2 PROJECT DESCRIPTION

2.1 INTRODUCTION

This Chapter of the EIAR provides a description of all elements of the proposed Letter Wind Farm (The Development). This includes all elements within the redline boundary, the wind turbines, 20kV Substation, Site Access Tracks, Turbine Hardstands, all site infrastructure, and grid connection route. This Chapter also provides a description of the work required along Turbine Delivery Route which is outside the redline boundary and which together with the works within the redline boundary are defined as the Project which form the basis of the assessments presented within Chapters 4 to 17. This Chapter provides details of the construction, operational and decommissioning phases.

This Chapter includes an overview of the Project followed by a detailed description of the main components and their method of construction. Measures that have been built into the design of the Project to reduce effects, also known as 'Embedded Mitigation', measures, are set out in the various technical chapters and in this chapter. In addition to these Embedded Mitigation measures, Chapters 4 to 15 also present mitigation and enhancement measures where specifically relevant to their assessment topic.

This Chapter of the EIAR is supported by supporting Figures in **Volume III** and the following Appendix documents provided in **Volume IV**:

- Construction Environmental Management Plan (CEMP) in **Appendix 2.1**
- Wind Farms within 20km of the Development in **Appendix 2.2**
- List of Projects for Cumulative Assessment in **Appendix 2.3**
- Forestry Replant Report **Appendix 2.4**

Common acronyms used throughout this EIAR can be found in **Appendix 1.2**.

2.2 PROJECT DESCRIPTION

Planning Permission is being sought by the Developer for the construction of 4 no. wind turbines, a permanent met mast, installation of battery arrays, an on-site 20kV substation and all ancillary works.

The Development will comprise of the following main components:

- Construction of 4 No. wind turbines with an overall ground to blade tip height ranging from 149.85m to 150m inclusive. The wind turbines will have a rotor diameter ranging from 115.7m to 117m inclusive and a hub height ranging from 91.5m to 92m inclusive.
- Construction of permanent turbine hardstands and turbine foundations.
- Construction of a bottomless bridge culvert across a minor stream on site (EPA River Segment Code: 26_4053).
- Construction of one temporary construction compound with associated temporary site offices, parking areas and security fencing.
- Installation of one (40-year life cycle) meteorological mast with a height of 50m and a 4m lightning pole on top.
- Construction of new internal site access tracks and upgrade of a section of existing internal Site track, to include all associated drainage.
- Improvement of existing site entrance with access via the L4282.
- Development of an internal site drainage network and sediment control systems.
- Construction of 1 no. permanent 20kV electrical substation
- All associated underground electrical and communications cabling connecting the wind turbines to the wind farm substation.
- All works associated with the connection of the wind farm to the national electricity grid, which will be via 20kV underground and partially overhead cable connection approximately 6.4km in length to the existing ESB Corderry 110kV Substation in the townlands of Letter, Greaghnadarragh, Stangaun, Corralustia, Turpaun, Gortnasillagh West, Lugmeeltan, Leckaun, Lisgaveen, Treannadullagh, Drumcashlagh and Corderry.
- Ancillary forestry felling to facilitate construction of the development.
- All associated site development works including berms, landscaping, and soil excavation.
- Installation of battery arrays located within container units (2 no. units) and associated electrical plant for grid stabilisation adjacent to the substation building.
- Development of one on-site borrow pit.
- A 10-year planning permission and 40-year operational life from the date of commissioning of the entire wind farm is being sought. This reflects the lifespan of modern-day turbines.

2.3 SITE LOCATION AND ENVIRONS

2.3.1 Introduction / Existing Land Use

The Site, as shown in **Figure 1.1**, is located within a cutaway peatland landscape near the Corry Mountains, Co. Leitrim. The Site is located approximately 2.9km west of Drumkeeran Village, Co. Leitrim and approximately 21km southeast of Sligo Town.

The Site is located within the townlands of Letter, Boleybaun and Stangaun.

The proposed grid connection is located in the townlands of Letter, Greaghnadarragh, Stangaun, Corralustia, Turpaun, Gortnasillagh West, Lugmeeltan, Leckaun, Lisgavneen, Treannadullagh, Drumcashlagh and Corderry.

Temporary works will be required to accommodate the delivery of the turbine components. These temporary works are not included as part of the planning application but are assessed a part of this EIAR and are located on the R263, N56, N15, N4, R285, and R280.

The Site extends to c. 45ha and has a mixed use as both commercial forestry and upland grazing.

The closest inhabited dwelling (H3) is located 710m from the nearest turbine. There are 17 houses within 1.5km of the proposed turbines. All houses located within 1.5km of the proposed turbines are shown on **Figure 1.3**.

2.3.2 Removal of Forestry and Replant Lands

The Site contains 19.83 hectares of commercial forestry. Turbines T1 and T2 are surrounded by forestry. Subsequently, tree felling will be required as part of the project. To facilitate the access roads, civil works, site compounds, borrow pits and Turbine Hardstands, 2ha coniferous forestry will need to be clearfelled. The felling area proposed is the minimum necessary to construct the Development and to comply with any environmental mitigation.

To ensure a tree clearance method that reduces the potential for sediment and nutrient runoff, the construction methodology will follow the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) and Forest Harvesting and Environmental Guidelines (2000).

The use of existing forestry infrastructure will be maximised to lessen disturbance from machines used for felling.

In this regard, before any felling works commence on site all personnel, particularly machine operators, will be made aware of the following and will have copies of relevant documentation, including:

- The felling plan, surface water management, construction management, emergency plans and any contingency plans;
- Environmental issues relating to the site;
- The outer perimeter of all buffer and exclusion zones;
- All health & safety issues relating to the site.

All construction of tracks, including the creation of buffer zones and roadside drainage, will take into consideration the appropriate edition of the following specifications, which have been developed by the Forest Service:

- Forest Protection Guidelines
- Forestry and Water Quality Guidelines
- Forest Harvesting and Environmental Guidelines
- Forestry and Freshwater Pearl Mussel Requirements - Site Assessment and Mitigation Measures
- Forest Biodiversity Guidelines
- Forestry and The Landscape Guidelines
- Forestry and Archaeology Guidelines

This forestry to be clearfelled is mostly consisting of mixed quality, semi-mature Lodgepole pine and Sitka spruce and is expected to take up to 1 week. This forestry will need to be replaced. Suitable replacement land has been sourced in Coolatty, Clones, Co. Monaghan which is 72km from the wind farm site and also outside any potential hydrological pathways of connectivity i.e., outside the catchment within which the proposed project is located.

It should be noted that the clearfelling of trees in the State requires a felling licence. The associated afforestation of alternative lands equivalent in area to those lands being permanently clearfelled is also subject to licensing ('afforestation licensing'). The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing. In light of the foregoing and for the purposes of this Project, the Developer commits that the location of any replanting

(alternative afforestation) associated with the project will be greater than 10km from the (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 Developer commits to not commencing the Project until both felling and afforestation licences are in place and this ensures the afforested lands are identified, assessed and licensed appropriately by the consenting authority.

2.3.3 Wind Farms in the Area (Cumulative)

There are 16 wind farms within 20km of the Site. **Figure 2.1** shows the location of in planning, consented and operational wind farms within a 20km radius of the proposed turbines and **Table 2.1** below provides further information on these wind farms. The nearest operational wind farm is Garvagh Glebe Wind Farm which is located approximately 920m to the south-west of the Site.

