3.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 THE PROPOSED DEVELOPMENT - OVERVIEW

The Proposed Development comprises the construction of 18 no. wind turbines and ancillary works. The turbines will have a blade tip height of 200m above the top of the foundation level and will be accessible from internal access routes within the Bord na Móna site.

The proposed development will comprise:

- 18 no. wind turbines (including tower sections, nacelle, hub, and rotor blades) and all associated foundations and hard-standing areas in respect of each turbine;
- Decommissioning and removal of 21 no. existing Bellacorick Wind Farm wind turbines (including tower sections, nacelle, hub, and rotor blades);
- New internal site access roads, approximately 29,000m in length (permanent and temporary), passing bays, car parking and associated drainage;
- An amenity route through the site to the existing Visitors Centre with access from a local road off the N59 near Dooleeg;
- 2 no. borrow pits;
- 5 no. peat deposition areas;
- 1 No. permanent Meteorological Mast 120m high, and the decommissioning and removal of an existing 100m Meteorological Mast on site;
- 4 no. temporary construction compounds, including material storage, site welfare facilities, and site offices;
- 1 no. 110kV electrical substation compound. The electrical substation will have 2 No. control buildings, a 36m high telecommunications tower, associated electrical plant and equipment and a wastewater holding tank.
- All associated underground electrical and communications cabling connecting the wind turbines to the proposed substation;
- All works associated with the connection of the proposed wind farm to the national electricity grid, including a 110kV underground electrical cable from the proposed on-site electrical sub-station to the existing sub-station at Bellacorick;
- All related site works and ancillary development including (but not limited to):
    - Earthworks;
    - Peat management works;
    - Site security;
    - Groundwater and surface water management;

    - Overburden (soils/peat) storage and management; and
    - Site reinstatement, landscaping and erosion control.
- A 10-year planning permission and 30-year operational life from the date of commissioning of the entire wind farm.

In addition, there will be a requirement for improvements and temporary modifications to public road infrastructure to facilitate the delivery of abnormal loads.

All elements of the proposed project as listed above, including grid connection and have been considered and are addressed as part of this EIAR.

3.2 COMMUNITY BENEFIT PROPOSAL

Bord na Móna presently operate four wind farm Community Gain Schemes at its wind farms in Mountlucas, Cloncreen, Oweninny Phase 1 and Bruckana. These schemes were established in 2014, 2019 and 2021 thanks to the help and cooperation of the communities surrounding the wind farms. The Community Gain Schemes for Bruckana, Cloncreen, Oweninny Phase 1 and Mountlucas Wind Farms were set up on the basis of community involvement and public consultation.

The Mountlucas and Bruckana Community gain schemes consists of a fixed level of funding (based on the installed capacity of the wind farm) that is made available each calendar year for community led projects in the local area. During 2017 and 2018, a 'near neighbour' scheme was established for residents in the vicinity of the Bruckana and Mountlucas wind farms.

Bord na Móna is proposing to replicate its proven Community Gain Scheme model for Oweninny Wind Farm Phase 3 and a Community Gain Scheme will be established for the proposed development in accordance with best practice requirements. The fund will be available for the lifetime of the project and will look to support the local community, through funding of projects and services, as required. A description of the Community Benefit proposal is outlined below and in the 'Oweninny Wind Farm Community Report' which is contained in Appendix 1.3.

3.2.1 Community Gain and Near Neighbour Scheme

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 range of other benefits associated with the development will be provided to the local community through the annual Community Gain Scheme. The aim of this scheme is to provide financial assistance to local communities and not-for-profit organisations around the development. In order to be eligible for funding, projects must fall within the thematic areas of: Amenities, Community Facilities, Culture/Heritage, Energy Efficiency/Improvements, Education and Recreation/Health. A key criterion is that the projects and initiatives will benefit the communities surrounding the wind farm.

The Near Neighbour Scheme will offer electricity bill payers living within a prescribed distance of a wind turbine an annual contribution towards their electricity usage. In addition to the electricity contribution payment, the Scheme will also offer participants a contribution towards the completion of energy measures on the property and/or education support. This is in line with existing near neighbour schemes that are active at other Bord na Móna Powergen Wind Farms.

The value of the fund for the Community Gain and Near Neighbour Schemes will be directly proportional to the installed capacity and energy produced at the site, which based on current schemes, will be in the region of €10 million over the lifetime of the project.

3.2.2 Renewable Energy Participation Scheme Scheme/Community Ownership

The Renewable Electricity Support Scheme (RESS) is a Government of Ireland initiative that provides support to renewable electricity projects in Ireland. RESS is a pivotal component of the Programme for Government and the Climate Action Plan 2023 and is a major step in achieving Ireland's target of at least 75% renewable electricity by 2030. One of the key objectives of RESS is to provide an Enabling Framework for Community Participation through the provision of pathways and supports for communities to participate in renewable energy projects.

RESS 1 was the first Renewable Electricity Support Scheme run by the Government of Ireland and concluded in 2020. RESS 2 was run in 2022 and concluded in June 2022. The successful projects in RESS 2 represent a potential increase of nearly 20% in Ireland's current renewable energy generation capacity. They will be delivered between 2023 and 2025. A public consultation was opened in 2022 to refine the Terms and Conditions developed for RESS 2 with a limited and specific set of changes for RESS 3. This consultation closed in December 2022.

Each of the RESS processes outline a set of requirements relating to the distribution of funds, including community benefit funds. If the proposed development utilises the RESS model, then any community benefit stipulations outlined in the finalised RESS model will have to be incorporated into the operation of the wind farm and will be of enduring benefit to the local community.

The Programme for Government commits to holding RESS auctions at frequent intervals throughout the lifetime of the scheme.

3.3 DEVELOPMENT LAYOUT

The layout of the proposed wind farm development provides for 18 wind turbines and 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 turbines will have a top of foundation to blade tip height of 200m. The blade rotor diameter will be 158m with a corresponding hub height of 121m.

The overall layout of the proposed development is shown in Figure 3.1. This figure shows the proposed locations of the wind turbines, hardstanding areas, passing bays, electrical substation, borrow pits, peat deposition areas, meteorological mast, temporary construction compounds, internal roads layout, the main site entrance and proposed amenity path.

Detailed site layout drawings of the proposed development are included as Appendix 2.1 of this report and are also detailed in the Planning Drawings that accompany this application (as listed in Chapter 1).

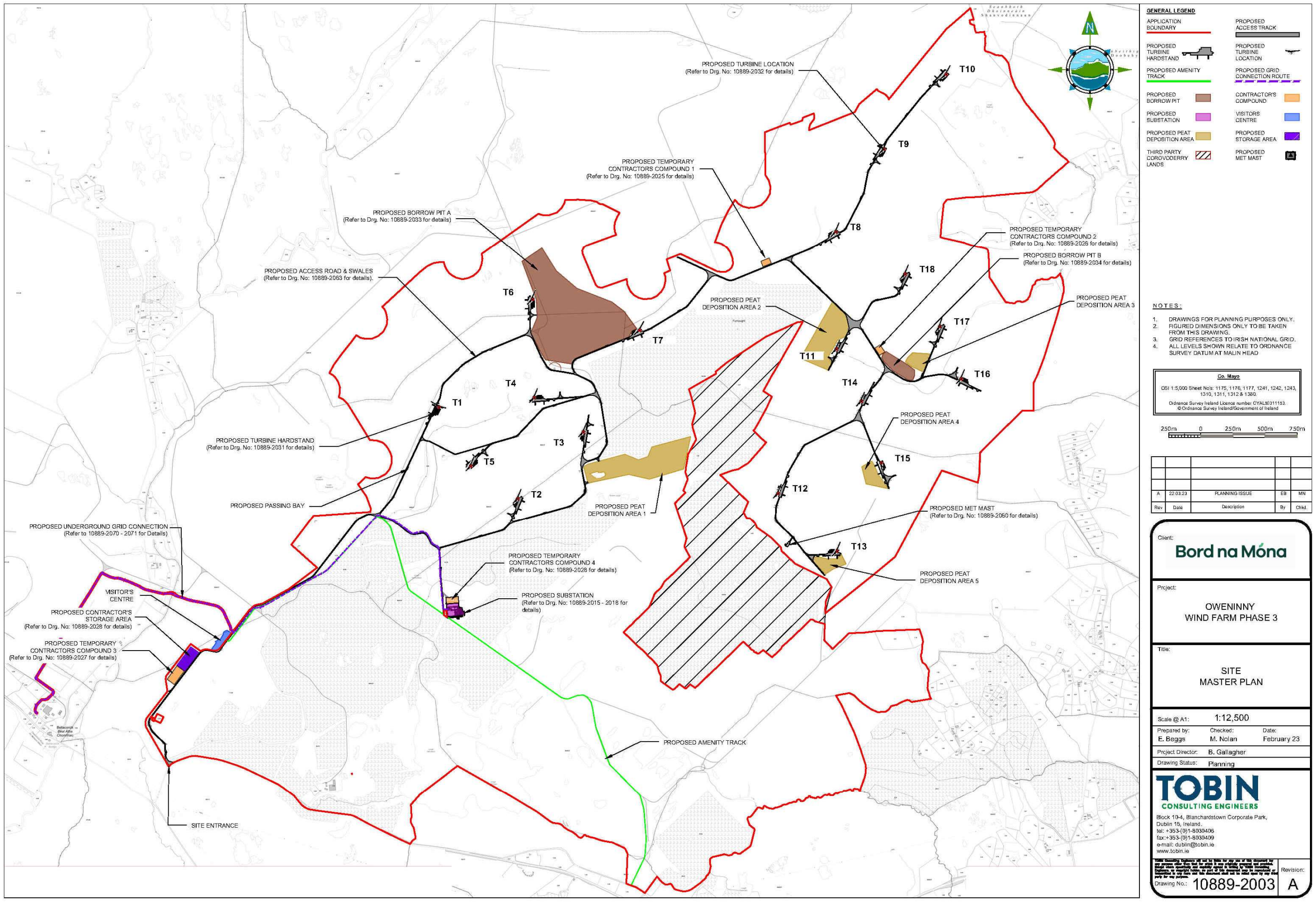

Figure 3.1: Site Layout Plan

3.4 DEVELOPMENT COMPONENTS

3.4.1 Wind Turbines

3.4.1.1 Turbine Locations

The location of individual turbines is influenced by a range of design constraints. These constraints are established in advance of the design modelling of the turbine layout and have a significant impact on the output from the design layout modelling of the proposed wind farm. The key constraints that were established prior to the development of the final turbine layout are as follows:

- Setback distance to dwellings of 800m (four times maximum tip height setback distance);
- 100m from ancient monuments;
- 50m from rivers and lakes;
- Telecoms link plus a buffer of a size requested by the relevant telecoms providers;
- 100m buffer from boundary of Lough Dahybawn SAC; and
- 2 rotor diameter setback from the boundary of the site.

