2 DESCRIPTION OF THE PROPOSED PROJECT

2.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) describes and presents information on the proposed Drumnahough Wind Energy project. The description includes details on the proposed project for which planning permission is being sought (The Proposed Development), and all other associated project components which do not constitute part of the subject planning application including an alternative grid connection option considered by the Applicant (The Proposed Project). The purpose is to present an appropriate level of detail to form the basis for the Environmental Impact Assessment (EIA).

Table 2-1 sets out the characteristics of the project elements for which development consent is being sought and all other associated project components. It also outlines the option of a connection to the National Electricity Grid (NEG) via a new proposed substation within the site boundary as the other potential connection method to the NEG.

The details of the proposed development and entire project are further supported by the following documents:

- Civil Engineering (EIAR **Volume 2**, **Chapter 3**)
- Construction Environmental Management Plan (CEMP) (EIAR **Volume 3, Appendix B-2**)
- Turbine Delivery Route Assessment (EIAR **Volume 3, Appendix B-3**)
- Project Design Process and Alternatives Considered (EIAR **Volume 2, Chapter 4**)
- Peat Stability Risk Assessment (EIAR **Volume 3, Appendix E-1**)
- Planning Drawings accompanying the planning application

Table 2-1 Characteristics of the Proposed Project

Proposed Development for which consent is sought	**Core Wind Farm Components** • Twelve (12) No. wind turbines (maximum turbine tip height 167.5m) with associated foundations and crane hardstand areas. • One (1) No. Permanent Meteorological Mast (110m height) and associated foundation, hardstand area and ancillary main crane hardstand area. • New and upgraded internal site service roads (3.2km of existing forestry tracks to be upgraded and 7.1km of new internal access tracks to be constructed). • Underground electric cabling systems between turbines within the wind farm site. • Underground electric cabling systems between the wind farm site and connection point at permitted 110kV Lenalea substation. **Associated Components of the Proposed Development** • Minor Upgrading of existing Site Entrance on the L-10142 • Upgrading/ Widening of existing Entrance on the L-1622-1 • New junction off the L-10142 to facilitate construction and access to T1 • Localised upgrading/widening along existing access roads within Meentycat wind farm • Two (2) No. temporary construction site compounds (one approximately 100m x 50m and one approximately 55m x 25m). • Three (3) No. borrow pits to be used as a source of stone material during construction and for storage of excess excavated peat materials. • Three (3) No. peat /spoil deposition areas (at borrow pit locations) • Associated surface water management system. • Tree felling to facilitate site development.
Alternative Grid Connection Option	• Underground electric cabling systems between the wind farm site and a proposed new 110kV substation. • One (1) No. proposed 110kV substation including: an outdoor electrical yard, two single storey buildings (one for the system operator and one for the wind farm operator) containing associated facilities (control, switchgear and metering rooms, welfare facilities, workshop and office. • A battery energy storage system (BESS) facility adjacent to the new 110kV substation. • 2 No. new end masts and associated overhead power lines to/from the proposed substation to/from the existing 110kV line. • 1.8km of new internal access tracks to be constructed • One (1) No. borrow pits to be used as a source of stone material during construction and for storage of excess excavated peat materials. • One (1) No. peat /spoil deposition areas (at borrow pit locations) • Associated surface water management system.
Other Associated Project Components	• Diversion of Existing 38kV Overhead Line at T1 • Temporary works on sections of the public road network along the turbine delivery route (including hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and local road widening). • Off-site replacement of permanently felled forestry at four (4) No. sites, one located across the Cork and Limerick county boundaries, two in Co. Clare and one site in Co. Galway.

2.2 PROPOSED DEVELOPMENT

2.2.1 Development Overview

The development proposed by Drumnahough Wind Farm DAC (the applicant), a co-development company between *SSE Renewables Ireland* and *Coillte Cuideachta Ghníomhaíochta Ainmnithe (Coillte CGA),* is a 12 No. turbine wind farm in the townlands of Treankeel, Meenadaura, Carrickalangan and Cark in County Donegal.

To facilitate a grid connection and export of renewable electricity to the National Electricity Grid (NEG), the proposed development includes a potential grid connection option by way of the wind farm's underground medium voltage collector circuit cables connecting to the consented 110kV Lenalea substation (DCC PL Ref. 09/50116) and the consented loop-in connection at Lenalea (DCC PL Ref. 18/50312) to the existing Binbane to Letterkenny 110kV overhead line. The wind farm's underground collector circuit cables will follow the public road L-10142 at the south east of the site for approximately 750m before diverting north along private access tracks to the permitted 110kV Lenalea substation.

An Bord Pleanála has deemed the development eligible as Strategic Infrastructure Development (SID) and the application will be made directly to the Board. The Board are the competent authority for the purposes of the Environmental Impact Assessment (EIA).

2.2.2 Development Location

The proposed development is located in a rural upland area of central Donegal on the southern and western slopes of Cronaglack, Crockalogh and Cark, approximately 12.5km south west of Letterkenny and 11km northwest of the twin towns of Ballybofey/Stranorlar. **Figure 2-1** shows the proposed development site boundary included in the planning application. The area within this boundary is 611ha.

The proposed wind farm and associated infrastructure lie within the townlands of Tooslenagh Treankeel, Meenadaura, Carrickalangan, Culliagh and Cark. The grid Connection Point at the permitted Lenalea substation is within the townland of Killymasny. The access track through Meetycat wind farm traverse through the townlands of Meentycat, Meenalabbin, and Aughkeely Co. Donegal.

Existing land cover at the site is a mix of Peat Bogs, Pastures, Natural Grassland, Transitional Woodland Scrub and Coniferous Forests**.** The upper, or more elevated, areas of the site are mostly composed of intact and eroded blanket bog which graduates to heath and wet grassland further down the slope. The eastern half of the site is planted with commercial coniferous forestry, which is owned and managed by Coillte. The surrounding land includes some pastures and lands principally occupied by agriculture with significant areas of natural vegetation.

Wind energy is another key land-use surrounding the proposed site with long established neighbouring operational wind farms of Cark (1997), Meentycat (2004), Culliagh (2000 and 2012) and Cark Extension (2012). The Binbane to Letterkenny 110kV overhead power line cross along the northern section of the site.

A wind farm development comprising fifteen (15) No. wind turbines with maximum turbine tip height of 135m, a permanent meteorological lattice mast 85m high, a substation and associated equipment, a borrow pit, internal site tracks, site drainage and associated works had previously been permitted at the project site, (Planning Ref. 08/50687 and 13/51609). These permissions have subsequently expired.

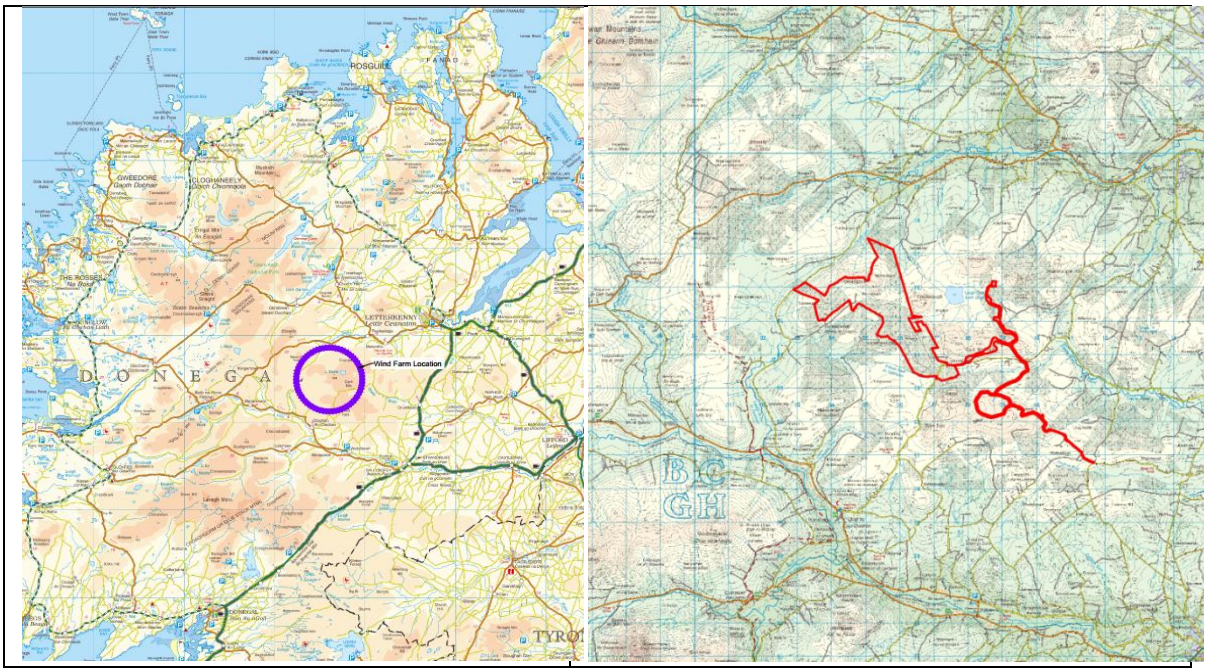

Figure 2-1 Site location map of the proposed Drumnahough Wind Farm Development

2.3 SIZE, DESIGN AND APPEARANCE OF THE PROPOSED PROJECT

2.3.1 Proposed Project Overview

Figure 2-2 shows the proposed development site boundary included in the planning application. The area within this boundary is 611ha.

Figure 2-3 shows the proposed development site layout for which planning permission is being sought and illustrates the positions of the turbines, access tracks, crane hardstand areas, route of the underground medium voltage collector circuit cables to the consented 110kV Lenalea substation, permanent met mast, borrow pits, material deposition areas, peat deposition areas and temporary construction compounds. The development footprint within the application area is approximately 65ha. Refer also to **Planning Drawing 19715- 5005.**

Figure 2-4 shows the extent of infrastructure within the planning application development boundary considered as part of the environmental assessment in the EIAR which includes additional elements of the project for which planning permission is not being sought in this application. This includes an alternative grid connection method to the NEG considered by the Applicant which comprises the wind farm's underground medium voltage collector circuit cables connecting to a new 110kv substation within the site, with a new loop in / loop out connection to the existing Binbane to Letterkenny 110kV overhead line. This new substation would also include a battery energy storage system (BESS), which would discharge to the grid as required. While the Applicant is currently not seeking permission for this alternative grid connection option as part of the planning application, this EIAR considers both potential grid connection options.

Both layouts reflect the outcome of the iterative engineering and environmental analysis approach adopted during the wind farm design process which took into account a number of factors including minimising any risk in terms of poor ground conditions, peat depths or negative influences on the existing drainage, avoidance of sensitive ecological habitats, and any known archaeological features. The design rationale and evolution is fully described in **EIAR Volume 2 Chapter 4.**

The project also includes additional components outside the boundaries of the Development Application Area including works along the turbine delivery route and replacement forestry lands. These are described in **Sections 2.4.3 and 2.3.13** below.