Table 2.1: Wind Farms within 20km of the Proposed Turbines

Wind Farm	Status	No. of Turbines	Approximate Distance to the Site Boundary	Direction from the Development
Altagowlan	Operational	9	4.6km	South-East
Black Banks (I & II)	Operational	12	1.4km	South-West
Carrane Hill	Operational	4	4.0km	South-West
Carrickeeny	Operational	4	18.9km	North-West
Corrie Mountain	Operational	8	3.2km	South-East
Croagh*	In-Planning	10	2.4km	West
Derrysallagh (Kilronan II)	Operational	10	6.2km	South-West
Faughary	Operational	3	19.1km	North
Garvagh Glebe	Operational	13	920m	South-West
Geevagh	Operational	6	5.7km	South-West
Kilronan	Operational	10	9.3km	South
Moneenatieve I & II	Operational	5	2.9km	South-East
Seltannavenny	Operational	2	6.7km	South-East
Spion Kop	Operational	2	4.2km	South-East
Tullynahaw	Operational	11	5.7km	South-East
Tullynamoyle I, II & III	Operational	15	7.1km	North-East
Tullynamoyle (V)	Consented under planning application P19/26	4	6.9km	North-East

Wind Farm	Status	No. of Turbines	Approximate Distance to the Site Boundary	Direction from the Development
Tullynamoyle (V)	Consented by An Bord Pleanála under case reference (Pl12.312895)	4	6.6km	North-East

* Croagh Wind Farm was recently refused planning permission by An Bord Pleanála (23/10/2023). However, for the purposes of a comprehensive appraisal, it has been included in the cumulative assessment for the chapters within this EIAR as the decision has the potential to be appealed and overturned.

In addition, there are two wind farms at pre-planning stage within 20km:

Wind Farm	Status	No. of Turbines	Approximate Distance to the Site Boundary	Direction from the Development
Charafena	Pre-Planning	7	18.1km	North
Lissinagroagh	Pre-Planning	20	17.4km	North-East

2.3.4 Land Ownership

The Site is located on lands under the ownership of the Developer and two third party landowners all of whom have consented to the application and the Development. Letters of consent accompany this application.

2.4 WIND RESOURCE

Due to the location in the west of Ireland, and elevation, the Site experiences high average annual wind speeds. The Irish Wind Atlas produced by Sustainable Energy Ireland shows average wind speeds for the country and it shows that wind speeds on the Site are consistent with a windfarm development (6.4m/sec at 30m, 7.7m/sec at 75m, 8.1m/sec at 100m and 8.9m/sec at 150m).

2.5 SITE INFRASTRUCTURE AND CONSTRUCTION

2.5.1 Proposed Layout Design

The layout of the Development has been designed to minimise the potential environmental effects of the wind farm while utilising the maximum energy yield from the Site's wind resource. The layout design was informed by the following constraints and buffers:

- No works will occur within a distance of at least 50m from watercourses (excluding watercourse crossings)
- No works will occur within distance to land drains of at least 15m
- No works will occur within a distance to archaeological monuments and structures of at least 100m
- No works will occur within a distance from turbines to inhabited houses of at least 600m
- Avoidance of existing telecommunications infrastructure and links
- Existing high voltage overhead powerlines on the west of the site where a 351m buffer is applied
- Avoidance of sensitive peatland habitats

The overall layout of the Site is shown in **Figure 2.1.** This figure shows the proposed locations of the wind turbines, electrical substation, met mast, temporary construction compound, borrow pit, internal access roads and the site entrance. The coordinates of the turbines are listed in **Table 2.2**.

Table 2.2: Turbine ITM Coordinates

Turbine No.	ITM Easting (m)	ITM Northing (m)	ING Easting [m]	ING Northing [m]
T1	587562	824666	187609	324648
T2	587446	824203	187692	324195
T3	587716	823983	187764	323965
T4	587857	823694	187905	323677

2.5.2 Wind Turbine Generator

The proposed turbines will be of typical modern design and will be a three-bladed, rotor up wind of the tower, variable speed, pitched blade regulated machine. Turbine appearance will be a matt non-reflective finish in a white, off-white or grey colour. The foundation-to-tip height will range from 149.85m to 150m.

The turbine will have a circular based tower, sitting on a reinforced concrete foundation. The tower will support the nacelle, rotor hub, and rotor blades. Commercial wind turbine towers are typically made of steel or a hybrid of steel and concrete. The nacelle is mainly

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

Each turbine will have a generator with a maximum capacity of 4.2MW giving an overall capacity of 16.8MW. The turbines may be direct drive machines or may contain a gearbox. The final turbine will be chosen in a competitive tendering process as part of the Project financing process, after all necessary consents have been secured.

A schematic drawing of the candidate turbines is shown on **Planning Drawing 5969-PL-604**.

The assessment considers and assesses all scenarios within the range of turbine parameters. The range of turbine parameters can be seen in **Table 2.3.**

Table 2.3: Turbine Parameters

Turbine Parameter	Assessment Envelope
Turbine Blade Tip Height	149.85m to 150m
Rotor Diameter	115.7to 117m
Hub Height	91.5m to 92m
Turbine Foundations	22m to 25m

2.5.3 Turbine Foundation and Turbine Hardstands

The Turbine Hardstand is designed to accommodate the delivery, laydown, and assembly of turbine components (in particular, rotor assembly) prior to turbine lifting and assembly and is shown in **Figure 2.4**. The Turbine Hardstands are needed to support the cranes during turbine construction, operational and maintenance and for decommissioning. The Turbine Hardstands will be constructed first and used to facilitate Turbine Foundation construction, such as steel reinforcement delivery and pouring of concrete.

The Turbine Hardstand areas will be 3,824m^2, as shown in **5969-PL-600.** Construction of the Turbine Hardstand and met mast hardstand will require the excavation of soils, the laying of a geotextile material on the formation surface and placing engineered stone and a top dressing. The Turbine Hardstands will be 1.7-2.8m in depth.

The Turbine Foundations will range between 22m to 25m in diameter and will have a depth to formation of 3.5m. The Turbine Foundation design will depend on the turbine type and will be decided by the structural engineers at detailed design stage and will be within these design parameters. The central part of the foundation (plinth) as seen on **Drawing No. 5969-PL-601-01** will be 6m in diameter and will be raised from the main Turbine Foundation below ground level. It will encompass a cast-in insert or bolts to connect to the bottom of the turbine tower and reinforced bar structural elements.

The area around and above the Turbine Foundation will be backfilled with compacted stone or crushed rock.

Further site investigations will be undertaken post consent to confirm that conditions do not vary from those encountered when initial investigations took place. This will confirm that the mitigation measures to be implemented remain accurate in protecting the environment. Traditional gravity foundations are considered for EIA purposes. These are concrete structures that depend on their own weight to achieve sufficient stability against overturning and sliding.

Turbine Foundations will need to be taken down to a level where the underlying soil or rock can bear the weight of a structure without shifting or compressing. This will be done by excavating through the peat / soil, subsoil and rock where necessary (depending on the various geological locations).