The proposed wind turbine layout has been optimised using wind farm design software (a combination of WAsP, WindPro Computational Fluid Dynamics and WindFarmer) to optimise the energy yield from the site, while maintaining sufficient distances between the proposed turbines to ensure turbulence and wake effects do not compromise turbine performance.

The Grid Reference co-ordinates of the proposed turbine locations are listed in Table 3.1 below. The levels at the top of the foundation are also listed in Table 3.1.

Table 3.1*: Turbine Location Details*

Turbine	X Co-ordinate (ITM)	Y Co-ordinate (ITM)	Top of Foundation (mOD)
T01	499,874	822,583	86.5
T02	500,488	821,872	86.5
T03	500,998	822,389	90.5
T04	500,616	822,656	89.0
T05	500,122	822,125	84.5
T06	500,600	823,419	95.5
T07	501,436	823,179	98.0
T08	502,962	823,949	100.5
T09	503,336	824,591	99.5
T10	503,820	825,172	96.5
T11	502,967	823,035	101.5
T12	502,512	821,912	104.5
T13	502,971	821,460	100.5
T14	503,160	822,629	99.5
T15	503,315	822,150	101.0
T16	503,937	822,802	94.5
T17	503,771	823,208	89.5
T18	503,500	823,615	92.5

3.4.1.2 Wind Turbine Specifications

The exact rating and design of the proposed turbine will be subject to a competitive procurement process that will only commence if the project receives consent. However, the individual turbine rating is expected to be within the range of 4.5MW to 6.5MW. The proposed turbine will be detailed by the turbine manufacturer on award of the contract. However, the proposed Oweninny Wind Farm Phase 3 turbines will be the typical three bladed, horizontal axis type with installed capacities of approximately 5MW per turbine resulting in an estimated 90MW in total for the wind farm.

The turbines will have a tip height of 200m above the top of foundation level.

The rotor diameter will be 158m. This rotor diameter corresponds to a blade length of 77.5m.

The exact make and model of the turbine will be dictated by a competitive tender process and will adhere to the specification set out above. Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics with only minor cosmetic differences differentiating one from another.

A typical turbine begins generating electricity at wind speeds of 2.5 to 3.5m/s with optimum power generation at wind speeds of approximately 12 to 20m/s. Turbines usually shut down at wind speeds greater than 25m/s in order to protect themselves from excessive wear. Modern turbines typically turn at 9 to 18 revolutions per minute (rpm) depending on wind speed and type of turbine. The entire nacelle and rotor are designed to swing around, or 'yaw', in order to face the prevailing wind. A wind vane located on the nacelle of the turbine controls the yaw mechanism. Rotors of all 18 No. turbines will rotate in the same direction. A control unit is located at the base of the turbine and an internal ladder leads up to the nacelle where the shaft, gearbox and generator are located.

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

Turbine design parameters have a bearing on the assessment of shadow flicker, noise, visual impact, traffic and transport and ecology (specifically birds), as addressed elsewhere in this EIAR.

At the turbine selection stage of the project, new turbine models or variations of currently existing models may be available that were not on the market at the pre-planning and EIAR preparation stage, that would better suit the site. Should this circumstance arise, the specific parameters of the new turbines will be assessed for their compliance with the criteria set out and considered in this EIAR, and any conditions that may be attached to any grant of planning permission that might issue.

A drawing of the proposed wind turbine is shown in Planning Drawing 10889-2032.

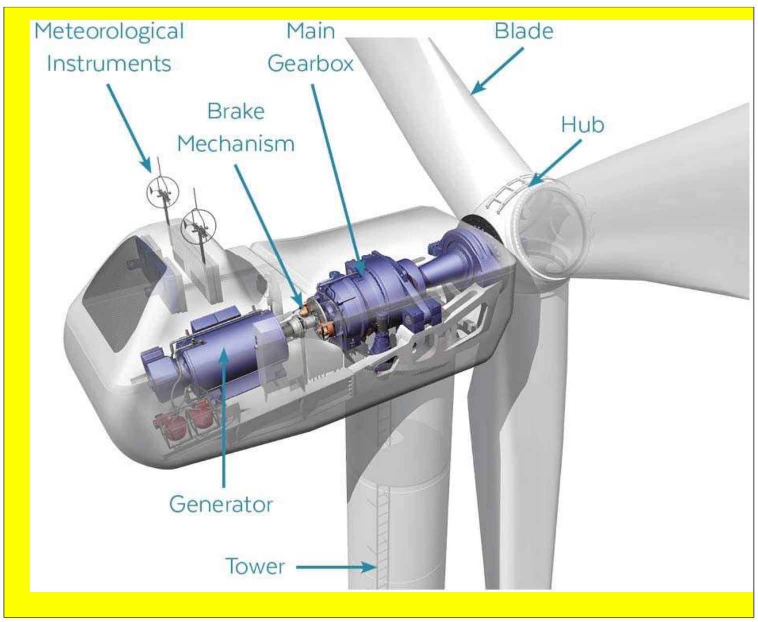

Figure 3.2: Turbine Nacelle and Hub Components

3.4.1.3 Turbine Tower

The turbine tower is a conical steel tube with triple paint finish. Modern tower design also provides for the use of concrete sections. Towers comprise a steel ring at the base of the tower which is assembled on top of the concrete foundations using locally supplied concrete and then pre-stressed. The tower is delivered to site in three to six sections. The first section is bolted to the steel base, which is cast into the concrete foundation. The base of the tower is approximately 4m in diameter, tapering to approximately 2m where it is attached to the nacelle. The tower is accessed by a galvanised steel hatch door, which will be kept locked except during maintenance.

3.4.1.4 Turbine Blades

Wind turbine blades are airfoil-shaped blades that harness wind energy and drive the rotor of a wind turbine. The airfoil-shaped-design (which provides lift in a fixed wing aircraft) is used to allow the blades to exert lift perpendicular to wind direction. The difference in air pressure across the two sides of the blade creates both lift and drag. The force of the lift is stronger than the drag and this causes the rotor to spin. The blades of modern turbines are generally made of fibreglass or carbon fibre reinforced polyester and are aerodynamically shaped to improve efficiency and lower noise production.

The wind farm has been designed to accommodate turbines with a blade length of 77.5m. The turbine delivery haul route utilised for the adjacent and constructed Oweninny windfarm (Phases 1 and 2) accommodated turbines blades of 57.5m in length. Other alternative haul routes to the site have been identified and are presented in Chapter 17. It is clear that either the utilisation of segmented blades or Blade lifters (or a mixture of both approaches) will be required to deliver the proposed blades to the site. It is expected that the 77.5m blade will be delivered to site in 2 segments over 2 no. deliveries, with the longer segment being up to 57.5m and the shorter segment a minimum of 20m. The LM 77.4m P blade from General Electric, is an example of a turbine blade currently available in the market which is supplied in two segments however, the exact segment lengths with be determined at procurement based on available options on the market at the time.

Segmented blade technology, whilst not new, is a developing market gaining popularity with suppliers. It allows suppliers to offer longer blades which reduce the cost of energy, whilst also providing for flexibility of site access and reduced transport costs and off-site upgrade areas, compared to other options such as blade lifters. Typically, segmented blades are split into a longer root segment and a shorter tip segment, the two of which are mechanically assembled onsite; however, segments can also be split into a shorter root and longer tip or can include hub and root extenders. Further details on the segmented blade options can be found in the review paper ‘The Concept of Segmented Wind Turbine Blades: A Review’ by Peeters et al, 2017. The utilization of both blade lifters and segmented blades is assessed in Chapter 17 Traffic and Transportation.

3.4.1.5 Turbine Foundations

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

Each wind turbine will require piled foundations or a gravity foundation of reinforced concrete (RC) comprising a base slab bearing onto rock or other competent substrata with a central upstand to support the tower. The foundations for each turbine will be designed by the appointed Designer. Piled foundation bases are generally 18-19 m in diameter and gravity foundation bases are 24-26 m in diameter with detailed foundation design being dictated by the local ground conditions.

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground surface. The turbine foundation transmits any load on the wind turbine into the ground. After the foundation level of each turbine has been formed using piling methods or on competent strata, the bottom section of the turbine tower or cage (Plate 3.1 below). Reinforcing steel is then built up around and through the cage (Plate 3.2 below), and the outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete (Plate 3.3 below).

Gravity, bored pile and driven pile details are shown on Planning Drawings 10889-2020 to 2022.