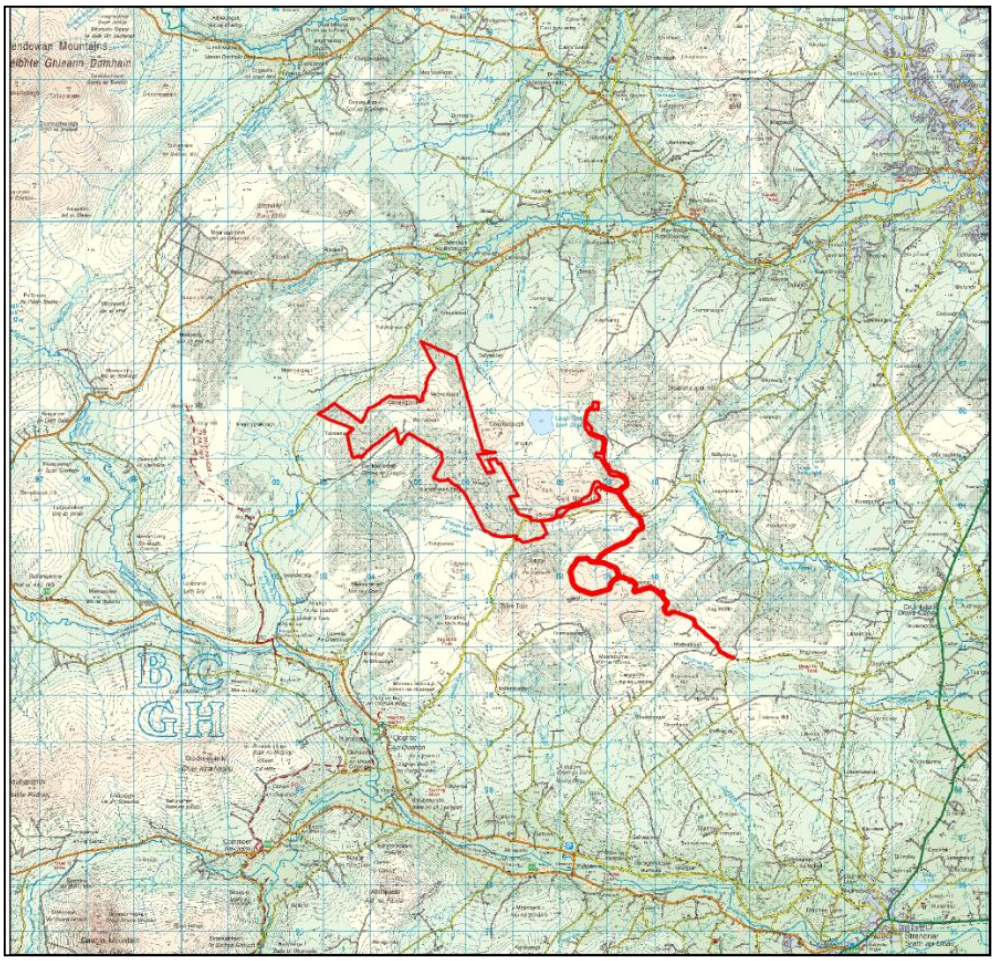

Figure 2-2 Proposed Development Site Boundary

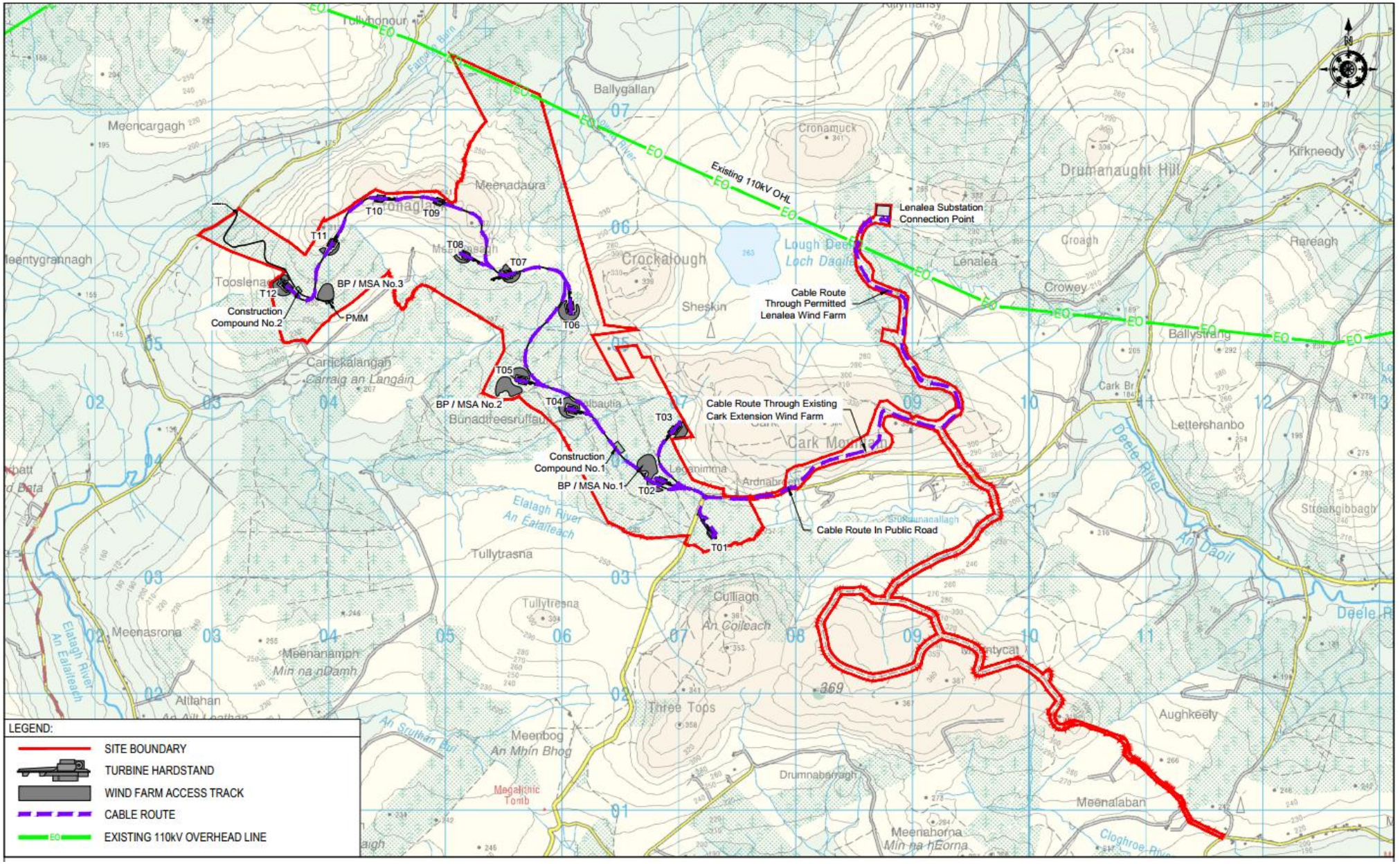

Figure 2-3 Proposed Development Layout

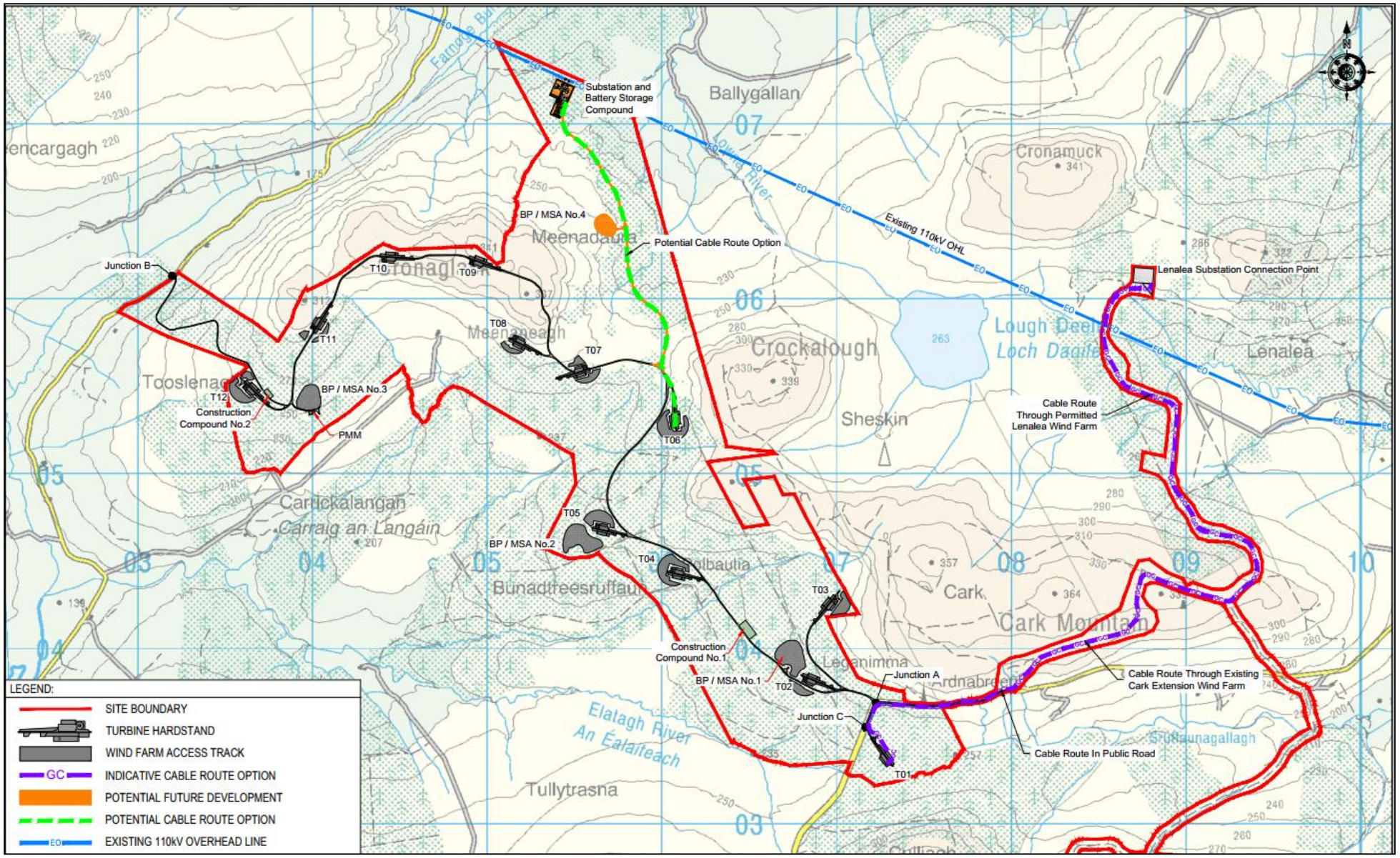

Figure 2-4 Extent of project within the planning Site boundary considered in the EIA

(Note: Alternative cable route (in green) and infrastructure (in orange) not included as part of the planning application but is included as part of the environmental assessment in the EIAR)

2.3.2 Wind Turbines

It is proposed to install twelve (12) No. wind turbines each with a maximum tip height of up to 167.5 metres. The final turbine type will be chosen in advance of the construction phase based on available technologies at that time, but it will not exceed 167.5m in tip height.

The turbine ultimately selected will be certified under the International Electrotechnical Commission IEC 61400-1 safety standards and will be designed to withstand the environmental conditions encountered on site. The proposed turbines will be of a typical modern design, incorporating tubular towers and three blades attached to a nacelle. The tower supports a nacelle and rotor hub. Commercial wind turbine hubs and towers are typically made of steel, while the blades can be made of a matrix of glass-fibre reinforced polyester or wood-epoxy or a similar composite material. Requirements for finish and colour are detailed in the 2006 Department of Environment, Heritage and Local Government Wind Farm Development Guidelines as follows:

- Turbines shall be finished to a white, off-white or grey colour to correspond with the colour scheme of existing turbines.
- All surfaces will have a matt non-reflective finish.

It is proposed to install lighting on the turbines in a pattern that is acceptable to the Irish Aviation Authority for aviation visibility purposes. The co-ordinates of the proposed turbines are set out in **Table 2-2**.

Table 2-2 Proposed Turbine Dimensions and Co-ordinates

Turbine Ref. No.	Maximum turbine tip height (m)	Grid Co-ordinates (ITM)
T1	167.5	E607237, N903333
T2	167.5	E606770, N903811
T3	167.5	E606931, N904253
T4	167.5	E606015, N904442
T5	167.5	E605584, N904694
T6	167.5	E606011, N905273
T7	167.5	E605505, N905602
T8	167.5	E605111, N905771
T9	167.5	E604865, N906205
T10	167.5	E604362, N906222
T11	167.5	E603952, N905837
T12	167.5	E603563, N905489

2.3.3 Wind Turbine Foundations

Each wind turbine will have a reinforced concrete base pad foundation. The foundation base will typically be approximately 28m in diameter and installed to a maximum excavation depth of approximately 6m below ground level, depending on ground conditions. Piled foundations may be required depending on the findings of the detailed ground investigation which will be carried out prior to the construction phase. Once completed, a portion of the foundation (typically a 30m^2 concrete plinth with 4m access area around that for further access and maintenance) will be above ground.

Refer to **Chapter 3 Civil Engineering** and planning application **Drawing No. 19715-5401** for further details on typical foundation details.

2.3.4 Hardstands and lay down areas

Turbine hardstands and temporary lay down area are required to accommodate the delivery and temporary storage of the turbine components prior to their erection and to support the cranes during erection. Each wind turbine will have an associated turbine hardstand area and temporary laydown area adjacent to the foundation. The hardstand areas will be excavated and bear onto rock (or other suitable bearing stratum) typically with a foundation depth of 0.5-1.5m depending on the local bedrock profile and the varying depth of peat. The hardstand area will remain in place during the lifetime of the wind farm. The temporary lay down areas will be cleared of vegetation, graded and generally left unfinished. Some sections of the lay down area will be surfaced using compacted stone aggregate. These sections will be recovered with soil after all turbines have been erected. **Table 2-3** outlines the typical footprints of hardstand and temporary layout areas. The proposed hardstand and lay down areas are further discussed in **Chapter 3, Civil Engineering**.

Table 2-3 Typical Turbine Hardstand and laydown area dimensions

Item	Area (m^2)
Main Hardstand	1,045
Hardstands For Assist Crane (170.5m^2 x 2)	341
Tower Storage Area	938
Blade Layout Area - Supports (45m^2 x 2)	90
Flying Ballast Laydown Area	504
Hardstand For Boom Assembly	74
Hardstand For Assembly Of Rotor	354
Total (hardstanding Area)	3,346
Clear Area (Free Of Tree Stumps)	750
Blade Layout Area - (Free Of Tree Stumps)	990
Total (clear area)	1,740

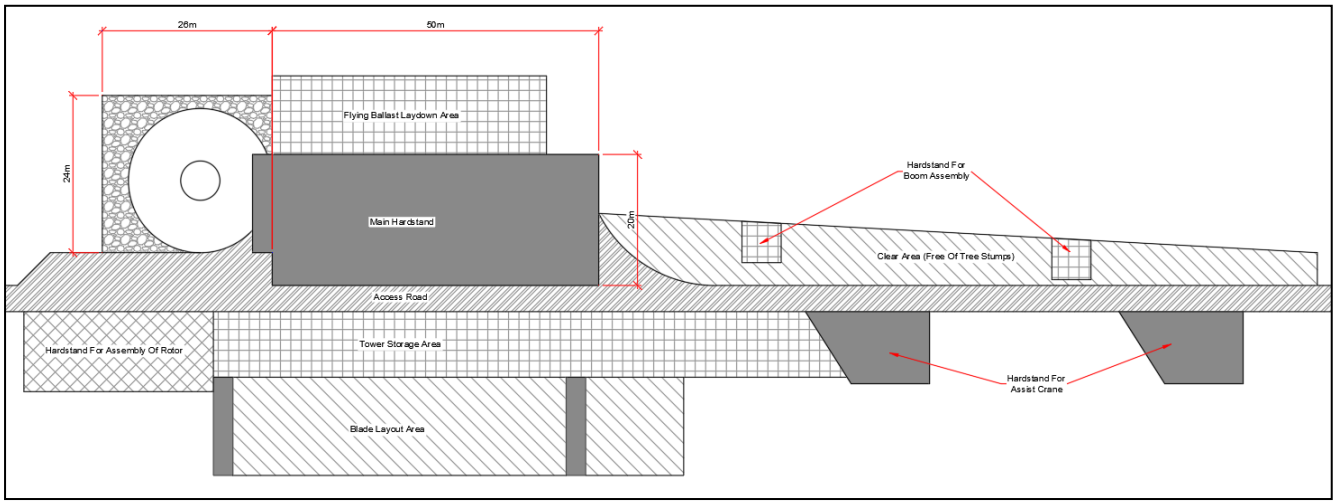

Figure 2-5 Typical Turbine Hardstand and laydown area

2.3.5 Permanent Meteorological Mast

A permanent meteorological mast will be erected within the proposed development lands to monitor the local wind regime while the wind farm is in operation. The permanent meteorological mast is to be located approximately 360m southeast of turbine T12. The structure will be up to 110m in height. The mast will have a foundation of circa 25m^2 and hardstanding area of 100m^2. A schematic of a typical meteorological mast is shown in **Figure 2-6** and Planning **Drawing 19715-5402**. The meteorological mast will be equipped with tower mounted meteorological instruments and telecommunication equipment and will be surrounded by a galvanised steel palisade fence, 2.4m in height.

Figure 2-6 Typical meteorological mast on a wind farm

2.3.6 Underground cabling within the proposed development site

A network of underground cabling servicing each turbine with electrical power and signal transmission will be installed along internal service roads within the proposed development site.