The method of construction for a Turbine Foundation is described as follows:

- Install temporary drainage around the perimeter of the excavation
- Excavate peat / soil and rock
- Form a level working area to build the foundation
- Install formwork and reinforcement
- Pour the concrete
- Once the concrete has set and the earthing system is in place, backfill the foundation with suitable excavated material
- Use the soil to build up the area around the Turbine Foundation

2.5.4 Access to the Site

The proposed site entrance is located to the south of the Site on the L-4282. The Turbine Delivery and Construction Haul Route will utilise this site entrance. The entrance is shown on **Figure 2.1.**

It is proposed that the turbine nacelles, tower hubs and rotor blades will be landed at Killybegs Harbour, Co. Donegal. From there they will be to the N56 some 4.0 km northeast of the harbour. The Turbine Delivery Route primarily follows the national road network namely the N56, N15, N4, R285 and R280 before turning left onto the local road L-4282 towards the Wind Farm Site entrance.

For abnormal loads between Killybegs Harbour and the Site, works will be required to facilitate the delivery of turbine components. These will be relatively minor in nature, for example, temporary removal of street furniture and signage. The extent of this is further detailed in **Chapter 15: Traffic and Transportation.**

The delivery of the turbines will require co-ordination with a number of statutory bodies including Donegal, Sligo, and Leitrim County Council, An Garda Síochána and delivery details are set out in **Chapter 15: Traffic and Transportation**.

2.5.5 Site Access Tracks

The Site Access Tracks are necessary to allow access for cranes and delivery trucks during construction of the Development and also during servicing/repairs to the wind turbines. The existing access track will be upgraded and used to minimise additional land take. The Site Access Tracks will be upgraded and constructed so that the minimum width will be 4m-5m but will be wider at bends and at passing bay locations. Gradients will generally, be limited to 1 in 7 (approximately 14%) and a stone layer provided, so as to provide a good grip during wet weather. Gradients of Site Access Roads will not exceed this value.

Table 2.3: Estimated Excavation for Road Construction

Road Section	Length (m)	Width (m)	Relevant Trial Pits	Average Peat Depth (m)	Depth to firm Sub-soil(m)	Depth to Rock(m)	Depth of Sub-soil to be excavated	Total Volume to be excavated (m^3)	Vol of peat to be excavated (m^3)	Vol of Sub-Soil to be excavated (m^3)	Vol of Rock to be excavated (m^3)
Upgraded Site Access Road	828	2	na	2.3	2.6	-	0.3	4305.6	3808.8	496.8	-
New Site Access Road (Floated)	1,745.5	5	na	>1.20	-	-	-	-	-	-	-
							Totals	**4,306**	**3,809**	**497**	**-**

As set out in **Table 2.3**, 828m of existing Site Access Road will be upgraded. This will involve widening the roads to cater for larger vehicles and loads. There will be also 1,746m of new Site Access Roads required for the Development. These will be constructed to provide a width of 5m. Both the upgraded and constructed roads will require 6,582m3 of crushed stone. The new access roads will be comprised of floated roads. Overburden will be removed, with a layer of geogrid placed on top. The first layer of stone aggregate is then placed on top of the geogrid. This should be a suitably sized "well graded material" that will be able to achieve a sound interlock with the geogrid. A second layer of geogrid will then be placed on top of the stone aggregate. After this, a capping layer will be placed on top of the geogrid and subsequently compacted.

The Site Access Road layout avoids environmental constraints and follows the natural contours of the land. Every effort has been made to minimise the length of road necessary.

Site Access Roads will be maintained during the construction phase. This will involve cleaning and surface improvement works. Harmful constituents from fuel spills and drips such as hydrocarbons pose a risk of environmental contamination and also a risk to human health if found in drinking water sources. All imported stone to the Site will have undergone appropriate quality testing. When weathered, the stone will not contain any constituents which may be harmful to the environment, surface and groundwater in particular. Further details of the prevention of this can be found in the Emergency and Response Management Plan of the CEMP in **Appendix 2.1**.

There is one proposed crossing of a natural stream within the Site. This crossing will be a bottomless bridge culvert. The bridge culvert will be reinforced with concrete and will join to the gravel Site Access Tracks. A 1.2m timber and rail fence with a galvanised chainlink fence to the internal face will be provided. Details of the crossing are included in **5969-PL-500.**

2.5.6 Met Mast

As part of the grid code[1] requirements, all wind farms with an installed capacity of greater than 10MW are required to supply continuous, real-time data for the wind farm location. The data required is the wind speed and wind direction at turbine hub height, air temperature and air pressure. The data required for the Development will be provided by a dedicated meteorological mast 50m in height with a 4m lightning mast (location as detailed in **Planning Drawing No 5969-PL-901.**

The Met Mast will be located on the west of the Site as detailed in **Figure 2.1** and will be a free-standing lattice type structure as shown in **Planning Drawing No**. **5969-PL-901.** The Met Mast foundation will be approximately 12m by 12m, with a depth of 2.25m and will be designed and constructed similar to the turbine foundations. It will encompass a cast-in insert or bolts to connect to the bottom of the met mast and reinforced bar structural elements. The area around and above the foundation will be backfilled with compacted granular material. The Met Mast will be linked to the 20kV Substation via buried Internal Cabling for power and communication and will be required for the full operational duration of the Development.

2.5.7 Electrical Substation and Battery Storage

It is proposed to construct a 20kV electricity substation on the Site, as shown on **Figure 2.1**. This will provide a connection point between the wind farm and the grid connection point at the existing Corderry 110kV substation. Electricity transmitted between the turbines and the substation on the Site will be at 20kV.

The substation will serve two main functions:

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

[1] EirGrid Grid Code Version 10

The construction and electrical components of the substation will be to ESB specifications within the parameters assessed. The substation building will be c. 9.98m by 5.37m with an overall height of 4.7m from ground to ridge level and will be constructed from engineered stone material using similar construction techniques as for the crane hardstands.

The control building will be a single story pitched roof structure with traditional rendered finishes. The telecommunication antenna will be fixed externally to the substation control building for communication and control purposes (e.g., for the Supervisory Control and Data Acquisition (SCADA) System) for the Developer, wind turbine suppliers, and ESB networks. The final external render of the control building will be an off-white or grey colour, and the final details will be agreed in writing with the planning authority prior to the commencement of development.

Warning / health & safety signage will be displayed as is normal practice for such installations. Motion sensitive lighting only will be used.

The Development will comprise the installation of two battery storage units positioned within the Site. These units will house lithium-ion (li-ion) battery arrays. These batteries will be used due to their proven track record with high life cycle, with an expected life cycle of 4,500 cycles equating to 15 years of use.

The two battery units will be enclosed by a 2.65m high palisade fence with the provision of two gates for access.

The battery storage units will be equipped with control features to monitor and respond to temperature variations and voltage protection. They are the energy storage method of choice within the renewable energy sector due to their track record in safety and wide array of uses in sectors such as:

- Integration of renewable energy
- Area regulation
- Reduction of grid congestion

The internal batteries are fixed into cabinet arrays within locked container units. Monitoring systems relating to the performance of the batteries are remotely monitored, within the on-site control building and externally to the Site via remote access. Any loss in battery capacity is notified immediately to the system controllers and will trigger a site inspection.