Plate 3.1: Levelled Turbine Anchor Cage

Plate 3.2: Turbine Anchor Cage with Adjustment Feet

Plate 3.3: Completed Turbine Base Cage

3.4.1.6 Hardstands and Assembly Area

Hardstand areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are typically used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place.

The turbine hardstanding areas are shown on Planning Drawing 10889-2031 and shown on the site layout drawings included with the Planning Application. The hard-standing area is intended to accommodate a crane during turbine assembly and erection. The designs shown represent a design based on manufacturer's requirements and seeks to accommodate a number of different turbine types and makes. The EIAR utilises this design to determine the quality, significance, extent and duration of potential impacts.

Unbound, levelled assembly areas will be located on either side of each hard-standing area as shown on Planning Drawing 10889-2031. These assembly areas are required for offloading turbine blades, tower sections and hub from trucks until such time as they are ready to be lifted into position by cranes.

3.4.1.7 Turbine Colour

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

- Department of the Environment, Heritage and Local Government (DoEHLG) – "*Wind Farm Development – Guidelines for Planning Authorities*" (2006);
- "The Influence of Colour on the Aesthetics of Wind Turbine Generators" – ETSU W/14/005333/00/2000.

3.4.1.8 Power Output

The proposed wind turbines have an assumed rated electrical power output of 5MW. This may vary because of the final turbine type, power output modelling and turbine development over the period leading up to construction. It is expected that the installed capacity for individual turbines will range from 4.5MW to 6.5MW. For the purposes of this EIAR, a rated output of 5MW has been used to calculate the power output of the proposed wind farm, which would result in an estimated installed capacity of 90 MW.

Based on the above, the proposed wind farm has the potential to produce up to 268,056 MWh (Megawatt hours) of electricity per year, based on the following calculation:

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

- A = 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.: 34%
- C = Rated output of the wind farm: 90 MW

The capacity factor of a wind farm takes into account the intermittency of the wind and is based on average wind speeds. A load factor of 34% is used here, based on future capacity factors for windfarms in this region provided in the Eirgrid report *Enduring Connection Policy 1 Constraints Report for Area A Solar and Wind*" (Eirgrid, 2020).

The 268,056 MWh of electricity produced by the proposed wind farm would be sufficient to supply the equivalent of 63,823 Irish households with electricity per year. This is based on the Commission for Energy Regulation (CER) decision paper concerning typical domestic consumption values for electricity customers published in March 2017. This decision paper updated the recommended typical annual household electricity consumption figure to 4,200 kWh.

3.4.2 Site Roads

The proposed development site will be accessed via the N59 road using the existing operational entrance for Oweninny Wind Farm Phase 1. Internal site roads will be constructed as part of the initial phase of the construction of the wind farm. Material will either be imported into the site or won from the proposed borrow pits within the site to provide the required base of the internal roads. The internal roads will be a mixture of permanent (construction/operational and amenity) roads, temporary (construction only) roads and amenity pathways/cycleways (permanent).

New roadways will have a running width of approximately 6 metres (6.5m including shoulders), with wider section at corners, bends and on the approaches to turbine locations. The proposed new roadways incorporate passing bays to allow traffic to pass easily while traveling around the site. Peat/soil excavated as part of the construction of the internal roads will be sidecast, bermed and profiled on either side of the trackway or brought to the nearest peat deposition area.

Two road construction methodologies will be used:

1. Floating Roads
2. Founded Roads

Typical road construction details are included in Planning Drawing 10889-2063. These construction methodologies are detailed in the section on road construction and can be summarised as follows:

<u>Construction of New Floating Roads</u>

A base geogrid is laid directly onto the existing peat surface. Up to 1,200mm of granular fill is laid with 2 no. layers of geogrid and possibly a geotextile separator. 5m wide pressure berms (typically 1m in height) may be required either side of the access road in some of the deeper peat areas. Granular material is end-tipped, and a bulldozer spreads the tipped stone over the base geogrid along the line of the road. A final surface layer is placed over the floating road and graded to accommodate wind turbine construction and delivery traffic. The finished road surface width will be approximately 6m.

<u>Construction of New Founded Roads</u>

Interceptor drains are installed upslope of the access road alignment to divert any surface water away from the construction area. Excavation takes place to a competent stratum beneath the peat. Road construction is carried out in sections of approximately 50m lengths. Where appropriate, excavated peat is placed/spread alongside the excavations. Battering of the side slopes of the excavations is carried out as the excavation progresses. A layer of geogrid/geotextile may be required at the surface of the competent stratum. A final surface layer shall be placed over the excavated road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic. The surface of the finished excavated access road is 1.2m above existing ground level.

3.4.3 Borrow Pits

There are two potential borrow pit locations which have been identified to produce excavated material to provide fill material for roads (permanent, temporary, amenity), passing bays, hardstands, upfill to foundations and temporary compounds. The borrow pits are located on the north-west, north-east and south-east corners of the proposed development and are at advantageous locations with regards to the hauling of materials within the site.

Approximate volumes of materials available on site are summarised in Table 3.2 below. The estimates are based upon specific dimensions so as to provide a safe working zone and to minimise land take.

Table 3.2: Borrow Pit Summary

Borrow Pit	Surface Area (m^2)	Material composition
Borrow Pit A	43,000	Glacial till
Borrow Pit B	3,300	Glacial till

The total approximate volume of potentially usable material is up to 300,000m^3, including a 1.3 factor for bulking (Caterpillar, 2017). No rock breakers or blasting is proposed for extracting material from these borrow pits. Extraction from borrow pits will be from above and below the water table. Where extraction is taken place above the water table, refuelling areas may be provided within the pit to allow for ease of work. The refuelling area will consist of a concrete slab upon which the fuel bowser will sit. This slab is designed to retain any fuel spillage which would fall to the centre of the slab. Drainage is via an interceptor.

Given the volumes of material available from these borrow pits, it is possible that they will fulfil a portion of the material requirements for the project. The use of on-site borrow pits will reduce the environmental effect of other aspects of the development such as by reducing the need to transport material to the site.

Post-construction, the borrow pit area will be partially backfilled with overburden and excavated material from elsewhere on the site and permanently secured. The temporary access roads to the borrow pits will be removed. Berms will be erected around the area to prevent access as necessary. Appropriate health and safety signage will also be erected on the berms and at locations around the borrow pit.

3.4.4 Electricity Substation Compound

It is proposed to construct one 110 kV substation compound within the site to house the TSO (Transmission System Operator) substation and the Independent Power Producer (IPP) substation , at the location shown on Planning Drawing 10889-2008. The layout of the proposed substation is shown on Planning Drawing 10889-2015. The construction and electrical components of the substations will be to EirGrid specifications. Further details regarding the connection between the substation and the national electricity grid are provided in Section 3.4.7. The footprint of the proposed substation compound is approximately 135 metres in length by approximately 75 metres in width. The substation footprint will include two control buildings (refer to Section 2.4.6) and electrical apparatus necessary to facilitate the generated power from the wind turbines to export onto the transmission system.

3.4.5 Substation Control Buildings

The TSO & IPP control buildings will be located within the substation compound. The TSO Control Building will measure approximately 25 metres by 18 metres and approximately 9.6 metres in height. The IPP Control Building will measure approximately 19 metres by 12 metres and approximately 7.0 metres in height. Layout drawings of the control buildings are shown on Planning Drawings 10889-2017 and 10889-2018.

The wind farm control buildings will include welfare facilities for the staff that will work on the proposed wind farm during the operational phase of the project. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. Due to the specific nature of the proposed development, there will be a very small water requirement for occasional toilet flushing and hand washing and therefore the water requirement of the proposed development is small. It is proposed to install a groundwater well adjacent to the substation in accordance with the Institute of Geologists Ireland, Guide for Drilling Wells for Private Water Supplies (IGI, 2007). The well will be flushed to the ground and covered with a standard manhole. A pump house is not currently required as an in-well pump will direct water to a water tank within the roof space of the control building (subject to final design).

It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off-site by a permitted waste collector to a wastewater treatment plant. It is not proposed to treat wastewater on-site, and therefore the EPA's *'Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses'* (EPA, 2021) does not apply. Similarly, the EPA's manual on *'Treatment Systems for Small Communities, Business, Leisure Centres and Hotels'* (EPA, 1999) also does not apply, as it too deals with on-site treatment of wastewater.

Such a proposal for managing the wastewater arising on site has become standard practice on wind farm sites, which are often proposed in areas where finding the necessary percolation requirements for on-site treatment would be challenging and has been accepted by numerous Planning Authorities and An Bord Pleanála as an acceptable proposal. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system will be submitted to the Planning Authority in advance of any works commencing on-site.

The wastewater storage tank alarm will be integrated with the on-site electrical equipment for alarm notification that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the site. When the final destination of the materials is known following the appointment of a permitted contractor, this information will be submitted to the Planning Authority if necessary.

3.4.6 Underground Cabling from Turbines to Substation

Clusters of turbines will be connected to the on-site proposed 110 kV substation via underground Medium Voltage (MV) cables. Fibre-optic cables will also connect each wind turbine to the wind turbine control system located within the IPP Control Building.

The electrical and fibre-optic cables running from the turbines to the substation compound will be run in cable ducts approximately 1.2 metres below the ground surface alongside the proposed wind farm internal roadways, are as shown on Planning Drawing 10889-2058.

3.4.7 Grid Connection

The proposed 110 kV substation will be connected to the national grid at the existing 110 kV Bellacorick substation via underground HV cables and will export power via the existing 110 kV overhead line infrastructure from Bellacorick substation.

