



GALETECH
ENERGY SERVICES

Islandmore Wind Farm

Environmental Impact Assessment
Report

Chapter 3: Description of the
Project

Islandmore Wind Farm Limited

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3.1 INTRODUCTION

The purpose of this chapter is to provide a description of the project in sufficient detail, which, when taken together with the descriptions of the existing environment provided in each chapter of this EIAR, will allow an independent reader to understand the significant environmental effects likely to arise from the project.

The description considers the location of the project together with its main physical characteristics including design, size, scale and land-use requirements of all relevant phases of the existence of the project from its construction through to operation and decommissioning. The project described in this chapter was arrived at following the consideration of various reasonable alternatives described in **Chapter 2**.

This chapter should also be read in conjunction with the technical plans and drawings submitted with the planning application and photomontages provided in **Annex 10.2** of this EIAR. Further descriptions of specific elements of the project and the existing baseline environment are also provided in individual chapters of this EIAR as they relate to particular environmental factors including, for example, in combination with other developments; the nature and quantity of materials and natural resources used and the potential production of residues, waste, pollution, noise and nuisances.

The description of the project also addresses other off-site/secondary developments which occur as a direct result of the project, including, for example, the importation of materials and aggregates to facilitate construction of the project.

The project will be commissioned in a single construction phase and the construction period is likely to last for approximately 15-18 months. The description of the proposed construction phase includes land-use requirements; proposed site construction works; off-site/secondary developments; description of materials, plant and equipment used to facilitate construction together with a description of potential emissions; waste and traffic etc.

3.2 PROJECT DURATION

A 10-year planning permission is being sought by the developer for this project. That is, planning permission would remain valid for 10-years following the final grant.

Section 41 of the Planning & Development Act 2000 (as amended; 'the 2000 Act') states that a planning authority may "...having regard to the nature and extent of the relevant development and any other material considerations, specify the period, being a period of more than 5 years, during which the permission is to have effect".

In addition, the *Wind Energy Development Guidelines for Planning Authorities 2006* state that "Planning Authorities may grant permission for a duration longer than 5 years if it is considered appropriate, for example, to ensure that the permission does not expire before a grid connection is granted. It is, however, the responsibility of the applicants in the first instance to request such longer durations in appropriate circumstances".¹ The construction of the project is dependent on achieving a connection offer to the national electricity grid network which is under the auspices of EirGrid or ESB Networks and planning permission for the connection infrastructure. Given these requirements, and other post-consent requirements (e.g. discharge of planning conditions, etc.), a 10-year planning permission is now typically standard practice for wind energy developments permitted in Ireland.

¹ This text is replicated at Section 7.22 of the *Draft Revised Wind Energy Development Guidelines 2019*.

The operational lifespan of the project is proposed to be 40-years following the full commissioning of the wind farm. Any further operation beyond 40-years would be subject to a further planning application and EIA. This EIAR therefore assumes that full decommissioning will take place at the end of the project lifespan.

3.3 SITE LOCATION & CONTEXT

The project site is located in north County Roscommon, c. 2-kilometres (km) north of Ballaghaderreen (**see Figure 3.1**), c. 13km east of Charlestown (County Mayo) and c. 6km southwest of Gorteen (County Sligo). The wind farm will be located in the townlands of Largan, Boleysillagh, Cloonmeen, Toobrackan, and Tullaghanrock, County Roscommon.

The project site is generally set in an upland area located between the towns of Ballaghaderreen (County Roscommon) to the south and Gorteen (County Sligo) to the north. The project site is generally located on an elevated plateau with ground elevations at the wind turbine locations ranging from approximately 140-metres (m) above ordnance datum (AOD) to 170m AOD. At the southern extent of the project site (the junction of the N5 and R293), ground elevations are approximately 80m AOD illustrating the undulating characteristics of the local landscape. In general, the terrain slopes to the east or southeast towards Lough Gara which is a notable waterbody located c. 7km to the east of the project site.

According to the Corine 2018 database, land use at the project site is predominately classed as wetlands, forest and semi-natural areas and agricultural areas (pastures). The wider landscape comprises a mosaic of peat bogs, commercial forestry and agricultural scrub; with pockets of improved agricultural pasture generally limited to areas to the southwest of Ballaghaderreen and west and northwest of the town of Frenchpark.

The N5 national primary route is located c. 500m south of the wind farm site; while the N17 national secondary route, along which turbine components will be transported, is located c. 13km to the west. The project site is crossed by a network of local secondary and tertiary classed roads.

Population density at the project site and in its immediate environs is sparse and settlement patterns largely comprise dispersed rural dwellings often accompanied by agricultural holdings and buildings. The town of Ballaghaderreen, located c. 2km south, is the primary settlement in the environs of the project site.

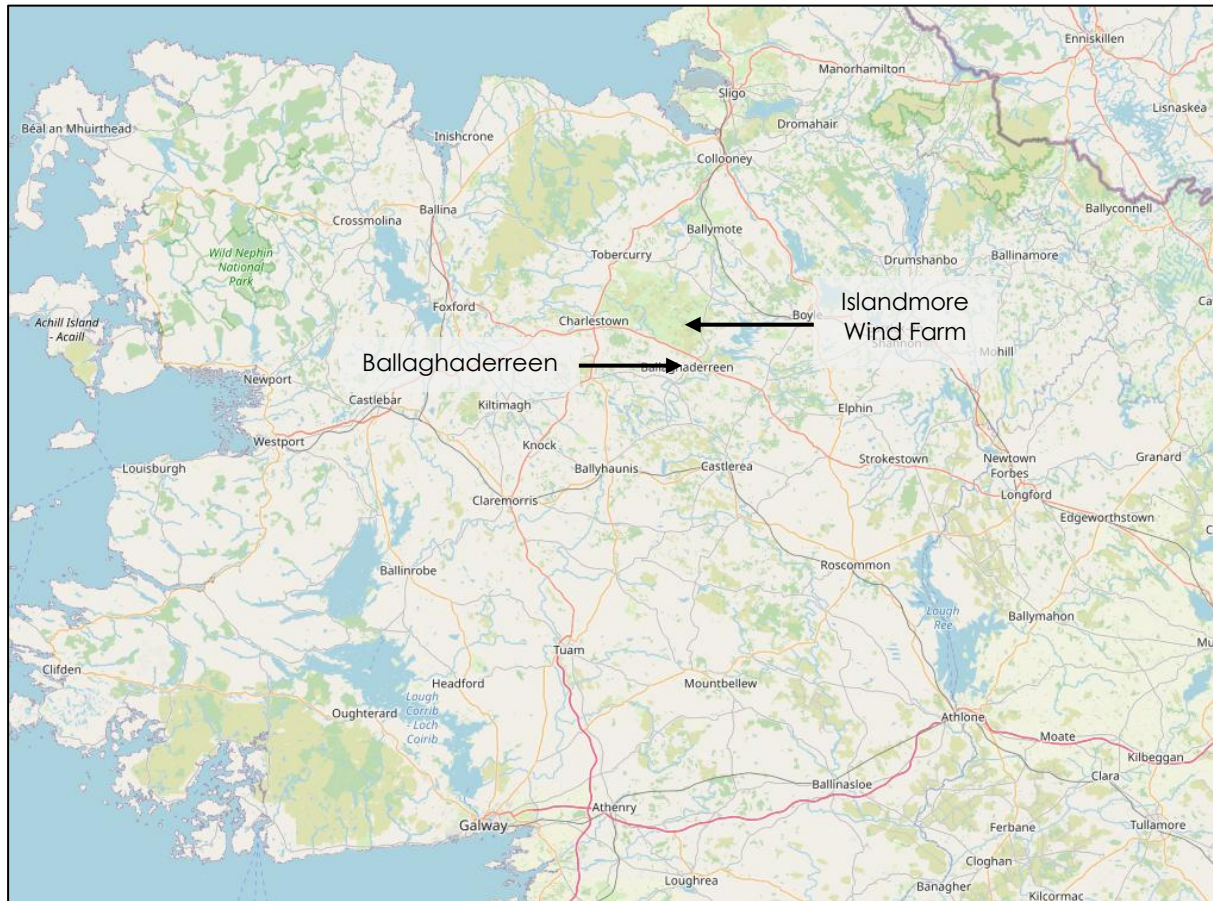


Figure 3.1: Project Site Location



Figure 3.2: General View across the Wind Farm Site

3.4 DESCRIPTION OF THE PROJECT

The project assessed within this EIAR comprises a wind farm, including all associated development works to accommodate its construction, installation, operation, maintenance and the export of electrical power to the national grid. This will include:-

- 3 no. wind turbines (T1-T3) with a hub height of 104m, a rotor diameter of 162m and an overall tip height of 185m;
- 7 no. wind turbines (T4-T10) with a hub height of 82m, a rotor diameter of 136m and an overall tip height of 150m;
- All associated turbine foundations and crane hardstanding areas;
- All associated underground electrical and communications cabling;
- Construction of approximately 4km of wind farm access tracks;
- Construction of 6 no. new site entrances and upgrade of 1 no. existing site entrance;
- 2 no. temporary construction compounds;
- 1 no. borrow pit which, when exhausted, will be utilised to permanently store excess excavated material;
- The storage, as required, of excavated material at dedicated spoil deposition areas;
- Felling of approximately 6.5 hectares (ha) of forestry plantation to facilitate the construction and operation of wind farm infrastructure; and,
- All associated and ancillary site development, excavation, construction, landscaping and reinstatement works, including provision of site drainage infrastructure and environmental mitigation measures.

Off-site or secondary elements of the project which are included for assessment in this EIAR and are included in the current SID planning application, include:-

- Temporary and permanent works to public roads along the turbine component haul route.

Off-site or secondary elements of the project which are included for assessment in this EIAR but are not included in the current SID planning application and will be subject to a separate licensing and/or consenting process, include:-

- A 110 kilovolt (kV) electricity substation and all associated electrical equipment; and,
- The installation of c. 7km of underground electricity line to facilitate connection of the electricity substation to the existing 110kV electricity substation at Tonroe, Ballaghaderreen, County Roscommon.

The location of the project is illustrated in **Figure 3.3** below (see also **Annex 3.1**).

