within and surrounding the Site: peat bogs, moors and heath, coniferous forestry, mixed forestry, land principally occupied by agriculture, non-irrigate land, pastures and transitional woodland scrub. Land use at the site is dominated by peat bog with smaller pockets of forestry and land used for agricultural purposes. Littleton is generally surrounded by farmland but there are extensive conifer plantations outside the eastern and western boundaries.

There is an extensive network of roads in the area. The M8 motorway and the R639 run to the northwest/west of Littleton bog. The R689 and R690 run to the east and the L4101 runs to the south. The main site access points are at the north and south ends of the bog adjacent to the railway line.

Due to the historic peat extraction activities at the Site, the bogs have been artificially drained in order to lower the peat water table. Drainage ditches were inserted into the upper surface of the bogs at different stages. Littleton Bog was the first bog within the Site to be cleared and drained in 1941. Longfordpass Bog (Popes Bog) was drained in 1947 whilst Ballybeg Lanespark Derryvella Bog was drained in 1968.

Drainage of the Site and the wider Littleton Bog Group is currently operating under licence from the EPA (Integrated Pollution Control Licence Ref. No. P0499-01). The drainage system has been operating in accordance with this existing Integrated Pollution Control licence, with all drainage water being discharged from the bogs passing through an appropriately designed silt pond treatment arrangement prior to discharge.

In 2018, Bord na Móna produced Cutaway Bog Decommissioning and Rehabilitation Plans for the Longfordpass, Littleton and Lanespark bogs located within the Application Site in accordance with Condition 10 of the IPC licence. Rehabilitation Phase 1 works were completed in Littleton, Longfordpass, Lanespark Bogs and the nearby Ballybeg and Derryvella Bogs between 2018-2012 with extensive drain-blocking and hydrological management. The key objective of peatland rehabilitation is environmental stabilisation. The rehabilitation works that have been completed and commenced in Phase 1 are described in the Cutaway Bog Decommissioning and Rehabilitation Plans (Appendix 2-1) and in Section 2.2 of Chapter 2. These works have created localised flooded areas within the site, adjacent to the drain blocking. The conditions created by the Phase 1 rehabilitation measures which have been implemented form part of the hydrological baseline and as such form an inherent component of the baseline environment considered in the impact assessment.



Currently surface water (or runoff water) is drained from the Site via a network of field drains typically spaced at 15 to 20m intervals, piped drains, main drains, headland drains, and silt ponds. Drainage of the Site was historically assisted by pumping stations located within the Site (P47/01 - P47/03) (it is noted that 12 no. pumps were active in Littleton Bog in 1988). These pumping stations discharged to small streams to the west of the Littleton Bog which merged downstream to form the Clover River. The pumping stations are no longer active. Silt ponds are used to trap sediment and prevent elevated levels of suspended sediment arising in effluent from the drained peatland. Treated surface water is then discharged at outfall points where the effluent flows into off-site drainage channels which in turn discharge into the local stream and river network.

Please refer to Chapter 9 - Hydrology, Hydrogeology and Water Quality which details the existing drainage on site.

4.3.2.1 *Existing and Planned Amenity in the Vicinity of the Proposed Development*

The Littleton Labyrinth is an existing amenity route developed by Tipperary County Council which provides a shared walking and cycling route connecting the village of Horse and Jockey to Lough Derryvilla. From Horse and Jockey, it follows a mixture of public roads and the Derrynaflan greenway before joining 7.2km of newly constructed trail (opened in 2025) along the former Bord na Móna railway line between Derrynaflan and Derryvilla.

The route overlaps the proposed Wind Farm Site between the former Bord na Mona Factory trailhead and Lough Derryvilla. An amenity car park was built as part of the Labyrinth on the proposed Wind Farm Site also at the former Bord na Mona Factory trailhead.

There are two other car parks provided by Tipperary County Council at Lough Derryvilla and the Horse and Jockey as part of the Littleton Labyrinth.

The Midlands Trail Network amenity routes are proposed by Fáilte Ireland and BnM with Decision to Grant received from An Commission Pleanála dated 27th January 2026. The proposed trails link the Littleton Labyrinth and creates two new stretches of shared walking and cycling routes through the BnM peatlands, namely, between the Former Bord na Mona Factory, Lanespark and the L2111 road towards Littleton and between Lough Derryvilla and the L2111 towards New Birmingham.

These routes are generally outside the proposed Wind Farm Site except for approximately 2.4 km of permitted and existing amenity trails.

Two car parks are proposed as part of Midlands Trail Network project where the routes meet the L2111.

Tipperary County Council have also identified in their *Tourism Product Development Plan 2020 – 2030* potential for the further development of the Littleton Labyrinth network of walkways and cycleways which would link Twomileborris, Gortnahoo, Urlingford, Templetohy and Littleton. If developed, these would cross the wider BnM land holdings and connect to the amenity tracks provided as part of the Proposed Wind Farm Project. Please refer to Section 4.4.1.7 where the amenity proposed as part of this development is described in full.

Figure 4.7 of Appendix 3 shows the location of these amenity trails.

4.3.3 Land Ownership

The lands associated with the Proposed Wind Farm Site are owned by a combination of BnM and a single private landowner. The proposed on-site borrow pit is located on these private lands.



The majority of the proposed GC route is contained within public roads with the exception of start and end points where the proposed 110 kV grid connection cable connects into both the onsite and network substations.

Temporary accommodation works required to facilitate the delivery of large components to the site shall be contained within the public road corridor and private lands.

Letters of consent accompany the planning application.

4.3.4 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 maximising the energy yields of the wind resource passing over the site. Available wind speed is a key factor in determining the economic viability of potential wind energy locations. The 2013 Sustainable Energy Authority of Ireland (SEAI) Wind Speed Atlas identifies the site as having an average wind speed of between 7.6 and 7.9 m/s at 100 m above ground level¹. Wind speed monitoring from the site has recorded a long-term mean wind speed of 7.1 m/s at 100m above ground level at the existing temporary meteorological mast location.

4.3.5 Other Wind Farms (within 20km of Site)

Operational/Permitted

There are several operational and consented wind developments located within 20 km of the Proposed Wind Farm. Figure 4.6, within Volume 4 of the EIAR, illustrates the location of existing wind farms within 20 km of the Site.

The geographic extent of the cumulative assessment is considered on a case-by-case basis, in line with the Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission, 1999). However, a 20km distance from the Site was considered a reasonable zone of influence for the purpose of assessing potential cumulative effects considering the size and extent of the Proposed Development, the nature of the effects and the receiving environment of the wider area.

The 20km radius from the proposed turbines is considered relevant in line with the recommended Study Area for the zone of theoretical visibility of proposed wind farm projects as set out in the Wind Energy Development Guidelines (2006) which cites the use of a 20km radius for blade tips greater than 100m. This represents a visual Study Area for potential cumulative projects but is also best practice for use as a Study Area for other potential cumulative effects including traffic, noise, water quality and air quality.

Table 4.1 below shows the list of operational and consented wind farms and their proximity to the Site.