2.3.7 Internal Site Service Roads

Internal site service roads/tracks are required to interconnect elements of the site and allow access to all wind turbines and wind farm infrastructure. A network of existing forestry and wind farm roadways, which will be upgraded and widened, together with new excavated and new floating roads will be used to access each of the turbines, substation compound and meteorological mast. The routing of internal site service roads/tracks is shown in **Figure 2-7**. Overall a total of 12.1km of road infrastructure will be required within the proposed development site. This is comprised of 8.9km of new internal service roads and 3.2km of existing internal access tracks being upgraded and widened. These service roads will have a standard running width of circa 5m with surface water

collection drains on either side. These roadways will be constructed using excavated and floating road techniques depending on the ground conditions. The methods of construction are outlined in EIAR Chapter 3.

Table 2-4 Extent of New and Upgraded Internal Site Service Roads

Internal Site Service Road	Without Substation (as per planning application)	With Substation (Alternative Grid Connection option)
Existing forestry tracks to be upgraded	3.2km	3.2km
New internal access tracks to be constructed	7.1km	8.9km
TOTAL	10.3	12.1

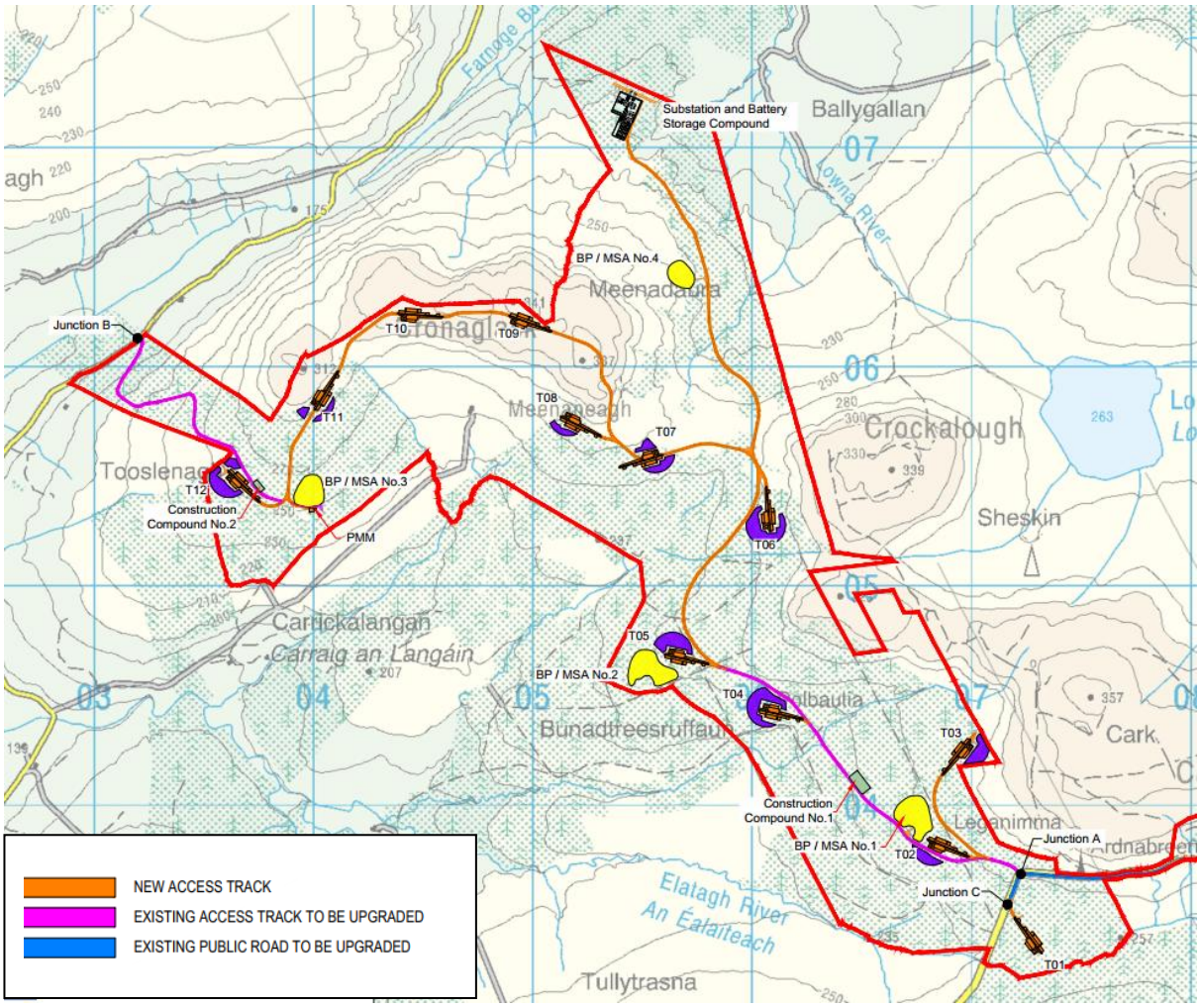

Figure 2-7 New and Upgraded Internal Site Services Roads

2.3.8 Site Access

Site access considerations were discussed with Donegal County Council Roads Department during a pre planning meeting in December 2019.

Primary access to the proposed development site will be provided via the existing forestry entrance from the local public road, L-10142 at the southeast of the site (Junction A). This will be the main site entrance during both the construction and operational phases of the development. The existing site

entrance on the L-10142 local public road will require minor resurfacing works and vegetation trimming to maintain required sightline distances. See **Figure 2-8** and **Figure 2-9**.

A second site access point is proposed north west of the site via an existing forestry track from the L-1622-1 local public road (Junction B). This existing entrance is proposed as a temporary access to be used during the early construction phase only. This existing entrance will require some minor widening of grass road verges and vegetation trimming to maintain required sightline distances. See **Figure 2-8** and **Figure 2-10**.

South of the existing forestry entrance (Junction A) a new junction and spur road off the L-10142 (Junction C) will be constructed to facilitate access to T1. See **Figure 2-8** and **Figure 2-11**.

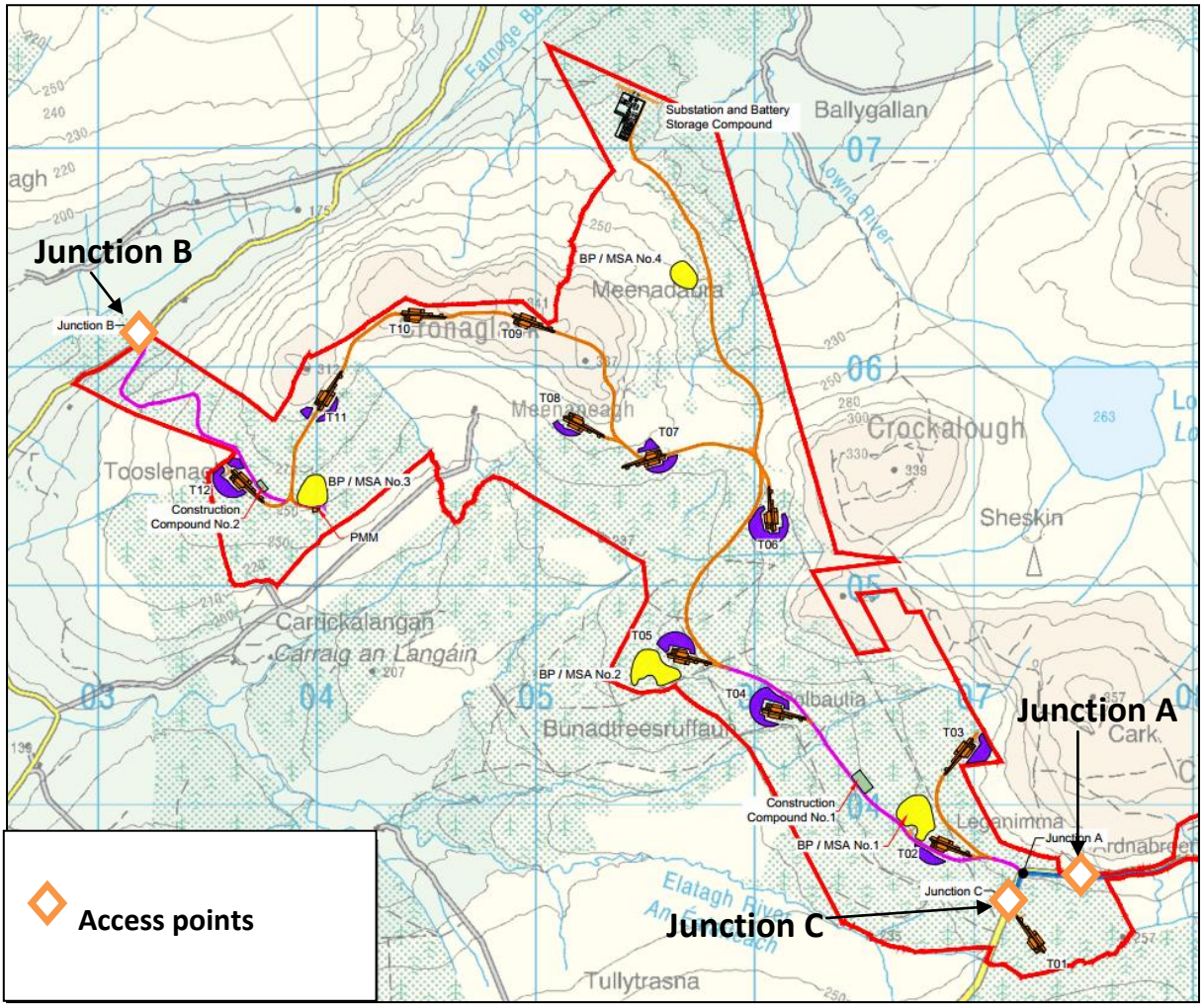

Figure 2-8 Site Access Points

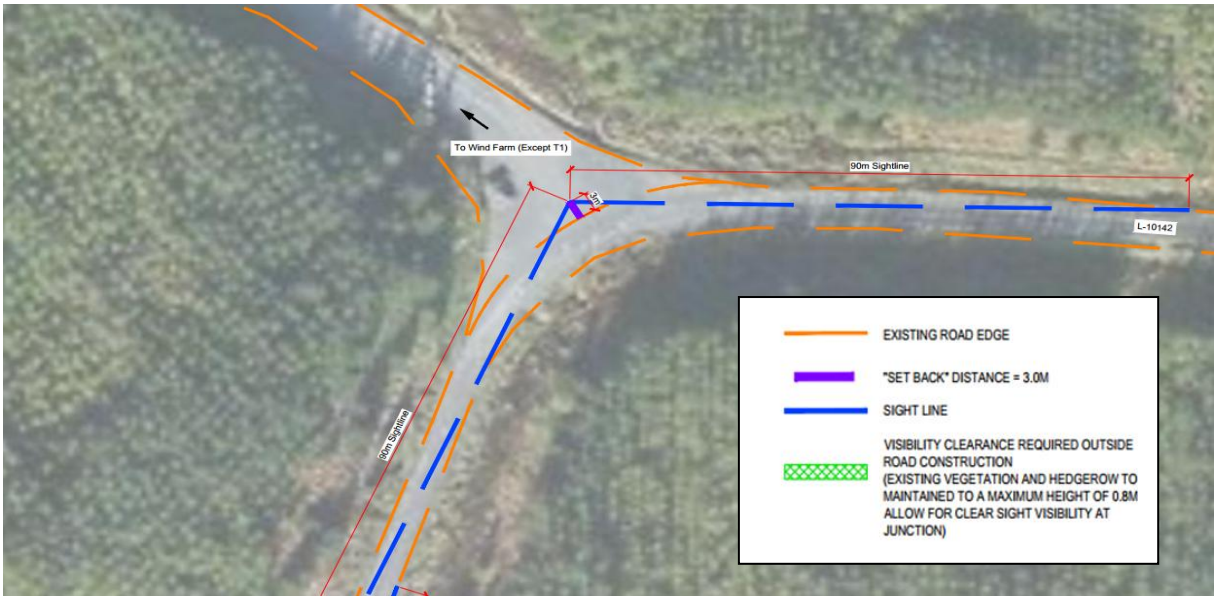

Figure 2-9 Existing forestry entrance from the local public road L-10142 (Junction A)

Figure 2-10 Proposed New Junction from the local public road L-10142 (Junction C)

Figure 2-11 Existing forestry entrance from the L-1622-1 local public road (Junction B).

2.3.9 Temporary construction compounds and welfare facilities

Two (2) No. temporary construction compounds will be set up upon commencement of the construction phase. The locations of the temporary compounds are shown in **Figure 2-12.**

Construction compound No.1 (located on the eastern section of the wind farm site between T2 and T4) will have a footprint of approximately 5000m² (0.5ha). Construction compound No.2 (located on the western section of the wind farm site near T12) will have a footprint of approximately 1375m^2 (0.137ha).

The compounds will be used as a secure storage area for construction materials and will also contain temporary site cabins to provide welfare facilities for site personnel. Facilities will include office space, meeting rooms, canteen area and mobile sanitary facilities. The proposed development will include an enclosed wastewater management system at the temporary compounds capable of handling the demand during the construction phase. A holding tank is proposed at each compound for wastewater management. The holding tanks will be emptied by a licensed permitted contractor only. Upon completion of the project the compounds will be decommissioned by backfilling the area with the material / peat arising during excavation and landscaping with topsoil.