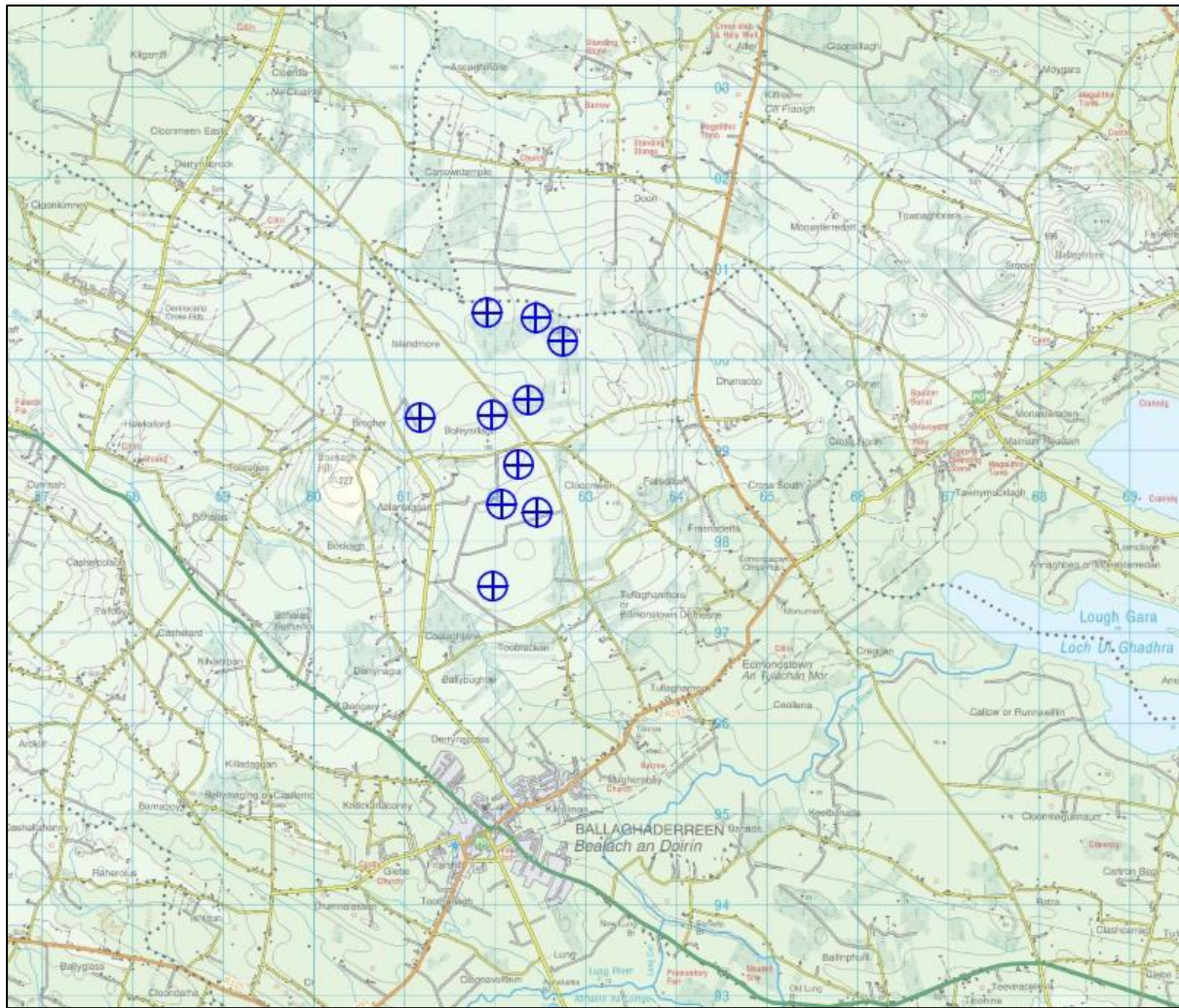


Figure 3.3: Wind Farm Site Location

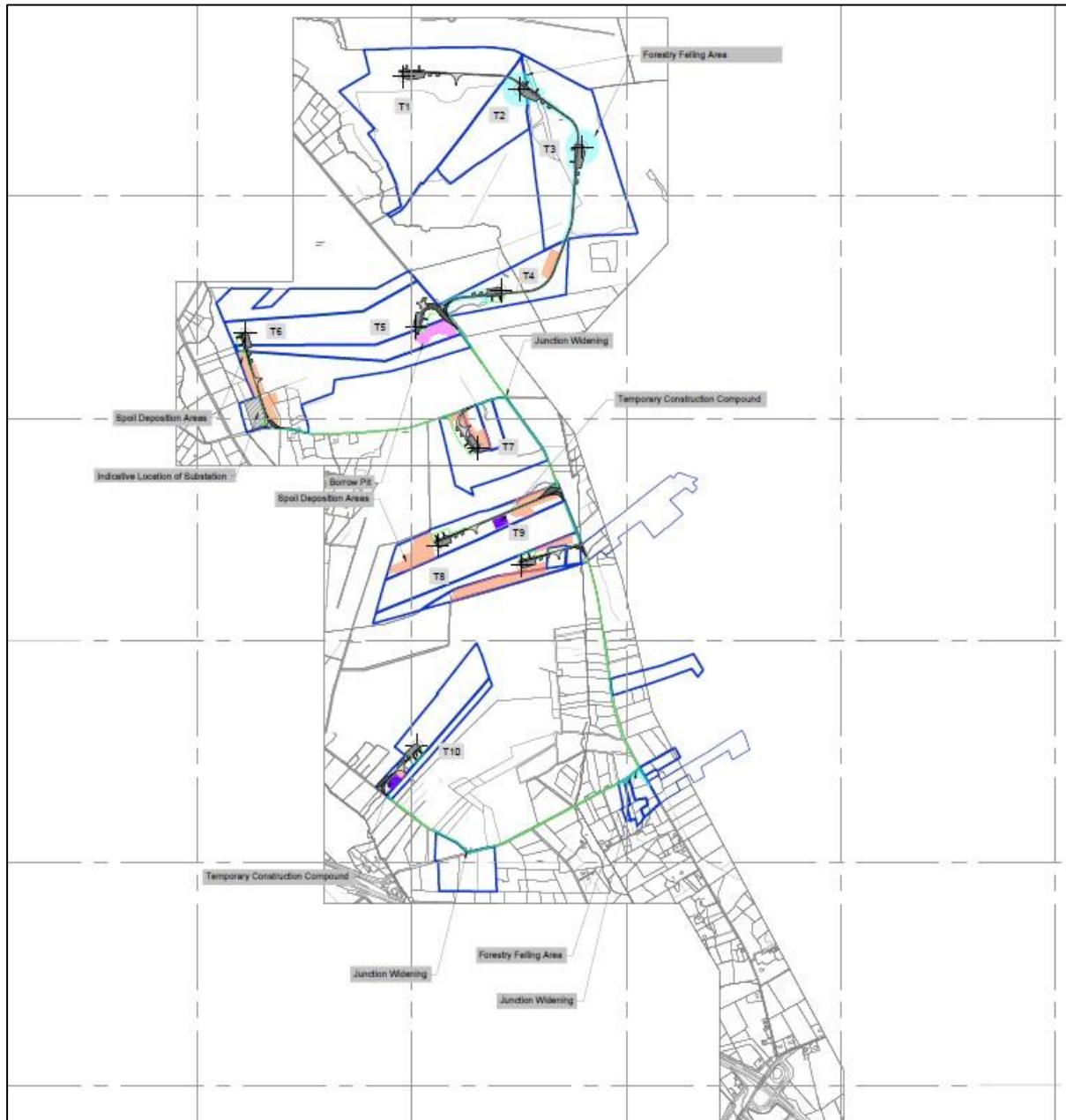


Figure 3.4: Wind Farm Site Layout (see also Annex 3.2)

Each element of the project is discussed in turn below and all relevant technical plans, drawings and other particulars are included in the accompanying planning application. This EIAR should, therefore, be read in conjunction with the plans and particulars of the relevant planning application as, as discussed at **Chapter 1 (Section 1.19)**, some project elements assessed in this EIAR will be subject to a separate planning application.

3.4.1 WIND TURBINES

As discussed in **Chapter 2**, the proposed wind turbine design and layout has been informed by a number of factors including environmental constraints, maximising energy yield and maintaining sufficient inter-turbine separation distances to minimise wake effects and maintain correct operational performance. The coordinates of the proposed wind turbines are set out in **Table 3.1** below.

Turbine ID	Easting*	Northing*	Overall Tip Height (m)	Approximate Top of Foundation Level (mAOD)
T1	561862	800538	185	150
T2	562401	800480	185	163
T3	562695	800222	185	169
T4	562316	799576	150	156
T5	561920	799411	150	167
T6	561124	799382	150	154
T7	562209	798866	150	161
T8	562021	798429	150	150
T9	562413	798339	150	142
T10	561924	797528	150	143

Table 3.1: Wind Turbine Coordinates and Existing Ground Levels

**Coordinates provided In Irish Transverse Mercator (ITM)*

***Note: Micrositing and any immaterial deviations to the proposed turbine locations within an overall development envelope (overall height or red line boundary) are fully assessed and incorporated into this EIAR.*

The project will feature a mix of wind turbine tip heights; with turbines T1-T3 having tip heights of 185m and turbines T4-T10 having tip heights of 150m. The rated electricity output for each turbine, based on the turbine models selected, is 7.2-megawatt (MW) for turbines T1-T3 and 4.5MW for turbines T4-T10, resulting in a total rated output of 53.1MW for the project.

Details of the wind turbine makes, models and dimensions are provided at **Table 3.2** below. Drawings of the wind turbines are provided at **Annex 3.3**.

Turbine ID	Turbine Model	Output (MW)	Hub Height (m)	Rotor Diameter (m)	Overall Tip Height (m)
T1-T3	Vestas V162-7.2MW	7.2	104	162	185
T4-T10	Vestas V136-4.5MW	4.5	82	136	150

Table 3.2: Wind Turbine Model and Dimensions

The turbines will each consist of a three-bladed rotor attached to a nacelle (hub) which contains the mechanical drive train and electrical generation mechanisms, mounted on a steel/concrete tower of tubular construction. The blades will be constructed of glass reinforced plastic. The colour of the turbine towers and blades will be white, off-white or light grey in accordance with the *Wind Energy Development Guidelines for Planning Authorities 2006*, or as otherwise determined by An Coimisiún Pleanála. The typical components of a standard wind turbine are illustrated in **Figure 3.5**.

The turbines will be geared to ensure that all turbines rotate in the same direction and will typically have a cut-in wind speed of 3 metres-per-second (m/s) and a cut-out speed of 25m/s. At the cut-in speed, the turbine begins to rotate; and at the cut-out speed, the turbine will automatically shut down.