¹ Sustainable Energy Authority of Ireland (SEAI), 2013. Wind Atlas. Available at: [Wind Atlas](http://www.seai.ie/WindAtlas)



Table 4-1: Operational and Consented Wind Farms Proximate to Site

Application Number	Development Name	Number of Turbines	Status	Approximate Distance & Direction from Nearest Turbine	Development Class
ACP Ref. 322154	Brisklagh Wind Farm	7	Unconsented ²	15.49918 E (T1)	Wind Energy
ACP Ref. 318704	Borrisbeg Wind Farm	10	Consented	21.25749 NW (T1), but within 20km of Site boundary	Wind Energy
ACP Ref. 321454	Brittas Wind Farm	12	Consented	12.10984 NW (T4)	Wind Energy
ACP Ref. 211502	Knockroe Wind Farm	7	Consented	14.00603 S (T11)	Wind Energy
TCC Ref. 20972 which was subsequently amended by TCC Ref. 2360803	Farranrory Wind Farm	9	Consented	10.11609 E (T6)	Wind Energy
TCC Ref. 06/510773	Lisheen Wind Farm 1	18	In Operation	11.39686 N (T1)	Wind Energy

² Unconsented is defined as a live planning application with no permission.



Application Number	Development Name	Number of Turbines	Status	Approximate Distance & Direction from Nearest Turbine	Development Class
KCC Ref. 14//202, 15/629, 19/787, and 20/459 LCC Ref. 14/139 and 19/597 TCC Ref. 12/510275, 14/510138 and 15/6000924	Lisheen Wind Farm 3	8	In Operation	13.14048 N (T1)	Wind Energy
TCC Ref. 10/510118 and KCC Ref. 10/145	Bruckana Wind Farm	14	In Operation	13.91004 N (T1)	Wind Energy
KCC Ref. 12/172	Lisdowney Wind Farm	4	In Operation	19.46397 NE (T1)	Wind Energy
KCC Ref. 1617	Foyle/Foyleature Wind Farm	4	In Operation	12.57826 E (T1)	Wind Energy
	Kyleballyougher Wind Farm	2	In Operation	13 E (T1)	Wind Energy
KCC Ref. 20281	Ballybay Wind Farm	5	In Operation	9.315062 E (T1)	Wind Energy
TCC Ref. 09/781 and ACP Ref. 237713	Knocknamuck/Cnoc Wind Farm	5	In Operation	7.978342 E (T1)	Wind Energy
TCC Ref. 09801 as extended by 15600723	Gurteen Wind Farm	1	In Operation	4.250567 E (T6)	Wind Energy



Application Number	Development Name	Number of Turbines	Status	Approximate Distance & Direction from Nearest Turbine	Development Class
TCC 13/231 and 15600561 ACP 243357 and 245874	Ballincurry Wind Farm	2	In Operation	4.935713 SE (T11)	Wind Energy
TCC 06/1695 amended by TCC Ref. 12466	Kill Hills	16	In Operation	9.997494 SW (T11)	Wind Energy
TCC 09/510100	Lisheen Wind Farm 2	12	In Operation	7.593389 N (T1)	Wind Energy

4.4 Proposed Site Infrastructure

4.4.1 Wind Farm

The Proposed Wind Farm will consist of 11 no. wind turbine generators (WTG's), 1 no. permanent onsite 110 kV electrical substation compound and associated infrastructure to facilitate connection to the existing Ballyragget 110kV substation. In addition, 1 no. on-site construction borrow pit is proposed which will be backfilled and restored for agricultural use. There are 6 no. dedicated peat and spoil deposition areas, 5 no. temporary construction compounds, and 1 no. permanent meteorological mast along with ancillary civil, drainage and electrical infrastructure. The Site also contains BEMP Lands and recreational amenity trails.

4.4.1.1 *Wind Turbine Description*

The proposed turbine is a conventional 3 blade design. Schematic drawings of the candidate turbine accompany the planning application. The plans and particulars are precise and provide specific dimensions for the proposed turbine. The turbine specification will have a hub height of 119m and a rotor diameter of 162m with a tip height of 200m.



4.4.1.1.1 Turbine Layout

The Proposed Wind Farm layout reflects the outcome of iterative engineering and environmental constraints assessments carried out during the wind farm design process aimed at eliminating or minimising adverse effects on the environment and considered inter alia risks to sensitive habitats, presence of known or potential archaeological features, risk to sensitive species, assessment of ground conditions and optimisation of cut-fill balance as part of design and existing drainage patterns and water catchment characteristics. The layout of the Proposed Wind Farm has been designed to minimise the potential environmental effects of the wind farm while at the same time maximising the energy yield of the wind resource passing over the site.

The design rationale and evolution of the Proposed Wind Farm layout is described in Chapter 3, Volume 2 - Consideration of Reasonable Alternatives. The proposed turbine layout is shown in Figure 4.2, contained within Volume 4 of the EIAR.

Turbine location co-ordinates in Irish Transverse Mercator (ITM) are listed in Table 4-2 below.

Table 4-2: Wind Turbine Generator (WTG) Location Coordinates

WTG ID	ITM Easting	ITM Northing
T01	624044	657148
T02	623721	656639
T03	623595	656033
T04	623023	656034
T05	622809	655374
T06	623461	655081
T07	622465	654873
T08	623020	654421
T09	620928	651759
T10	621249	651425
T11	621455	651016

The turbines will have multiple painted coatings to protect against corrosion with an off-white or light grey non-reflective finish. This minimises visual impact, in accordance with the following guidelines on wind energy development:

- “Wind Energy Development – Planning Guidelines” (2006), Department of the Environment, Heritage and Local Government;
- “The Influence of Colour on the Aesthetics of Wind Turbine Generators,” ETSU W/14/00533/00/00;
- PAN 45, The Scottish Office Environment Department;
- PPG22, Department of the Environment - Welsh Office; and
- Technical Advice Note 8, Welsh Assembly, 2005.



It is proposed to install lighting on the turbines in accordance with the requirements of the Irish Aviation Authority (IAA) for aviation visibility purposes. The lighting configuration and type will be in accordance with the International Civil Aviation Organisation (ICAO) obstacle light requirements.

4.4.1.1.2 Turbine Tower and Foundation

Following detailed site investigations, it has been determined that the wind turbine foundations at the proposed Wind Farm Site will be a combination of standard shallow and piled reinforced concrete foundations. The turbine foundation bases are circular in shape, 31 m in diameter for shallow foundations, 27 m in diameter for piled foundations, and 3.65 m in depth.

The turbine foundations shall be constructed using standard reinforced concrete construction techniques. Detailed construction methodologies for turbine foundations are provided in the CEMP in Appendix 4.1 of Volume 3.

A section of reinforced concrete foundation called a plinth shall protrude above ground to which the turbine tower will be bolted.

Turbine foundations will be designed to Eurocode Standards. Foundation loads will be provided by the wind turbine supplier, and factors of safety will be applied to these in accordance with European design standards:

- EN 1992-1-1: Eurocode 2: Design of concrete structures.
- BS EN 61400-1:2005: Wind Turbines Design Requirements.

The tower of the turbine is a conical steel tube, delivered to site in sections and bolted together using flanged connections.

Once the turbine components arrive on site they will be placed on the hard standing and lay down areas prior to assembly. The towers will be delivered in sections, and each blade will be delivered in a separate delivery. Once there is a suitable weather window the turbine will be assembled.

The first (base) section is bolted to a steel frame, which is cast into the turbine concrete foundation. The upper sections of the tower are bolted to the lower ones in sequence. The base of the tower is approximately 6.5m in diameter, tapering to approximately 4m where it is attached to the nacelle. The first floor of the tower is approximately 2-3m above ground level it is accessed by a galvanised steel staircase and a steel hatch door which will be kept locked except during maintenance. Access to the top platform in the tower is by a ladder or service lift. Access to the nacelle from the top platform is by ladder. Access to the transformer room in the nacelle is controlled with an interlock.