2.5.8 Internal Cabling

The power generated by each wind turbine will be transmitted via underground Wind Farm Internal Cabling to the new electrical Substation at 20kV, as will the communication signals whose cables will be installed in the same trench. There will be circa 2,178m of internal cabling. Fibre-optic cables will also connect each wind turbine to the wind turbine control system located within the Control Building. The electrical and fibre-optic cables running from the turbines to the substation compound will be run in cable ducts 1m below the ground surface within the Site Roads and/or their verges.

2.5.9 Grid Connection

Connection will be sought from the grid system operators by application to the ESB. The substation will connect via underground and partially overhead 20kV cables. At the existing Corderry 110kV substation, the cable will connect into existing infrastructure within the confines of the substation and its compound. The Grid Connection will be constructed to the requirements and specifications of the ESB.

The route of this underground grid connection is provided in **Figure 1.2.** The overall length of the grid connection between the substation and the existing Corderry 110kV GIS substation is 6.4km, of which, 0.098km is within the site of the Development, and 6.3km is located along the public road corridor.

The proposed grid route is largely independent of the haul routes (see **Figure 15.4**). Leaving the wind farm site, the grid route will follow L4282 in an easterly direction for a distance of approx. 652m, before veering left to join the L8280. From here the grid connection will continue in a general northerly direction for approx. 5.6km before joining the existing Corderry 110kV Substation. The grid connection route will traverse seven existing bridges and water crossings along the L8280. Of the 6.3km, some 6.260km will be buried within the existing roadway with the remaining 40m consisting of overhead lines.

<u>Underground Grid Connection</u>

The Grid Connection will be constructed to the requirements and specifications of the ESB. The three conductors will be laid in separate ducts which will be laid in accordance with the ESB functional specifications for 20kV Networks Ducting/Cabling (Minimum Standards). The width of a 20kV cable trench with a trefoil formation will be 600mm. The depth of the trench for 20kV cables is 1.22m. A separate duct will be provided within the trench for fibre optic communications.

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

- All relevant bodies i.e. ESB, Gas Networks Ireland, Eir, Leitrim County Council, Irish Water etc. will be contacted and up to date drawings for all existing services will be sought.
- Immediately prior to construction taking place, the area where excavation is planned will be surveyed by CATSCAN (sub-surface survey technique to locate any below-ground utilities) and all existing services will be verified. Temporary warning signs will be erected.
- Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.
- A silt fencing filtration system will be installed on all existing drainage channels for the duration of the cable construction to prevent contamination of any watercourse.
- A 13-tonne rubber tracked 360-degree excavator will be used to excavate the trench to the dimensions of 600mm wide by 1.22m deep.
- Once the trench is excavated, a 50mm depth base layer of sand (in road trench) or 15 N/mm^2 CBM4 concrete (lean-mix) will be installed and compacted. All concrete will be offloaded directly from the concrete truck into the trench.
- uPVC ducts will be installed on top of the compacted base layer material in the trench.
- Once the ducts are installed, couplers (a device used for joining pipes) will be fitted and capped to prevent any dirt entering the unjointed open end of the duct.
- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to record the exact location of the ducts.
- The co-ordinates will be plotted on as-built record drawings for the grid connection cable operational phase.
- When ducts have been installed in the correct position on the trench base layer, sand (in road trench) or Lean-mix CBM4 (CL1093) (off road trench) will be carefully installed in the trench around the ducts so as not to displace the duct and will be compacted.
- Timer spacer templates will be used during installation so that the correct cover of duct surround material is achieved above, below and at the sides of the duct in the trench.
- A red cable protection strip will be installed above duct surround layer of material and for the full length of the cable route.
- A layer of Lean-mix CBM4 (CL1093) (in road) will be installed on top of the duct surround material to a level 300mm below the finished surface level.

- Yellow marker warning tape will be installed for the full width of the trench, and for the full length of the cable route, 300mm from the finished surface level.
- The finished surface of the road will then be reinstated on a temporary basis to the requirements of the Guidelines for Managing Openings in Public Roads, 2017.
- Precast concrete cable joint bays (junction boxes) will be installed within the excavated trench.
- The junction boxes will be backfilled and the finished surface above the junction box reinstated on a temporary basis as per the requirements of the Guidelines for Managing Openings in Public Roads, 2017. The cable junction boxes will be re-excavated a second time during cable pulling and jointing, after which the finished surface above the joint bays will be reinstated again to its original condition.
- When trenching and ducting is complete, the installation of the grid connection cable will commence between the substation and the existing 110kV substation at Corderry.
- The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable will be pulled through.
- The cables will be jointed together within the precast concrete cable junction box (Joint Bay).
- The finished surface above each cable joint bay is reinstated on a permanent basis to the requirements of the Guidelines for Managing Openings in Public Roads, 2017.

Overhead Line

The proposed Grid Connection will be constructed by ESBN to the requirements and specifications of ESB Networks. The 20kV overhead line conductor construction type is 150mm^2 AAAC (All Aluminium Alloy Conductor) designed according to ESB Networks '*Functional Design Specification for MV Overhead Lines*[2]'. Two new standard 20kV single poles, with a distance of 40m is required. The wooden poles are standard ESB Networks 20kV wooden poles which vary in length on this project between 11 and 13 metres. The top of pole diameter varies between 200mm and 220mm. The actual height of pole above ground will vary between 8.8m and 10.7m and between 2.2 to 2.3m of the pole will not be seen as it will be buried in the ground.

[2] ESB Networks (2013 reviewed 2018). *Functional Design Specification for MV Overhead Lines*.

Pole and line installation works will be standard for a 20kV ESB overhead line:

- Poles are carried from adjacent roadways to each erection site and placed into an excavated hole using a wheeled or tracked excavator fitted with a pole grab attachment
- The pole hole is manually backfilled and tamped down to a minimum depth of 1.0m until the backfill is capable of supporting the pole; the excavator then continues the backfilling and tamping
- Where rock is encountered, the pole hole is formed using a hydraulic rock-breaker attachment mounted on the excavator
- Where the line changes direction and at pole set locations with poor ground conditions, stay wires will be required. These wires are supported by means of stay blocks, which are made of wooden sleepers and are buried underground
- Stringing of the conductor involves pulling out polypropylene rope along the route by hand, attaching the conductors and then pulling into position with stringing machine.

2.5.9.1 *Joint Bays*

Joint Bays are pre-cast concrete chambers where individual lengths of cables will be joined to form one continuous cable. A joint bay is constructed in a pit. Each joint bay typically will be 2.9m long x 1.6m x 1.3m deep. A reinforced concreted slab will be constructed on top of the bay.

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

2.5.9.2 *Trench Layout*

The trench layout will be as per the appropriate ESB Specifications. The specification of Leitrim County Council will be followed for the excavation and reinstatement of the ducted cable trenches which is expected to be in accordance with the requirements of the Guidelines for Managing Openings in Public Roads, 2017.

2.5.9.3 *Joining Ducts*

All joining ducts shall be laid in straight lines to even gradients. Once the ducts have been installed and backfilled with lean-mix concrete and with Clause 804 stone the duct run will

be thoroughly cleaned by pulling the appropriate size of ESB approved duct brush through the duct.