Each turbine will utilise its own transformer, which will be located inside the turbine tower. Transformers will either be oil-filled (and bunded to prevent spillage) or of a solid cast resin type which eliminates spill risk and the requirement for bunding requirements. The transformers will increase the electrical voltage and on-site

electrical cables will connect the turbines to the electrical control building to be located within the electricity substation.

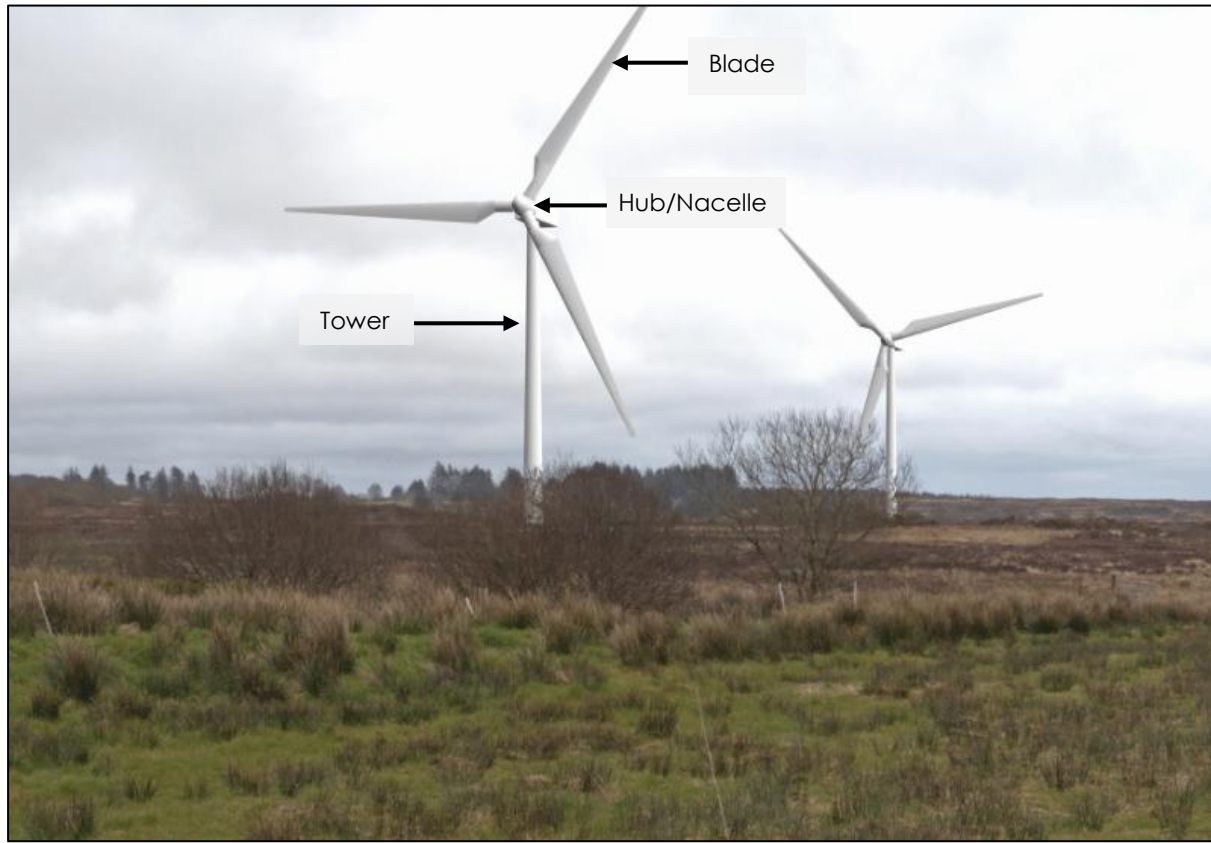


Figure 3.5: Typical Wind Turbine Components

Each assessment contained in individual chapters of this EIAR has therefore been undertaken on the basis of the wind turbine makes, models and dimensions as set out above.

It is important to note, however, that turbine technology advances rapidly with component dimensions constantly changing to maximise efficiency. Furthermore, the process for securing planning permission and other subsequent consents can take a significant period of time. It may therefore be the case that, at the time of construction, the abovementioned turbine models are no longer available in the market. Accordingly, while this EIAR assesses the likely significant environmental effects of the wind turbine models and their principal dimensions, as presented above, it also fully incorporates an assessment of any immaterial deviations thereof (in terms of hub height and rotor diameter). Any proposal to immaterially deviate from the above dimensions will be subject to a separate future consent process.

3.4.2 TURBINE FOUNDATIONS

Each turbine tower is secured to a steel ring foundation which can comprise either a reinforced concrete (gravity) foundation or a piled foundation. Initial geotechnical investigations carried out to date at each of the turbine locations demonstrate that the subsoil conditions (see **Chapter 6** and **Annex 6.1**) are generally suitable for the construction of standard turbine gravity foundations at turbines T1-T8 and turbine T10; and that a piled foundation is likely to be required at turbine T9. The precise foundation design requirements for each turbine shall, as described at **Annex 6.1**, be established through the detailed post-consent technical design process and further geotechnical

investigations prior to construction, as is standard best-practice in all construction projects.

Again, it is established EIA practice that such details may be left over for agreement post consent, on the proviso that the results to be achieved by any mitigation measures are specified and the project cannot proceed unless those results are fully achieved (*People Over Wind & anor -v- An Bord Pleanála [2015] IEHC 271*).

The depth of excavation required for each wind turbine foundation will vary depending on precise ground conditions. The diameter of a standard gravity raft foundation will be c. 27m for turbines T1-T3 and c. 24m for turbines T4-T8 and T10 with foundation depths ranging between c. 3m and 5m, depending on ground conditions at each turbine location. A piled foundation, for turbine T9, will comprise a circular concrete pile cap (c. 20m in diameter) supported by multiple piles ranging from c. 1m to 2m in diameter extending to depths of c. 15-30m below ground level depending on specific ground conditions.

Excavations will be undertaken by conventional mechanical methods and no blasting will be required for turbine foundations. The total volume of excavated material at each foundation will range from approximately 2,150m³ to 2,650m³ depending on local ground conditions. Vegetation and excavated material removed during the construction of turbine foundations will be side-cast and appropriately stockpiled (see **Chapter 6**) and, in so far as is practicable, used to reinstate the foundation and provide additional ballast. Any excess material arising will be utilised, firstly, for landscaping and reinstatement purposes elsewhere within the project site (e.g. landscaping of hardstands and access tracks [including through the construction of berms as appropriate] and reinstatement of the borrow pit) or, as required, deposited at the dedicated spoil deposition areas or disposed of off-site (see **Section 3.4.7**).

Once the turbine foundation has been excavated and the base fill placed, the bottom section of the tower or 'can' is installed. Reinforced steel rebar is built around and through the can before concrete is poured into the foundation in accordance with the turbine manufacturer's specifications. A typical turbine foundation is shown at **Figure 3.6** below. It is proposed that, where possible, concrete, aggregates and other materials for foundations shall be sourced locally, which will reduce the total distance travelled by heavy goods vehicles (HGVs) hauling construction materials to the subject site (see **Chapter 14**) and associated emissions (see **Chapters 8 and 9**).



Figure 3.6: Typical Turbine Foundation

3.4.3 CRANE HARDSTANDS

Hardstand areas shall be established adjacent to each turbine to facilitate crane operations for turbine installation. The hardstand areas will typically measure approximately 105m by 28m (T1-T3) and 65m by 25m (T4-T10). Hardstand areas will be established via traditional 'excavate and replace' methods, with material being excavated from the relevant area and replaced with a levelled and compacted (unsealed) layer of hardcore placed on top of a geotextile membrane. The location and precise configuration of the hardstands may necessitate some immaterial deviations in accordance with the micro-siting tolerance threshold (see **Section 3.4.8**).

The crane hardstands will be retained *in situ* during the operation phase of the project to accommodate any crane activities in the event of a major component change-out (e.g. replacing a turbine blade or gearbox/generator) and during the decommissioning phase.

Temporary set down areas, also comprising levelled and compacted (unsealed) hardcore on a geotextile membrane, will be located immediately adjacent to each hardstand during the construction phase to accommodate the temporary storage of turbine components following their delivery to the project site, and crane components during crane assembly. Following the installation of the turbines, reinstatement of these areas will involve removing crushed stone and underlying geotextile and allowing the areas to revegetate naturally.

3.4.4 ON-SITE ACCESS TRACKS & SITE ENTRANCES

A total of c. 4km of on-site access tracks will be required for construction purposes and for site access during the operation phase.

The majority of access tracks will be of a 'floating' construction type which, given the ground conditions and type of terrain present, is deemed an appropriate construction approach to minimise excavations and the generation of spoil material (see **Section 3.4.7**). This approach typically comprises the placement of a layer of geotextile, or geogrid, on the surface onto which aggregate is spread. Standard 'excavate and replace' type tracks will be construction at the crane hardstandings to ensure sufficient weight bearing capacity for crane operations.

The access tracks shall be similar to normal agricultural tracks but with a slightly wider typical running width of approximately 5m (wider at bends to accommodate turbine component delivery vehicles). Access tracks will be unsealed and constructed of crushed stone material to allow for permeability. Construction materials for access tracks will be sourced from the on-site borrow pit, insofar as practicable; however, material will also be imported to the project site from local quarries (see **Chapter 14**).

The access tracks will be constructed to ensure that horizontal and vertical alignments are suitable to accommodate abnormal HGV loads and to provide adequate drainage. The wind turbine manufacturer shall be consulted during the post-consent detailed design process to ensure that the access tracks are suitable to accommodate turbine component delivery. This may necessitate some immaterial deviations in the precise alignment of the access tracks.

Passing bays and turning heads shall also be provided along the access tracks to accommodate the turning of vehicles and passing traffic, as required. Additional excavated strips will be required alongside (or within) the access tracks to accommodate drainage and cable trenches. Where excess material arises from the construction of this ancillary infrastructure, it will be utilised in the construction of berms (where appropriate) adjacent to access tracks or crane hardstandings, landscaping, reinstatement of the borrow pit or disposed of at the dedicated spoil deposition areas.

Following the construction phase, access tracks, passing bays and turning heads that are not required during the operation phase will be reinstated, wherever possible; however, it is anticipated that all such infrastructure will be retained in full.

No major watercourses traverse the site. However, a number of drainage ditches and lower order watercourses/streams are present in the environs of the site including the Owengarve and its related tributaries, the Brogher, the Tullaghanmore or Monstown and a number of unnamed watercourses. The layout of the project has been designed to avoid surface water features insofar as practicable; however, it will be necessary for access tracks to cross 2 no. watercourses (to the east of turbine T4 (the Owengarve [Sligo] Stream) and east of turbine T9 (unnamed stream) respectively) and a number of drainage ditches.