4.4.1.1.3 Turbine Blades and Hub/Nacelle

The blades of the proposed wind turbine are made up of glass fibre reinforced polyester. They turn at between 5-15 revolutions per minute depending on the wind speed and type of turbine.

A turbine begins generating electricity at a wind speed of 3-4 m/s depending on the turbine type, with rated power generation at wind speeds of approximately 12-14 m/s. The turbines usually shut down at wind speeds greater than 25 m/s, although some machines are designed to operate at up to 30 m/s.



The cast iron hub supports the three blades and transfers the reaction loads to the nacelle which houses the generating components of the wind turbine including the generator and gearbox, electrical components and control unit. These convert the rotation of the blades to generator rotation.

A yaw mechanism turns the nacelle and blades into and out of the wind. A wind vane on the nacelle controls the yaw mechanism.

The blade bearings allow the blades to operate at varying pitch angles. Based on the prevailing wind conditions (determined by the wind vane), the blades are continuously positioned to optimise the pitch angle.

The turbines are equipped with an aerodynamic brake. Stopping the turbine is done by full feathering the three blades (individually turning each blade).

A glass fibre reinforced polyester hood covers the nacelle. The turbines are equipped with a Lightning Protection System (LPS) earthing and isolation to help protect the wind turbine against the physical damage caused by lightning strikes. Additionally, the turbines will be equipped with a Fire Suppression System. The turbine will also be equipped with an Ice Detection and Anti-Icing System.

4.4.1.1.4 Turbine Installation

It is anticipated that each turbine will take approximately 3 to 5 days to erect (depending on the weather) using two cranes. It is expected that the turbine installation phase of the construction works shall take place over a period of approximately 5-months. Further details of the proposed construction programme are contained in Section 4.5.2 of this chapter.

4.4.1.1.5 Turbine Transformer and Wind Farm Power Output

The turbine will have a transformer located within the tower. The turbine transformer will step up the voltage to either 33kV to reduce the electrical loss on the cabling connector circuits that connect to the site substation via a network of underground medium voltage cable circuits to be located adjacent to the proposed site track network.

The Proposed Development will have an estimated Maximum Export Capacity (MEC) of 68.2MW. Assuming an installed capacity of 68.2 MW, this level of generation capacity has been used to calculate the power output of the proposed Wind Farm based on the following calculation:

$$A \times B \times C = \text{Megawatt Hours of electricity produced per year}$$

where:

A = The number of hours in a year: 8,760 hours B = The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 31% is applied here³.

C = Rated capacity of the wind farm: 68.2 MW (worst case scenario to calculate the minimum theoretical power output)

³ EirGrid in their All-Island Generation Capacity Statement (2017-2026) estimates a capacity factor of approximately 31% for onshore wind.



The Proposed Development has the potential to produce approximately 185,203.92 MWh (megawatt hours) of electricity per year and over 6,482.14 GWh (gigawatt hours) of electricity over the 35-year lifetime of the Proposed Development. The electricity produced by the proposed wind farm would be sufficient to supply 44,906 Irish households annually, based on the average Irish household using 4.2 MWh of electricity⁴.

4.4.1.2 Site Access, Internal Access Tracks and Hard Standings

4.4.1.2.1 Site Access Points

Access to the proposed Wind Farm Site shall be taken from the public road network at 6 no. points. These are a combination of existing bog operations accesses which shall be upgraded and proposed access points to be created to facilitate the construction and operation of the proposed wind farm. The individual access points are summarised as follows:

- 1 no. site access point (Access Point 1) in the south of the Site from the Local Road L-2201 to Lanespark at Ballybeg comprising the re-use and upgrading of an existing bog operations rail line and vehicular access crossing point. This access point shall be used during the construction phase only for general construction traffic;
- 2 no. access points (Access Point 2 and 3) between Lanespark and Littleton Bog from the Local Road L-4153 at Derryhogan comprising the re-use and upgrading of an existing bog operations vehicular access road crossing point. These access points shall form a public road crossing. For Access Point 3 a minor realignment of a private gate and hedgerow is also proposed to allow for an appropriate sightline. A letter of consent for this is included. This shall be used as a crossing point for turbine components, and during the construction and operation phases of the Proposed Development;
- 2 no. access points (Access Point 4 and 5) within Littleton Bog off the Local Road L-4114 at Longfordpass North comprising the creation of two new access points on opposite sides of the public road. These access points shall form a public road crossing with the northern of these acting as a crossover point for HGVs, oversized loads and component deliveries only. The southern access point off the L-4114 local road shall be used during the construction and operation phases of the Proposed Development and will be the main access for day to day operations of the wind farm;
- 1 no. access point (Access Point 6) in the north of the site from the R639 at Longfordpass North comprising the creation of a new access point. This shall act as the primary access point to the site for the delivery of large turbine components and shall be used during the construction and operation phases of the Proposed Development. Access shall be via left turn only. It will not be used for general construction or operations traffic.

Tables 4-3 – 4-5 below show the exact nature of the proposed accesses.

⁴ This figure is taken from the March 2017 Commission for Energy Regulation (CER) Review of Typical Consumption Figures Decision Paper and Commission for Regulation of Utilities Energy and Water Monitoring Report for 2021



Table 4-3: Component Deliveries / Oversized Loads / HGVs Access

Access number	Road	Entrance	Exit	Notes
Access 1	L4101	X	X	No access or egress for component deliveries permitted.
Access 2	Unnamed local road at Derryhogan	✓	✓	No left or right turn, crossover to Access 3 permitted.
Access 3	Unnamed local road at Derryhogan	✓	✓	No left or right turn, crossover to Access 2 permitted.
Access 4	Unnamed local road at Longfordpass North	✓	✓	No left or right turn, crossover to Access 5 permitted.
Access 5	Unnamed local road at Longfordpass North	✓	✓	No left or right turn, crossover to Access 4 permitted.
Access 6	R639	✓	✓	Access will be via a left turn only

Table 4-4: General Construction Traffic (excluding HGVs) Access

Access Number	Road	Entrance	Exit	Notes
Access 1	L4101	✓	✓	Construction vehicles permitted to enter and exit, both left and right turns permitted.
Access 2	Unnamed local road at Derryhogan	✓	✓	No left or right turn, crossover to Access 3 permitted.
Access 3	Unnamed local road at Derryhogan	✓	✓	Construction vehicles permitted to enter and exit, both left and right turns permitted.
Access 4	Unnamed local road at Longfordpass North	✓	✓	No left or right turn, crossover to Access 5 permitted.
Access 5	Unnamed local road at Longfordpass North	X	X	No access or egress for general construction traffic permitted.
Access 6	R639	X	X	No access or egress for general construction traffic permitted.



Table 4-5: General Operations Traffic Access

Access Number	Road	Entrance	Exit	Notes
Access 1	L4101	X	X	No access or egress for general operations traffic permitted.
Access 2	Unnamed local road at Derryhogan	✓	✓	General operations vehicles permitted to enter and exit, both left and right turns permitted. No oversized loads to enter.
Access 3	Unnamed local road at Derryhogan	✓	✓	General operations vehicles permitted to enter and exit, both left and right turns permitted. No oversized loads to enter.
Access 4	Unnamed local road at Longford pass North	✓	✓	General operations vehicles permitted to enter and exit, both left and right turns permitted.
Access 5	Unnamed local road at Longford pass North	X	X	No access or egress for general operations traffic permitted.
Access 6	R639	X	X	No access or egress for general operations traffic permitted.

The layout of the site access points is shown on the planning application site layout plan drawings. For detail on the proposed access points to the Site, please refer to Chapter 15, Volume 2.