Details of the construction methodology are summarised below:

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

2.5.10 Borrow Pit

As identified in **Chapter 8: Soils and Geology,** there is evidence of disused borrow pits (possibly used for the construction of the existing forest roads) south-west of T2. Borrow pit 01 is described as being moderate quality while borrow pit 02 is low quality. Only borrow pit 01 will be utilised as construction fill (**Figure 2.2**). The borrow pit will provide excavated material to provide fill for the roads, hardstands, upfill to foundations and the temporary compound. The borrow pit will be excavated only as required. Where fill material is available from the excavation of the turbine foundations, this material will be used first. The use of an on-site borrow pit will reduce the need to transport material to the Site.

When the borrow pit is no longer required, it will be reinstated using any surplus inert material such as peat and subsoil from the Site, allowed to restore naturally and made secure using permanent stock proof fencing.

2.5.11 Onsite Drainage

The surface water runoff contained within natural and artificial drainage channels includes stream and river waterbodies, drainage ditches, and other minor natural and artificial manmade drainage features. Drainage measures will be provided to attenuate runoff, guard against soil erosion, soil compaction, and safeguard local water quality. Details of the drainage system are shown on Planning Drawings **5969-PL-301** to **5969-PL-304** and

outlined in detail in the Surface Water Management Plan, part of the CEMP attached as **Appendix 2.1** and full details are provided in **Chapter 9: Hydrology and Hydrogeology.**

Drainage measures will be provided to attenuate runoff, guard against soil erosion, soil compaction, and safeguard local water quality. A total of 12 No. stilling ponds will be located throughout the Site and can be seen on **Planning Drawings No. 5969-PL-101 to 104.**

A buffer zone of at least 50m will be in place for natural streams. Where this is not possible for example, at the bottomless bridge culvert along the Site Access Road, construction methods incorporating mitigation measures from this EIAR are set out in **Appendix 2.1**.

Sustainable Drainage System (SuDS) principles namely separation of overland flow from construction areas, the mimicking of diverted overland flow around construction areas and treatment trains to treat water from construction areas, will all be employed as explained in **Chapter 9: Hydrology and Hydrogeology**. Associated controls are listed below:

Source controls for surface water

- Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sandbags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems. Detailed plates and figures of these can be found in **Appendix 2.1**.
- Maintaining small working areas; covering stockpiles with geotextiles to protect against water erosion and runoff in rainy weather, and/or cessation of works in certain areas such as working on a high gradient during wet and windy weather.

In-line controls for surface water

- In line controls are controls which are directly applied to the surface water body including interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sandbags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds and/or temporary pumping chambers.

Treatment systems for surface water:

- Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbusters. When

heavy rainfall is predicted works will be suspended or scaled back. It is proposed that all drainage will be left in place upon completion of the construction phase. Full details on drainage management and mitigation can be found in **Chapter 9: Hydrology and Hydrogeology** and the Surface Water Management Plan attached as part of the CEMP in **Appendix 2.1.**

2.5.12 Table of Key Development Infrastructure Metrics

The Key Development Infrastructure Metrics are contained in **Table 2.5**. This table is provided for ease of access to these metrics for reference by the personnel writing the other EIAR Chapters.

Table 2.5: Key Development Infrastructure Metrics

Description	Length (m)	Width (m)	Depth (m)	No.	Area (m^2)	Volume of Excavation (m^3)
New Site Access Road	1,746	5	-	1	8,730	-
Upgraded Site Access Road	828	2	2.6	1	1,656	4,306
Turbine Hardstands	-	-	2.3	4	3,824	33,968
Turbine Foundations (up to 25m diameter)	-	-	3.5	4	491	7,689
Met Mast foundation	12	12	2.25	1	144	324
Electrical Substation	-	-	0.3	1	54	38
Construction Compound	-	-	0.3	1	1,500	600
20kV Cable Trench	6,425	0.6	0.925	1	3,855	3,566
Joint Bays	2.9	1.6	1.3	13	60	1,000
Internal Cabling	2,178	0.45	1	1	980	980
Drainage	-	-	1	1	558	1,786
Borrow Pit 01				1	5,000	25,000

Table 2.6: Summary of Re-Use of Excavated Material

Storage / Reuse Areas	Volume of storage (m^3)	Peat	Sub soil
Side cast adjacent to new access roads (2m high berm, both sides, 5m wide along 40% of the route)	6,980	6,980	0
Spoil Storage Areas 1 - 4	32,019	20,775	11,244
Re-use as fill on top of completed turbine bases	1,884	0	1,884
Used to infill borrow pit	11,499	9,231	384
Apron spreading within other areas of felled forestry (max. height 1m)	4,000	1,542	
Total Available (m^3)	**56,382**		
Spoil Generated (m^3)	**54,236**		
Storage Utilisation (%)	**96.2%**		

2.6 CONSTRUCTION

The first phase of the Project will comprise the construction phase. This phase will begin with site preparation works and will be complete when the turbines are built and ready for commissioning, and when all wastes have been removed from the site. For this Development, it is envisaged that the construction phase will last approximately 14-15 months. An indicated construction programme is set out at **Table 2.7**.

Table 2.7: Indicative Construction Programme

Activity	Month														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Site Establishment/ Fencing off	X														
Internal Access Road Upgrade & Construction		X	X	X	X										
Substation & Compound Construction				X	X	X	X								
Substation Electrical Works									X	X	X	X	X	X	

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

2.6.1 Construction and Environmental Management Plan (CEMP)

A CEMP is appended to the EIAR in **Appendix 2.1**. The CEMP includes an Emergency Response Plan, Peat and Spoil Management Plan, Surface Water Management Plan, Water Quality Management Plan, Waste Management Plan, Decommissioning Plan and Traffic Management Plan. The CEMP includes all the mitigation measures proposed within the EIAR and the NIS related to the Construction Phase. A Summary of all the mitigation measures of the EIAR is included in **Appendix 16.1**.

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

The following sections describe key activities which, if unmitigated against, may cause harm or nuisance to the public.

2.6.2 Refuelling

Vehicles will be refuelled off-site where possible. For vehicles that require being refuelled on-site, fuels will be stored in the temporary construction compound and bunded to at least

110% of the storage capacity of fuels to be stored. Refuelling will take place via a mobile double skinned fuel bowser. The bowser will be a double axle refuelling trailer which will be towed to the refuelling locations by a 4x4 vehicle. The 4x4 will carry, a drip tray, spill kit and absorbent mats in case of any accidental spillages. Only designated competent personnel will refuel plant and machinery on the Site.

2.6.3 Concrete

There will be no concrete batching on the Site. Rather, it will be transported to the Site as it is required. A dedicated, bunded area will be created to cater for concrete wash-out and this will be within the temporary construction compound located to the south of T4. This will be for the wash-out of the chutes only after the pour. Concrete trucks will then exit the Site and return to the supply plant to wash out the mixer itself.