The watercourses shall be crossed through the installation of bottomless culverts (or similar) which shall be designed to maintain the hydraulic capacity of the channel and minimise, or avoid insofar as possible, any instream works.

Where crossings over drainage ditches are required, pre-cast concrete pipes shall be installed and ground levels made up using well-graded aggregates. The concrete pipes shall be appropriately designed to accommodate likely flow rates and prevent

any risk of flooding and shall be installed such that they do not pose any restriction to flows.



Figure 3.7: Typical Access Track

A total of 7 no. site entrances will be required to facilitate access to the project site. Of these, 6 no. will be new access points and 1 no. will comprise the upgrade of an existing agricultural entrance; with 4 no. entrances being from the L5501, 2 no. entrance from the L55018 and 1 no. entrance from an unnamed local road. These site entrances will be for the construction, operation and decommissioning phases of the project and each entrance will be appropriately designed to ensure all visibility splays (sightlines) are provided for².

Following the construction phase, site entrances will be reduced in scale but will be reinstated such that they remain capable of accommodating abnormal loads in the event of a major component change-out during the operation phase of

² Visibility splays will be provided in accordance with Section 12.24 (Roads and Transportation) of the Roscommon County Development Plan 2022-2028.

development. The reinstatement of the site entrances will comprise the installation of post and rail fencing, gates and the planting of hedgerows as appropriate. Hedgerows, where planted, will be appropriately located to allow for future growth while ensuring, at all times, that visibility splays are maintained during the operation phase.

3.4.5 ELECTRICAL AND COMMUNICATIONS CABLING

All on-site electrical and communications cables will be placed underground and be of a solid polymeric construction with either aluminium or copper conductors. All electrical cables will follow the alignment of the on-site access tracks and the public road network, insofar as is practical. Trenching will be by a mechanical digger. The proposed depth of the cable trench is c. 1m with a width of c. 0.5m.

The excavated material from the cable trenches located within private lands will be side-cast alongside the trench and reinstated following the laying of cable ducts. Material excavated from trenches located within the public road corridor will not be re-used for reinstatement but will be removed and placed in the spoil deposition areas or, in the case of road cuttings, disposed of at an approved waste management facility. These trenches will be backfilled using imported aggregates and the carriageway of the affected road will be subject to a full-width resurfacing.

3.4.6 TEMPORARY CONSTRUCTION COMPOUNDS

During the construction period, 2 no. temporary construction compounds will be required. The compounds will be located along the access tracks leading to turbines T8 and T10 respectively. The compound proximate to turbine T8 will have an approximate area of 2,500m² (0.25ha), while the compound at turbine T10 will have an approximate area of 2,200m² (0.22ha). The compounds will generally comprise:-

- Temporary cabins to be used for the contractor's site office, the monitoring of incoming vehicles and temporary welfare facilities for the construction staff, including temporary toilets and potable water;
- Parking for construction staff, construction vehicles, and visitors;
- Secure storage for tools, plant and small parts;
- Waste management area where waste will be sorted and collected by a licensed service provider;
- Safe bunded storage of components and materials including fuels, lubricants and oils; and,
- Security fencing around the compound.

Temporary portaloo chemical toilets, to be provided for construction staff, will be sealed units to ensure that no discharges escape into the local environment. These will be supplied and maintained by a licensed supplier with foul waste removed from site at regular intervals to a licenced facility. Potable water (for drinking, food preparation, and hand washing etc.) will be supplied on-site by water dispensers and this will also be sourced and maintained by a licensed supplier.

The temporary construction compounds will be marked out and fenced to prevent encroachment onto non-designated areas.

The temporary construction compounds have been located and designed such that all cabins, storage containers, waste management facilities and bunded areas will be

located a minimum distance of 50m from all natural watercourses in order to minimise the risk of pollution and the discharge of deleterious matter to watercourses. Stormwater which may arise from the roofs of cabins, containers or from sealed bunds will be passed through an oil interceptor prior to being discharged to the local environment.

The compound sites will be of floated construction to minimise excavations and constructed similar to the access tracks as described at **Section 3.4.4** above. The compounds will be surfaced with c. 400mm of free-draining crushed stone placed on geotextile membrane such that rainwater can percolate to ground. After the completion of all construction activities, the compounds will be decommissioned with all structures removed and fully reinstated. Reinstatement will involve removing crushed stone and underlying geotextile, and allowing the area to revegetate naturally.

3.4.7 EARTHWORKS

Earthworks will largely arise at the project site from the excavation of topsoil, subsoil, and rock (where present) at the locations of proposed infrastructure.

During construction; excavated material will be side cast for re-use in the reinstatement and landscaping of the site or, in the case of rock, in the construction of access tracks and crane hardstands. It is estimated that c. 177,000m³ of material will be excavated to facilitate the construction of the overall project (wind farm, haul route upgrade works and grid connection infrastructure). The re-use of excavated material will be carefully managed to ensure that it is appropriately used and to maintain the geological integrity of the project site.

Where peat is encountered, it will be classified by type (i.e. acrotelm and catotelm) and temporarily stored in low, compacted stockpiles to preserve its structure and hydrological and geological characteristics. The reuse of peat will focus; in the first instance; on reinstating disturbed areas at turbine foundations, access tracks, crane hardstands and temporary construction and storage compounds and will also be utilised in the reinstatement of the borrow pit. Where excess peat arises which cannot be used for reinstatement purposes, it will firstly be placed in low berms (maximum height of 1m) adjacent to access tracks and crane hardstands at appropriate locations. Finally, where a further excess arises, this material will be permanently stored in dedicated deposition areas or removed from site and disposed of at an approved waste handling facility.

The placement of peat will follow best practice methodologies and will be carried out in a manner which maintains the integrity of the material and, in the case of the deposition areas, mimics natural peatland topography and hydrology with a particular focus on reestablishing water retention and promoting revegetation with bog species.

Material excavated at the locations of haul route upgrade works will largely be utilised in the reinstatement of each works area. However, where asphalt arises, it will be removed from site and disposed of at an approved waste management facility.

Material excavated from cable trenches located within the public road corridor will not be re-used for reinstatement but will be removed and placed in the spoil deposition areas (where appropriate) or, in the case of asphalt, disposed of at an approved waste management facility.

A Planning-Stage Spoil Management Plan (enclosed within the Planning Stage

Construction & Environmental Management Plan [CEMP] at **Annex 3.4, Volume II**) has been prepared to detail proposals regarding the appropriate management of material which may arise from the construction of the project. Prior to the commencement of development at the site, a detailed Spoil Management Plan will be prepared following the post-consent detailed design process and will address the reuse, reinstatement, storage and restoration of all material excavated during the construction phase including detailed methodologies regarding the establishment and management of the spoil deposition areas.

3.4.7.1 Borrow Pit

During the environmental scoping and constraints analysis process, a rock outcrop was identified to the southeast of turbine T5 and was considered to be potentially suitable for supplying rock for construction purposes. Following initial site investigations (see **Chapter 6**), the rock has been assessed as being suitable for construction purposes and it is proposed to develop a borrow pit. The borrow pit will extend to an approximate area of 0.9ha and will have an approximate depth of 10m. Rock will be extracted from the borrow pit by standard means of excavation and rock breaking.

In the unlikely event that blasting is required, a mobile drilling rig will bore vertical holes into the designated rock area. It is anticipated that drilling for a single blast will take approximately 3-4 days, depending on ground conditions and the volume of rock to be excavated. The boreholes will be charged with explosives under the supervision of a qualified and experienced blasting engineer. The blasting engineer will determine the precise location, depth, and charge requirements for each blast and will coordinate the secure delivery of explosives to the project site. All handling, storage, and use of explosives will be conducted in strict accordance with relevant regulations. The blasting engineer will oversee the setting and detonation of charges, ensuring that all safety protocols are followed. Prior notification of each blast will be provided to all landowners within a 500m radius of the borrow pit.

Where the borrow pit, which will be subject to further post-consent investigations, is opened and developed, it will be reinstated using surplus excavated material generated elsewhere within the project site. Given the characteristics of the project site, it is likely that peat will be used to reinstate the borrow pit. The peat will be placed in the borrow pit in accordance with best practice guidelines to prevent desiccation and minimise carbon losses and to encourage vegetative regeneration of the top layer. No treatment of peat will be carried out prior to its placement within the borrow pit thus ensuring the maintenance of its integrity to the greatest possible degree. Further details are set out at **Chapters 5 and 6**.

Following the backfilling of the borrow pit, the top layer of peat will be graded to match the surrounding ground profile and the borrow pit will be permanently fenced off for safety reasons.

Works at the borrow pit will be monitored, on a weekly basis during the construction phase and, monthly, for a 6-month period thereafter by an appropriately qualified geotechnical engineer.

3.4.7.2 Spoil Deposition

In the first instance, surplus excavated material will, as described in the preceding sections, be utilised in the reinstatement and landscaping of the project where practicable, including the installation of berms adjacent to access tracks and crane hardstandings as appropriate. While it is estimated that the above reinstatement and

landscaping processes will account for substantial volumes of excavated material; it is proposed to develop a number of dedicated spoil deposition areas, including the borrow pit, where excess material (predominately peat) which cannot be utilised for reinstatement or is unsuitable for landscaping purposes, will be stored permanently.

The location of the deposition areas have been selected due to the absence of notable environmental constraints, separation distance to watercourses and generally flat or gently sloping gradient. Excavated material will be transported to the selected areas where it will be placed in layers and compacted as necessary to ensure long term stability and mitigate settlement. Appropriate drainage management measures will be implemented to encourage vegetative regeneration of the material while ensuring that the deposited peat/spoil does not become waterlogged. The drainage measures will also be designed to prevent any pollution of surface water features in the environs of the project site.

Spoil will be transported to the deposition areas where it will be placed in layers in accordance with best-practice methods. The deposition areas will have a height of 1.5m. Appropriate drainage management measures will be implemented to ensure that the deposited spoil does not become waterlogged. Following the completion of construction, the spoil deposition areas will be allowed to vegetate naturally and it is likely that species already found within the project site become established.

Works at the spoil deposition areas will be monitored, on a weekly basis during the construction phase and monthly for a 6-month period thereafter, by an appropriately qualified geotechnical engineer.

In the event that material is generated which is unsuitable for storage within the deposition areas (e.g. asphalt cuttings from public road upgrades or the installation of underground electricity cables within public road network) or excess material arises which cannot be accommodated on-site, this shall be removed from site and disposed of at a licensed waste disposal facility.