The access points have been selected with consideration for safety of public road users, construction staff and to ensure that it can be constructed to comply with the requirements of both Tipperary County Council and TII design requirements for direct accesses.

All HGV traffic travelling to the site shall only be permitted to use approved transport routes and site access points as identified in the Traffic Management Plan (TMP) contained within the CEMP at Volume 3, Appendix 4.1.

4.4.1.2.2 Internal Access Tracks

The Proposed Wind Farm will include the construction of 15.45 km of new internal access tracks and the upgrading of 2.95 km of existing bog operations tracks and associated drainage infrastructure.

The proposed internal site track layout will permit access for vehicles during the construction phase, for maintenance during the operational phase and for vehicles to decommission the turbines at the end of the life of the Proposed Development.



All access tracks serving wind turbines will be 6 m wide along straight sections and wider junctions and turning areas as required as shown on accompanying planning application drawings in accordance with wind turbine manufacturer requirements. Access tracks serving the permanent met mast and onsite borrow pit exclusively shall be 6.0 m wide.

Internal wind farm access tracks shall be constructed by a combination of founded and floating methods as required, the majority of the access tracks will be floated, with elements of access tracks for areas around hardstands and around accesses to public roads being founded. The design of access tracks has been determined by geotechnical walkovers and detailed site investigations.

The proportion of access track construction within the Site is as follows:

- Total length of new founded access track: 2.1 km;
- Total length of upgraded existing bog operations track: 2.95 km;
- Total length of new floating access track: 13.35 km.

Access track formation will consist of a minimum 500 mm compacted hardcore on geo-textile membrane with a capping layer of compacted granular stone (CL 804) to form a suitable running surface. The proposed construction methodology for newly constructed tracks is as follows:

Excavated soil will be placed along the side of sections of the tracks in suitable locations as identified in the Peat and Spoil Management Plan (Appendix 8.2, Volume 3) and where appropriate to blend in with surrounding landscaping and partially obscure visibility of the track during operation. Surplus spoil material shall be deposited in designated construction borrow pits and deposition areas as identified in the Peat and Spoil Management Plan.

The stone required for the construction of the internal access tracks will be sourced from within the Site construction borrow pit and from licenced quarries in the vicinity of the Proposed Development. The location of licensed quarries and haulage routes are identified in Chapter 15 and in Figure 15.6, Volume 4.

Further details on access track construction are provided in the CEMP in Appendix 4.1, Volume 3.

Internal access track drawings are presented in the 100-Series planning application drawings.

A drainage system will be installed adjacent to the internal access tracks. Existing drainage infrastructure will be maintained and upgraded where necessary. Existing drainage channels will be upgraded to the same standard as the proposed drainage infrastructure in accordance with the drainage design and Surface Water Management Plan which can be found in Appendix 9.2, Volume 3.

Drainage infrastructure will be constructed in parallel with the access track construction.

Drainage ditches will be formed, within the excavated width and along the sides of the internal access tracks.

The layout of the proposed drainage system can be found on planning application drainage drawings, prepared by Hydro-Environmental Services (HES).



4.4.1.2.3 Hard Standing and Laydown Areas

Each wind turbine will have a turbine hard standing and laydown area adjacent to the foundation to accommodate the delivery and temporary storage of the turbine components prior to their erection and to support the cranes during erection.

Once the turbine components arrive on site they will be placed on the hard standing and lay down areas prior to assembly. The towers will be delivered in sections, and each blade will be delivered in a separate delivery. Subject to suitable weather conditions the turbine will be assembled.

A turbine hard standing area consists of a main crane pad hard standing of 88 m x 30 m with a number of additional smaller hard standings that act as ancillary crane pads and set down and assembly areas, located as shown on the accompanying planning drawings, Series No. 0102. This area will accommodate a main crane and an assist crane during the assembly of the turbine, as well as during occasional maintenance periods during operation. It will also facilitate parking for operation and maintenance staff.

4.4.1.2.4 Watercourse Crossings

Table 4.6 below lists the Watercourse Crossings of WFD Watercourses within the Site. Please refer to Volume 2 Chapter 9, Hydrology, Hydrogeology and Water Quality for a full description and assessment of all other drain and minor crossings.

Table 4-6: List of EPA Watercourse Crossings in Wind Farm Site

EPA Watercourse Name	EPA Code	Existing Crossing Description	Existing Crossing Details	Proposed Crossing
North Glengoole	16N28	Existing, well-established culvert With machine pass, rail bed, and associated drainage overtop	Open and working upstream and downstream. Corrugated circular culvert pipe. Heavy tree and scrub growth at inlet and outlet. Culvert diameter 1.2m, culvert length ~52m	Existing Culvert
Black [Two Mile Borris]	16B01	Existing, well-established culvert With machine pass, rail bed, and associated drainage overtop.	Open and working upstream and downstream Corrugated circular culvert pipe. Heavy tree and scrub growth at inlet and outlet. Culvert diameter 1.5m, culvert length ~55m	Existing Culvert

4.4.1.3 Permanent Meteorological Mast

One (1 no.) permanent meteorological (met) mast shall be erected on Site at the location shown on the Site Layout Figure 4.2, contained within Volume 4 of the EIAR.



The mast shall comprise a 120 m high lattice steel structure with a shallow reinforced concrete foundation. A lightning rod will extend above the mast by 1 m.

The met mast installation works will be as follows:

- An access track will be extended towards the mast location from the local road as shown on Figure 4.2. The access track will be 6m in width. Temporary and permanent drainage infrastructure will be extended, and underground cable power supply will be provided along the new access.
- A small aggregate crane pad of 40 m x 15 m in size will be constructed in front of the proposed mast location.
- General construction methods for the above access track and hard standing will match those described for wind farm access tracks and hard standings however the dimensions and stone depth requirements of the infrastructure will be considerably less than that required for that serving the wind turbine construction.
- The foundation will be excavated followed by shuttering, steel fixing and finally concrete pouring by ready mix truck. Excavation and concrete operations will be carried out in accordance with the CEMP (Appendix 4.1). The foundation will be 12 m x 12 m x 1.8 m in size.
- Following crane setup, the mast sections will be delivered and unloaded by truck.
- In accordance with an agreed lifting plan, mast sections will be lifted by crane into place. Wind speeds will be monitored at all times during lifting operations by the lead climber and crane operator.
- Mast sections will be bolted together by climbers.
- Following erection of main mast sections, lightning protection and other ancillary components will be fixed to the mast.

Details of the proposed met mast design can be found in the planning application drawings, Series No. 0102.

4.4.1.4 On-Site Electrical Cabling

Electricity generated from wind turbines will be collected at medium voltage (33kV) by an internal circuit of buried cables. This circuit will be terminated at the proposed onsite substation. The internal collector circuit cable routes are shown on the 0100 series planning application drawings and will follow the alignment of the internal access tracks.

The electricity will be transmitted as a three-phase power supply so there will be three individual conductors (or individual cables) in each cable circuit. The three conductors will each be laid in separate ducts which will be laid in a trefoil formation but may also be laid in a flat formation where conditions require it such as where the ducts need to cross an existing structure or culvert in such cases, cable ducts will be cast into the structures to allow the power cables to cross the watercourses under the access tracks.

Internal cable trench section types associated with on-site electrical cabling are presented in the accompanying planning application drawings.

Further details on cable trench construction methodologies can be found in the CEMP in EIAR Volume 3, Appendix 4.1.