The proposed development requires approximately 4.8km of 110 kV underground cable (UGC) installation from the 110 kV onsite substation to the existing ESB Bellacorick 110 kV substation. The entire UGC will be installed along the existing wind farm access roads. The entire UGC route was assessed and included in this assessment. The underground cable route is outlined on Planning Drawings 10889-2050 to 10889-2053.

The 110kV cable route from the proposed substation to the existing on site Bellacorrick substation encounters a number of natural and manmade obstacles along the route that will require minor amendments to the cable installation methodology. The location, description and methodology amendments are detailed in Table 3.3 below.

Table 3.3: Cable Route Installation Methodology Variations

Location	Description	Installation Methodology
Immediately north of proposed Oweninny Phase 3 substation	Utilising Existing Culvert of local stream	Sufficient space for the proposed 110 kV cable to perform an over-the-top crossing between the top of the culvert material and the surface of the road. Depth is approximately 1m
Crossing point at River Muing	Utilising Existing Culvert of River Muing	Sufficient space for the proposed 110 kV cable to perform an over-the-top crossing between the top of the culvert material and the surface of the road. Depth is approximately 1m
Oweninny River bridge crossing	Utilizing existing Oweninny Bridge	Conduit system within the bridge - no instream works
Crossing point on local Shranakilla road	Underground crossing of local road	Single Shot Horizontal Directional drilling (HDD) Installation – 2 Metre Depth
West of Oweninny river, north of Bellacorick substation	Potential Interaction with Existing Oweninny Phase 1 110kv underground electrical cable	Increased depth of cable to approximately 2m underground
North of Bellacorick substation	Potential Interaction with existing High-Pressure pipeline	Sufficient space for the proposed 110 kV cable to perform an over-the-top crossing between the top of the high-pressure pipeline and the surface of the road. Depth is approximately 1m

Joint bays, as detailed on Planning Drawing 10889-2059, are required approximately every 600 - 800m where the separate cable lengths are joined together. The joint bays proposed along the cable route will be located either within the existing wind farm assess road or, more likely, at suitable off-access road locations, which will be immediately adjacent to the existing access roads to minimise the disruption to traffic and to reduce the impact during the construction phase. The selection of joint bay locations involves a detailed technical and environmental evaluation of the sites to ensure that the area is suitable for construction works. These joint bays will be underground and reinstated entirely/backfilled during reinstatement works.

A designated working area (DWA) is defined and marked during the joint bays' construction, providing adequate space for cable pulling and jointing around the joint bay. This working area will also provide space for the movement of all construction vehicles. Due consideration will be given to the possible presence of existing underground and overhead services, traffic management requirements and existing ground conditions. Refer to Planning Drawings 10889-2050 to 10889-2053 for the proposed route for the underground cable for the proposed development.

The proposed underground cable route lies within the development boundary, so the disruption to the traffic and the public will be minimal. Before the construction commences, contractors will carry out detailed site investigations along the proposed route in advance of the approved designs being finalised for the UGC trenching and ducting civil works. These site investigations will include slit trenches along the roadways to detail the route and ensure sufficient space to install a 110 kV cable trench typically measuring approximately 0.6m (width) by 1.2m (depth).

The cables will be laid in trenches as per Eirgrid/ESB Networks Specification. Refer to Planning Drawing 10889-2070 and 10889-2071 for the proposed cable trench arrangement. A typical underground cable duct installation is shown in Figure 3.3 below.

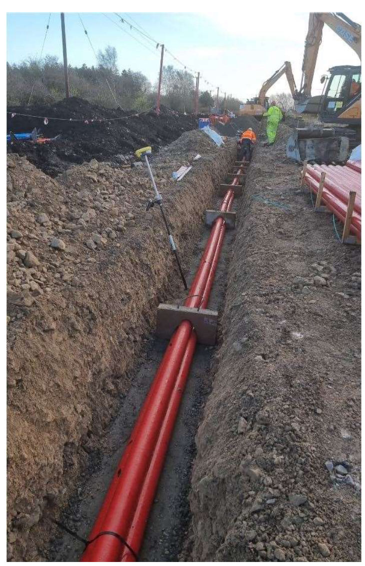

Figure 3.3: Typical Cable Duct Installation

At the crossing point on local Shranakilla Road, the cable duct will be drilled under the road using single shot Horizontal Directional drilling (HDD). The cable duct will be drilled at 2 metre depth. A launch pit for the directional drilling run will be excavated on one side of the road and a reception pit will be excavated on the other side. A pilot borehole will be drilled on the proposed route and this hole will be enlarged by passing a larger cutting tool of sufficient diameter to allow the cable duct to pass. The cable duct will be pulled through the hole by the drill stem and cutting head to allow for the centring of the pipe through the newly cut hole.

3.4.8 Local Electricity Supply

As part of the development, a local supply will be required as a back-up power supply to the proposed substation for light, heat and power purposes. The local supply adjacent to the development will be utilised. Thelocal supply will be designed and constructed by ESB Networks. The exact source of supply is to be confirmed, however, the supply will enter the substation by either MV overhead line or MV underground cable. Thelocal supply will have an associated step-down transformer (i.e. MV to LV) and will enter the substation building by underground cable and terminate onto the control building AC distribution board.

3.4.9 Anemometry Masts

One permanent anemometry mast is proposed as part of the proposed development. The anemometry mast will be equipped with wind monitoring equipment at various heights. The mast will be located as shown on the site layout drawing 10889-2003. The mast will be a slender, free-standing lattice structure up to 120 metres in height, as shown on Planning Drawing 10889-2060.

The mast will be constructed on a hardstanding area sufficiently large to accommodate the crane that will be used to erect the mast, adjacent to an existing track.

3.4.10 Temporary Construction Compounds

Four temporary construction compounds are proposed as part of the proposed development as shown on Planning Drawing 10889-2003; one main compound at the Visitor's Centre, one compound at the proposed sub-station, and two smaller compounds.

Table 3.4: Temporary Construction Compounds

Compound No.	Location	Dimensions	Total Area (m^2)
1	South-west of T8	70m x 45m	3,150
2	Between T11 and T17	70m x 45m	3,150
3	Beside Visitor's Centre	130m by 70m	9,100
4	Beside proposed sub-station	100m by 50m	5,000

The construction compounds will typically consist of temporary site offices, staff welfare facilities, storage areas, and car-parking areas for staff and visitors. The layout of the temporary construction compounds is shown on Planning Drawings 10889-2025 to 10889-2028.

Temporary toilets will be used during the construction phase as part of the welfare facilities for site staff and visitors. Wastewater from toilets will be directed to a sealed storage tank, with all waste water tankered off site by an appropriately consented waste collector to wastewater treatment plants

3.4.11 Temporary Security Cabin

A temporary security cabin will be installed within the site for the duration of the construction phase of the proposed development. The security cabin will be located close to the existing permanent site entrances to the south of the existing visitor centre.

The security cabin will be prefabricated structures measuring 7.2 metres by 2.5 metres and 2.85 metres in height. The cabin will serve as the check in and check out point for staff and visitors during the construction phase. The temporary cabin will be removed as part of the post-construction reinstatement works upon commissioning of the wind farm development. The layout and sections of the proposed security cabin is shown on Planning Drawing 10889 – 2066.

3.4.12 Amenity Track

An amenity track, approximately 5.2km in length, will be provided as part of the development facilitating a route from a local road off the N59 at Dooleeg to the existing visitor centre, as shown on Planning Drawing 10889–2064. This access point is close to the Western Way (Slí an Iarthair) Trail which runs along the N59 and continues north to Ballycastle, along the western periphery of the Bellacorick Bog Complex. The amenity track will be suitable for both walking and cycling.

The route of this amenity track is currently used by walkers and the works proposed as part of this development include maintenance of the track with localised improvements where required.

Feedback from public consultation suggests that current users would prefer that the existing surface of the track be retained where possible. Where this is not possible, in localised areas gravel/crushed stone and surface dressing will be used to improve the track surface.

During the construction phase access to the existing visitor centre will be restricted to reduce public interaction with construction vehicles. Groups or individuals who wish to access the visitor centre will be accommodated using a shuttle bus service that will be located on the existing hardstanding areas adjacent to the Bord na Móna works located to the east of the Oweninny Wind Farm entrance.

3.5 ACCESS AND TRANSPORTATION

3.5.1 Construction/Operational Site Entrances

The existing wind farm entrance off the N59 will be used to transport materials and equipment to the site. The existing entrance is currently used for accessing the Oweninny Phase 1 wind farm site.

This entrance will be the main construction entrance to the site and will facilitate both materials delivery to the site (stone, steel and concrete) as well as large oversize components such as turbine and substation components.

3.5.2 Amenity Site Entrances

As discussed above, the amenity access point to the site will be off a local road that connects to the N59 at Dooleeg and will utilise a mixture of existing public local roads, existing Bord na Mona internal trackway and proposed windfarm internal roads to access the existing Visitor centre. There will be no vehicular access beyond the existing public road. Once construction has been completed vehicular access for the public to the Oweninny Wind Farm Visitor's Centre will be restored.

3.5.3 Construction Materials Transport Route

Turbine and construction materials will be restricted to the following routes:

- Construction materials coming from Bangor Erris and other areas west of the site will be transported along the N59, accessing the site via the existing entrance;
- Construction materials coming from Crossmolina and other areas east of the site will be transported along the N59, accessing the site via the existing entrance;

3.5.4 Turbine Component Transport Routes

A number of turbine component transport options have been identified. These routes are described in detail in Chapter 17 Traffic and Transport. The three routes identified originate from Galway port (Route A) and Killybegs port (Routes B and C). Route A commences at Galway port, and utilising both motorway and national grade roads accesses the site via Tuam, Claremorris, Charlestown, Foxford and finally Crossmolina. Route B and C commence at Killybegs port and initially share the same route though Bundoran before splitting into alternative routes to Crossmolina.