3.4.8 MICROSITING

The immaterial micro-siting of elements of the project, following post-consent detailed site investigations and geotechnical analyses, also forms part of the project assessed in this EIAR.

A micro-siting allowance of 20m in any direction is proposed for wind turbines in accordance with Section 5.3 of the *Wind Energy Development Guidelines for Planning Authorities 2006*³. It is anticipated that the agreed micro-siting distance will form a condition accompanying a grant of planning permission. It is also proposed that hardstands, access tracks, and underground cables may be immaterially micro-sited subject to compliance with the mitigation measures included in this EIAR.

These immaterial micro-siting deviations have been incorporated, and fully assessed, throughout this EIAR and will have no likely significant impacts on the substantive conclusions of the EIAR.

3.5 OFF-SITE & SECONDARY DEVELOPMENTS

³ Flexibility regarding wind turbine positioning is also referred to at Section 7.5 of the *Draft Revised Wind Energy Development Guidelines 2019*.

3.5.1 TURBINE COMPONENT DELIVERY ROUTE

Whilst the final turbine component haul route has not been selected and will be entirely dependent on the turbine supplier and the chosen port of entry, it has been determined that turbine components will, most likely, enter via the Port of Galway. It is envisaged that, from here, the components will then be transported by specialised HGVs along the L5048, R339, L5034, R336, N6, M6, M17, N17, N5, R293, L5501 and various local roads in the immediate vicinity of the project site before accessing the site via the proposed site entrances.

In order to facilitate the delivery of turbine components, both permanent and temporary works will be required at various locations along the above route.

Between the Port of Galway and the junction of the N5 and R293, works will be of a temporary nature, including the temporary removal of street furniture such as road signs, bollards and street lighting and the temporary placement of hardcore at roundabouts and junctions to accommodate their navigation by turbine components. In addition, some pruning of roadside vegetation may be required on occasion.

The precise works at each location, which will be fully reinstated and the areas returned to their original condition following the delivery of turbine components, will be agreed in advance with the relevant local authority prior to the movement of any abnormal loads in the form of a Traffic Management Plan and/or Abnormal Load Permit application, as is the normal course.

Between the junction of the N5 and R293 and the respective site entrances, turbine components will follow the R293 for a short distance before transitioning to the local road network. Due to the characteristics of the local roads, a combination of temporary and permanent works will be required to facilitate the delivery of turbine components. These works will include the temporary removal of street furniture, temporary junction upgrades, permanent carriageway widening, and permanent reprofiling of carriageways.

A summary description of the works to be undertaken along the haul route is provided in the following sections; with a full description provided at **Annex 3.5**.

During the delivery of abnormal-sized loads to site, all HGVs will be accompanied by escort vehicles. An Garda Síochána will also be informed prior to turbine component transportation as it will be necessary to temporarily close junctions as the components pass through.

3.5.1.1 Port of Galway to N17/N5 Junction

From the Port of Galway to the junction of the N17/N5, the turbine component haul route generally follows motorways and national routes and, thus, due to the characteristics of the road network, no permanent works will be required. It will, on occasion, be necessary to temporarily remove street furniture; including road signs, bollards and street lighting; to undertake temporary works to existing roundabouts to accommodate oversized vehicle loads, and to prune/trim roadside vegetation.

3.5.1.2 N17/N5 Junction to N5/R293 Junction

At the junction of the N17 and the N5, due to the size and turning requirements of the turbine delivery vehicles, the standard traffic route for vehicles seeking to travel eastbound on the N5 (i.e. utilising the northern slip-road) cannot be used. Instead, the

turbine components will travel along the southern slip-road (typically used for vehicles intending to travel westbound on the N5) before merging onto the N5 and proceeding eastbound.

In order to accommodate this manoeuvre, the temporary widening of the verge, removal of street furniture and pruning of roadside vegetation will be required; however, the extent of works will be minimal and street furniture will be reinstated immediately following each delivery of turbine components. Appropriate traffic management measures; including an escort by An Garda Síochána; will be in place to ensure that public and road safety is maintained at all times during the manoeuvres.

3.5.1.3 N5/R293 Slip-Road and R293/L5501 Junction

At the junction of the N5/R293, temporary widening of the roadside verge, lowering of roadside embankments and removal of street furniture will be required to enable turbine components navigate the junction. All works will be undertaken following consultation with Transport Infrastructure Ireland (TII) and the Planning Authority and, immediately following the delivery of turbine components, the works area shall be returned to its pre-existing condition or as otherwise agreed with TII and the Planning Authority.

From the N5/R293 slip road, the turbine delivery route continues onto the L5501. Due to the nature of ground elevations and the presence of a crest at the R293/L5501 junction, it is proposed to lower the carriageway of the R293 by approximately 100mm to enable turbine components navigate the junction. The adjoining sections of the R293 and L5501 will be reprofiled to a similar or lesser degree to maintain appropriate gradients along the public roads. Following the lowering of the carriageway, the road will be reinstated to the requisite specification and to the satisfaction of the Planning Authority.

3.5.1.4 R293/L5501 Junction to Wind Farm Site Entrances

From the junction of the R293 and L5501 to the wind farm site entrances, the public roads will be subject to permanent upgrade works including the widening of the existing carriageways together with the reprofiling of some carriageways to remove existing road crests. The carriageways of the public roads will generally be widened to a width of c. 5m (or as may be required) utilising the existing road corridor insofar as possible to accommodate construction traffic. The widening of the carriageways will involve, on occasion, the removal of roadside vegetation.

A number of passing bays have also been provided along the L5501 and L5506 to ensure that construction and public traffic can safely pass each other.

Additionally, existing roadside drainage arrangements may be altered to accommodate the widening of carriageways comprising the realignment of existing drains. In all cases, there shall be no reduction in the hydraulic capacity of the drainage network, such that an adverse effect on the integrity of the road structures could arise, and to prevent flooding.

Upgrade works along this section will include:-

- Localised widening of the carriageway of the L5501 to a width of c. 5m from its junction with the R293 to its junction with the L5506;
- Temporary widening of the junction of the L5501 and L5506 on lands to the

southwest of the existing junction to accommodate the delivery of wind turbine components. Works will comprise the removal of forestry and placement of hardcore. Following the delivery of components, a layer of geotextile will be placed atop the hardcore and the area will be soiled over and allowed to vegetate naturally and fenced off. In the event that a turbine component requires replacement during the operation phase, the fencing can be removed and hardcore exposed to allow deliveries navigate the junction;

- Localised widening of the L5506, to a width of c. 5m, from its junction with the L5501 to its junction with the unnamed road leading to turbine T10;
- Widening of the junction of the L5506 and the unnamed local road to the northwest of the existing junction. Existing hedgerows will be removed followed by the placement of hardcore to enable the delivery of turbine components. Following their delivery, the hardcore shall be removed, the area soiled over and reseeded, the area will be fenced off, and replacement hedgerows planted;
- Localised widening of the unnamed local road leading to turbine T10 to a width of c. 5m. Where vegetation is to be removed, it shall be replaced following the delivery of turbine components;
- Localised widening of the L5501, to a width of c. 5m, from its junction with the L5506 to its junction with the L55018.
- Temporary widening of the junction of the L5501 and L55018 on lands to the southwest of the existing junction to accommodate the delivery of wind turbine components. Works will comprise the removal of any vegetation and placement of placement of hardcore. Following the delivery of components, a layer of geotextile will be placed atop the hardcore and the area will be soiled over and allowed to vegetate naturally and fenced off. In the event that a turbine component requires replacement during the operation phase, the fencing can be removed and hardcore exposed to allow deliveries navigate the junction;
- Localised widening of the L55018, to a width of c. 5m, from its junction with the L5501 to the entrance to turbine T6; and,
- Localised widening of the L5501, to a width of c. 5m, from its junction with the L55018 to the entrances to turbine T5 and turbines T1 to T4.

On occasion, and only as required, the works may also include the relocation of roadside features such as road signs or boundary fencing.

All works will be carried out in accordance with relevant best practice manuals, guidelines and specifications including, in particular, the *Guidelines for Managing Openings in Public Roads* (Department of Transport, Tourism and Sport, Second Edition [Rev. 1]; April 2017).

3.5.2 AGGREGATES SOURCES, HAUL ROUTES & QUANTITIES

As described at **Section 3.4.7.1**, preliminary site investigations have identified that shallow rock is present within the project site which can be utilised in the construction of access tracks and crane hardstandings. However, additional aggregates; including access track and crane hardstanding topping material, concrete, and stone and asphalt for public road upgrades; will be imported from local suppliers.

Only fully licensed quarries which have been subject to EIA and have appropriate planning permission for the volumes of material to be extracted will be used. These aggregates are intended for extraction in the normal course of the relevant quarry's business and therefore will have no additional likely significant environmental impacts above and beyond those normally entailed in the operation of the quarry.

Quarries, which may be selected to supply materials, following a competitive tendering process, are identified at **Annex 2.4** and the likely haul routes to the project site indicated. As part of the detailed Traffic Management Plan, to be prepared prior to the commencement of development, suppliers will be instructed to utilise the extensive national and regional road networks to access the site and to avoid local roads insofar as possible. Further details of the construction materials haul route and vehicle volumes are provided in **Chapter 14**.

On the basis of the design process undertaken to date, the estimated volumes of construction materials/aggregates (rock/stone and concrete) required in the construction of wind farm infrastructure are detailed at **Table 3.3** below.

Infrastructure ID	Rock/Stone sourced from On-Site Excavations (m ³)	Rock/Stone/sand sourced from Local Supplier (m ³)	Concrete sourced from Local Supplier (m ³)	Asphalt sourced from Local Supplier (m ³)
Wind Farm Site	40,000	37,000	5,400	0
Haul Route Upgrades	0	9,000	0	3,260

Table 3.3: Estimated Wind Farm & Haul Route Material (Aggregates) Volumes

3.5.3 GRID CONNECTION INFRASTRUCTURE

The point of connection to the national grid will ultimately be decided by EirGrid or ESB Networks, as the independent electricity system operators with statutory responsibility. The precise means of connection will be dependent on a range of factors and at the discretion of the system operators.

However, as set out at **Chapter 2**, on the basis of a detailed analysis including an assessment of the existing grid network and its capacity; it is assessed that the existing Tonroe 110kV electricity substation is the most likely point of connection to the national network. It is further assessed that the most likely method of connecting to the Tonroe 110kV substation is through the construction of a 110kV substation at the wind farm site and the installation of c. 7km of 110kV underground electricity line.