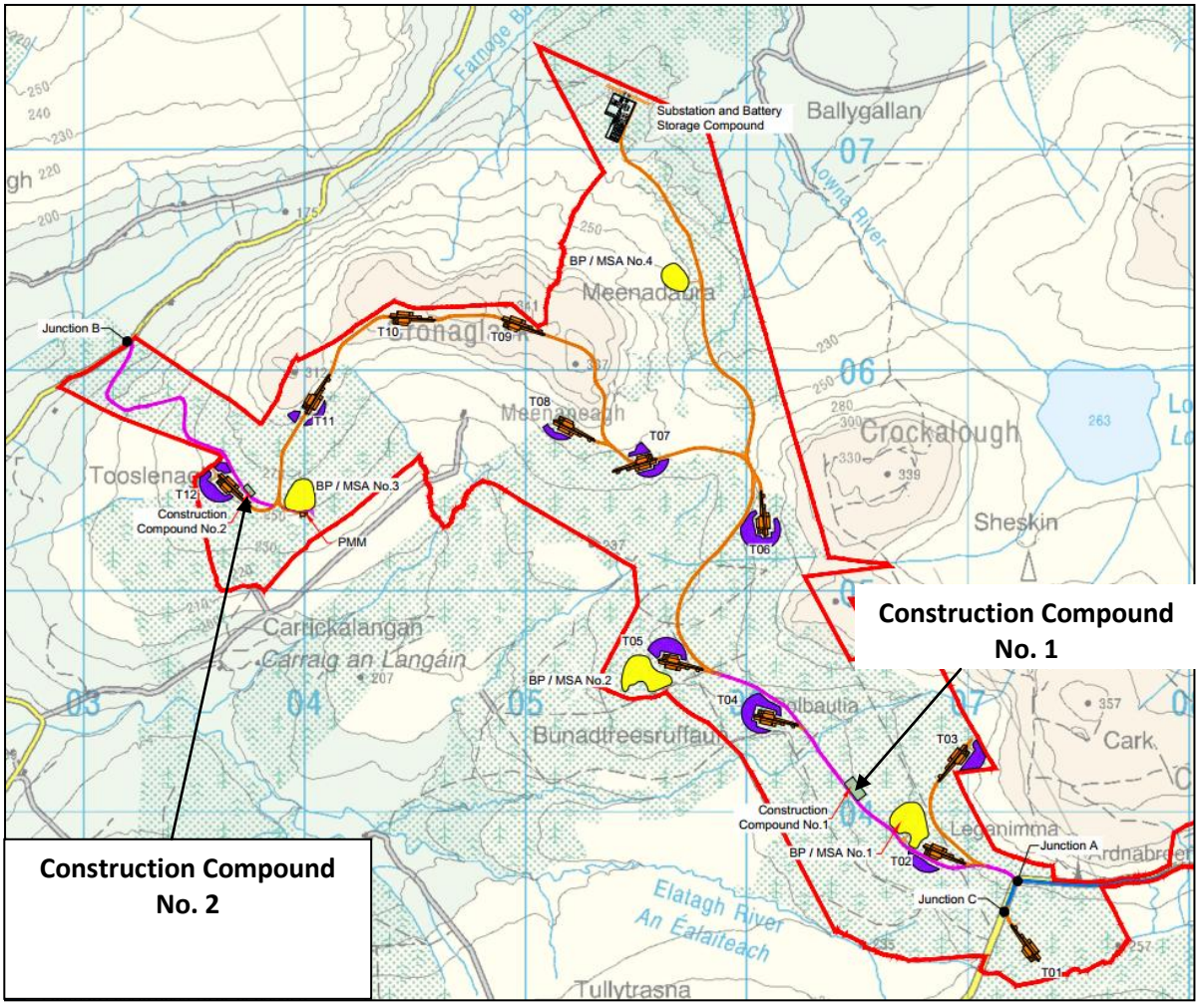

Figure 2-12 Location of Temporary Construction Compounds

2.3.10 Borrow Pits and Material Storage Areas

There are four (4) No. proposed on-site borrow pit locations which have been identified to provide the majority of the required fill material for internal roads, passing bays, hardstands, foundations and temporary compound. The locations of these proposed borrows pits are shown in **Figure 2-13**. If the proposed grid connection route to the permitted Lenalea substation is the advanced grid connection option then borrow pit No. 4 will not be required and will not be developed.

It is estimated that approximately 306,680m³ of aggregate will be won from these borrow pits. This accounts for approximately 80% of total aggregate requirement for construction. The extraction of rock from the borrow pits may potentially be undertaken by a combination of rock breaking, ripping and blasting.

Post-construction, the borrow pit areas will act as material storage areas for the management of excess peat and soil material generated on the site during construction.

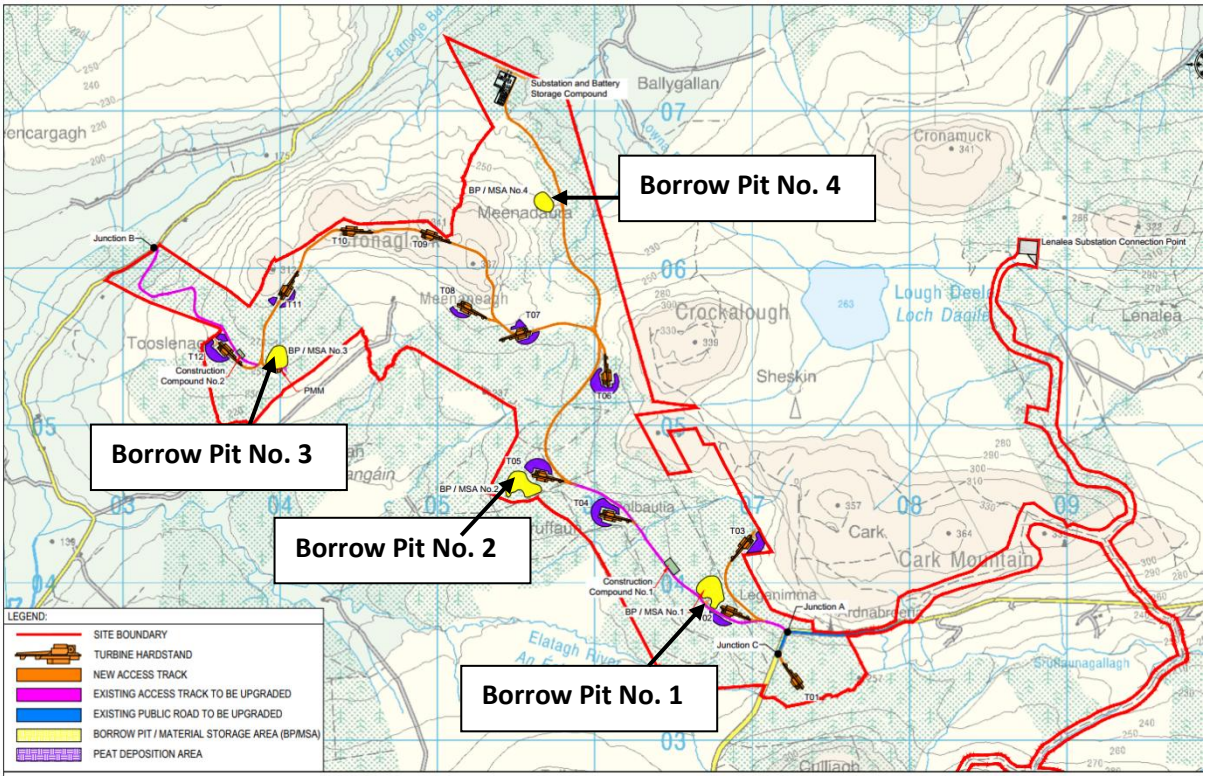

Figure 2-13 Borrow Pit/Material Storage Locations

2.3.11 Surface Water management

A site surface water management system will be constructed on the site so as to attenuate run-off, guard against soil erosion and safeguard downstream water quality. The drainage system will be implemented along all works areas including all internal site access roads, storage areas, crane hardstand areas and site construction temporary compounds. Details of the proposed site drainage system are described in Chapter 3 of the EIAR.

The following gives an outline of drainage management arrangements along internal services roads:

The surface water run-off drainage system will be implemented along all internal access routes, to separate and collect 'dirty water' run-off from the roadway and to intercept clean over land surface water flows from crossing internal roadways.

To achieve separation, clean water drains will be positioned on the upslope and dirty water drains positioned on the downslope of road sides, with road surfaces sloped towards dirty drains.

Clean water will be piped under both the access roads and downslope collection drains to avoid contamination. Piping the clean water under the service road allows the clean water to follow the course it would have taken before construction thus mimicking the existing surface water over land flow pattern of the site and thus not altering the natural existing hydrological regime on site.

2.3.12 Conifer Felling

Felling of commercial conifer forestry is required within and around wind farm infrastructure to accommodate the construction of the turbine foundations, hardstands, access tracks, turbine assembly and proposed 110kV substation (if the alternative connection point option is advanced). It is proposed to fell a distance of 95m (in line with the required clearance for bats) around turbines and circa 5m on either side of roads. Overall felling of approximately 37.2ha of forestry will be required.

All tree felling will be undertaken in accordance with a tree felling licence, using good working practices as outlined by the Department of Agriculture, Food and the Marine (DAFM) Standards for Felling and Reforestation (2019). These standards deal with sensitive areas, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel and machine oils. All conditions associated with a proposed felling licence will be complied with.

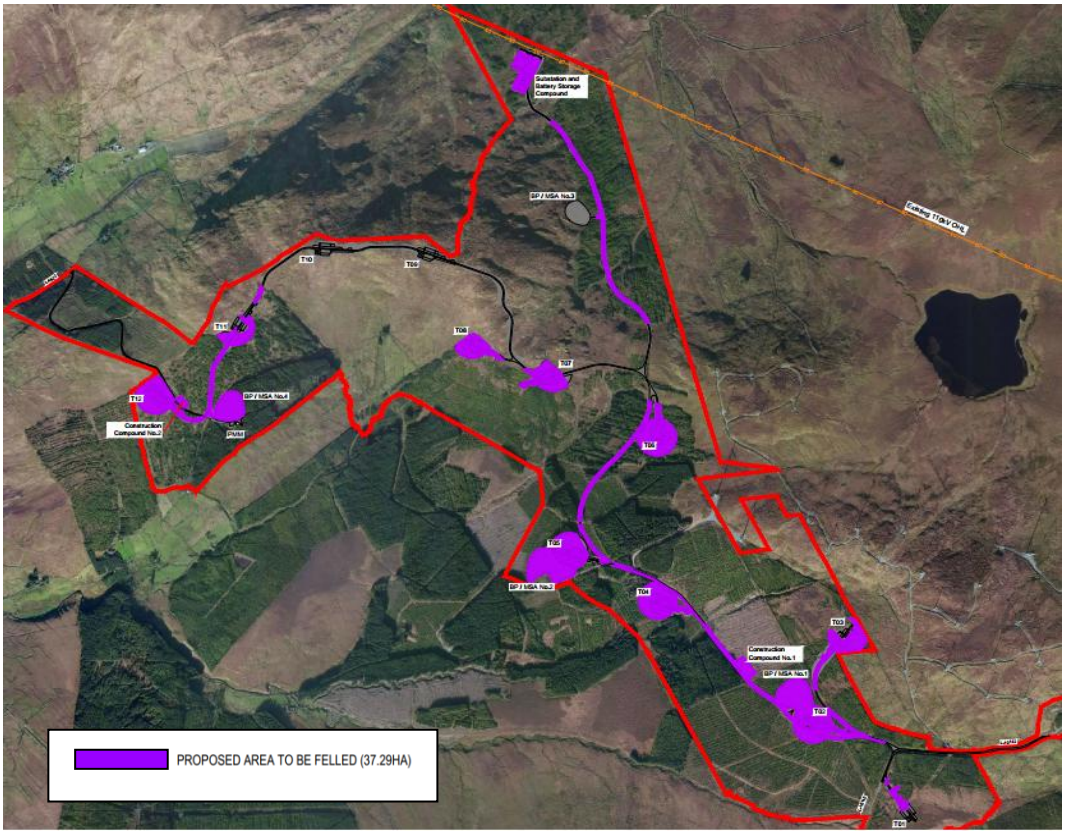

Figure 2-14 Areas to be Felled

2.3.13 Replacement Forestry

To allow for forestry removed as part of the project, replacement forestry will be planted at off-site approved lands. Four No locations have been identified as follows:

- Pollacorragune, Co. Galway
- Craghera, Shessiv, Co. Clare
- Furroor, Kilcolumb, Reanagishagh, Lisroe Co. Clare
- Rathgoggan North, Co. Cork and Co. Limerick

The lands at each of these sites (**Figure 2-15**) have been granted technical approval by the Forest Service for afforestation. These lands, or similarly approved lands, will be used for replanting should the proposed development receive planning permission.

Figure 2-15 Replant land locations

The proposed replacement lands in the townland of Pollacorragune, Co. Galway (**Figure 2-16**) are located less than 5km west of Tuam. The site comprises of agricultural grassland. The approved area for afforestation measures 7.99ha.

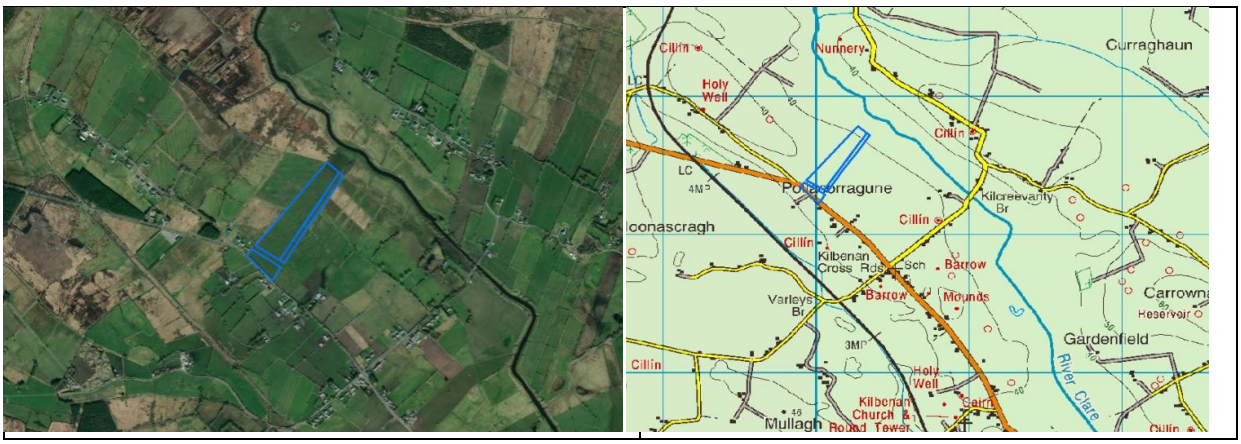

Figure 2-16 Replacement lands at Pollacorragune, Co. Galway

The proposed replacement lands in the townlands of Craghera and Shessiv, Co. Clare (**Figure 2-17**) are located approximately 5.5km northwest of Killadysart village in south east Co. Clare. These lands comprise of semi-natural and improved agricultural grassland. The approved area for afforestation measures circa 13.03ha.