4.4.1.5 Construction Borrow Pit and Peat /Spoil Deposition Areas

The civil engineering assessment of the Proposed Development indicates the requirement for over 316,148 m³ of stone across the Site to provide for the internal access tracks, hard standings, upfill to foundations and construction of the temporary compounds. Further details are provided in the Peat and Spoil Management Plan contained in Appendix 8.1 and Chapter 8 – Land, Soils and Geology.

One (1 no.) construction borrow pit has been identified within the Site.

The construction borrow pit will be excavated only as required. Where rock and fill material are available from the formation of turbine foundations, turbine hard standings and internal access tracks this material will be used first.

Weaker rock will be extracted using a hydraulic excavator and a ripper. Where stronger rock is encountered and cannot be extracted using an excavator, then rock breaking equipment will be employed. This will typically involve the use of a hydraulic excavator with a rock breaker.

Excavated rock will be crushed on site using a mobile crusher and crushed down into the correct grade for use in the construction.

The location and design of the construction borrow pit is shown planning drawings - Series 0100 and 0600.

The construction methodology for borrow pit is provided in the CEMP in EIAR Volume 3, Appendix 4.1.

Surplus topsoil/peat and spoil will be deposited in berms for reinstatement purposes around turbine bases, hardstanding and within proposed designated Peat Deposition Area (PDAs), shown in Figure 4.2. Details of peat and spoil management are presented in Appendix 8.1 – Spoil and Peat Management Plan in Volume 3 and Chapter 8 – Land, Soils and Geology.

4.4.1.6 Biodiversity Enhancement and Management Plan Measures

A Biodiversity Enhancement and Management Plan (BEMP) has been prepared to outline a set of land management prescriptions as part of proposed project. The BEMP is located in Appendix 6.1 of Volume 3 of this EIAR.

The BEMP lands are located wholly inside the site boundary, in Littleton Bog, and shown on Figure 6.15 of Volume 3 of this EIAR.

The BEMP includes both mitigation and enhancement measures relating to habitat creation and management, which are clearly differentiated. Additionally, maintenance measures are detailed. All mitigation, enhancement and maintenance measures included in this BEMP will be implemented in full.

The BEMP includes the following:

- Details of all measures to be taken to protect and enhance habitats of local biodiversity value occurring at the site and the species which utilise the same within the vicinity;
- A description of target habitats and range of species appropriate to the site;
- Appropriate strategies for maintaining existing and targeted habitats and species;
- Timelines for new planting and habitat creation;
- Details of ecological oversight and monitoring;



- A map identifying the areas to be managed.

The measures set out in the BEMP include those designed to protect and enhance existing habitats. Higher value habitats will be actively managed to maintain and improve their value and lower value habitats will see specific interventions designed to improve their attractiveness for a range of species. Appropriate planting will increase the available feeding, roosting and nesting cover for wildlife.

The measures outlined in the BEMP include:

- Tree Planting;
- Drain Blocking;
- Wetland Retention and Level Monitoring;
- Creation of Ponds / Scrapes;
- Eucalyptus Removal;
- Heath / Marsh Fritillary Habitat and management of same;
- Establishment of Calcareous Grassland on Main Site Compound;
- Nest Boxes;
- Log Piles;
- Creation of Refugia Piles and Hibernacula.

The BEMP programme will run for the lifetime of the Proposed Development and many of the proposed features (e.g. tree and hedgerow planting) will have a longer-lasting biodiversity benefit.

It is expected that measures associated with the implementation of the proposed BEMP will be equivalent to standard agricultural activities and will be maintained by BnM.

4.4.1.7 *Recreational Amenity Trails*

As part of the Proposed Development, a recreational amenity in the form of walking and cycling trails is proposed within the Wind Farm Site to enhance public access and promote the recreational use of the area.

A network of trails forming loops and links is proposed utilising a combination of the internal access tracks proposed for the windfarm and approximately 4.0 km of new floating dedicated amenity tracks, with all new amenity trails designed to a width of 3 m to accommodate both pedestrians and cyclists. To support public access, an additional car parking area is proposed adjacent to the site entrance to the R639 in proximity to the amenity trail.

As part of this dog proof fencing is included, which will help to protect adjacent sensitive areas.

A drainage system will be installed adjacent to the amenity tracks. Existing drainage infrastructure will be maintained and upgraded where necessary. Existing drainage channels will be upgraded to the same standard as the proposed drainage infrastructure in accordance with the drainage design and Surface Water Management Plan which can be found in Appendix 9.2, Volume 3.

The proposed locations and layouts of the recreational trails and associated infrastructure are illustrated in the planning application drawings, Series No. 0100.



4.4.1.8 On-Site Electricity Substation

An onsite 110 kV electricity substation will be constructed within the Proposed Wind Farm Site as shown in Figure 4.2, Volume 4. This will provide a connection point between the wind farm and national grid via underground cabling to the existing Ballyragget 110kV substation within the townland of Moatpark, Co. Kilkenny.

The total area of the on-site substation compound is 9,375 m² and consists of 3 no. sub-compounds as follows:

- TSO compound measuring 25 m x 18 m, 9.69 m in height;
- IPP compound measuring 29.2 m x 9.3 m, 4.71 m in height;
- Ancillary services equipment compound measuring 36.7 m x 12.2 m.

The substation compound will include 2 no. substation control buildings and electrical components necessary to export the electricity generated from the wind farm to the national grid. The substation compound will be surrounded by a 2.7-metre-high steel palisade fence and internal fences will also be provided to segregate different areas within the main substation compound. A total of 10 no. car parking spaces are proposed of the overall substation compound, 4 no. to serve the ESB compound and 6 no. for the developers IPP compound, of which 4 no. are to be EV parking spaces with chargers provided.

Lighting will be required on site, and this will be provided by lighting poles located around the substation and exterior wall mounted lights on the control buildings. This lighting will be sensor activated.

2 no. wastewater holding tanks will be provided outside the substation compound fence line so that it can be maintained where required without requiring access to the substation compound. The wastewater holding tank will be a sealed storage tank with all wastewater tankered off site as required by an authorised waste collector to a wastewater treatment plant. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007, will be employed to transport wastewater away from the site. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. 2 no. bored wells are proposed which will provide water to the substation, additionally, 2 no. rainwater harvesting tanks associated with the substation will also be installed. .

The substation compound will also contain external electrical and ancillary infrastructure including the following:

- Cable sealing ends;
- Surge arrestors;
- Cable disconnectors;
- Post insulators;
- Circuit breakers;
- Current and voltage transformers;
- Steel gantry's and cable chairs;
- Power transformers;
- Power quality compensation equipment;
- Concrete plinths and bunds;
- External lighting;
- Lightning protection masts;
- Security cameras;
- Palisade and stock proof fencing and gates.

There is 1 no. 36m high telecommunications mast located adjacent to the substation compound with an approximately 1 m long lightning protection rod protruding above this).



There are 6 no. lightning protection masts (18 m in height), these will represent the tallest structures in the compound.

Details of the proposed substation compound and equipment can be found in planning application drawings, Series 0102.

4.4.2 Grid Connection

4.4.2.1 *Grid Connection Cabling*

The proposed Grid Connection (GC) route will consist entirely of underground 110kV cable and will connect the on-site substation at Littleton Bog to the existing Ballyragget 110 kV substation within the townland of Moatpark, Co. Kilkenny.

The proposed GC route will be 30.9 km in length, with 28.4 km to be constructed within the existing road corridor and the remainder in private lands. Refer to Figure 4.3, Volume 4 for the overall layout of the GC route.