Therefore, the construction and operation of a 110kV electricity substation and associated underground electricity line to the Tonroe 110kV substation has been assessed throughout this EIAR; however, the final selected grid connection infrastructure will be subject to a separate future planning application and EIAR, as required. Site location plans of the electricity substation and electricity line are enclosed at **Annex 3.6**, with further details provided below.

3.5.3.1 Electricity Substation

The 110kV electricity substation will comprise an electrical switchroom and electrical compound. The proposed substation (switchroom & compound) will extend to an area of c. 8,800m² and will be surrounded by a palisade fence, with associated gates, of 2.6m in height for safety and security reasons. The substation compound will contain 2 no. control buildings and all necessary electrical equipment and apparatus to

facilitate the export of electricity to the national grid. Electrical equipment located within the substation compound will include connection points and associated equipment such as incoming and outgoing circuit breakers, earth fault protection devices, the grid transformer, and external lighting (cowled to prevent the illumination of hedgerows or third party lands).

The layout of the substation is illustrated at **Annex 3.7**. It is important to note that this layout has been designed in accordance with current EirGrid specifications; however, the Developer may be instructed by EirGrid to immaterially alter the precise siting and/or specification of control buildings and/or electrical equipment within the overall substation footprint. Any such immaterial deviations have been fully assessed and provided for within this EIAR.

The substation site is located in a relatively flat area of agricultural pasture and scrub and does not traverse any drains or watercourses; however, an unnamed stream is located adjacent to the southwestern boundary of the substation site. There will be a requirement to undertake minor modifications to ground levels in order to achieve the required levels for the buildings, structures and electrical equipment. As part of the design process, it is estimated that c. 14,000m³ of material will be excavated to facilitate the construction of the electricity substation. Further details of excavated material volumes, and the management of same, are provided in the Spoil Management Plan enclosed at **Annex 6.2**.

The substation compound will be surfaced with free-draining crushed stone aggregates such that rainwater can percolate to ground. Rock and capping material will be sourced from local (appropriately licenced) quarries. On the basis of the design process undertaken to date, the estimated volumes of construction materials/aggregates required in the construction of the electricity substation are detailed at **Table 3.4** below.

Infrastructure ID	Rock/Stone sourced from On-Site Excavations (m ³)	Rock/Stone sourced from Local Supplier (m ³)	Concrete sourced from Local Supplier (m ³)	Asphalt sourced from Local Supplier (m ³)
Electricity Substation (Building & Compound)	0	15,000	500	0

Table 3.4: Estimated Electricity Substation Material (Aggregates) Volumes

The boundaries of the electricity substation are largely surrounded by open agricultural grassland and peatland. Whilst the substation site is not particularly prominent, it is likely that additional strengthening of existing hedgerows and planting of new hedgerows will be undertaken to further screen the substation from view.

The electricity substation will be accessed via a wind farm site entrance from the L55018 (see **Section 3.4.4** above).

The electricity substation will be connected to the wind turbines via underground electrical cabling, as described at **Section 3.4.5** above.

3.5.3.2 Control Buildings

The electricity substation compound will contain 2 no. control buildings; one of which, the Independent Power Producer Building (the 'IPP' Building'), will be operated and maintained by the Developer, while the Transmission System Operator Control Building ('the EirGrid Building') will be operated and maintained by EirGrid.

The IPP Building will have a gross floor area of c. 172m². The building shall be constructed of blockwork and will be finished in sand and cement render, slate roof covering and steel doors and will house switchgear and associated electrical equipment and apparatus. The building will not require a dedicated water source.

The EirGrid Building will have a gross floor area of c. 450m². This building shall also be constructed of blockwork and will be finished in sand and cement render, slate roof covering and steel doors and will contain a control room to allow operatives monitor and manage the operation of the electrical apparatus and will also include storage and welfare facilities.

A water connection will also be provided to the substation and will comprise either a connection to local water scheme or a bored well. Wastewater from the control buildings will be stored in a sealed tank and will be tankered off-site as required by a local licensed waste collector. Water supply and wastewater management proposals of this nature are common practice for wind farm developments.

Layout and elevation drawings of the control buildings are provided at **Annex 3.7**. The precise internal layout of the buildings may be subject to further immaterial alterations to reflect any future revisions to EirGrid specifications. As set out above, any immaterial deviations from the indicative layout illustrated at **Annex 3.7** are fully provided for within this EIAR.

3.5.3.3 110kV Underground Electricity Line

The electricity substation will be connected to the Tonroe 110kV substation via c. 7km of underground electricity line. From the electricity substation, the electricity line will be located within wind farm access track before following the L55018, L5501, L5506, crossing beneath the N5 via horizontal directional drilling, L55019, L1203, L12032 and L12034 before following private lands to the Tonroe 110kV electricity substation.

Due to the characteristics of the above public roads, the electricity line will generally be located within the paved carriageways.

The electricity line will be installed within ducting in excavated trenches of c. 1.2m deep and c. 0.6m wide. The electricity line will be pulled through the ducting in sections of 650/750m in length or as may be required. The lengths of electricity line will be connected at designated 'joint bays' to be constructed along the proposed route. Joint bays will be located with the roadside verge (i.e. off-road) insofar as practicable.

Existing utility services are present along the route. Where existing utilities/services are encountered, the underground electricity line will be installed either above or below the third party infrastructure depending on the depth of cover available and following consultation with the service provider and Planning Authority.



Figures 3.8 and 3.9: Typical Trench Construction

Communication chambers are also required along the route and will include an access cover to facilitate access should it be required.

Following the installation of the ducts, joint bays, and communication chambers; ground levels will be made up using appropriate material (including excavated material where appropriate) and finished/reinstated to the requirements of ESB Networks, the Planning Authority (public road) or landowner (private lands). Further, all local roads within which it is proposed to install the underground electricity line will be subject to a full-carriageway reinstatement thus ensuring that there are no long-term effects on the public road network.

All trenching works will be undertaken to ensure that only short sections of trench are open at any one time. Excavated material will be segregated and stored separately for use during the reinstatement of the trench/joint bays/communication chambers or for disposal at an appropriate licensed facility as necessary.

The sequence of works is typically as follows:-

- Identify existing underground services prior to excavation;
- Excavate the trench to the required dimensions;
- Place a blinding layer at the base of the trench;
- Place and joint the high-density polyethylene (HDPE) power ducts using ties at 3m intervals;

- Lay in and compact a layer of leanmix concrete around and above ducts and place red marker strips above;
- Install 2 no. HDPE communications cable ducts;
- Lay in and compact an additional layer of leanmix concrete and place further red marker strips above;
- Final backfill layer (excavated material if suitable) to include yellow marker strips; and,
- Appropriate reinstatement as discussed above.

Prior to the commencement of construction, a detailed Method Statement will be prepared by the contractor outlining the precise methodology to be put in place during the trenching phase. This Method Statement will be reviewed by the Environmental Manager (EM; to be appointed by the contractor) to ensure that the environmental protective measures to be implemented are suitable and to the required standard.

Horizontal Directional Drilling (HDD) will be undertaken at 7 no. locations along the route of the underground electricity line. At 6 no. locations, HDD will be undertaken to navigate watercourse crossings and to avoid trenching/excavations within either the channel of watercourses or bridging structures over watercourses. Launch and receptor pits will be excavated at either side of the crossings to accommodate the drilling rig and will be located a minimum distance of 15m from each watercourse.

The precise depth of the bore below each stream bed will be determined during the detailed design process and informed by future site investigations; however, it is anticipated that the depth will be a minimum of 3m below the stream bed. At this depth, there will be no impacts on the stream channel, aquatic habitats or the structural integrity and stability of the bridges/culverts. Following the installation of the underground electricity line, the launch and receptor pits will be reinstated to match the surrounding area and marker posts will be placed at either side of the road to indicate the location and alignment of the electrical cabling.

The underground electricity line will also be installed via HDD beneath the N5. Launch and receptor pits will be excavated north and south of the N5, respectively; while the bore will be at a depth of c. 4.5m below the road carriageway. It should also be noted that an underground electricity line associated with the permitted North Connacht 110kV Project (An Coimisiún Pleanála Reference ABP-313724-22) will be installed within the N5 at this location. The depth of the HDD bore has been designed to avoid any adverse effects on the structure or carriageway of the N5 or on the North Connacht 110kV Project underground electricity line.

Prior to the commencement of drilling operations, the appointed contractor will prepare a detailed Method Statement outlining the precise methodology to be followed. This statement may be reviewed as necessary by the Planning Authority.

As part of the design process, it is estimated that c. 5,000m³ of material will be excavated to accommodate the underground electricity line; while a similar volume of backfill material (stone and concrete) will be imported from a local quarry (quarries). Asphalt will be imported to reinstate the trench and for the full-carriageway resurfacing of the route. Full details of excavated material volumes, and the management of same, are provided in the Spoil Management Plan enclosed at **Annex 6.2**.

The estimated volumes of construction materials/aggregates required in the construction of the underground electricity line are detailed at **Table 3.5** below.

Infrastructure ID	Rock/Stone sourced from Wind Farm Borrow Pit (m ³)	Rock/Stone sourced from Local Supplier (m ³)	Concrete sourced from Local Supplier (m ³)	Asphalt sourced from Local Supplier (m ³)
Electricity Line	-	2,400	2,600	1,100 ⁴

Table 3.5: Estimated Electricity Line Material (Aggregates) Volumes

3.5.4 TREE FELLING AND REPLANTING

3.5.4.1 Tree Felling

The felling of commercial forestry will be required to accommodate the construction and operation of the wind turbines, the construction of access tracks and the completion of haul route upgrade works. The total area of forestry to be felled is approximately 6.5ha. Within the wind farm site, it is noted that, other than in the immediate vicinity of turbines T2 and T3, the areas of forestry have generally failed to establish and are often patchy with localised areas of more established trees; however, for assessment purposes, no distinction is made as to the quality of the forestry present.

A felling plan has been prepared for the project and is enclosed at **Annex 3.8**. The felling plan illustrates the areas where forestry will be felled to accommodate the physical infrastructure of the project and to ensure the appropriate protection of bat species present at the project site. Further details on the felling requirements for bats are provided at **Chapter 5**.

It should also be noted that, following the post-consent detailed design process and consultation with the turbine manufacturer/supplier, further felling may be required to ensure the efficient and effective operation of the wind turbines. The areas illustrated at **Annex 3.8** are, therefore, the minimum felling requirements and additional areas of forestry; surrounding turbines T1, T2 & T3; may also be subsequently felled.