Route C accesses Crossmolina via Ballisodare and route B utilises the national road to Tubbercurry.

Route C which travels from Killybegs to the site via Donegal, Sligo, Ballisodare, Ballina and Crossmolina is the route utilised in 2019 and 2021 for Oweninny Wind Farms Phase 1 and Phase 2.

The port of Foynes has also been used recently for the delivery of large turbine components to Cloncreen windfarm in east Offaly. This route also utilised part of the M18 and could access Route A.

Route A, B and C are outlined in Figure 3.4 below.

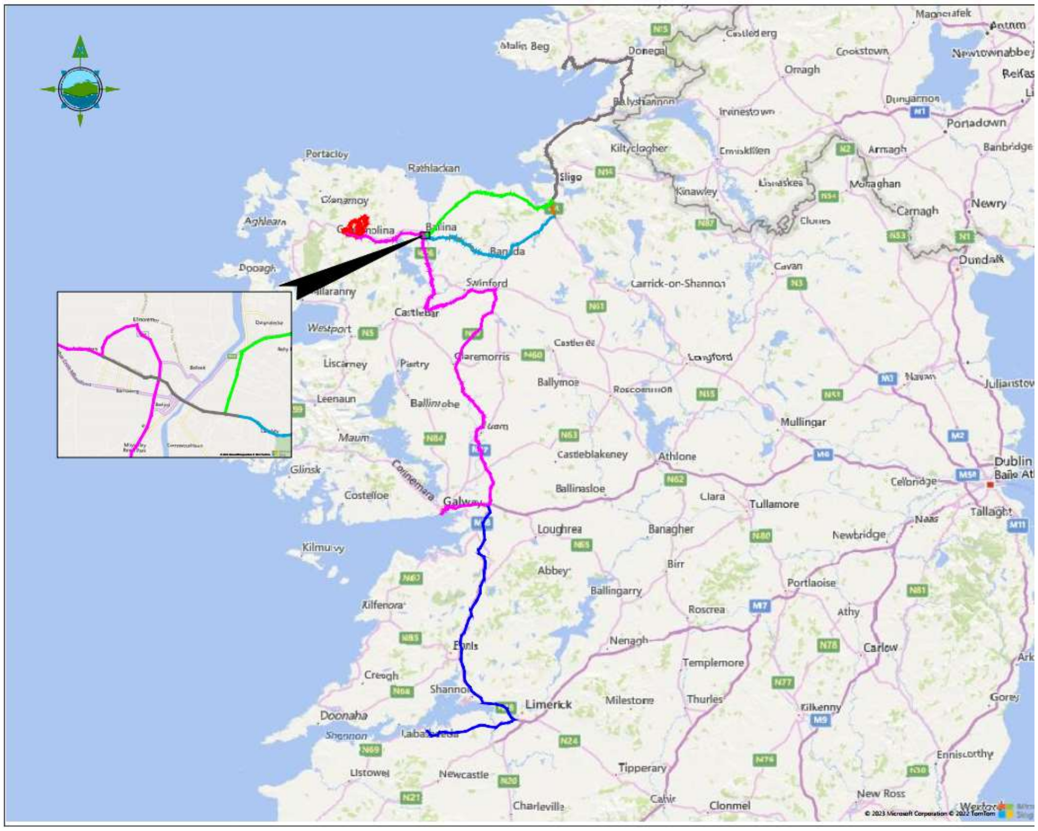

Figure 3.4: Turbine Delivery Routes A, B and C

The deliveries of turbine components to the site will be made in convoys of three to five vehicles and mostly at night when roads are quietest. Convoys will be accompanied by escorts at the front and rear operating a "stop and go" system. Although the turbine delivery vehicles are large, they will not prevent other road users or emergency vehicles passing, should the need arise. The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users.

It is not anticipated that any section of the local road network will be closed during transport of turbines, although there will be some delays to local traffic at pinch points. During these periods, it may be necessary to operate local diversions for through traffic.

Prior to the construction of the Proposed Development a test run of the proposed transport operation along the proposed route will be completed using vehicles with attachments to simulate the dimensions of the turbine components. Following this test run, the Traffic Management Plan will be reviewed and updated with the haulage company when the final transport arrangements are known, delivery dates confirmed and escort proposals in place. The plan will then be submitted to the relevant County Councils for agreement in writing in advance of any abnormal loads using the local roads. The plan will provide for all necessary safety measures, including a convoy and Garda escort as required, off-peak turning/reversing movements and any necessary safety controls.

3.5.5 Traffic Management

As described in Chapter 17, Traffic and Transport, the successful completion of this project will require significant co-ordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the project in order to minimise the effects of the additional traffic generated by the proposed development. The Traffic Management Plan proposed for the Oweninny Wind Farm Phase 3 is included in the CEMP, in Appendix 3.1.

3.6 SURFACE WATER MANAGEMENT

3.6.1 Existing Site Drainage

The proposed development is located within a former peat extraction site. An extensive network of drainage channels was present throughout the peatland is managed under IPC licence P0505-01 Oweninny bog group. During production, the peatlands were made up of large production fields (700 to 1800m in length) which were separated by drainage channels 15m apart. At the end of each production field there was a 21m turning ground.

Rehabilitation of the peatland started pre 2003 on parts of the site where peat extraction had ceased. Since 2003, all production in the bog ceased and a rehabilitation programme was implemented across the full site. To date the rehabilitation programme has resulted in the recolonisation of the peatlands with typical bog species such as the heath vegetation and *Sphagnum*. A number of ponds and pools now occur in topographical depressions on site as a result of rehabilitation works.

All equipment associated with peat extraction works including rail tracks within the peatland area have been decommissioned and a programme of sedimentation pond decommissioning has been completed on ponds near roads and access points.

The peatlands are located within the Owenmore, Moy and Killala Bay Hydrometric Catchment Areas. The majority of the bog is drained into the Muing and Owenmore Rivers (also known as the Owenniny River). The eastern sections of the peatlands are drained by the Fiddaunagosty and Shanvolahan Rivers.

3.6.2 Drainage Design Concept

Runoff will be maintained at Greenfield runoff rates. The layout of the development has been designed to collect surface water runoff from hardstanding areas within the development and discharge to associated surface water attenuation lagoons adjacent to the proposed infrastructure. It will then be managed by gravity flow at Greenfield runoff rates.

It is proposed, that during the ground clearance of the proposed development, water control measures will be implemented to limit the impact on water quality. Suspended solid (silt) removal features will be implemented in accordance with CIRIA C697 SuDS Manual, and CIRIA C648 Control of water pollution from linear construction projects.

All temporary and permanent drainage from the site shall be designed to have as a minimum three stages of treatment, as defined in the SuDS Manual. Management of runoff will include the following:

- Filtration of water through filter media (sand / stone check dam, silt fence);
- Detention / settlement in settlement ponds or behind check dam in swales; and
- Conveyance of shallow depths of water in vegetated swale.

3.6.2.1 Interceptor Drains

Interceptor drains/diversion ditches will be installed ahead of the main earthworks activities to minimise the effects of collected water on the stripped/exposed soils once earthworks commence. This drainage will integrate into the existing peatland drainage. These drainage ditches will be installed on the upgradient boundary of the areas affected by the access track earthworks operations and installed ahead of the main track construction operations commencing. They will generally follow the natural flow of the ground. The interceptor drains will intercept any storm water surface run-off and collect it to the existing low points in the ground, allowing the clean water flows to be transferred independently through the works without mixing with the construction drainage. It will then be directed to areas where it can be redistributed over the ground by means of a level spreader.

3.6.2.2 Swales

Track edge drainage/swales are required to control run-off from the running surface to lower water levels in the subgrade, to control surface water and to carry this flow to outlet points. Swales along access tracks are to be installed in advance of the main construction phase. On sections of track where there is significant longitudinal gradient, regular surface water interception channels will be employed – these will typically be at 10-20m intervals to collect any surface water that is discharging as sheet flow along the track and discharge the flow into the trackside swale.

3.6.2.3 Settlement Ponds

Settlement ponds will be located downstream of road swale sections and at turbine/hardstand locations, to manage/buffer volumes of runoff discharging from the drainage system during periods of high rainfall, thereby reducing the hydraulic loading to watercourses. Settlement ponds, as outlined on Planning Drawing 10889-2036, are designed in consideration of the greenfield runoff rates.

Settlement lagoons will be installed concurrently with the formation of the road and will be fenced off for safety. They will be located as close to the source of sediment as possible and as far as possible from the buffer zones of existing watercourses. The minimum buffer zone width will be 50m as outlined above.

Subject to potential planning conditions and prior to commencement of construction activity, this drainage design (including construction specific measures) will be reviewed by the appointed Contractor as part of the review of the Construction Environmental Management Plan (CEMP), Appendix 3.1.

A Surface Water Management Plan (SWMP) has been prepared and is included as Appendix 11.4 of the EIAR. The purpose of this plan is to ensure that all site works are conducted in an environmentally responsible manner so as to minimise any adverse impacts from the proposed development on surface water quality. The plan incorporates the following specific objectives:

- Provide overall surface water management principles and guidelines for the construction phase of the Oweninny Wind Farm Phase 3 project;
- Address erosion, sedimentation and water quality issues; and
- Present measures and management practices for the prevention and/or mitigation of potential downstream impacts.

During the operational phase of the project, the management of surface water will be carried out in accordance with the proposed design and associated management features. The design of the wind farm has been developed following a detailed examination of the existing drainage on site. The drainage design ensures that any surface water arising from the proposed wind farm during operation will be contained and treated to ensure it can be dispersed out from the proposed development without any significant impact.