Connection works from the onsite substation to Ballyragget substation will involve the installation of ducting, joint bays and ancillary infrastructure and the subsequent running of cables along the existing road network. This will require delivery of plant and construction materials, followed by excavation, laying of cables and subsequent reinstatement of trenches and road surfaces.

For cable trenches located in public roads, the contractor will excavate cable trenches and then lay high density polyethylene (HDPE) ducting in the trench in a surround of cement bound material. A rope will be inserted into the ducts to facilitate cable-pulling later. The as-constructed detail of the cable duct locations will be carefully recorded. Cable marker strips will be placed above the ducts and two communication ducts will also be laid. An additional layer of cable marker strips will be laid above the communication ducts and the trench backfilled. Back-filling and reinstatement in public roads will be to a specification to be agreed with the road authority, at a minimum matching the pre-construction surface. Please refer to Appendix 4.3 for details of the grid connection and cabling.

A minimum separation distance of 300mm will be maintained between existing services and new cable ducts. New cable ducts will be laid below existing services wherever possible.

In advance of the construction phase cable detection tools, a ground penetrating radar and slit trenches will be used, as appropriate, to verify the exact locations of existing services. The final locations of the proposed cable routes in the public roads and in the verge along the public road will be within the area indicated and assessed in this EIAR and will minimise conflicts with other services.

It is expected that full road closures will be put in place to facilitate cabling works in combination with lane closures, partial road closures and stop/go systems. This will enable the works to be completed as quickly and as safely as possible, with minimal disruption time for residents of the area. These works shall be undertaken on a rolling basis with short sections closed for short periods before moving onto the next section. This is described in more detail in Chapter 15, Volume 2 of the EIAR.

Connection works within the Ballyragget substation property boundary will be carried out by the network operator in accordance with a future grid connection offer.

Table 4-7 below shows the 4 no. non-watercourse features that are crossed by the GC route.



Table 4-7: Grid Connection Non-Watercourse Crossing

Crossing ID	Easting (ITM)	Northing (ITM)	Feature	Crossing Method
1A	623105	659377	Railway line crossing	Standard crossing below railway line
1B	624292	660280	Cattle underpass structure	HDD
4A	635357	663902	Ringfort adjacent to road	Standard crossing below road
8	643278	668407	High pressure gas	Standard crossing below gas line

4.4.2.2 Watercourse Crossings Along the Grid Connection Route

The GC cable route contains 11 no. watercourse crossings, 10 no. of which are EPA mapped. These are listed in 4.8 below.

Table 4-8: Grid Connection Watercourse Crossings

Crossing ID	Easting (ITM)	Northing (ITM)	Feature	EPA Watercourse Name	EPA Code	Proposed Crossing Methodology
GC-WC-01	624884	660459	River	Drish River	16D02	HDD
GC-WC-02	627557	662814	River	Goul River	15G02	HDD
GC-WC-03	628129	663283	Stream	Aldreagh Stream	15A03	HDD
GC-WC-04	630026	663573	Stream	Borrisbeg Stream	15B18	HDD
GC-WC-05	631586	663278	Stream	Borrisbeg Stream	15B18	HDD
GC-WC-06	635357	663902	Stream	Clomantagh_Lower Stream (not present)	15C91	Within road
GC-WC-07	640307	664969	Stream	Gorteenahilla Stream	15G08	HDD
GC-WC-08	640626	665400	Stream	No EPA mapped stream at this location	N/A	HDD
GC-WC-09	642120	667578	Stream	Lismaine Stream	15L16	HDD
GC-WC-10	643572	668666	Stream	Lisdowney Stream	15L02	HDD
GC-WC-11	643930	671951	River	River Nore	15N01	HDD

10 no. crossings will be traversed using horizontal directional drilling (HDD). The remaining crossing will be traversed by undercrossing or overcrossing methods, depending on the depth of the culvert or using open trenching.



Please refer to Volume 2 Chapter 9, Hydrology, Hydrogeology and Water Quality for a full description and assessment of all other drain and minor crossings. Further details on watercourse crossing methods and detailed description of the construction methodologies along the proposed GC cable route can be found in the CEMP in Appendix 4.1, Volume 3 of the EIAR.

4.4.2.3 *Joint Bays and Communication Chambers*

Joint bays are pre-cast concrete chambers where individual lengths of cables are joined to form one continuous cable. A joint bay is constructed in a pit. The bay is 6m x 2.5m x 2.1m deep. A reinforced precast concrete slab is laid in the bay to accommodate the jointing enclosure.

Suitable joint bay locations along the grid connection route have been identified and assessed as part of the EIAR.

It is expected that 70 no. joint bays will be required for the grid connection. Of these, 67 no. joint bays shall be located in public roads with 3 no. located on private lands. The locations of joint bays are shown on Figure 4.3.

Precast concrete cable joint bays will be installed within excavations in line with the cable trench. The cable joint bays are backfilled and the finished surface above the joint bay reinstated as per its original condition.

The cable joint bays are re-excavated a second time during cable pulling and jointing, after which the finished surface above the joint bays is reinstated again to its original condition. Construction work areas and traffic management measures will be set up at 2 no. consecutive cable joint bays simultaneously. The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable is pulled through. The cables are jointed within the precast concrete cable joint bays. The finished surface above each cable joint bay is reinstated to its original condition, and the construction work area removed.

Further details of joint bay construction can be found in the CEMP in Appendix 4.1, Volume 3 of the EIAR.

4.4.3 Turbine Delivery Route

Large components associated with the wind farm construction e.g. turbine blades and tower sections, will be transported to site via the identified turbine delivery route (TDR) which travels along the following summarised route:

- Loads will exit the Port of Entry (PoE) of Foynes Port and join the N69 heading east;
- At Limerick, they will join the N18 heading northeast and merge onto the M7;
- Loads will exit at Junction 17 Portlaoise Interchange and perform a U-turn to re-join the M7 heading southwest;
- They will merge onto the M8 and continue southwest;
- At the M8 Junction 4 East Roundabout loads will turn left to join the R693;
- At the following roundabout loads will turn right onto the R639 then drive through Urlingford;
- To the southwest of Urlingford loads will turn left at the proposed site entrance.



A substation transformer unit will be transported to site which will be categorised as an abnormal load. As a result, an abnormal load permit will be sought for this movement. Multiple transformers have already been delivered to ESNB substations in the area without any impact on the structures along the road network.

A route selection process was carried out to identify the optimum delivery route to the Site. Please refer to Appendix 4.2 in Volume 4 for the Abnormal Indivisible Load Route Survey prepared by Pell Frischmann regarding this.

Figure 4.4 presents the proposed TDR and location of temporary accommodation works associated with the project.

Further details on the proposed TDR are contained in Chapter 15 – Material Assets.

4.4.3.1 Temporary Accommodation Works

Temporary accommodation works will be required at selected locations along the TDR to facilitate the delivery of large components to the site. No permanent road widening or junction accommodation works are required along the turbine delivery route. Some temporary hardcore surfacing will be required at roundabouts or areas of oversail. All temporary accommodation works associated with the TDR will be fully reinstated following the construction stage. Further details and assessment of these works are provided in Chapter 15- Material Assets and in Appendix 4.2.

Temporary accommodation works will only be required during the operational phase in the unlikely event of a major turbine component replacement. The temporary accommodation works will not be required for the decommissioning phase as turbine components can be broken up on site and removed using standard HGVs.

Key elements of the temporary accommodation works for the delivery of turbines between the M8 and site are summarised in Table 4.9 and full details of all accommodation works are provided in Chapter 15 Material Assets as well as Appendix 4.2.