All felling works, including any felling additional to that illustrated at **Annex 3.8**, will be undertaken entirely in accordance with the mitigation measures, where relevant, as set out in this EIAR; and, therefore, it is assessed that any such additional felling will have no likely significant impacts on the substantive conclusions of this EIAR.

All tree felling to be undertaken will be the subject of a felling licence application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017. In accordance with the Forest Service's policy on granting felling licenses for wind farm developments, a copy of the relevant planning consent is required to be submitted with the felling licence application which, as a result, cannot be applied for until such time as planning permission is obtained for the project.

3.5.4.2 Replanting

In accordance with the Forest Service's published policy on granting felling licences for wind farm developments, areas of forestry which have been felled to

⁴ It should be noted that the underground electricity line will be installed within a number of local roads which will be subject to upgrade works and accordingly, the asphalt requirements for the reinstatement of those sections of public road are included at **Table 3.3**.

accommodate turbine bases, access tracks and any other wind farm-related uses (i.e. the c. 6.5ha [of forestry identified at **Annex 3.8**]) must be replaced by replanting at an alternative site. The replanting of forestry must be completed under licence in accordance with the Forestry Act 2014 (as amended) and Forestry Regulations 2017.

As part of the felling licence application process, it will be necessary for the Developer to identify appropriate replacement lands. These lands can be located anywhere within the Republic of Ireland and will be subject to a separate environmental assessment and technical approval process as part of the felling licence consenting regime.

The replanting process, regardless of location, will be completed in accordance with the *Forestry Standards Manual* (Department of Agriculture, Food and the Marine; 2015) and will follow best practice methods generally comprising the following:-

- Site Preparation & Installation of Drainage Infrastructure;
- Planting;
- Fencing: Installation of stockproof fencing (post-and-wire);
- Vegetation Control: Undertaken throughout the crop establishment period (generally 4-5 years);
- Replacement of Failures: Undertaken throughout the crop establishment period (generally 4-5 years); and,
- Monitoring: Undertaken throughout the crop establishment period (generally 4-5 years).

3.5.5 LANDSCAPING

In addition to the forestry felling described above, some further hedgerow and tree removal will be required throughout the project site to enable the construction of the wind farm or enable the delivery of wind turbine components. The extent of hedgerow and tree removal has, by design, been minimised and no vegetation will be unnecessarily removed.

The Ecological Clerk of Works (ECoW), to be appointed to monitor works during the construction phase, will select appropriate locations for the replacement of hedgerows and trees. The siting of this replacement vegetation will be carefully selected to maintain or enhance the ecological connectivity of the site while ensuring that adverse effects do not arise as a consequence. All new treelines or hedgerows will be planted using native species and in a similar composition to treelines or hedgerows lost. The replacement of these trees and hedgerows will be conducted in accordance with the wider reinstatement and landscaping proposals for the project.

3.5.6 CONSTRUCTION DRAINAGE MANAGEMENT AND DISPOSAL

Construction works will be carried out in accordance with the 'Land & Soil' and 'Water' assessments and mitigation measures included in this EIAR in order to prevent any likely significant effects on nearby watercourses by debris, silt and hydrocarbons (see **Chapters 6 & 7**). These measures have also been implemented in the Natura Impact Statement (NIS) which accompanies the planning application.

Sources of likely significant effects on the hydrological environment during construction include increased volumes of surface water runoff; the generation of silt laden surface water runoff from excavations and the storage of stockpiled materials;

contamination due to the leakage of oils/fuel from site vehicles; spillage during refuelling operations; and leakage from chemical, waste and fuel storage areas.

Specific mitigation measures are presented in the relevant chapters of this EIAR in relation to each of these issues and have been incorporated within the Planning-Stage CEMP (**Annex 3.4**). The precise implementation and siting of these measures will be determined, subject to planning permission being granted, following the further post-consent detailed design process and will be included within a detailed CEMP to be agreed with the Planning Authority prior to the commencement of construction.

All surface water runoff from stockpiles (including the spoil deposition areas), excavations, or from dewatering operations will be passed through an appropriate attenuation train, including 'dirty water' drains, silt fences (also known as silt curtains) and silt traps (also known as silt/settlement/sediment/stilling ponds)⁵. Other surface water protection measures which may be implemented, as appropriate, include straw bales, silt bags and siltbusters.

Surface water control measures will be implemented as construction progresses through the site; however, prior to the commencement of earthworks, temporary silt/sediment control infrastructure (e.g. straw bales) will be placed in agricultural/peatland drains around the site until the full range of construction phase measures are installed.

The installation of surface water runoff measures will avoid any discharge of silt or sediment laden waters directly to any surface water feature prior to being fully treated. At the point of discharge, buffered outfalls (or level spreaders) will be installed to ensure that erosion or scouring does not occur. Discharge rates will be designed to mimic greenfield runoff rates thus avoiding any long term alteration to the hydrological regime of the project site. Further details of the proposed surface water protection measures are enclosed at **Chapter 7**.

A Planning-Stage Surface Water Management Plan (SWMP) has been prepared in respect of the project (enclosed at **Annex 3.4**). This SWMP will be further developed prior to the commencement of development, following the post-consent detailed design process, and will incorporate the precise implementation and siting of surface water management infrastructure.

Following the completion of construction, surface water treatment infrastructure will, where appropriate, be decommissioned and removed from site; however, it is likely that the majority of infrastructure will be retained to serve a drainage function during the operation phase of the project.

Stormwater drainage infrastructure will be installed around the electricity substation to capture any runoff from roofed or paved areas and will be passed through an oil interceptor before being discharged to an agricultural drain. As above, discharge rates will be designed to mimic greenfield runoff rates thus avoiding any long term alteration to the hydrological regime of the project site.

3.6 CONSTRUCTION PHASE

The construction phase is likely to last for approximately 15-18 months from commencement of enabling works through to the installation and commissioning of the turbines and ending with site reinstatement and landscaping.

⁵ Please note that the titles of surface water protection infrastructure are used interchangeably within this EIAR and accompanying documentation.

The construction phase of the development will comprise a 6-day week with normal working hours from 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturdays. It may be necessary to undertake works outside of these hours to avail of favourable weather conditions (e.g. during time of low wind speed to facilitate turbine installation etc.) or during extended concrete pours (e.g. where turbine foundation pours must be completed within 24-hours). Where construction activities are necessary outside of the normal working hours, local residents and the Planning Authority will receive prior notification.

No construction works are envisaged during the operation phase. Works during this phase will typically involve the routine inspection and servicing of the turbines and ancillary structures, as necessary. In exceptional circumstances there may be a requirement for more substantial works e.g. replacing a turbine blade, or gearbox/generator replacement. Intermittent maintenance of the wind farm site will be undertaken as necessary, including access tracks, hardstandings and substation.

Further details of the construction phase and specific mitigation measures to be implemented are provided in each chapter of this EIAR as they relate to each environmental topic.

3.6.1 CONSTRUCTION METHOD

The construction of the wind farm will consist of the following general sequence:-

- Preliminary traffic management and surface water protection measures to be implemented;
- Establishment of the site entrances, to be commenced and completed, ensuring that adequate visibility splays are provided;
- Progressive installation of surface water protection measures;
- Establishment and continued management of spoil deposition areas;
- Establishment of the borrow pit;
- Progressive construction of internal on-site access tracks utilising material extracted from the borrow pit, where possible, and imported from local quarries;
- Construction of the temporary construction compounds for off-loading materials and equipment and to accommodate temporary site offices;
- Construction of bunded areas for oil, fuel and lubricant storage tanks;
- As the internal access tracks progress to each turbine location, tree felling will be completed where required and foundation excavations for the turbines will commence and foundations laid. The hardstanding areas will also be constructed;
- Permanent and temporary upgrade works along the turbine component haul route will be commenced;
- Once the on-site access tracks are completed, the trenching and laying of underground cable ducting and cabling will begin;
- Installation of turbines will commence once the on-site access tracks, hardstands, foundations and drainage measures are in place and the haul route upgrade works are complete. It is anticipated that each turbine will take

approximately 1-week to install. 2 no. cranes will be used for this operation. As each turbine is completed, the electrical connections will be made; and,

- Progressive site reinstatement, restoration and landscaping including habitat management proposals and re-profiling of borrow pit and spoil deposition areas, removal of turbine storage areas; installation of post-and-wire fencing around turbines, access tracks and at site entrances; installation of gates and vegetation at site entrances; and decommissioning of the temporary construction compounds and temporary equipment storage areas.

The construction method for the electricity substation and underground electricity line will consist of the following general sequence (to be completed concurrently with wind farm construction):-

- Site preparatory and groundworks associated with the substation compound footprint including control buildings;
- Construction of the control buildings;
- Construction of bases or plinths for electrical apparatus;
- Installation of palisade fencing around substation;
- Installation of internal and external electrical apparatus in control buildings and within compound area;
- Installation of underground electricity line (including joint bays, communication chambers, and HDD works) between substation and Tonroe 110kV electricity substation;
- Connection of underground electricity to the respective substations;
- Commissioning of electrical apparatus and underground electricity line; and,
- Progressive site reinstatement, restoration, landscaping and planting proposals including the installation of stockproof fencing and the installation of gates.

Once the turbines are installed, and the substation and electrical system completed, the turbines will be tested and commissioned.

A detailed CEMP will be prepared in advance of all construction activities and will incorporate all mitigation measures proposed in this EIAR. A Planning-Stage CEMP has been prepared and is enclosed at **Annex 3.4**.

The construction phase will be supervised by a range of environmental and engineering specialist personnel; including a Project Supervisor for the Construction Stage (PSCS), Ecological Clerk of Works (ECoW), Archaeological Clerk of Works (ACoW), and Geotechnical Clerk of Works (GCoW), among others; who will liaise closely with the appointed contractor's on-site Environmental Manager to monitor construction activities and to ensure that all applicable environmental control measures are implemented in full.