The decommissioning phase will not require any significant works that will impact on the drainage network.

The protection of water quality and prevention of pollution events requires a sustained and concentrated input from the Contractor with regard to the provision and maintenance of sediment control structures. The drainage system, as it is designed, does not impact on the existing drainage regime on site.

3.6.2.4 Silt Control

Silt control measures e.g. silt bags, will be implemented as required during the construction process.

Dewatering silt bags allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing silt from silt-laden water collected from works areas within a construction site. Silt bags are easily disposed by a licensed waste contractor.

Figure 3.5: Examples of Proprietary Silt Control Measures

In specific locations, silt fences will be installed as an additional water protection measure around existing watercourses, particularly where works are proposed within the 50-metre buffer zone of a stream.

3.6.2.5 Culverts

Culverts will be required where site roads, crane pads and turbine pads cross main bog drainage networks. Indicative locations of the culverts are shown on Planning Drawing 10889-2037.

Precast concrete culverts of minimum 300mm in diameter shall be provided, a typical detail of which is shown on Planning Drawing 10889-2025. The proposed culverts and any diversion of the existing main drainage network across the site are specified on Planning Drawing 10889-2037.

3.7 CONSTRUCTION MANAGEMENT

3.7.1 Construction Timing

Approximately 100-120 persons will be employed during the peak construction period and it is estimated that the construction phase will take approximately 24 months from starting onsite to completion of commissioning of the turbines. All vegetation clearance that is required during construction works must commence outside the breeding birds season, which runs from the 1st of March to the 31st of August.

3.7.2 Construction Sequencing

The construction phase can be broken down into six overlapping main phases:

- Bellacorick turbine decommissioning; approximately 3 months
- Civil engineering works; approximately 18 months
- Electrical works; approximately 18 months (will commence shortly after civil works and will then run in parallel); and
- Turbine delivery; approximately 8 months
- Turbine installation; approximately 8 months (will commence shortly after delivery and will then run in parallel); and
- Substation and turbine commissioning; approximately 4 months

The main tasks under each phase are outlined below.

<u>Bellacorick Wind Farm Decommissioning Works:</u>

- Disconnect turbines from the grid.
- Dismantle and removal by competent contractor
- Cranes will be erected on hardstand areas left after the construction phase.
- Turbine to be dismantled fully from blade tip to top of foundation.
- Firstly the rotor blades and hub will be taken down and then the nacelle (incl. generator) will be taken down.
- Depending on Original Equipment Manufacturer (OEM) requirements the generator may need to come down first and temporary works are sometimes utilised to hold hub and blades in place whilst it comes down.
- Sequence above might alter slightly from above depending on OEMs requirements and crane company’s lift plan.
- The tower sections will be removed section by section and lowered to the ground.

- Finally, all parts will be transported by road to its final destination either wholly intact or in more transportable components and will be either properly disposed or reused.
- The turbines will be removed from site by articulated trucks as part of the proposed Traffic Management Plan and Transport Management Plan which will be finalised post consent.
- Upon dismantling of turbines, the concrete foundation will remain in situ.
- The 21 no. turbine foundations will infilled with peat and where the foundation is above ground locally that ground will be built up to cover the foundation.
- The MV cable will be removed from the ducting at joint bay locations and ducting will remain in the ground.
- The cable will be disposed of in an orderly fashion by an approved contractor and the joint bays will be backfilled after excavation and post cable removal.
- All electrical equipment will be removed from the control building . The building structure will remain in-situ and will be maintained as part of the operational maintenance of the Oweninny Phase 3 wind farm.
- The transport route for turbine components will be assessed and subject to that assessment any required temporary modifications will be agreed with the local authority in advance of works.
- The components involved in decommissioning will be re-used, recycled or sent for waste disposal and these include, but not limited, to cables, metals, fibreglass and hydrocarbons.
- A waste management plan will be produced prior to works commencing on site.

Civil Works:

- Any tree felling required to facilitate the proposed development will be carried out in advance of the civil works.
- Construct secure construction site boundary fencing as required.
- Construct new site roads, drainage ditches and culverts.
- Carry out necessary improvement works to existing site roads, drainage ditches and culverts.
- Clear and construct hardcore area for temporary construction compounds and associated parking areas and install facilities.
- Prepare excavation areas at three proposed borrow pit locations as required.
- Construct remaining road infrastructure, hard-standing areas and crane pads.
- Install ducting in the roads for electrical and telecommunications cables.

- Prepare on-site substation compound and associated drainage ditches and culverts.
- Construct substation control buildings as well as bunds and plinths as necessary for transformers and electrical equipment. Erect security fencing around substation.
- Decommission Bellacorick turbines and remove above ground turbine components from site.
- Excavate/pile as required for turbine bases. Store excavated material locally for backfilling and re-use, where possible.
- Prepare turbine base areas. Store excavated material locally for backfilling and re-use, where possible. Place blinding concrete to turbine bases on competent strata. Fix reinforcing steel and anchorage system for tower section. Construct shuttering. Fix any ducts etc. to be cast in. Pour concrete bases. Cure concrete and remove shuttering after a suitable number of days.
- Backfill around tower foundations and prepare the area to the specific requirements of the turbine supplier and installer.
- Excavate trench and install ducting for grid connection between the on-site substation and the proposed connection point to the existing overhead 110kV transmission line in, including stream crossings.
- Construct bases and steel towers for underground cable transition to overhead line at existing overhead 110kV transmission line connection point in Bellacorick.
- All improvements and temporary modifications required to facilitate delivery of the turbine components from several routes ending at Killybegs or Galway, the Galway route could also be used to access to Foynes. All of these ports have potential to be accessed.
- Install permanent meteorological mast;
- Upon completion of commissioning works, commence reinstatement works on surrounding lands as required.
- Remove temporary site offices, reinstate northern construction compound to pre-construction condition, provide secured site access and signage as required.
- Upgrade southern temporary construction compound to accommodate permanent public car park and install picnic/seating facilities and signage; and
- Complete landscaping works.

<u>Electrical Works:</u>

- Install internal and external electrical equipment at the on-site substation.

- Install MV electrical cabling and fibre-optic telecommunications cabling between the turbines and the on-site substation in the underground ducting; and
- Install electrical and telecommunications cabling from the on-site substation to the existing overhead 110kV transmission line in Bellacorick.

Turbine Delivery, Installation and Commissioning:

- Prepare transport delivery plan for the turbine components from routes ending at Killybegs or Galway, the Galway route could also be used to access Foynes. All of these ports have potential to be accessed co-ordinate approval for deliveries with the relevant authorities.
- Backfill tower foundations and cover with suitable material.
- Erect cranes and associated equipment not required at this time.
- Erect tower sections and nacelle first, followed by the turbine blades.
- Complete electrical connection of each of the turbines to the installed MV electrical network - grid connection.
- Remove temporary site offices. Provide any gates, landscaping, signs etc. which may be required.
- Commence turbine commissioning and testing; and
- Complete commissioning and authorisation for wind farm to commence operations.

The phasing and scheduling of the main construction task items are outlined in Figure 3.8, where January 2025 has been selected as an arbitrary start date for construction activities

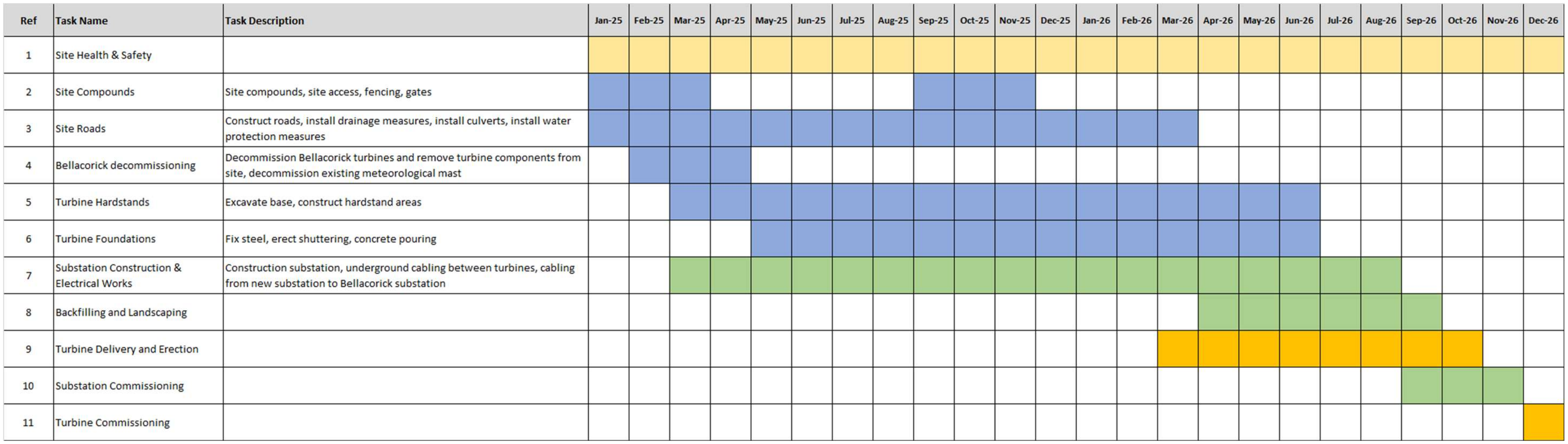

Figure 3.6: Indicative Construction Schedule

3.8 CONSTRUCTION METHODOLOGIES

3.8.1 Temporary Compounds, Hardstands Material Storage Areas and Site Offices

At the commencement of the construction phase, four temporary compound areas will be constructed to provide office space, welfare facilities, hardstands for storing materials and hazardous materials.