The main concrete pours at the turbine locations will be planned in advance and proposed mitigation measures (are detailed in **Chapter 9: Hydrology and Hydrogeology**) and are summarised as follows:

- Avoiding large concrete pours, for Turbine Foundations for example, on days when heavy or prolonged rainfall is forecast i.e., 25mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or rainfall depth greater than monthly average in seven days (prolonged heavy rainfall over a week). Concrete pouring will be avoided during a period in which a Met Éireann Status Red weather event has been implemented
- Ensuring that all concrete pour areas are dewatered prior to pouring concrete and while the concrete is curing
- Making covers available so that areas can be covered if heavy rain arrives during the curing process which will prevent runoff of concrete which has a high pH.

2.6.4 Dust Suppression

During periods of dry and windy weather, there is potential for dust to become friable and cause nuisance to nearby residences and users of the local road network. Damping down will be required in this instance to see that dust does not become friable. This is most likely to occur during periods of dry and/or windy weather. This requires wetting the material and ensuring water is supplied at the correct levels for the duration of the work activity.

To reduce mud and debris from getting onto the local road network, a wheel wash facility will be employed at exiting points on-site which will wash mud and debris from vehicles egressing the Site.

Where rock is sourced from off-site (see locations in **Figure 15.3**), HGVs entering the Site carrying rock will be covered to prevent dust generation. A road sweeper will be available for use in case of any mud or debris making it onto the public road network.

2.6.5 Construction Hours

The Development will have approximately 50 construction workers during the peak of the construction phase. Working hours for construction will be from 07:00 to 19:00 on weekdays, with reduced working hours at weekends, from 08:00 to 13:00 on a Saturday. It should be noted that during the turbine erection phase, operations will need to take place outside those hours with concrete pours commencing at 05:00 and continuing until 16:00, to facilitate Turbine Foundation construction and so that lifting operations are completed safely. Hours of working for Turbine Foundation construction will be agreed with Leitrim County Council prior to the commencement of Turbine Foundation construction. **Chapter 15: Traffic and Transportation** refers to this in further detail. A detailed Traffic Management Plan (**Appendix 2.1**) will be implemented during the construction phase. This shall be agreed during the planning compliance stage with the Planning Authority so that strict controls described therein are in place with all suppliers coming to the Site.

2.6.6 Construction Compound and Temporary Works Area

The temporary construction compound will be set up upon commencement of the construction phase. The proposed location for the temporary construction compound is south of T4 as shown in **Planning Drawing No. 5969-PL-903.** The compound will be 12m by 6m by 4.7m [338m³]. The compound will be used as a secure storage area for construction materials and to contain temporary site accommodation units for staff welfare facilities. The compound will contain cabins for offices space, meeting rooms, canteen area, a drying room, parking facilities, and similar personnel facilities.

An area within the compound will be used for the storage of fuel and oils and this will be suitably bunded and the bund will be lined with an impermeable membrane in order to prevent any contamination of the surrounding soils, vegetation and water table. Double protection containers / equipment will be used along with drip trays and details are included in the CEMP, included as **Appendix 2.1**.

During the construction phase, water will be supplied by water bowser. The maximum wastewater production is estimated to be the same as the maximum water consumption

(2,000 litres per day)[3]. The project will include an enclosed wastewater management system at the temporary compound (**Planning Drawing No. 5969-PL-904 & 5969-PL-905**) capable of handling the demand during the construction phase with 50 construction workers on site at peak. A holding tank is proposed for wastewater management. Wastewater will be removed off-site weekly, by a licensed wastewater disposal company and disposed at an appropriate licenced facility, likely to be in Drumkeeran.

2.6.7 Construction of Crane Hardstands and Foundations

The construction method for all the crane hardstands will be via excavated approach. Each hardstand will be 3,824m^2. Foundations will be taken down to competent bearing strata by excavating through the soil, subsoil, and rock if necessary.

The method of construction for Turbine Foundation is described below:

- Install temporary drainage around perimeter of excavation (see **Chapter 9: Hydrology and Hydrogeology** for full details of proposed drainage)
- Excavate soil and rock and temporarily store adjacent to the works
- Form a level working area to build foundation
- Install formwork and reinforcement
- Pour concrete
- Cure concrete
- Once the concrete has set and the earthing system is in place, backfill the foundation with rock
- Use soil to build up the area around the turbine base

2.6.8 Construction Turbine Assembly

Once on Site, the wind turbine components will follow a detailed route and plan to minimise manoeuvring. Components will be placed on Turbine Hardstands prior to assembly. A 'just in time' delivery strategy will be in place for turbine blades to reduce the need for temporary set down areas. One large crane will be required for erecting the turbines, assisted by a smaller crane. The same number of cranes will also be required for maintenance during the operational phase.

[3] Table 3 of the EPA WW treatment Manual (Treatment systems for Small Communities, Business, Leisure Centres and Hotels), Environmental Protection Agency, 1999. Quarry (excluding canteen) best reflects a construction site.
[Available online: https://www.epa.ie/publications/compliance--enforcement/wastewater/EPA_water_treatment_manual_-small-comm_business.pdf]

The towers will be delivered in sections, and work on assembly will not start until a suitable weather window is available, e.g., Wind Gust Speed Threshold of less than 6ms^{-1}. The bottom tower section will be bolted onto the concrete foundations. The mid tower section will then be lifted into position and bolted to the bottom tower section. Finally, the top tower section will be lifted into position and bolted to the mid tower section. Three methods can be used to attach the blades:

1. The blades can be attached to the nacelle and hub on the ground. The hub and blades are then lifted as one. The nacelle of a wind turbine houses the drive train and other tower-top components. The hub of the wind turbine connects the blades to the main shaft and ultimately to the rest of the drive train.
2. The hub can be attached to the nacelle and the two blades attached to the hub while the nacelle is on the ground – the "bunny lift". The nacelle is then lifted into position and the third blade lifted into place separately. This requires manoeuvring of several components on the ground and usually the repositioning of cranes.
3. Lifting the nacelle and hub as one unit, as described above and then attaching the blades one at a time, rotating the hub between lifts. The blade lifting operations do not require repositioning of the crane.