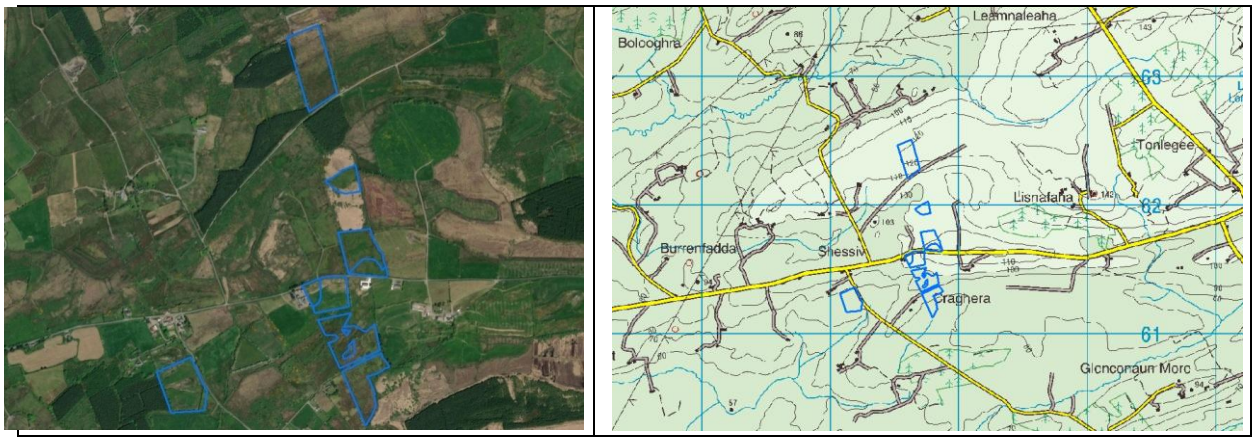

Figure 2-17 Replacement lands at Craghera and Shessiv, Co. Clare

The proposed replacement lands in the townlands of Furroor, Kilcolumb, Reanagishagh, and Lisroe, Co. Clare (**Figure 2-18**) are located approximately 12.5km southwest of Ennis town. These lands comprise of improved agricultural grassland. The approved area for afforestation measures circa 9.39ha.

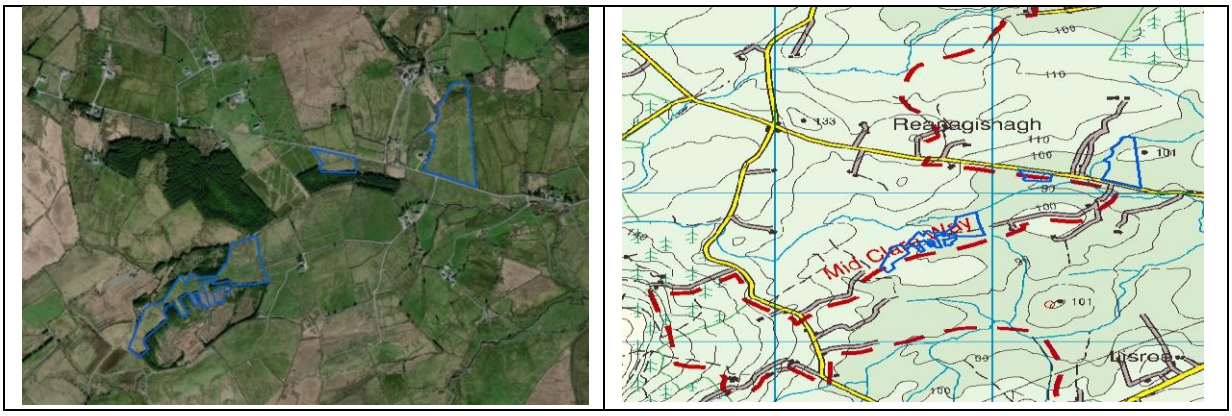

Figure 2-18 Replacement lands at Furroor, Kilcolumb, Reanagishagh, and Lisroe, Co. Clare

The proposed replacement lands in the townland of Rathgoggan North in Co. Cork and Co. Limerick (**Figure 2-19**) are located approximately 1.3km north east of Charleville. The proposed site consists of agriculture pastures and open grassland. The approved area for afforestation measures circa 20.96ha.

Figure 2-19 Replacement lands at Rathgoggan, Co. Cork and Co. Limerick

2.3.14 Grid Connection Options and Infrastructure

There are two proposed connection routes and associated connection point options for connecting the proposed Drumnahough Wind Farm to the National Grid considered in the EIAR as shown in **Figure 2-20 and Figure 2-21** and described in the following subsections.

2.3.14.1 Connection Route and Connection Point to the Permitted Lenalea Substation:

This Connection Route and Connection Point consists of a medium voltage underground electrical cable from the wind farm site entrance to the permitted 110kV Lenalea substation. The overall connection cable route will be approximately 5.3km.

Beginning as a collector circuit within the wind farm, the underground cable will be installed along existing forestry tracks and wind farm access tracks east from the site to the public road L-10142. The cable route will continue along the public road L-10142 for a distance of 750m before diverting north along private access tracks to the permitted 110kV Lenalea substation. See **Figure 2-20**

Cable trenching along the public road section of the route will be carried out in the road edge or in the grass verge where possible. This will be done under the terms of road opening licences from Donegal County Council. Road closure applications may also be required. All works will be planned and undertaken in full consultation with Donegal County Council, in particular the Roads Department/Roads Engineer for the area.

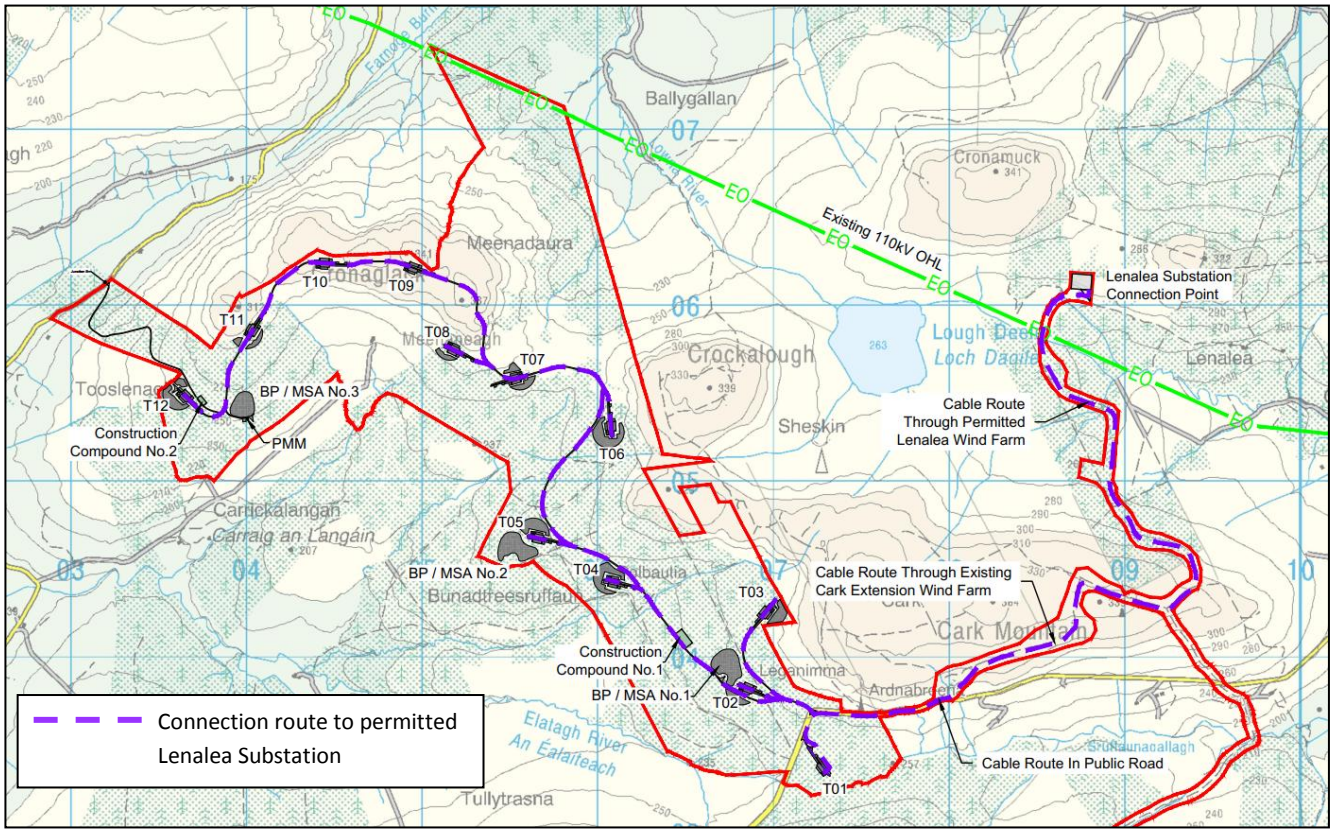

Figure 2-20 Connection Route Option to permitted Lenalea Substation

2.3.14.2 Alternative Connection Route and Connection Point via new on-site 110kv Substation

This Connection Route and Connection Point consists of an underground medium voltage electrical cable beginning as a collector circuit within the wind farm in the townland of Cark and travelling northeast to a proposed 110kV substation in the townland of Trenkeel. **See Figure 2-21**. The proposed 110kv substation will in turn connect to the existing 110kV overhead line between Binbane and Letterkenny, which traverses the site. This will require the installation of two new loop-in lattice towers within the existing Binbane to Letterkenny 110kV OHL. The existing OHL conductor will be terminated at these two lattice towers in order to facilitate the OHL loop-in connection to the proposed 110kV Drumnahough substation, with the new connection looped through to the Drumnahough 110kV substation via a set of terminal towers located within the substation compound. A BESS is also proposed adjacent to the proposed 110kv substation to provide flexibility to the power system through the ability to store energy at times when supply outstrips national energy requirements and allow for the provision of other necessary ancillary services to the national grid. The layout and connection infrastructure is shown in **See Figure 2-22.**

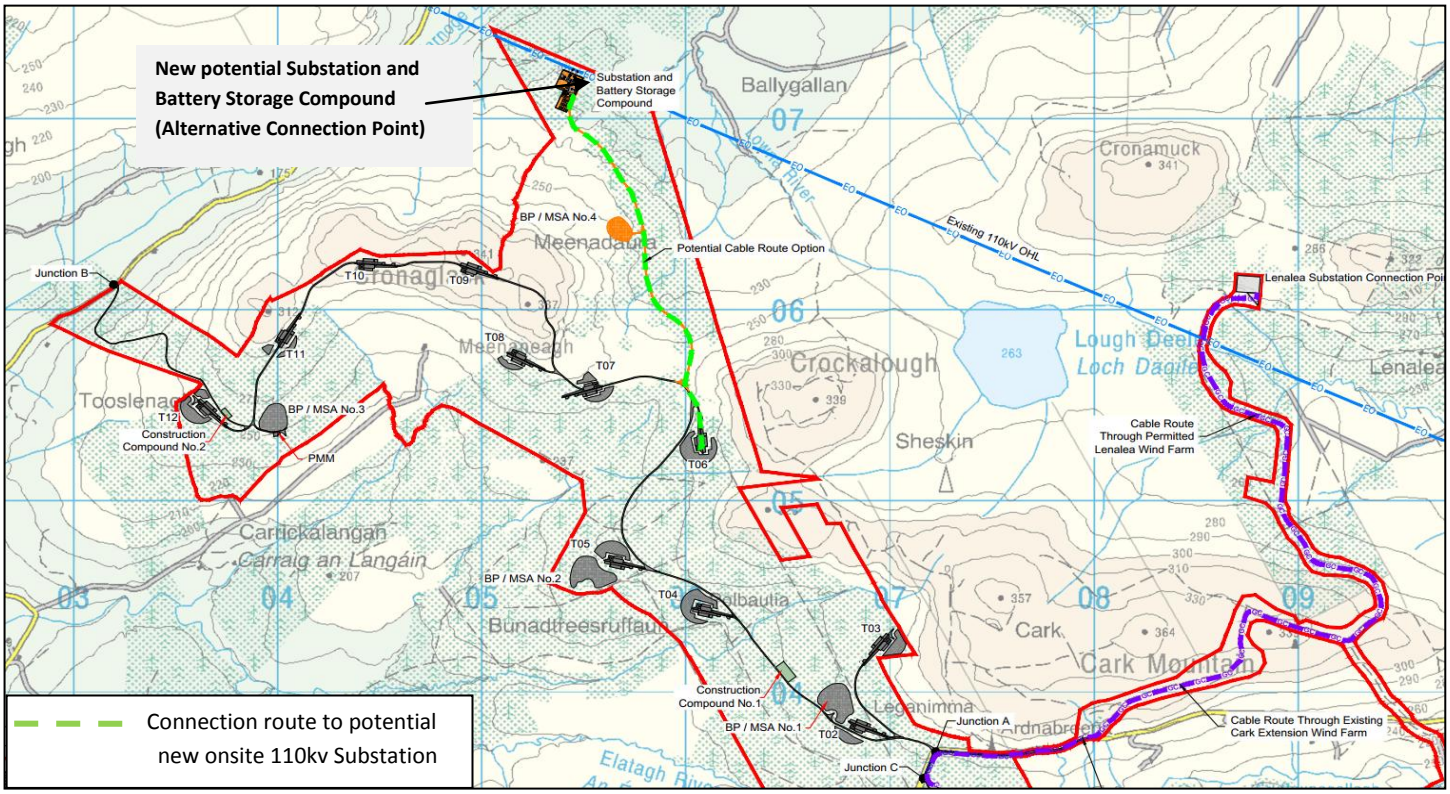

Figure 2-21 Connection Route Option to potential 110kv Substation and BESS

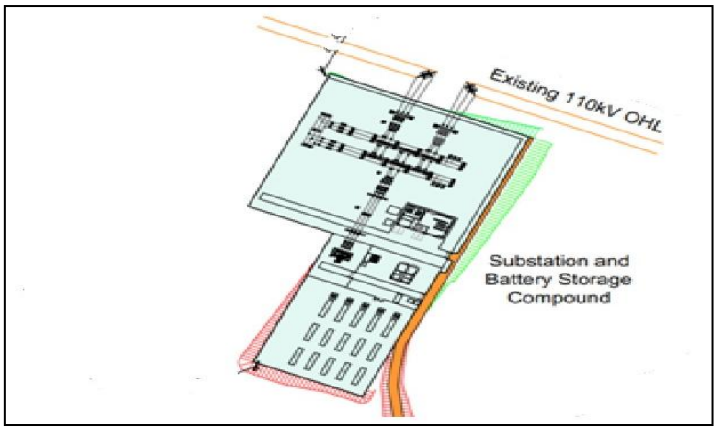

Figure 2-22 Alternative connection option infrastructure

Substation

The proposed 110kV substation will occupy an area of approximately 12,125m^2 (1.2ha) and will comprise an outdoor electrical yard and two single storey buildings (one for the system operator and one for the wind farm operator). The system operator building will be 375m² in area and contain a control room, a battery room, a store room, an office / canteen and a toilet. The wind farm operator building (or IPP substation building) will be 125m² in area and contain a store room, a communications room, a control room, a staff room, an office, a switchgear room and a toilet. Both substation buildings will be approximately 6.1m in height, with pitched roofs and an external blockwork and plastered finish. There will be a very small water requirement for toilet flushing and hand washing and therefore it is proposed to harvest water from the roofs of the buildings. The discharge from the toilet within each building will go to a holding tank located within the substation compound where the effluent will be temporarily stored and removed at regular intervals. Parking for each building will be located within the compound area. The Substation Buildings and associated compound will be contained within a 2.6m high galvanised steel palisade fence. No additional landscaping is proposed or deemed necessary. Access to the proposed 110 kV substation compound will be within the site via a new access track branching off the track between turbine T6 and T7.