No planning permission is required for proposed temporary accommodation works, any works associated with the remainder of the TDR Nodes shall be permitted through a road opening license.

Table 4-9: TDR Temporary Accommodation Works between M8 and Site (Load Route Survey, Pell Frischmann, January 2026)

TDR Node Reference	Location	Summary Description of Proposed Temporary Accommodation Works
18	M8 / R693 Roundabout	Removal of two lighting columns and road signs and vegetation clearance to facilitate oversail. Load bearing surface to be laid.
19	R693 / R639 Roundabout	Removal of lighting columns, road signs and tree clearance and laying of load bearing surfacing.
20	R639 Splitter Island	Removal of traffic calming bollards and a load bearing surface to be laid.



4.4.3.2 *Other Haul Routes*

The location of licensed quarries, waste facilities and associated haulage routes to the Site are identified in Chapter 15 – Material Assets.

4.5 Construction

4.5.1 Construction Activities

In the event that the Commission decides to grant planning permission for the elements of the Proposed Development as described in Section 4.2.1, upgrading of existing site tracks and the provision of new site tracks will precede all other activities. Drainage infrastructure will be upgraded and constructed in parallel with the track construction. This will be followed by the construction of the turbine hard standing areas and turbine foundations.

In parallel with these works the on-site electrical works i.e., the sub-station and internal cable network as well as off-site connection works to the national grid will be completed, subject to obtaining separate planning permission for these works. Construction methodologies as well as details for the management of refuelling, deliveries to site and waste management are described in the CEMP in Appendix 4-1.

4.5.2 Construction Programme

The construction of the project in its entirety is expected to take 24 months. The proposed construction programme upon which assessments in the EIAR have been based is presented in Table 4.10 below.



Table 4-10: Proposed Construction Programme

Activity	Month																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mobilisation and site setup																								
Site clearance and felling																								
Internal access tracks (incl. amenity trails)																								
Turbine hard standings																								
Turbine foundations																								
TDR accommodation works																								
Turbine Installation																								
Onsite substation																								
Permanent Met Mast																								
Grid connection cable works																								
Private electrical network																								
Landscaping, reinstatement, demobilisation																								



4.5.3 Hours of Construction

The hours of construction activity for the project will be limited to avoid unsociable hours as per Section 8.5 (d) of the code of practice for BS 5228: Part 1: 1997. Construction operations shall be restricted to between 07:00 - 19:00 hours Monday to Friday and 07:00 - 13:00 hours on Saturdays. It should be noted that it will be necessary to commence turbine base concrete pours earlier due to time constraints incurred by the concrete curing process. Work on Sundays or public holidays will only be conducted in exceptional circumstances or in an emergency. In such circumstances non-standard construction times will be agreed with the Local Authority in advance. Additional emergency works may also be required outside of normal working hours as quoted above. Further details on working hours and restrictions of same are provided in the CEMP in Appendix 4.1, Volume 3 of the EIAR.

4.5.4 Construction and Environmental Management Plan (CEMP)

A detailed Construction and Environmental Management Plan (CEMP) is contained in Appendix 4.1, Volume 3 of the EIAR.

The CEMP sets out the key environmental management measures associated with the construction, operation and decommissioning of the proposed project, to ensure that during these phases of the project, the environment is protected, and any potential impacts are minimised. The CEMP will be updated as required at the construction stage, on the appointment of the main contractor to the project to address the requirements of any relevant planning conditions, including any additional mitigation measures that are conditioned.

The CEMP document is divided into six sections:

Section 1:

Introduction provides details on the existing site and the proposed project.

Section 2

Existing Site Environmental Conditions provides details of the main existing geotechnical, hydrological, ecological and archaeological conditions onsite. These conditions are to be considered by the Contractor in the construction, operation and decommissioning of this proposed project.

Section 3

Overview of Construction Works, this section provides an overview of the construction works proposed and drainage and sediment controls to be installed.

Section 4

Environmental Management Plan (EMP), this section outlines the main requirements of the EMP and outlines controls for the protection of the environment for example soil management, waste management, traffic management, site drainage management, site reinstatement & decommissioning, habitat and archaeology management etc.



Section 5

Safety & Health Management Plan, this section defines the work practices, procedures and management responsibilities relating to the management of health and safety during the design, construction and operation of the proposed project.

Section 6

Emergency Response Plan contains predetermined guidelines and procedures to ensure the safety, health and welfare of everybody involved in the project and to protect the environment during the construction phase of the proposed project.

4.5.5 Traffic Management

A Traffic Management Plan (TMP) has been prepared as part of this EIAR and is contained within the CEMP at Volume 3, Appendix 4.1.

In the event permission is granted for the proposed project the TMP shall be updated as required following the appointment of the contractor for the main construction works to address the requirements of relevant planning conditions and mitigation measures identified in the EIAR.

The TMP will be agreed with Tipperary and Kilkenny County Councils to provide a safe environment for road users and construction workers and to prevent soiling and damage to the existing public road network as a result of the construction of the Project.

4.5.5.1 *Construction Haul Routes*

The stone required for the construction of the internal access tracks will be sourced from within the on-site construction borrow pit as far as is possible. The upper 150 mm of wearing course / capping layer will come from a quarry. This will significantly reduce the need for road haulage from local quarries.

Haul routes to be used throughout the construction process are detailed in the Traffic Management Plan contained in the CEMP, Volume 3, Appendix 4.1.

4.5.5.2 *Dust Suppression*

In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. If necessary, water will be taken from stilling ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and the construction compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this would 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 may lead to increased runoff. A site speed limit will also be adhered to which will assist in suppressing dust on the Proposed Development site.



4.5.5.3 *Vehicle Washing*

Wheels or vehicle underbodies will be washed before leaving the site to prevent the build-up of mud on public (and site) roads. A vehicle wheel wash facility will be provided near the entrance to the Wind Farm Site. The site roads will be well finished with non-friable, 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. A road sweeper will be used if any section of the public roads were to be dirtied by trucks associated with the Proposed Development.

4.5.6 Soil and Peat Management

Management of all excavated soils and peat shall be carried out in accordance with the Soils Management Plan contained within the CEMP in Appendix 4.1.

A total of 6 no. peat deposition areas has been identified on site covering c. 186,332 .m². These accommodate a total of 139,749 m³ at a height of 0.75 m or 186,332 m³ at a height of 1 m. This is sufficient to accommodate the level of peat being extracted.

Topsoil will be re-used for landscaping and will also be used for reinstatement purposes around turbine bases and hard standing areas.

Further details on soils management can be found in Chapter 8 - Land, Soils and Geology, Volume 2 of this EIAR and the Spoil and Peat Management Plan in Appendix 8.2, Volume 3 of the EIAR.

4.5.7 Surface Water Management and Site Drainage

An appropriate drainage design is the primary mitigation measure for the protection of waterbodies, incorporating silt protection infrastructure and control measures to reduce the rate of surface water runoff from the wind farm site.

A drainage system will be installed adjacent to the internal access tracks. A SuDS design approach shall ensure that existing drainage patterns shall be maintained throughout the Site. This is outlined in detail in the Surface Water Management Plan (SWMP) which is contained in Appendix 9.3, Volume 3 of the EIAR.

Two distinct methods will be employed in the management of construction surface water runoff. The first method involves keeping clean water clean by avoiding disturbance to natural drainage features, minimising any works in or around drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting runoff from works areas within the site that might carry silt or sediment, and to route them towards settlement ponds prior to controlled diffuse release over vegetated natural surfaces. There will be no direct discharge to surface waterbodies.