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

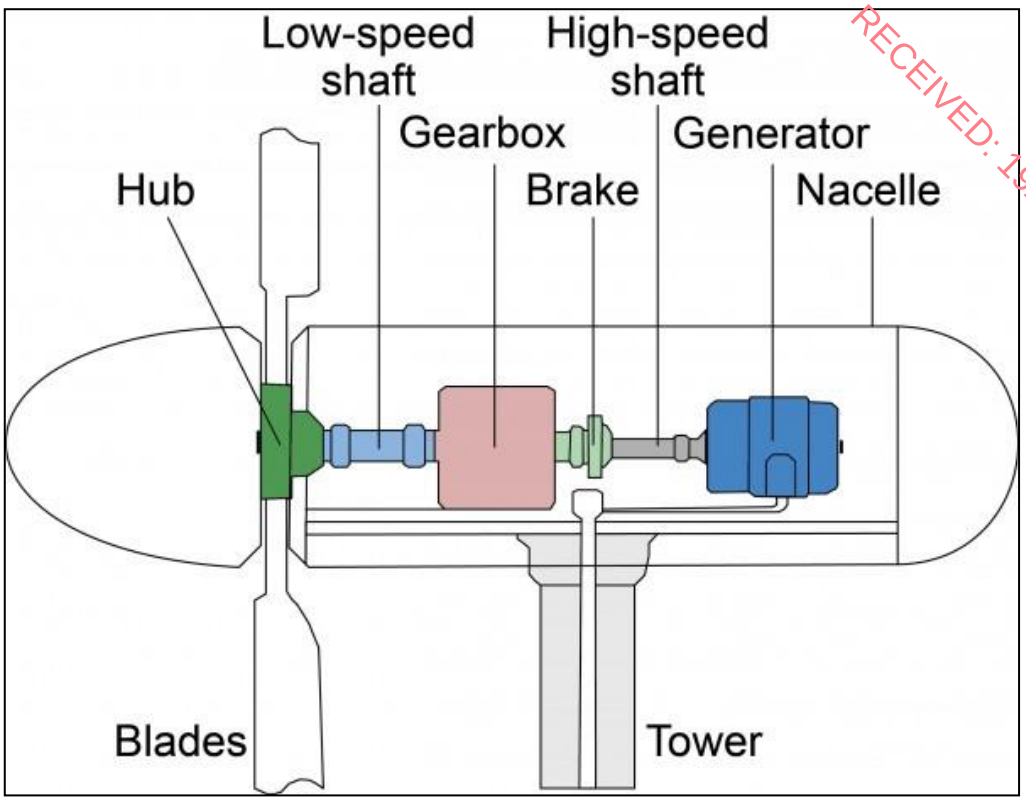

Plate 2.1: Turbine components[4] Source: (University of Michigan, 2022)

2.6.9 Construction Traffic

It is estimated in **Chapter 15**, that during civil construction, 2,432 fully loaded Heavy Goods Vehicle trips will be required for the Project. This breaks down to 447 loads per month or an average of 22 to 23 loads per day.

The peak number of deliveries per day will occur during the concrete pour for Turbine Foundation construction. An estimated 140 concrete deliveries will be required per Turbine Foundation. Other materials will also be delivered on such days, so a realistic estimation of peak deliveries is 300 deliveries per day (for 14 separate days in the construction programme when the Turbine Foundations will be poured). On these concrete pour days, 14-18 deliveries per hour will be required.

[4] (Michigan, 2022)

University of Michigan, 2022. *Center for Sustainable Systems.* [Online]
Available at: https://css.umich.edu/publications/factsheets/energy/wind-energy-factsheet
[Accessed 24 January 2023].

2.6.10 Reinstatement and Monitoring

Following completion of construction, all plant and machinery will be removed from the Site. The temporary works/assembly areas needed for the construction period such as blade laydown areas (A cleared, greenfield, flat area to store the blades. It is positioned adjoining the main crane hardstand.), will be reinstated using the original spoil material removed and stockpiled close to the location from where it was excavated. Stockpiles will be restricted to less than 2m in height and located outside of the surface water buffer zones. All stockpiling locations will be subject to approval by the Site Manager and Project Ecological Clerk of Works (ECoW).

The upgraded local roads along the Turbine Delivery Route will be reinstated (temporary and permanent) in accordance with "Guidelines for Managing Openings in Public Roads", Department of Transport, Tourism and Sport, Second Edition (Rev. 1), April 2017. This will involve full width resurfacing as part of the permanent reinstatement to be carried out once commissioning of the wind farm substation is complete.

The grid route will be completed as described in **Section 2.5.9.**

The on-site installed drainage network will be left in place. This will be monitored on a quarterly basis to see that it is operating to its stated design purpose. Water monitoring on nearby natural watercourses will be undertaken during and post construction.
There will be no reinstatement works required during the decommissioning phase.

2.6.11 Construction Supervision and Monitoring

The construction activities will be monitored by a Geotechnical Engineer, a qualified archaeologist and an Ecological Clerk of Works (ECoW). The Geotechnical Engineer will be contracted for the detailed design phase and their services retained throughout the construction and reinstatement phases. The Geotechnical Engineer will oversee all earthworks and excavation activities and monitor for issues such as ground stability, water ingress into excavations etc. Roles and responsibilities are further detailed in **Appendix 2.1**.

Daily monitoring of excavations by the Geotechnical Engineer will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken. Further details of what this will involve are detailed in **Chapter 8: Soils and Geology and Chapter 9: Hydrology and Hydrogeology**.

The ECoW will be employed prior to the commencement of the construction phase to monitor and review the pollution control measures and working practices during construction and have input into site remediation. The ECoW will have stop work authority if, for example, a sensitive habitat feature is encroached upon or there is the possibility of silt/pollution runoff to natural watercourses.

The potential exists for the presence of unrecorded, sub-surface archaeological features within green field locations in proposed construction areas within the Site. A series of pre-construction and construction phase archaeological investigations under licence by the National Monuments Service will be carried out by a suitably qualified archaeologist. The archaeologist will have responsibility for ensuring that potential archaeological features are protected should any be discovered during excavations. The site will be accessible to the appointed archaeologist at all times during working hours and the nominated archaeologist will monitor all invasive works.

If any sub-surface archaeological remains are identified during site investigations, they will be cleaned, recorded and left to remain *in situ* within cordoned off areas while the National Monuments Service are notified and consulted in relation to appropriate future mitigation strategies, which may entail preservation *in situ* by avoidance or preservation by record by archaeological excavations.

A Water Quality Management Plan has been prepared as part of **Appendix 2.1** and will be implemented prior to commencement of construction. Regular inspections of the installed drainage system will be undertaken, especially after heavy rainfall events, to check blockages and see that there is no build-up of standing water in any part of the system where is it not designed to be.

Excess build-up of silt will be removed at check dams, attenuation/settlement ponds or any other drainage feature by scraper or excavator and under the supervision of the ECoW.
During the construction phase, field testing and laboratory analysis of a range of parameters with relevant regulatory limits and Environmental Quality Standards will be undertaken for each watercourse close to the site, and specifically following heavy rainfall events (i.e., weekly, monthly and event based). The locations and further detailed in **Chapter 9: Hydrology and Hydrogeology**.

The CEMP for the Development sets out the proposed site organisation, sequencing of works, methodologies, mitigation measures and monitoring measures.

The local road network near the Site is used to transport construction materials and will be monitored during construction, so that any damage caused by construction traffic associated with the Project can be identified and repaired, as local roads are more prone to damage than national roads. This monitoring will be undertaken on the L-4282, L8082 and R280. Readymix concrete will be sourced from local quarries when required (see locations in **Figure 15.4**) and monitoring, such as visual inspections, will also be undertaken on the route as required. This is detailed and assessed in **Chapter 15: Traffic and Transportation**.

2.6.12 Construction Sequencing

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

1. Site Preparation including felling and drainage
2. Site Roads
3. Contractor Compound and Welfare Facilities
4. Crane hardstandings
5. Turbine Foundations
6. Internal cable ducting
7. Installation of the Grid Connection
8. Erection of wind turbines
9. Commissioning and Energisation

The 20 kV substation will be constructed in parallel with Turbine Hardstands, foundations and ducting.

The first step will be to prepare the Site for construction. This will include felling and implementing the designed drainage measures. The Site Access Roads will then be constructed and/or upgraded. The next step will be to construct the Temporary Construction Compound and Welfare Facilities. Access to the area will be Site Entrance 1. The next step will be to prepare the areas of the site where site infrastructure is to be located by marking out the construction works corridor, the relevant environmental buffer zones.