Layout drawings of the proposed substation compound and buildings are provided in EIAR Volume 3 Appendix L-1. A typical substation compound is shown in **Figure 2-23.**

Figure 2-23 Typical Substation Compound

Battery Energy Storage System (BESS) Facility

The BESS facility will be located adjacent to the proposed substation and occupy an area of approximately 3875m^2. The area and will be surrounded by a 2.4m high palisade-type fence. Access to the fenced off compound shall be through similar styled palisade double gates. The battery storage system and associated container arrangement, will contain up to 20 No. containerised modules, with dimensions equal to that of standardised 40-foot shipping containers (12.4m x 2.5m x 2.8m), consisting of 10 No. battery units, 5 No. converter system containers and 5 No. transformer system containers which will convert the stored energy from direct current (DC) to alternating current (AC). The selected battery storage technology will be based on the most suitable technology available at the time of construction, with its design to be fully in accordance with latest international and industry standards as well as local regulation requirements.

2.4 DESCRIPTION OF CONSTRUCTION

2.4.1 Proposed Works

The construction of the proposed development will principally comprise of the following works:

- Felling of any areas of coniferous forestry plantation necessary to facilitate construction works;
- Construction of site entrances and any sections of internal access roads necessary to facilitate access to the temporary construction compound and proposed on-site borrow pit locations;
- Construction of temporary construction compound including fencing (for security and ecology, water and archaeological exclusion zones), site offices, parking, material laydown and storage areas, etc;
- Establishment of on-site borrow pits and temporary storage of stockpiled overburden and surplus excavated materials within the material storage areas.
- Earthworks and drainage infrastructure associated with construction of new and upgraded internal access roads, crane hardstand, turbine foundations and substation compound;
- Construction of upgraded and new watercourse crossings for construction of internal access roads and underground cables;
- Excavation of turbine bases and permanent met mast foundations, and associated turbine hardstand areas;
- Installation of sections of underground cabling between turbines;
- Installation of sections of underground cabling to selected connection point option;
- Construction of the substation compound and BESS facility for the alternative grid connection option;
- Works to the local public road network required to facilitate access for turbine component deliveries to the wind farm;
- Turbine delivery, installation and commissioning; and
- Meteorological mast delivery, installation and commissioning.

Construction works will be carried out in a phased manner in order to:

- Minimise disruption to the local community;
- Minimise environmental impact; and
- Create the safest working conditions possible.

2.4.2 Construction Methods

Details on the construction methods are fully set out in EIAR **Chapter 3 Civil Engineering** and in **Volume 3 Appendix B-2 CEMP**. **Table 2-5** provides a summary of the types of proposed construction techniques for the various elements of the project.

Table 2-5. Proposed Construction Techniques

Element	Construction Technique
Wind turbine foundations and hardstands	Wind turbine locations will be cleared, graded, and foundations will be either excavated or piled by rotary core technique. Blasting may be required at wind turbine locations where bedrock is present near the ground surface. An engineered concrete foundation will be installed in the excavated/piled structure location. Backfill will be provided, and grading will be performed in a manner to allow for immediate drainage away from each tower. Construction activities include tree removal, vegetation clearing, topsoil and/or peat stripping, excavation and or piling, grading, foundation construction, final grading and landscaping of temporary works areas.
Permanent Meteorological Mast	Construction includes tree removal, topsoil and peat stripping, excavation, grading, foundation construction, final grading and landscaping of temporary works area.
Site Access	Sightlines improvements of the existing site access junctions will be required. Construction activities include vegetation clearing, topsoil and/subsoil stripping, aggregate placement and grading, and landscaping of temporary works areas.
Internal roadways	**Upgrading, widening and new excavated roadways:** Construction activities will include vegetation clearing, topsoil and/or peat stripping, excavation, placement of geogrid/ geotextile layer and aggregate, compaction, grading , berm placement and landscaping.
	Floating Roads: Construction activities will include removal of major protrusions, placement of geogrid/ geotextile layer and aggregate, compaction, grading , berm placement and landscaping.
Internal underground site electrical cables	To the extent possible, underground electrical collector cables will be co-located with access roads in order to minimize the area of construction disturbance. Underground cable installation construction activities include topsoil stripping, trenching, installing electrical cables, and revegetation of disturbed areas unless the cables are under the roads.
Substation Compound and Battery Energy Storage System (for alternative connection point option only)	Construction includes tree removal, topsoil stripping, excavation, grading, foundation construction, building construction, 2 No. new end masts for loop-in connection to overhead 110kV line, final grading and landscaping of temporary works area.
Construction compounds	Construction includes tree removal, topsoil stripping, excavation, grading, aggregate placement, compaction and landscaping
Borrow pits	Construction includes topsoil stripping, excavation and/or blasting
Water crossings	No in-stream works. Existing crossings: widening using pre-cast piping New crossings: Clear span crossings
Connection cable to grid connection point (other than at water crossings)	Construction activities include excavation, trenching, backfilling, resurfacing
Diversion of 38kV line	The diversion will consist of either; Option 1. Undergrounding the line along its current alignment, or; Option 2. Diverting the line overhead following a new alignment. For option 1 construction works will include excavation, trenching, backfilling, resurfacing. For option 2 construction works will include excavation for new poles.
TDR upgrades	Construction activities include temporary widening by vegetation clearing, topsoil and/subsoil stripping, aggregate placement and grading, and landscaping of temporary works areas along with hedge or tree cutting, and temporary relocation of powerlines/poles, lampposts, signage

2.4.3 Turbine Delivery

Figure 2-24 shows the turbine delivery route proposed for this project. The components are expected to be delivered to Killybegs Port by sea and transported to site along the national, regional and local road network as follows:

- Starting at Killybegs Port;
- Travelling northbound along the Shore Rd (R263) to the junction between R263 to N56;
- Follow the N56 eastbound to the junction with the N15 near Donegal town;
- Follow the N15 north / northeast to the junction with the N14 in Lifford;
- Follow the N14 north / northwest to the junction with the N13;
- Follow the N13 west and then south to the junction with the L-2744 local pubic road;
- Follow L-2744 westbound to the entrance of the existing Meentycat Wind Farm;
- Follow existing windfarm roads through the Meentycat and Cark Extension Wind Farms to the L-10142
- Follow the L-10142 westbound to the eastern site entrance (Junction A).

The majority of the proposed route to the proposed development site has previously been used for turbine component delivery to the operational Meentycat Wind Farm (Planning Refs. 01/8038 and 06/60566). An Autotrack assessment drawing as shown in **Appendix B-1** for the wind turbine blades has revealed a requirement for some minor and temporary public road widenings in order to achieve delivery. In some cases, temporary accommodation works are required along the turbine delivery route such as hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and local road widening. Any updates to existing road infrastructure will be carried out in advance of turbine deliveries and following consultation and agreement with Donegal County Council. The location and nature of works is described in **Appendix B-3**, "*Turbine Delivery Route Assessment Report*".

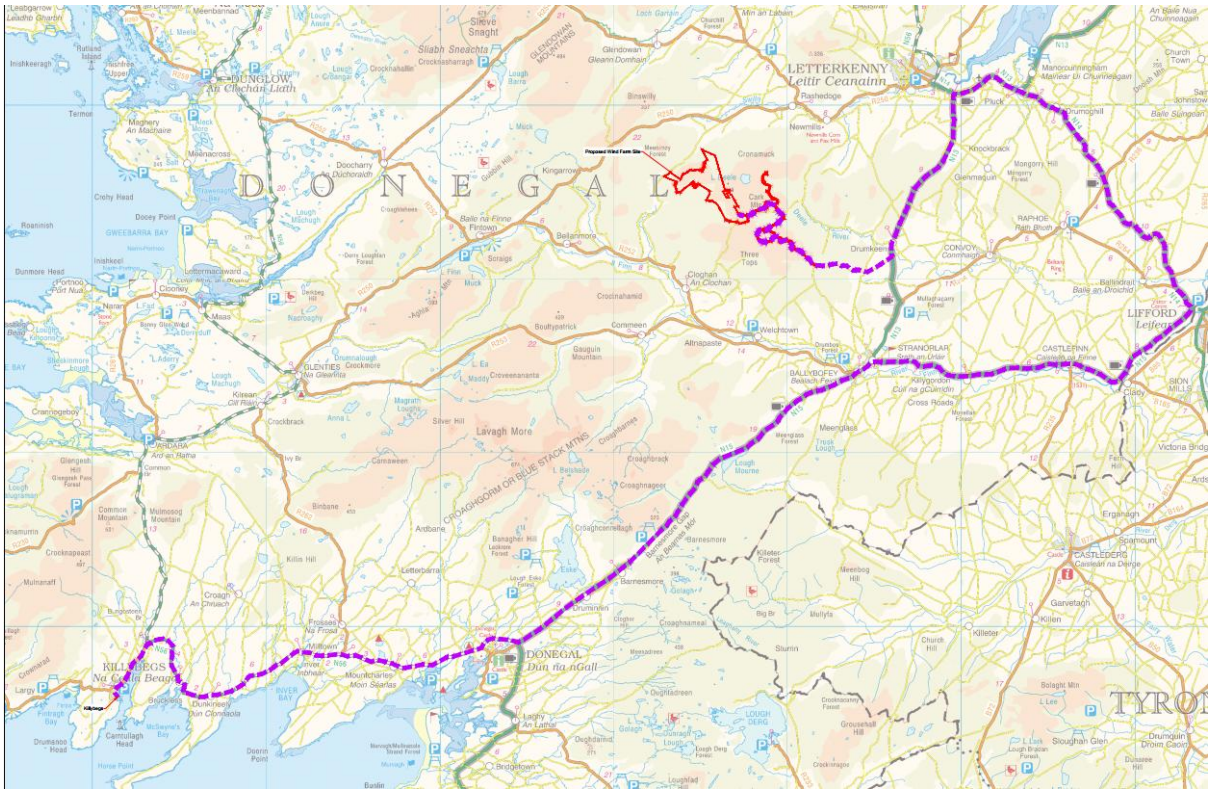

Figure 2-24 Proposed Turbine Delivery Route

2.4.4 Traffic Management

Reasonable efforts will be made to minimise the impact of the works on local residences and users of the public road networks. A Traffic Management Plan (TMP) outlining the required traffic management procedures to be implemented on the public roads during the construction of the proposed development and delivery of the wind turbine components is included as **Appendix H-2**. In the event An Bord Pleanála (the Board) decides to grant approval for the proposed development, the final TMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by the Board. The Traffic Management Plan will be updated at the construction stage (or the update commenced during planning compliance stage) to ensure controls are in place with all suppliers coming to the project site.

2.4.5 Construction Environmental Management Plan (CEMP)

A Construction and Environmental Management Plan (CEMP) has been prepared and will be updated through preconstruction and construction and implemented on site. The CEMP will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment, prior to construction, during construction and during operation of the proposed development, are implemented. The CEMP will collate and manage the proposed and agreed mitigation measures, monitoring and follow-up arrangements and management of environmental impacts. The environmental commitments of the project will be managed through the CEMP and will be secured in contract documentation and arrangements for construction and later development stages. The CEMP will mainly address the construction phase however, where monitoring is to continue into the operational phase these commitments will be communicated and transcribed into operational process documentation.

A CEMP is included in **Appendix B-2** of Volume 3. The primary objective of this CEMP is to provide a framework for actions, responsibilities and protocols associated with environmental management with which the Appointed Contractor(s) are required to adhere in order to construct the proposed development in accordance with regulatory requirements and to reduce and/or avoid any adverse environmental impacts.

This CEMP document will be updated as required to address, for example, any conditions stipulated in the planning permission. The version presented sets out the fundamental work practices, construction management procedures, management responsibilities, mitigation measures and monitoring proposals that are required to be adhered to.

The CEMP includes the following minimum site management controls.

a) Temporary Construction Compounds

- Drainage within the temporary site compound will be directed to an oil interceptor to prevent pollution if any spillages occur.
- No domestic wastewater discharges to the environment. Temporary toilet facilities will include an integrated wastewater holding tank which will be emptied routinely by a licence waste contractor.
- A bunded containment area will be provided within the compound for the storage of fuels, lubricants, oils etc.