The site accommodation is likely to consist of temporary porta-cabins constructed on a granular platform. The peat/topsoil will be stripped where hardstands or development is proposed. The hardstandings shall be constructed to heights of 0.5 or 1.0m above existing ground level based on the various extents of potential surface water flooding across the site.

Ground investigation in the form of peat probing and trial pitting has been carried out along the proposed turbine and hardstanding locations to inform the depth of excavation and upfill required. Preliminary volume calculations provide a rough estimation of fill required for the hardstands and access tracks. This is estimated as 316,000m^3 of material will be required. It is likely that much of the subbase material volume will be obtained from onsite borrow pits with surface course provided by off-site quarries.

The layout of the temporary construction compounds is shown on Planning Drawings 10889 – 2025 to 2028.

3.8.2 Turbine Foundations

Foundations for wind turbines may be of the gravity or piled type. Trial pitting and peat probing has been carried out at each of the turbine base locations. The geotechnical investigations to date indicate that the majority of the foundations at the proposed wind farm will be piled.

For the piled turbine foundations, the piling type and configuration, as shown on Planning Drawings 10889-2021 and 10889-2022, could be up to 50 no. 300mm square concrete driven piles or up to 16 no. 600 – 12002mm diameter bore piles. Final piling depths will depend on localised ground conditions and the drawings detail a piling depth of 18m.

A gravity type configuration is illustrated in Drawing 10889-2020.

The final details of the foundation types will be established by detailed post-consent geotechnical investigations.

A Peat Stability Risk Report has been prepared for the proposed development, including the turbine foundations, and is included in Appendix 9.4.

Each of the turbines to be erected on site will have a reinforced concrete base. Overburden will be stripped off the foundation area to a suitable formation using a 360° excavator and will be placed across the site as close to the excavation as practical. A five-metre-wide working area will be required around each turbine base, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur. Material excavated to create the working area will be stored locally for later reuse in backfilling the working area around the turbine foundation. The excavated material will be surrounded by silt fences to ensure sediment-laden run-off does not occur.

The formation material will be approved by an Engineer as meeting the turbine manufacturer's requirements. In the case of gravity foundations, if the formation level is reached at a depth greater than the depth of the foundation, the ground level will have to be raised with compacted structural fill . Drainage measures will be installed to protect the formation by forming an interceptor drain around the perimeter of the base which will outfall out at the lowest point level with the spreader or settlement pond. In the case of piled foundations, the piling of concrete piles to the required depth will be carried out. The piles will either be constructed by coring and inserting a steel sleeve which will be filled with reinforced concrete prior to sleeve removal or driven Where piling is carried out soil/peat will be excavated with the provision of a surrounding work area to allow placing of shuttering etc.

An embankment approximately 600mm high will be constructed around the perimeter of each turbine base where required and a fence or berm will be erected to prevent construction traffic from driving into the excavated hole and also to demarcate the working area. All necessary health and safety signage will be erected to warn of deep excavations etc. Access to and from excavated bases will be formed by excavating a pedestrian walkway to a standard 1:12 grade (appropriate for designated walking routes and recreational trails).

There will be a minimum of 100 mm of blinding concrete laid on the formation material positioned using a concrete skip and 360° excavator or concrete pump to protect ground formation and to give a safe working platform.

An approved and certified mobile telescopic crane or teleporter of suitable size will be used to unload reinforcing steel to required areas. The turbine anchor cage will be assembled and lifted into position using a crane and approved lifting appliances, prior to fixing the bottom matt of steel, reinforcing steel will be positioned around the anchor cage in accordance with the turbine suppliers' requirements. The anchor cage will be levelled using the adjustable base plates at the base of the anchor cage. The top flange of the anchor cage will be checked to ensure it is level using an automatic optical level. The remaining reinforcing steel will then be fixed, and earthing material attached. The level of anchor cage will be checked again prior to, and during the concrete pour. The detailed design and exact dimensions will be determined once a turbine manufacturer has been selected following a competitive procurement process.

Formwork to concrete bases will be propped/supported sufficiently so as to prevent failure. Concrete for bases will be poured using a concrete pump. After a period of time when the concrete has set sufficiently, the top surface of the concrete surface is to be finished with a power float.

Once the base has sufficient curing time it will be filled with suitable fill up to existing ground level. The working area around the perimeter of the foundation will be backfilled with suitable material.

3.8.3 Site Roads and Crane Pad Areas

Site roads will be constructed to each turbine base and at each base a crane hard standing will be constructed to the turbine manufacturer's specifications. Tracked excavators will carry out excavation for roads with appropriate equipment attached. Any excavated Peat will be sidecast, profiled and bermed as close to the excavation areas as practical or transported to a designated peat deposition area as set out in the Peat Management Plan (Appendix 9.3). A two to three-metre-wide working area will be required around each hard-standing area, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur.

When the formation layer has been reached, stone from the on-site borrow pits or local quarries shall be placed to form the road foundation. In the event of large clay deposits being encountered in sections of road, a geotextile layer will be required at sub base level. The sub grade will be compacted with the use of a roller or other approved compaction method. The final top layer of unbound material will not be provided until all turbine bases have been poured. This prevents damage to the wearing course due to stone and concrete trucks movements. All roads will be maintained for the duration of the project.

3.8.4 Substation and Grid Connection

The main elements of the electricity substation, which comprises the TSO (Transmission System Operator) substation and the Independent Power Producer (IPP) substation, will be constructed as follows:

- The area of the onsite electrical substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby temporary storage area for later use in landscaping. Any excess material will be sent to one of the proposed onsite overburden storage areas.
- The foundations will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix. The block work walls will be built up from the footings to damp proof course level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors.
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation. The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions.
- The roof trusses will then be felted, battened, tiled and sealed against the weather. The electrical equipment will be installed and commissioned. The base for the 36m telecommunications mast will be formed and the mast sections and associated equipment installed. Perimeter fencing will be erected.

The construction and components of the substation have been designed to ESB/Eirgrid specifications. The substation and buildings will be accessible from a dedicated road as shown on Planning Drawing 10889-2003.

The proposed wind farm will connect to the existing national grid via the proposed 110kV substation, to the existing Bellacorick 110kV substation via an underground HV cable.

3.8.5 Decommissioning of Bellacorick Windfarm

Decommissioning of Bellacorrick windfarm will be carried out as outlined in Appendix 3.2 and with reference to 'Decommissioning of Onshore Wind Turbines – Industry Guidance Document' WindEurope 2020 (ref: Appendix 3.3). The key stages in the decommissioning of the infrastructure are the following:

- Definition of the extent of decommissioning and dismantling – In this case all of the wind turbines and associated control building will be removed. The turbine foundations, internal roads and connecting ducting will remain in situ.
- Determination of further use of the dismantled wind turbines – a decisions on whether the wind turbines are of sufficient robustness for sale for reuse as a turbine or not is required as this will influence the nature of the dismantling phase.
- Review of existing restrictions, limitations, conditions, obligations- A review of planning conditions that arise from this application, local permitting requirements, grid connection conditions and EU legislation such as laws, regulations, rules, technical norms, standards, specifications, guidelines, directives will be required prior to commencement of site works.
- Preparation and Planning of Dismantling procedures
- Preparation and Planning of Disposal route/destinations
- Completion of tendering and awarding of contract(s)
- Check of conditions and preparation of risk assessment
- Briefing on dismantling compliance with removal instructions health and safety requirements - The dismantling company must familiarise and instruct the employees on the construction site before starting their work on construction site-specific risk assessment and the dismantling or removal instructions (occupational safety).
- Decommissioning of wind turbines - The first step is to safely shut down and decommission the WTG intended for dismantling. The second step is physically separated from the internal cable route (usually the MV grid).
- Dismantling of Wind Turbine to Top of Foundation - The sequence of dismantling and are determined as follows, 1. Rotor star (rotor blades and hub); 2. Nacelle (gondola);3. Tower sections;
- Decommissioning and dismantling of Control Building
- Proper disposal of electrical and Wind turbine components - The waste fractions resulting from the dismantling the Wind turbines and control building, are transported in accordance with the waste management plan drawn up to the specialist waste management companies appointed as part of the contract, and disposed of (reused, recycled or recovered).
- Revegetation of turbine foundations and control building footprints: Peat and soils excavated as part of the Oweninny Phase 3 Wind Farm infrastructure development will be used to cover over these areas. These areas will then be allowed to natural reseed and revegetate.

The decommissioning of Bellacorick windfarm will be an element of the overall communications and Health and Safety plans for the site during the construction phase.

3.8.6 Decommissioning of Meteorological Mast

The proposed development will include the decommissioning of 100m high meteorological mast on the site. This work will include the following steps:

- Day One
    - Mobilise on site with one tractor & trailer and one 13 tonne excavator.
    - Establish safe working area around mast.
    - Climb mast and remove instruments and logger box.
- Day Two
    - On one side of the mast, transfer guy ropes from ground anchors to the 13T+ excavator.
    - Cut guy rope attached to 13T+ excavator to allow mast to fall.
    - Excavate mast anchors and anchor bases making good the ground.
- Day Three
    - Dismantle and remove mast components and accessories from site using trailer.
    - Demobilise from site.

3.9 ENVIRONMENTAL MANAGEMENT

3.9.1 Construction Phase Monitoring and Oversight

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

A CEMP has been prepared for the proposed development and is included in Appendix 3.1. It is intended that the CEMP would be updated prior to the commencement of the construction of the wind farm, to ensure that all mitigation measures, conditions and or alterations to the EIAR and application documents that may emerge during the course of the planning process are included. Following the update, the CEMP will be submitted to the Planning Authority for written approval.