Following the site preparation, construction of the crane hard-standing areas for the 4 No. turbines will occur. The 4 No. Turbine Foundations will then be excavated and foundations

constructed using reinforcing bar (rebar) and imported concrete. No concrete batching will take place on site.

Following the construction of the Turbine Foundations, internal cable ducting from the turbine locations to the on-site 20 kV substation will be laid in trenches along the constructed access roads.

The grid connection will then be constructed. For the underground grid connection there will be 6.3km of trenches for underground cabling (UGC) to Corderry110kV substation. The ducts to be installed in an excavated trench will be 600mm wide and 1m deep. For the overhead portion of the grid connection two new standard 20kV single poles, with a distance of 40m is required. The wooden poles are standard ESB Networks 20kV wooden poles which vary in length on this project between 11 and 13 metres

The last step will be to erect the 4 No. wind turbines on the foundations using two cranes. Commissioning and testing of the turbines can then proceed.

2.6.13 Construction Employment

It is estimated that between 35 and 60 direct and indirect jobs could be created during the construction phase of the Project. It is not expected that all of these jobs will be based at the Site.

2.7 COMMISSIONING

Wind farm commissioning can take in the region of three 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).

2.8 OPERATION AND MAINTENANCE

During the operation of the wind farm, the turbine manufacturer, the wind farm operator, or a service company will carry out regular maintenance of the turbines, substation, battery storage units, and site infrastructure. Monthly routine inspection and preventative maintenance visits will be necessary to provide for the smooth and efficient running of the wind farm. This will occur over one day with one vehicle attending the Site. In addition,

operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link.

2.9 DECOMMISSIONING

The Applicant is applying for a consent for a period of 40 years for the operation of the wind farm. The full description of the decommissioning is as follows:

- Removal of 4 No. wind turbines and concrete plinths.
- Removal of permanent meteorological mast.
- Removal of all associated underground electrical and communications cabling connecting the wind turbines to the wind farm substation. Ducting is to remain *in-situ*
- Removal of 2 No. battery storage units.

All other elements of the proposed development will remain in-situ. The Site Access Roads and associated drainage systems will serve ongoing forestry and agriculture activity in the area. All other hard surfaced areas will be allowed to revegetate naturally. Based on the experience of the project team monitoring operational wind farm sites throughout the country, the approach of allowing these areas to revegetate naturally has proven to be very successful.

Cranes of similar size to those used for construction will disassemble each turbine using the same crane hardstands. The towers, blades and all above ground components will be removed from site and reused, recycled, or disposed of in a suitably licenced facility. (The financial costs of decommissioning, at current material values, will be more than met by the recycling value of the turbine components.)

Turbines will be cut on site so as to fit on articulated trucks, therefore allowing the use of the civil construction delivery route to the south for removal. There will be no need to reinstate the bottomless bridge culvert.

Potential impacts will be similar to that of the construction phase, albeit to a lesser extent and are described in each chapter of this EIAR.

The battery storage units will have a lifespan of circa 15 years, which is the usable life of the battery technology proposed for the Site. Decommissioning of the battery storage units will include the removal of the units from the Site. This will require the use of a fixed crane

and articulated Heavy Goods Vehicles (HGVs). Removal will enable the recycling of the units on the open market, or the repositioning to an alternative site.

Given the nature and small amount of infrastructure required for the battery storage units, it is considered unlikely that any impacts would occur from the decommissioning works. All decommissioning works will be carried out in accordance with best practice and legislation at the time of decommissioning.

A decommissioning plan is included as part of the CEMP in **Appendix 2.1**. Prior to the decommissioning works, a plan will be submitted to the planning authority for written agreement. The plan will take account of contemporary best practice.

2.10 COMMUNITY BENEFIT

In addition to helping Ireland reduce environmentally damaging fossil fuel emissions and helping avoid significant fines from the EU, Letter Wind Farm will also contribute positively to the national and regional economy.

A SEAI report indicated that in 2019 wind energy generated 32% of all electricity, avoided 3.9 million tonnes of CO_2 emissions; and avoided approximately €260 million in fossil fuel imports[5]. Additionally, a report published by Barringa in January 2019 states that:
"Our analysis indicates that the deployment of 4.1 GW of wind generation capacity in Ireland between 2000 and 2020 will result in a total net cost to consumers, over 20 years, of €0.1bn (€63 million to be exact), which equates to a cost of less than €1 per person per year."[6]

In addition to the above financial costs and benefits, the Barringa report outlines that wind generation in Ireland avoids:
"33 million tonnes of power sector CO_2 emissions. The total carbon emissions from electricity generation in 2017 was 11.7 Mt, so a saving of 33 Mt is equivalent to almost 3 years of total carbon emissions in the electricity sector today. 137 TWh of fossil fuel consumption at a saving of €2.7bn. In comparison, Ireland consumed 44 TWh (3814 ktoe) of fossil fuels for electricity generation in 2017, so a saving of 137 TWh is equivalent to 3 years of current fossil fuel consumption for electricity generation."

[5] https://www.seai.ie/publications/Energy-in-Ireland-2020.pdf [Accessed 08/02/2022]
[6] https://windenergyireland.com/images/files/baringa-wind-for-a-euro-report-january-2019.pdf [Accessed 08/02/2022]

The Project has the potential to bring significant positive benefits to local communities. It will support sustainable local employment; it will contribute annual rates between €218,000 to €252,000 to the local authority; and it will provide opportunity for local community investment in the project in line with the new Renewable Energy Support Scheme (RESS). This is a Government of Ireland initiative that provides support to renewable energy projects in Ireland. A Community Benefit Fund will be put in place for the RESS period (i.e., 15 years of the operation) of the Project to provide direct funding to those areas surrounding the Project. The significant annual community benefit fund will be established in line with Government policy which will include funding for both wider community initiatives and a Near Neighbour scheme focused on houses in close proximity to the Project.

It is anticipated that for each megawatt hour (MWh) of electricity produced by the wind farm, the project will contribute €2 into a community fund for the RESS period i.e., first 15 years of operation. If this commitment is improved upon in upcoming Government Policy, this will be adjusted accordingly.

The Project has the potential to make more than €100,000 available per annum in the local area for community funding for the RESS period, consistent with Government Policy. However, the above figure is indicative only and is and will be dependent on the generation capacity of the wind farm which is influenced by a number of factors including:

- Number and type of wind turbines permitted
- Capacity and availability of energy production of the delivered turbines
- Quantity of wind and wind conditions in any given year

2.10.1 Fund Usage and Administration

The Community Benefit Fund belongs to the local community surrounding the Development. 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 step will be to form a benefit fund development working group that clearly represents both the closest neighbours to the Project as well as nearby communities. Workshops will be organised to facilitate consideration of the priorities for the local fund. This group will then work on designing the governance and structure of a community entity that will administer the Community Benefit Fund.

It is acknowledged that the people living closest to a wind farm are the most important stakeholders and a proportion of the Community Benefit Fund will be set aside as a dedicated "Near Neighbour Fund". The exact structure of this will be confirmed as part of

the development of the overall Community Benefit Fund but would typically provide support of varying degrees for properties up to 2km from turbines. This is supported by the requirements set out in the RESS2 and may be adjusted in future RESS schemes that may relate to this Project.