The proposed access tracks will be constructed from a permeable aggregate material to allows the runoff to infiltrate underground. The excess water will drain into the swales which will be connected, during the construction stage, to the settlement ponds. Settlement ponds will be designed in the accordance with CIRIA C648.

Existing bog operations drainage is extensive throughout the Site and shall be maintained and upgraded as required to meet the requirements of the proposed wind farm drainage design.

Further details of the surface water management and proposed drainage of the Site is contained in Chapter 9 - Hydrology, Hydrogeology and Water Quality and the SWMP in Appendix 9.2, Volume 3 of the EIAR.



4.5.8 Waste Management

A Waste Management Plan for the project has been included in the CEMP, Volume 3, Appendix 4.1.

The Developer, in conjunction with the appointed contractor, will prevent, reduce, reuse and recover as much of the waste generated on site as practicable and ensure the appropriate transport and disposal of residual waste to off-site licensed facilities. This is in accordance with the relevant National Waste Management Guidelines and the European Waste Management Hierarchy, as enshrined in the Waste Management Act 1996, as amended.

The location of licensed waste facilities in the vicinity of the proposed project area identified in Appendix 4.1, Volume 3.

Any waste generated during the project construction phase will be collected, source separated and stored in dedicated receptacles at the temporary compound during the construction stage. It will be the responsibility of the site contractor for the main construction works (when appointed) to nominate a suitable site representative as a Project Manager, Site Manager or Site Engineer as Waste Manager who will have the overall responsibility for the management of waste. The location of licensed waste facilities in the vicinity of the proposed project area identified in Appendix 4.1, Volume 3.

4.5.9 Temporary Site Compounds

During the construction phase, temporary facilities will be provided for construction personnel. 5 no. temporary site construction compounds shall be created to facilitate the construction of the Proposed Development. The locations of the temporary site compounds are shown on the Site Layout Figure 4.2, contained within Volume 4 of the EIAR.

Facilities to be provided in the temporary site compound will consist of the following:

- Site office portacabins;
- Employee parking;
- Portable toilets with sealed contained foul drainage holding tanks;
- Bunded fuel storage;
- Bottled water for potable supply;
- Contractor lock-up facility;
- Rainwater harvesting tanks;
- Water tanks to supply water used for other purposes;
- Diesel generator;
- Canteen facilities;
- Waste management areas;
- Material/non-fuel storage areas.

The temporary site compound shall be aggregate hard standings surrounded by security fencing, located as shown on the accompanying drawings. Temporary facilities will be removed, and the lands reinstated on completion of the construction phase.



4.6 Operation

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

During the operational period, the turbines will operate automatically on a day-to-day basis, responding by means of anemometry equipment and control systems to changes in wind speed and direction. The turbine manufacturer or a service company will carry out regular maintenance of the turbines. Scheduled services will occur twice a year.

The operation of the wind turbines will be monitored remotely, and an operative working from a remote headquarters will oversee the day to day running of the proposed wind farm.

The applicant requests the grant of permission is on the basis of a 35-year operational period from the date of full operational commissioning of the wind farm. With permission for the onsite substation sought in perpetuity given that the substation will form part of the national electricity network. Therefore, the substation will be retained as a permanent structure and will not be removed.

Thirty-five years is the anticipated minimum 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 be optimum from an environmental viewpoint, particularly in relation to carbon savings.

4.6.1 Routine Maintenance

Wind farms are designed to operate largely unattended and during the operational phase the wind farm will be managed and controlled remotely. Each turbine will have its own in-built supervision and control system that will be capable of starting the turbine, monitoring its operation and shutting down the turbine in the case of fault conditions.

Visits will be necessary to carry out routine inspection and preventative maintenance. This maintenance includes, inter alia, the inspection of turbines; lubrication and replacement of any components; and upkeep and repair of access tracks to allow safe year-round access. Infrastructure associated with the Wind Farm such as the substation, cabling and drainage systems also require periodic checks and servicing to ensure safety and efficiency is maintained. A light vehicle will be required for routine access, and in the event of any unscheduled fault conditions. In the unlikely event of a major component failure, a mobile crane will be required on site.

It is expected that maintenance activities associated with the implementation of the proposed BEMP measures will be equivalent in nature to agricultural activities and will be carried out by the involved landowners. The BEMP management measures are described in detail in Appendix 6.1.

4.7 Decommissioning

On decommissioning, cranes will disassemble the above ground turbine components which will be removed off site for recycling. All the major component parts are bolted together, so this is a relatively straightforward process.



It is proposed that all internal site access tracks and turbine hard standings will be left in place. Turbine hard standings will be covered using original stripped topsoil, which would have been placed adjacent to the works area and landscaped during the construction stage, and allowed to revegetate naturally.

Leaving the turbine foundations in-situ is considered a more environmentally sensible option as to remove the reinforced concrete associated with each turbine would result in environmental nuisances such as noise, vibration, and dust.

The temporary accommodation works along the TDR will not be required for the decommissioning phase as turbine components can be dismantled on site and removed using standard HGVs.

Grid connection infrastructure including the on-site substation and ancillary electrical equipment shall form part of the national grid and will be left in situ.

It is expected that the decommissioning phase will take no longer than 6 months to complete.

A detailed decommissioning plan will be agreed in advance of construction with Tipperary County Council.

4.8 Community benefit fund

In addition to employment during the construction and operational phases of the proposed development and annual rates that will be paid to the local authority by the developer, a Community Benefit Fund will be developed during the first year of operation of the wind farm.

A key criterion of the Department's Community Benefit Rulebook, as updated in 2025, is that the projects and initiatives will benefit the communities surrounding the wind farm. As part of this, a Fund Committee will be established and will consist of a number of volunteer community representatives, the project Developer and administrator (if applicable). The Fund Committee should aim to represent the widest cross-section of the community possible. The Fund Committee will then develop a strategy for the Community Fund. Both BnM and SSE have a long history of delivering local community funds, and have supported a number of strategic initiatives, including scholarships and major projects.

For example, SSE operates a Scholarship Fund for students living near Galway Wind Park, and BnM offers Scholarships across its Cloncreen, Derrinlough and Oweninny Phase 2 Wind Farms. These funds can provide a monetary grant to a number of successful applicants, for each year of study, up to a maximum of 4 years, for a number of students (including apprenticeships) living in the vicinity the proposed development. The Scholarship may be used towards course fees, accommodation, tools, transport costs, etc.

The Fund will also include a Near Neighbour Scheme which will offer principal primary residents within a prescribed distance of a wind turbine an annual financial payment, which could be used towards energy bills, home retrofits, or other energy efficiency measures. In addition to these payments, this Scheme may also offer participants a contribution towards the completion of energy measures on the property and/or education support.

The value of the Community Benefit Fund will be linked to the productivity of the wind farm and is calculated based on €2/MWh and the overall total generated by the wind farm. It is estimated that the proposed Fund could be in the region of circa €5.5 million over the first 15 years of the Fund, on the basis that the proposed project will generate 185,204 MWh of electricity produced per year.



4.9 Do-Nothing Scenario

Please note that irrespective of the consenting of the Proposed Wind Farm the remaining measures outlined in the Rehabilitation Plans, i.e. monitoring of the Littleton, Longfordpass and Lanespark Phase 1 measures and enhanced Phase 2 measures at nearby Ballybeg and Derryvella bogs, will continue to be implemented by BnM in agreement with the EPA. Please see Appendix 2.1 (Volume 3 of the EIAR) and Section 2.2.1 of Chapter 2 of the EIAR for further detail.



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