The CEMP also includes a Traffic Management Plan.

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

3.9.2 Surface Water Monitoring During Construction

The surface water drainage system will require regular inspection during construction works and during operations to ensure that it is working optimally. Where issues arise, the works will be stopped immediately as required and the source of potential impacts on the surface water quality investigated.

Records of all maintenance and monitoring activities associated with the construction site will be retained by the Contractor on-site.

3.9.3 Concrete Deliveries

Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in sealed concrete delivery trucks. The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. Concrete trucks will be washed out fully at the batching plant, where facilities are already in place.

The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a concrete wash unit. This type of unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids can be disposed of off-site at an appropriate waste facility. Where temporary lined impermeable containment areas are used, such containment areas are excavated and lined with an impermeable membrane.

The areas are generally covered when not in use to prevent infill of rainwater. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the concrete pours, any of the remaining liquid contents is tankered off-site. Any solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste.

Due to the volume of concrete required for each turbine foundation, and the requirement for the concrete pours to be continuous, deliveries are often carried out outside normal working hours in order to limit the traffic impact on other road users, particularly peak period school and work commuter traffic. Such activities are limited to the day of turbine foundation concrete pours.

The risks of pollution arising from concrete deliveries will be further reduced by the following:

- Concrete trucks will not be washed out on the site but will be directed back to their batching plant for washout other than the delivery chutes.
- Site roads will be constructed to a high standard to allow transport of the turbine components around the site, and hence, concrete delivery trucks will be able to access all areas where the concrete will be needed. No concrete will be transported around the site in open trailers or dumpers so as to avoid spillage while in transport. All concrete used in the construction of turbine bases will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed.
- The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site full washout and discussing emergency procedures.

- Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on the site.

3.9.4 Concrete Pouring

Because of the scale of the main concrete pours that will be required to construct the proposed wind farm, the main pours will be planned weeks in advance, and refined in the days leading up to the pour. Special procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These may include:

- Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast.
- Restricting concrete pumps and machine buckets from slewing over watercourses while placing concrete.
- Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
- Ensuring that covers are available for freshly placed concrete to avoid the surface washing away in heavy rain.
- Disposing of surplus concrete after completion of a pour will be off-site.

3.9.5 Refuelling

Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site.

On-site refuelling of machinery will be carried out using a mobile fuel truck which will be re-filled off site and brought to machinery requiring fuel is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the proposed wind farm. The 4x4 jeep will also carry spill kits (fuel absorbent material and pads) in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use.

Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.

3.9.6 Road Construction

3.9.6.1 Permanent Roads, including Amenity Roads (founded/floating)

The construction methodology for excavated roads is summarised as follows:

- Interceptor drains should be installed upslope of the access road alignment to divert any surface water away from the construction area.
- Excavation of roads shall be to the line and level given in the detailed design requirements. Excavation should take place to a competent stratum beneath the peat (as agreed with the site designer).
- All excavated peat shall be placed in the peat deposition area or side-cast where possible.
- Side slopes of the excavations will be battered as the excavation progresses.
- The surface of the excavated road will be developed using granular fill. The depth will vary based on the depth of peat and on the designer requirements.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum (to be confirmed by the designer).
- A final unbound surface layer shall be placed over the excavated road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.
- An additional 50mm surface of quarry dust will be placed over the roads selected for use as amenity access roads.

The construction methodology for permanent floating roads is summarised as follows:

- A geotextile separation layer is placed on the existing ground surface.
- A biaxial geogrid is placed on the geotextile.
- Where the CBR of the underlying material is >1%, 400 mm of Class 1A/6F2/6I/6J material followed by 100 mm of a compacted Clause 804 running layer for a total road thickness of 500 mm.
- Where CBR of the underlying material is <1%, 300 mm of Class 1A/6F2/6I/6J material is placed, followed by a second layer of biaxial geogrid, followed by 300 mm of Class 1A/6F2/6I/6J material, followed by a 100 mm of a compacted Clause 804 running layer for a total road thickness of 700 mm.

Permanent floating roads will have an approximate 6.0m wide running width.

Typical sections of a new permanent road are shown on Planning Drawing 10325-2063. The road widths will be increased to form the indicated passing bays.

3.9.6.2 Temporary Floating Roads

The construction methodology for temporary roads, is summarised as follows:

- Temporary floating roads will be approximately 6.0m wide.
- A geotextile separation layer is placed on the existing ground surface.
- A biaxial geogrid is placed on the geotextile.
- Where the CBR of the underlying material is >1%, 400 mm of Class 1A/6F2/6I/6J material followed by 100 mm of a compacted Clause 804 running layer for a total road thickness of 500 mm.
- Where CBR of the underlying material is <1%, 300 mm of Class 1A/6F2/6I/6J material is placed, followed by a second layer of biaxial geogrid, followed by 300 mm of Class 1A/6F2/6I/6J material, followed by a 100 mm of a compacted Clause 804 running layer for a total road thickness of 700 mm.
- Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area; and
- Road construction will be carried out in sections of approximately 50m lengths.

Typical sections of a new temporary floating road are shown on Planning Drawing 10889-2063.

3.9.7 Dust Suppression

In periods of extended dry weather, dust suppression may be necessary along haul roads and around the borrow pit area(s) 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 site 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.

3.9.8 Vehicle Washing

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

To avoid the potential for the transfer of alien invasive plant species into the site, a self-contained wheelwash system will be installed at the project site. Planning Drawing 10889-2062 includes details of a proposed self-contained wheelwash system which will be installed as part of the construction phase of works. The wheelwash will be located at the construction and delivery entrance of the site, off the N59, as shown on Planning Drawing 10889-2005.

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

3.10 HEALTH AND SAFETY

The proposed wind farm will be designed, constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation, including:

- Safety, Health and Welfare at Work Acts 2005 to 2014;
- Safety, Health and Welfare at Work (General Application) Regulations;
- Safety, Health and Welfare at Work (Construction) Regulations 2013; and
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006.

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

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

3.10.1 Construction Phase

A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage.

All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. Safepass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting site access during construction. Appropriate warning signs will be posted, directing all visitors to the site manager.

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

The PSDP appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to):

- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project;
- Where possible, eliminate the hazards or reduce the risks;
- Communicate necessary control measures, design assumptions or remaining risks to the PSCS so they can be dealt with in the Safety and Health Plan;
- Ensure that the work of designers is coordinated to ensure safety;
- Organise co-operation between designers;
- Prepare a written Safety and Health Plan;
- Prepare a safety file for the completed structure and give it to the client; and
- Notify the Authority and the client of non-compliance with any written directions issued.

The PSCS appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to):

- Development of the Safety and Health Plan for the construction stage with updating where required as work progresses;
- Compile and develop safety file information;
- Reporting of accidents / incidents;
- Weekly site meeting with PSCS;
- Coordinate arrangements for checking the implementation of safe working procedures. Ensure that the following are being carried out:
- Induction of all site staff including any new staff enlisted for the project from time to time;
- Toolbox talks as necessary;

- Maintenance of a file which lists personnel on site, their name, nationality, current Safe Pass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date;
- report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance;
- Monitor the compliance of contractors and others and take corrective action where necessary; and
- Notify the Authority and the client of non-compliance with any written directions issued.

3.10.2 Operational Phase

Similar to the construction phase of the project, it is not anticipated that the operational phase of the wind farm will cause a significant negative Health and Safety impact on agricultural and commercial activities outside the development footprint and this will continue throughout the lifetime of the development.

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

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

Signs will be erected at suitable locations such as, amenity access points and carparks, setting out the conditions of public access under the relevant legislation and providing normal hours (and out of hours) contact details. Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed or are becoming hidden by vegetation or foliage, with prompt action taken as necessary.

Signs will also be erected at suitable locations across the site as required for the ease and safety of operation of the wind farm. These signs include:

- Buried cable route markers at 50m (maximum) intervals and change of cable route direction;
- Directions to relevant turbines at junctions;
- “No access to Unauthorised Personnel” at appropriate locations;

- Speed limits signs at site entrance and junctions;
- “Warning these Premises are alarmed” at appropriate locations;
- “Danger HV” at appropriate locations;
- “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at site entrance;
- “No unauthorised vehicles beyond this point” at specific site entrances; and
- Other operational signage required as per site-specific hazards.

An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the site and providing for access for emergency services at all times.

The components of a wind turbine are designed to last up to 30 years and are equipped with a number of safety devices to ensure safe operation during their lifetime. During the operation of the wind farm regular maintenance of the turbines will be carried out by the turbine manufacturer or appointed service company. A project or task specific Health and Safety Plan will be developed for these works in accordance with the site’s health and safety requirements.

3.11 WIND FARM OPERATION

The proposed wind farm development is expected to have a lifespan of 30 years. During this period, on a day-to-day basis the wind turbines will operate automatically, responding by means of anemometry equipment and control systems to changes in wind speed and direction.

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

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

3.12 WIND FARM DECOMMISSIONING

As stated previously the wind turbines proposed as part of the proposed development are expected to have a lifespan of 30 years. Following the end of their useful life, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site may be decommissioned fully, with the exception of the electricity substation.

Upon decommissioning of the proposed wind farm, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and allowed to revegetate or reseed as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in potentially significant environment nuisances such as noise, dust and/or vibration. The majority of the site roadways will be in use for additional purposes to the operation of the wind farm (such as a mature amenity and recreational use) by the time the decommissioning of the project is to be considered, and therefore it will be more appropriate to leave the site roads in situ for future use. If it were to be confirmed that the roads were not required in the future for any other useful purpose, they could be removed.

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