- The compounds will be in place for the duration of the construction phase and will be removed once commissioning is complete.

b) Soil Stripping

- The timing of the construction phase soil stripping and excavation works will take account of predicted weather, particularly rainfall.
- Soil stripping activities will be suspended during periods of prolonged rainfall events.
- The area of exposed ground will be kept to a minimum by maintaining where possible existing vegetation that would otherwise be subject to erosion in the vicinity of the wind farm infrastructure. The clearing of peat will be delayed until just before construction begins rather than stripping the entire site months in advance particularly during road construction.

c) Excavation Works

- Earth movement activities will be suspended during periods of prolonged rainfall events
- The earthworks material will be placed and compacted in layers to prevent water ingress and degradation of the material.
- Drainage and associated pollution control measures will be implemented on site before the main body of construction activity commences.
- Best practice for excavation in peat is that the acrotelm (top 50cm of peat), which contains the seed bank, is stored and maintained separately from the catotelm (i.e. peat below the acrotelm layer). Wherever good quality acrotelm is identified, it will be stored for re-use in accordance with best practice. Once works are complete, the acrotelm can be used to cover exposed areas of peat. Exposed areas of the site that are slow to re-vegetate may need to be replanted with suitable vegetation. This can be by natural regeneration or by reseeding. Natural regeneration relies on colonisation of bare ground by native species from adjacent habitats. For this method, a roughened surface will be provided that can trap seeds and soil to provide initial regeneration areas.

d) Dewatering

- Where dewatering is required for construction activities, any pumped waters will be directed to the surface water management system.

e) Storage and Stockpiles

- Temporary stockpiles of excavated spoil, stored in the footprint of the excavation areas, will then be directed for use in backfilling, landscaping and restoration or placed in the deposition areas at the borrow pits.
- Stockpiles of stripped topsoil will be in locations with minimum trafficking to prevent damage and dusting
- Reusable excavated sub-soils and aggregate will be stored in temporary stockpiles at suitably sheltered areas to prevent erosion or weathering and shall be shaped to ensure rainfall does not degrade the stored material
- Where unsuitable material is encountered this will be removed to the borrow pit for permanent storage.
- Stockpiled materials will be located 50m away from drainage systems and silt retaining measures (silt fence, / silt curtain or other suitable materials) to reduce risk of silt run-off shall be installed along the downgradient edges of stockpiled earth materials.

f) Refuelling of Construction Plant On-Site

- Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using.
- Plant nappies or absorbent mats to be placed under refuelling point during all refuelling to absorb drips.
- Mobile bowsers, tanks and drums should be stored in secure, impermeable storage area, 50m away from drains and open water.
- To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up to date service record will be required from the main contractor.
- Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits, all oil and any contaminated material will be removed and properly disposed of in a licensed facility.
- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery.
- Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction.
- In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery.

g) Materials Handling, Fuels and Oil Storage

- Storage of fuels/oil will be located 50m for watercourses.
- Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores.
- Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicle movements.
- Leakages of fuel/ oil from stores will be prevented by storing these materials in bunded tanks which have a capacity of 110% of the total volume of the stored oil. Ancillary equipment such as hoses and pipes will be contained within the bunded storage container. Taps, nozzles or valves will be fitted with a lock system.
- Long term storage of waste oils will not be allowed on site. These waste oils will be collected in leak-proof containers and removed from the site for disposal or re-cycling by an approved service provider.
- On-site washing of concrete truck barrels will not be allowed. The washing of the chutes at the rear of the trucks may be permitted. A designated chute wash down area, which will retain the washout water, will be located within the construction compound and there will be no other chute wash down activity on any other part of the wind farm site.

h) Road maintenance

The road surface can become contaminated with clay or other silty material during construction. Road cleaning will, therefore, need to be undertaken regularly during wet weather to reduce the volume of sediment runoff to the treatment system. This is normally achieved by scraping the road surface with the front bucket of an excavator and disposing of the material at designated locations within the site which may include the proposed borrow pits.

i) Construction Wheel Wash

A Construction Wheel Wash will be used to wash truck tyres leaving the construction site. Water residue from the wheel wash will be fed through a settlement pond, interceptor and then discharged to a vegetated area of low ecological value. The wheel wash area will be cleaned regularly so as to avoid the buildup of residue.

j) Inspection and maintenance

The drainage and treatment system will be managed and monitored and particularly after extreme rainfall events during the construction phase. Controls will be regularly inspected and maintained to ensure that any failures are quickly identified and repaired so as to prevent water pollution. A programme of inspection and maintenance will be designed and dedicated construction personnel assigned to manage this programme. A checklist of the inspection and maintenance control measures will be developed and records kept of inspections and maintenance works.

2.4.6 Duration and Timing

It is envisaged that the proposed development will commence in 2023 with a 14 month construction period. The start date is dependent on planning being granted, receipt of a grid connection offer from EirGrid, funding and all permits being in place.

A typical programme of work is outlined in **Table 2-6** below. A number of these phases will however run concurrently as outlined as follows.

- As the internal site access roads are constructed up to each turbine, hardstanding areas for the crane, turbine foundations and building foundations will be prepared.
- Once the roads are completed, the trenching and laying of underground cables will begin.
- Construction of the site sub-station and control houses (if the alternative connection point option is selected) will commence so that they will be ready to export power as turbines are commissioned.

Table 2-6 Preliminary Construction Programme

Phase	Activity	Duration
Phase 1	Clearfelling (to be complete ahead of construction site mobilisation)	2 months (prior to construction)
Phase 2	Prepare site, pre-construction activities, site entrance, temporary compound	1 month
Phase 3	Access road construction + Drainage plan implementation	3 months
Phase 4	Hard standing construction for turbines	2 months
Phase 5	Turbine Foundation construction	4 months
Phase 6	Trenching and ducting (underground electrical collection system)	2 months
Phase 7	Substation construction	4 months
Phase 8	Permanent meteorological mast erection	1 month
Phase 9	Turbine delivery	3 months
Phase 10	Turbine erection	4 months
Phase 11	Wind Farm Commissioning	4 months (approx)

2.4.7 Major temporary features

Temporary features on site include the compound facilities, plant and equipment along with safety fencing and building materials. Large excavators and turbine erection cranes are also a temporary feature on site during the construction phase. There will be some temporary stockpiling of peat or soils on site. Any surplus peat material will be placed within the material deposition area.

2.4.8 List of Plant

Mechanical machinery and electrical equipment typically used for construction projects will be required to facilitate the proposed development. The following is a non-exhaustive list of plant that is typically used for wind farm and heavy civil engineering work:

- 30-50T Excavators;
- 15-30T Excavator;
- Rubber Tired 15-20T Excavator;
- 3-10T Mini Diggers;
- Low Ground Pressure Excavators (Bog master);
- Mobile Crane for construction;
- Rebar/shuttering/precast units/conc. pipes/box culverts etc 60t to 120t;
- Cranes (1 main, 1 assist) Erection 120t to 1000t;
- Telescopic Handler;
- Tractors and trailers;
- Road grader;
- Double contained fuel bowsers;
- 12T Rollers;
- Diesel powered generators; and
- Water bowsers.

2.4.9 Construction Working Hours

Typically construction will occur within the hours 07.00am – 7.00pm, Monday to Friday and 07.00am to 2.00pm on Saturdays. Due to the requirement for the concrete pours to be continuous, the working day may extend 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, which are normally complete in a single day per turbine. Turbine and crane erections may also occasionally occur outside of these times in order to take advantage of low wind periods. Working hours will be confirmed at the outset of the project and any changes in hours will be agreed with the Local Authority.

Works along public roads would be from 9.00 a.m. to 5.00 p.m. Monday to Friday and 9.00 a.m. to 2.00 p.m. on Saturdays.

A permit for moving abnormal loads will be sought from An Garda Siochana for the delivery of oversized wind turbine components (i.e. blades, nacelles and towers).

No work on Sunday or bank holidays unless preapproved with the Local Authority.

2.4.10 Construction Personnel

During the construction phase, the number of on-site construction personnel will vary for each phase of the development. Overall, it is envisaged that the proposed development would generate employment for up to 60 persons during the construction phase to include site contractors, on-site vehicle and plant operators, engineers, materials delivery personnel, environmental personnel, health and safety personnel.

2.5 DESCRIPTION OF COMMISSIONING

Wind farm commissioning can take approximately two to four months to complete from the erection of the final turbine to exporting of power. It involves commissioning engineers working through an entire schedule of SCADA (Supervisory Control and Data Acquisition) and electrical testing and control measures to ensure the wind farm will perform and export power to the NEG as designed.

2.6 DESCRIPTION OF OPERATION

During the operation of the wind farm, the turbine manufacturer, the Developer or a service company will carry out regular monitoring and maintenance of the turbines and the substation. Routine inspection and preventive maintenance visits will be necessary to ensure the smooth and efficient running of the wind farm.

2.6.1 Operating Conditions

The proposed development is expected to have a lifespan of circa 30 years. The proposed development is designed to operate when wind speeds at the hub height are within the operating range of the wind turbines. Most turbine models have a cut in wind speed of 3m/s with optimum generation at approximately 12.5m/s. The turbines are expected to have a cut out wind speed of 25m/s.

Each wind turbine will be computerised to control critical functions, monitor wind conditions and report data back to a SCADA system. An anemometer mounted on the top of the wind turbine nacelle provides wind speed information used to automatically set blade pitch and control the wind turbine. A wind vane mounted on top of the nacelle provides information needed to yaw the wind turbine into the wind. The SCADA system monitors problems and diagnoses failures. If a problem causes a wind turbine to shut down, the wind turbine will either be restarted by the SCADA system operator, or service personnel will perform the necessary repairs and then manually restart the wind turbines.

In addition, the wind turbine can also be controlled manually at the nacelle, from a panel inside the base of the tower, or from a remote computer via the SCADA system. Using the tower top control panel, the wind turbine can be stopped, started, and turned out of the wind.

Turbines can be programmed to shut down during periods when shadow flicker is predicted to occur. Shadow flicker control modules will be installed on the appropriate turbines which can be programmed to shut down to bring shadow flicker to within acceptable levels. The draft revised "*Wind Energy Development Guidelines*" (December 2019) proposes that no existing dwelling or affected property should experience shadow flicker as a result of the wind energy development.

Fitting of turbines with shadow flicker control modules ensures that the proposed wind farm can comply with existing guideline thresholds and the draft revised guidelines on shadow flicker. This is detailed in EIAR **Chapter 14, Shadow Flicker**.

2.6.1.1 Turbine Maintenance

During the operation of the wind farm, the turbine manufacturer, the Developer or a service company will carry out regular maintenance of the turbines. During the life of the project, it is envisaged that at least two permanent jobs will be created locally in the form of an operator or maintenance personnel. In addition, operation and monitoring activities may be carried out remotely with the aid of computers connected via a telephone broadband link. However, routine inspection and preventive maintenance visits will be necessary to ensure the smooth and efficient running of the wind farm and require a minimal presence.

2.6.1.2 Grid Maintenance

It is unlikely that the underground cable will require much maintenance during its operation but in the event a fault does occur, inspection of the fault can be carried out to determine what works to the ducting may be required.

2.7 DECOMMISSIONING PHASE OF THE PROPOSED DEVELOPMENT

At the end of the estimated 30 year lifespan of the proposed development, the Developer will make the decision whether to repower or decommission the turbines. Any further proposals for development at the site during or after this time will be subject to a new planning permission application. If planning permission is not sought after the end of life of the turbines, the site will be decommissioned and partially reinstated with all 12 No. wind turbines and towers removed. Removal of infrastructure will be undertaken in line with landowner and regulatory requirements and best practice applicable at the time. The information below outlines the likely decommissioning tasks based on current requirements and best practice.

Prior to the decommissioning work, the following will be provided to Donegal County Council for approval:

- A plan outlining measures to ensure the safety of the public workforce and the use of best available techniques at the time
- A comprehensive reinstatement proposal, including the implementation of a program that details the removal of all structures and landscaping.

If the site is to be decommissioned, cranes of similar size to those used for construction will disassemble each turbine. The towers, blades and all components will then be removed.

Wastes generated during the decommissioning phase will be taken off site, and disposed of at an authorised waste facility. Any materials suitable for recycling will be disposed of in an appropriate manner.

At present it is anticipated that underground cables connecting the turbines to the selected substation will be cut back and left underground. The cables will not be removed if an environmental assessment of the decommissioning operation demonstrates that this would do more harm than leaving them *in situ*. The assessment will be carried out closer to the time to take into account environmental changes over the project life.

If the alternative grid connection option is required to be developed, the new 110kV substation would remain in place as it will be under the ownership of ESB/EirGrid.

Hardstand and turbine foundation areas will be left in situ and covered with soil to match the existing landscape. Access roads will be left for use by the landowners.

2.8 THE USE OF NATURAL RESOURCES

2.8.1.1 Aggregate

Large amounts of aggregates, concrete, and steel will be used during construction. The majority of aggregate materials (circa 80%) required for the construction of the roads, hardstands and the substation and battery compound will come from aggregate (rock, stone, gravel, sand) extracted from four (4) No. proposed on-site borrow pits. Material to be delivered to site will mainly consist of higher grade materials not available to be won on site, limestone capping material for roads and hardstands, and concrete for the construction of the 12 No. turbine bases, permanent met mast foundation and substation infrastructure.

Table 2-7 Summary of Approximate Aggregate Quantities

Stone / Aggregate	Quantity
Internal access roads	125,000 m^3
Turbine bases	25,000 m^3
Turbine hardstands	150,000 m^3
Deposition area berms	6,000 m^3
Substation and battery storage compounds	55,000 m^3
Cable route trenches	7,200 m^3
Met mast	1,400 m^3
Temporary site compounds	13,750 m^3
Total Volume of Stone/Aggregate Required	383,350 m^3
Site won **Aggregate**	306,680 m^3
Imported Aggregate	76,670 m^3
Concrete	**Quantity**
Turbine bases	7,200 m^3
Substation and battery facility compound foundation	100 m^3
Met mast foundation	20 m^3
Total Volume of Concrete Required	7,320 m^3

Concrete and additional aggregate materials will be sourced from authorised facilities. The following quarries in County Donegal are in proximity to the proposed site:

- Bonar's Quarry;
- Churchill Stone; and
- Letterkenny Concrete & Quarry Products Limited.

These are the most likely source to be used, but this will be confirmed by the appointed contractors.

2.8.1.2 Water

Water needs for construction activities will be limited to concrete truck chute washing, wheel wash, dust suppression and sanitary facilities. This water requirement will be sourced from on-site rainwater collection systems and settlement ponds.

It is estimated that up to approximately 3,000 litres per day of potable water will be required during peak construction for construction employees. It is proposed that this water requirement will be imported in bulk water tanks.

Potable water for the operational and maintenance phase is estimated to be approximately 50 litres per day. This water will be supplied as bottled water.

2.9 THE PRODUCTION OF WASTE

2.9.1 Excavated Soils, subsoil and peat

It has been calculated that there will be approximately 368,400m³ of material excavated during the construction of Drumnahough Wind Farm, of this, 255,300m³ will be peat and the remaining 113,100m^3 will be soils, subsoil and stone. All soils and subsoils generated from excavation works will be retained on site and reused in bunding, landscaping and localised earthworks. Where suitable, acrotelm peat will be used for reinstatement around turbines and felled areas. Excess peat and spoil material will be stored on site in designated peat deposition areas. Spoil excavated from the public road associated with the placement of underground medium voltage cable to grid connection point at the permitted Lenalea substation, will be removed offsite to a suitable waste facility as approved by the Local Authority. Table 2.6 outlines currently licensed/permitted waste facilities which are approved to accept this waste stream and may be utilised.

2.9.2 Domestic Waste-Water Effluent

Wastewater from welfare facilities on site will drain to integrated wastewater holding tanks associated with the toilet units. The stored effluent will then be collected on a regular basis from site by a permitted waste contractor and removed to a licensed/permitted waste facility for treatment and disposal. **Table 2-8** outlines some known waste facilities which are approved to accept this waste stream and may be utilised.

During the construction time period, wastewater production is estimated to be 3,000 litres per day. Although primarily controlled remotely, during the operational phase, maintenance personnel will visit the substation building on a regular basis. The daily average wastewater production during the operational phase is estimated from the average number of workers on site, which is expected to be 2 workers, resulting in a typical wastewater production rate of 100 litres per day. The wastewater generated during the operational phase will be managed by a holding tank which is of twin-hull design and fitted with an alarm to indicate levels and when it is due for empty. The holding tank will be emptied by a permitted contractor only.

2.9.3 General Wastes

Construction phase waste may consist of hardcore, concrete, spare steel reinforcement, shuttering timber and unused oil, diesel and building materials. This waste will be stored in the construction compound and collected at the end of the construction phase and taken off site to be reused, recycled and disposed of in accordance with best practice procedures at an approved facility. Plastic waste will be taken for recycling by an approved contractor and disposed or recycled at an approved facility. Domestic type waste generated by contractors will be collected on site, stored in an enclosed skip at the construction compounds and disposed of at a licensed landfill facility.

The power generation aspect of the proposed development would not produce any waste emissions or pollutants. The general operation and maintenance of the proposed development has the potential to produce a minimal amount of waste. Wastes arising during the operation phase of the project include but are not limited to lubricating oils, cooling oils, and packaging from spare parts.

The containment and disposal of such oils will be carried out by an approved contractor. Such operations will be carried out in accordance with the Waste Management (Hazardous Waste) Regulations, 1998. The remaining wastes will all be removed from site and reused, recycled or disposed of in an authorised facility in accordance with best practice.

Table 2-8 Sample of Authorised Waste Facilities

Waste Type/Stream	EWC code	Facility	Location
Soils from public roads	17 03 01 17 03 02	Belgard Quarry	Tallaght Dublin
		Burrishoole Community Partnership Ltd	Newport, Co. Mayo
		RDC Contracts	Clondalkin Dublin
		Mullafarry Quarry Ltd	Killala, Co Mayo
Domestic Wastewater	20 03 04	Donegal Waste and Recycle	Glenties, Co. Donegal
		Enviro Grind Ltd	Pettigo, Co. Donegal
		Donegal Waste and Recycle	Laghey, Co. Donegal
C&D waste	17 01 07	Donegal Waste and Recycle	Glenties
		Donegal Waste and Recycle	Laghey, Co. Donegal
		Dorrian Construction Ltd	LetterKenny, Co. Donegal
		Ulster Environmental Management Services Ltd	Burnfoot Co. Donegal
Waste oils	13 02 08	Stranorlar Civic Amenity Site	Stranorlar, Co. Donegal
		Letterkenny Civic Amenity Site	Letterkenny Co. Donegal
		Letterkenny Skip Hire,	Letterkenny Co. Donegal
Domestic waste	20 03 01	Bryson Recycling Ltd Letterkenny Skip Hire	Letterkenny Co. Donegal
		Donegal Waste and Recycle	Laghey, Co. Donegal
		Donegal Waste and Recycle	Glenties
Oil interceptors	13 05 01 13 05 02 13 05 03 13 05 06 13 05 08	Clare Drains Environmental Ltd	Quin , Co. Clare
		KPA (Ballinalack Limited)	Co Westmeath N91 ATY0
		K Fahy Waste Facility Ltd	Co. Limerick
		John Conaty Limited	Kells Co Meath

2.10 EMISSIONS AND NUISANCES

The anticipated residues and emissions likely to be generated during the project lifetime are summarised in **Table 2-9** below. These environmental effects have been identified, assessed and proposals for management of the anticipated nuisances and/or emissions are presented throughout relevant chapters of this EIAR.

Table 2-9 Emissions and Nuisances

Project Phase	Aspect	Potential Emission/Nuisance	Assessment Provided
Construction/ Decommissioning	Air	The main emissions to atmosphere during the construction stage of the project is from fugitive dust associated with the following activities: • Groundworks associated with the construction of the project infrastructure • Transportation and unloading of crushed stone around the site; • Vehicular movement over potentially hard dusty surfaces such as freshly excavated and constructed access tracks and crane hardstanding areas; • Vehicular movement over material potentially carried off site and deposited on public roads. The movement of machinery, construction vehicles and the use of generators during the construction phase will also generate exhaust fumes containing predominantly carbon dioxide (CO_2), sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}).	EIAR Vol 2 Chapter 8 Air and Climate
	Noise	Traffic flows, excavation/blasting mechanical machinery and electrical equipment typically used for construction projects would generate noise emissions.	EIAR Vol 2 Chapter 11 Noise
	Water	Surface water runoff and discharges from construction working areas are likely during construction, although overall the quantity of surface runoff would not change overall as a result of the construction work. Occasional and low quantity discharges could arise from pumping in order to dewater foundation excavations. This would be discharged to the system water management drainage system. Pollution sources could arise as a result of soil erosion or from oil/ fuel or chemical storage and use. Proposals for management of water quality and quantity from the proposed development are presented in EIAR Volume 3: Appendix B-2: CEMP.	EIAR Vol 2 Chapter 10 Water
	Traffic	The additional traffic, especially heavy goods vehicles associated with the construction phase, has the potential to cause nuisance to those using the local road networks	EIAR Vol 2 Chapter 5 Population and Human Health, EIAR Vol 3 Appendix H-1 and H-2
Operational	Air	Due to the nature of the project no significant point source or diffuse air emissions would be produced during its operation.	EIAR Vol 2 Chapter 8 Air and Climate
	Noise	Potential noise nuisance from operational turbines and a proposed new 110kV on-site substation .	EIAR Vol 2 Chapter 11 Noise
	Water	No water emissions or pollution sources have been identified for the operational phase.	EIAR Vol 2 Chapter 10 Water
	Shadow Flicker	In certain conditions, the movement of wind turbine blades could give rise to shadow flicker nuisance at nearby residential receptors.	EIAR Vol 2 Chapter 14 Shadow Flicker

2.11 TRANSBOUNDARY EFFECTS

The location of the project is entirely in County Donegal within the Republic of Ireland. Transboundary impacts relate to potential impacts on other Member States, i.e. outside of the Republic of Ireland. At its closest, the wind farm site is approximately 18km from the Northern Ireland border.

Considering the nature of the project, the largely localised nature of potential impacts and the distance from the neighbouring member state, it is considered that any potential for impacts on transboundary receptors would only arise due to water quality effects, ecological effects on water bodies or visual effects. Following on from the assessments carried out as part of the EIAR studies, it is concluded that the project is unlikely to result in significant transboundary impacts.

The River Finn crosses the border east of Castlefinn in Co. Donegal and just west of Claddy, Co. Tyrone. From here it runs in a north-northwest direction past Lifford and Strabane and onwards through Derry/Londonderry before entering the sea at Lough Foyle. Most of the wind farm drains to the Finn catchment. That part of the River Finn which lies within Northern Ireland is referred to as the River Foyle and is designated as the River Foyle and Tributaries SAC (Ref. UK0030320) for Otter, Salmon and watercourses with floating vegetation. The assessments undertaken as part of this EIAR have concluded that the project is unlikely to have a significant water quality effect locally and thus significant transboundary impacts are unlikely.

Transboundary effects were considered in the Landscape and Visual Impact scoping assessment and it was determined that transboundary landscape or visual impacts are unlikely to be significant. The zone of visual influence maps prepared as part of this assessment indicate that there are only limited areas within the neighbouring member state where the proposed wind farm will be visible from and that the proposed development itself does not introduce any additional areas of theoretical wind turbine visibility on transboundary receptors. Significant transboundary visual impacts are unlikely.

2.12 RISK OF MAJOR ACCIDENTS AND DISASTERS

It is considered that there is no risk for the project to cause major accidents and/or disasters or vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters and man-made disasters for the following reasons:

2.12.1 Construction Issues

As in all construction activities, there is a wide range of potential risk of accidents and hazards associated with wind farm construction. While many risks are similar in nature to those for other industries, wind farm construction works take place in exposed windy locations and involve transport of heavy equipment, heavy cranage and specialised electrical installation.

All work on site will be carried out in compliance with all relevant Legislation and Work Practices including:

- Safety, Health & Welfare at Work (Construction) Regulations 2013;
- Safety, Health & Welfare at Work Act 2005;

- Safety, Health & Welfare at Work (General Applications) Regulations 2007 to 2016; and
- Irish Wind Energy Association Best Practice Guidelines.

To ensure that the construction areas, site environs and public roads remain safe for all users. The Construction and Environmental Management Plan (CEMP), (refer to **Appendix B-2** of the EIAR) outlines the safety procedures that will be implemented during the construction phase. The effective implementation of the CEMP will help to reduce the risks associated with the construction phase of the Proposed Project.

Landslide

Extensive walkovers and surveys of the site including 560 peat probes across the site determined that the Proposed Development site is principally covered in peat, ranging in depths up to 4.5m with an average depth of 1-2 m. There is therefore a risk that the Proposed Development could increase peat slide risk and be affected by a peat slide. An assessment was therefore required of the peat slide risk of the Proposed Development on the site. This has been undertaken and provided in EIAR Volume 3 **Appendix E-1** (Peat Stability Risk Assessment).

A two-stage peat stability risk assessment approach was undertaken as part of the assessment. Stage 1 was based on desk study information, site reconnaissance and assessment of contour data. Stage 1 concluded that further quantitative stability risk assessment was required for this site. Stage 2 involved quantitative risk assessment factor of safety analysis (Infinite Slope Stability Analysis), and application of the Peat Slide Hazard Rating System (PHRS) (Nichol, 2006). Both stages were completed for this project. This approach is in line with industry best practice guidance, as published by the Scottish Government PLHRA (2nd Ed 2017). The findings of the PHRS, carried out as part of the Stage 2 assessment, were that the risk level ranged from **Very Low** (T2, T3, BP1, BP2 & BP3) to **Low-Moderate** (T9, T10, T11, BP4, PMM, Substation). The remainder of the turbines are in **Low** risk areas. Following on from the PHRS, MWP conducted an Infinite Slope Stability Analysis (ISSA) for the site using the peat probe data and slope data from the LiDAR DEM to calculate the Factor of Safety (FoS) against peat slide for each location probed.

MWP completed assessments of the risk presented using the industry best practice guidance of the Scottish Executive and Scottish Government guidelines for Peat Landslide Hazard and Risk Assessments. The outcome of the risk assessment was that landslide presented a Negligible Level of risk to the Wind Farm Infrastructure. A further risk assessment for the risk of landslide to surrounding environment found a Negligible Level of risk. This is an outcome consistent with an iterative constraints driven approach to wind farm infrastructure design. Design measures in the form of peat stability monitoring programme during construction have been proposed in order to further mitigate and manage risk.

2.12.2 Operational Issues

Fire/ Fuels

The presence of electrical generating equipment and electrical cables along with the storage and use of various oils (diesel fuels, lubricating oils, hydraulic fluids) can create the potential for fire and/or ground contamination. This potential exists within the turbine tower, nacelle, substation, electrical transmission structures and operations maintenance buildings. Modern wind farm design will

minimise the use of combustible materials. Lightning and surge protection will cover the nacelle and rotor blades, as well as electrical equipment, including cables. Each element of equipment has strict and exact operational protocols that provide for the elimination of risk. The protocols set out the flammability or chemical properties of each of the oils, lubricants and fuels that may be used within equipment on site. The proposed development will be operated to the specifications of the chosen turbines and in accordance with all electrical standard operating procedures.

Lightning Strikes

A lightning strike could cause a fire or could cause severe damage to blades which may lead to blade failure. To protect wind turbines from damage caused by a lightning strike and to provide grounding each turbine will be equipped with an electrical grounding system.

Turbine Structural Failure

Turbine structural failure includes tower collapse, blade failure or separation. Risk may arise due to stress, wear and tear.

Rigorous safety checks are conducted on the turbines during operation to ensure the risks posed to staff, landowners and general public are negligible. These checks are specified particular to the turbine model purchased for the project. The separation distances of turbines from public roads and residences are well beyond fall over distances that would present a risk of significant accidents.

Severe Weather

There is potential for the Proposed Development to be impacted by severe weather including increased wind and storms. However, wind turbines are designed to withstand extreme weather conditions with brake mechanisms installed within the turbines so that they only operate under specific wind speeds and will shut-down during high wind speed events. Therefore, there is very low risk to the Proposed Development from high wind speeds.

Flooding

Flood risk is considered in EIAR Chapter 10 to determine whether the site is at risk from extreme fluvial flooding events. This assessment concluded that the site is not at risk from extreme flooding. The assessment also considered the increase risk of downstream flooding as a result of the proposed development. The assessment considers that forest felling, new site access tracks, turbine hard-standing areas and other new, hard surfaces have the potential to contribute to a low level of increase in surface water run-off. The assessment however determined that the risk of an increase in downstream flooding is low due to the small percentage increase in run-off contributing to the catchments as a result of the wind farm development. The proposed development is at a distance of approximately 7.5km from the nearest recorded location by the Office of Public Works (OPW) where flooding has occurred in the Swilly sub catchment.

REFERENCES

*Draft Revised Wind Energy Development Guidelines.*s.l., Department of Housing Planning and Local Government., 2019.

Safety, Health and Welfare at Work (Construction) Regulations. s.l., Health and Safety Authority, 2013.

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