The detailed CEMP, which will incorporate further technical information following the undertaking of post-consent detailed design, will be submitted to the Planning Authority for approval prior to any works commencing on the project site. The CEMP shall also provide additional details of intended construction practices including:-

- Specific design details of the temporary construction compounds and equipment storage compound including identification of areas for the

storage of construction materials, construction waste, site offices and staff facilities;

- A detailed Traffic Management Plan for the timing and routing of construction traffic to and from the construction site and associated directional signage, to include, in particular, proposals to facilitate and manage the delivery of oversized loads and alternative arrangements to be put in place for pedestrians and vehicles during the temporary closure of any public road or footpath during the course of site development works;
- Implementation stage details of the proposed construction methods, including detailed measures regarding the management of spoil deposition areas;
- Specific measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network;
- Details of appropriate measures for construction stage noise, dust and vibration, and any monitoring of such levels;
- Storage and containment of all construction related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained. All such bunds shall be roofed to exclude rainwater;
- Appropriate provision for re-fuelling of vehicles;
- Off-site disposal of construction/demolition waste;
- Detailed design measures to ensure that surface water run-off is controlled such that no silt or other pollutants enter watercourses in full compliance with the measures outlined in this EIAR; and,
- Further details of the intended hours of construction.

The CEMP will also take full cognisance of, and incorporate, the measures outlined within any specific environmental management plans proposed as part of this EIAR and will also incorporate any specific requirements set out in conditions of consent, subject to a grant of planning permission.

3.6.2 SITE ENTRANCES

A total of 7 no. site entrances will be required to facilitate access to the project site. Of these, 6 no. will be new access points and 1 no. will comprise the upgrade of an existing agricultural entrance; with 4 no. entrances being from the L5501, 2 no. entrances from the L55018 and 1 no. entrance from an unnamed local road.

The construction of site entrances will be carried out by placing geotextile or geogrid within the defined entrance footprint followed by the placement of granular fill (rock) in compacted layers. Drainage features will be installed to manage runoff and prevent sedimentation of adjacent surface water channels. Visibility splays will be cleared and temporary traffic management measures will be implemented during construction to ensure the safety of road users and construction personnel.

Following the delivery of turbine components, the scale of the wind farm (construction phase) site entrances will be reduced but will be reinstated such that they remain capable of accommodating abnormal loads in the event of a major component change-out during the operation phase of development. The reinstatement of the site entrances will comprise the installation of post and rail fencing, gates and the planting of hedgerows (where appropriate and as advised by the ECoW). Hedgerows, where

planted, will be appropriately located to allow for future growth while ensuring, at all times, that visibility splays are maintained during the operation phase.

3.6.3 HARDSTANDING AREAS AND ON-SITE ACCESS TRACKS

The areas of hardstanding for crane operations will generally be constructed as follows:-

- Underlying soil and peat material will be excavated as required;
- Rock/stone will typically be laid on a geotextile mat and compacted in layers to an appropriate depth. The sub-layers of the hardstanding areas will be constructed of rock/stone extracted from the borrow pit insofar as possible, with the upper layer comprising capping material imported from a local quarry (quarries). All such areas of hardstanding will be permeable to avoid significant volumes of surface water run-off; and,
- Areas of temporary hardstanding (for turbine component storage and crane assembly) will be reinstated following the construction phase by removing aggregates, placing excavated material and allowing the areas to revegetate naturally. The crane hardstandings and on-site access tracks will be retained during the operation phase to facilitate access for maintenance personnel and in the event of a major component change-out.

Short sections of access track adjacent to each crane hardstanding will be constructed via similar methodology.

The majority of access tracks at the project site will be constructed via 'floated' technique, using the following methodology:-

- Rock/stone will typically be laid on a geotextile mat and compacted in layers to an appropriate depth. The sub-layers will be constructed of rock/stone extracted from the borrow pit insofar as possible, with the upper layer comprising capping material imported from a local quarry (quarries). All such areas will be permeable to avoid significant volumes of surface water run-off; and,
- Where access tracks are required to cross drainage ditches, these will be piped or spanned with an appropriate bridging structure. At the crossings of the watercourses to the east of turbine T4 and east of turbine T9 respectively, bottomless culverts or clear-span structures will be installed (subject to final post-consent detailed design) to prevent any interference with the hydraulic capacity of the watercourses.

3.6.4 TEMPORARY CONSTRUCTION COMPOUNDS

The compound base, which will be placed on a geotextile mat, will be made up of well graded aggregates, compacted as necessary. A designated waste management area and fuels and chemicals storage area will be provided within the compounds along with site offices, parking, staff welfare facilities and equipment storage areas. The compounds will be fenced with temporary security fencing to restrict access. Following the completion of the construction phase, the compounds will be fully reinstated involving the removal of crushed stone and underlying geotextile, spreading of excavated material (as required) and allowing the areas to revegetate naturally.

3.6.5 CHEMICAL STORAGE AND REFUELLING

Storage areas for oils, chemicals and fuels will comprise bunded areas of hardstand of sufficient capacity within the temporary construction compounds. Bunds will have a watertight roof structure and will be supplied by a licensed manufacturer to enable adequate safe storage for the quantities of material required. An adequate supply of spill kits will be readily available in order to clean up any minor spillages should they occur. A hydrocarbon interceptor will be installed within the surface water drainage system during the construction phase to trap any hydrocarbons that may be present. As part of the design process, a 50m buffer has been observed around all surface water features and no fuel/chemicals shall be handled or stored within this zone.

From the construction compounds, fuel will be transported to works areas by a 4x4 with a double skinned bowser with drip trays under a strict protocol and carried out by suitably trained personnel. The bowser/4x4 will be fully stocked with spill kits and absorbent material, with delivery personnel being fully trained to deal with any accidental spills. The bowser will be bunded appropriately for its carrying capacity. As above, a 50m buffer will be observed around all surface water features and no refuelling will be permitted within this zone.

3.6.6 CONSTRUCTION WASTE MANAGEMENT

Waste will be generated during the construction phase and the main items of anticipated construction waste are as follows:-

- Hardcore, stone, gravel, concrete, plaster, topsoil, subsoil, timber, concrete blocks and miscellaneous building materials;
- Waste from chemical portaloo toilets;
- Plastics; and,
- Oils and chemicals.

Waste disposal measures proposed include:-

- On-site segregation of all waste materials into appropriate categories including, for example, topsoil, bedrock, concrete, bricks, tiles, oils /diesels, metals, dry recyclables e.g. cardboard, plastic, timber;
- All waste materials will be stored in skips or other suitable and sealed receptacles in a designated area of the construction compound;
- Wherever possible, left over materials (e.g. timber off-cuts) and any suitable demolition materials shall be re-used on-site;
- Uncontaminated excavated material (rock, topsoil, subsoil, etc.) will be re-used on-site in preference to importation of clean inert fill;
- Bedrock may be encountered during foundation excavation. If bedrock is encountered it will be utilised for infill during construction;
- All waste leaving the site will be transported by permitted contractors and taken to suitably licensed or permitted facilities and will be recycled, recovered or reused, where possible; and,
- All waste leaving the site will be recorded in accordance with legal requirements and copies of relevant documentation maintained.

3.6.7 CONSTRUCTION EMPLOYMENT

It is estimated that up to 100 no. people will be employed during the construction phase. The actual number present on site will depend on the activities being undertaken at any given time and will vary throughout the course of the construction programme. Employment will be the responsibility of the construction contractor but it is likely that the workforce will include labour from the local area.

3.6.8 CONSTRUCTION TRAFFIC

Vehicular traffic required for the construction phase is likely to include:-

- Articulated trucks (HGVs) to bring initial equipment onto site and later to bring the turbine components, electrical cables, steel reinforcement for foundations, anemometer mast, and ancillary equipment;
- Tipper trucks and excavation plant involved in site development and excavation works;
- Cranes to erect the turbines; and,
- Miscellaneous vehicles and handling equipment, including vehicles associated with the construction workforce.

Effects from construction traffic could include temporarily increased local traffic levels and traffic noise. Construction traffic on the local road network will be managed in accordance with a Traffic Management Plan and the requirements of the Planning Authority. This may include the installation of temporary road signage and traffic lights, as appropriate. Noise arising from construction traffic would be localised, temporary and of a short-term duration.

Deliveries of turbine components will take place at times to avoid peak traffic periods and are likely to occur during night-time hours. All abnormal loads will be accompanied by an advance escort vehicle.

Traffic mitigation measures will be implemented during the construction phase, as follows:-

- Signage at site entrances giving access information;
- Temporary traffic restrictions kept to minimum duration and extent;
- Diversions put in place to facilitate continued use of roads, where restrictions have to be put in place (e.g. along the underground electricity line route);
- Construction traffic management, including one-way systems where possible and strictly enforced speed limits;
- Provision of a designated person to manage access arrangements and act as a point of contact to the public; and,
- All temporary road alterations and public road upgrades to be carried out in full consultation with the respective planning authorities.

3.7 OPERATION PHASE

The operation phase of the project is 40-years. During this period, the wind turbines will be operational and, other than routine maintenance and monitoring, there will be no other activities on site and site activities will continue as normal. On average, the project will be visited on 1-2 no. occasions per week by a light commercial vehicle for

maintenance purposes. In exceptional circumstances there may be a requirement to replace a turbine component, which would require more substantive works on site.

Waste will be generated during the operation phase including, for example, cooling oils, lubricating oils and packaging from spare parts or equipment. All waste will be removed from site and reused, recycled or disposed of in accordance with best-practice and all regulations in a licensed facility.

Further details on the operation phase and specific mitigation measures are provided in each chapter of this EIAR as they relate to each environmental topic.

3.8 DECOMMISSIONING PHASE

The proposed operation phase of the project is 40-years. At the end of this period, several options will exist:-

- Continued operation of the existing turbines;
- Refurbishment/replacement of the turbines and continued operation; and
- Decommissioning of the wind farm.

Any further operation beyond 40-years would be subject to a further planning application and EIA. In its scope, this EIAR assumes full decommissioning of the project will take place after 40-years. All structures above ground level shall be demolished and removed from the site for reuse/recycling; however, access tracks may be retained for continued use by landowners for agricultural purposes. Drainage/surface water management infrastructure will likely be decommissioned; however, drainage infrastructure serving the spoil deposition areas and/or assessed to be serving an ongoing or wider beneficial drainage function, it shall remain *in situ*.

A Planning-Stage Decommissioning Plan has been prepared and is enclosed at **Annex 3.9**. In advance of decommissioning, a Decommission Plan shall be prepared and agreed with the Planning Authority which shall detail specific measures including working hours, dust and noise management measures, spoil and material management proposals, surface water control measures, and traffic management controls. Further details on the decommissioning phase and specific mitigation measures are provided in each chapter of this EIAR as they relate to each environmental topic.

3.8.1 WIND TURBINES

Wind turbines are comprised of the tower, nacelle and blades which are modular items that can be disassembled. This will involve a process which will be similar to the construction phase, but in reverse. If the turbines are to be sold on or reused elsewhere, they shall be removed from site by specialist vehicles similar to those used during their transportation to site. If wind turbine components are not to be reused, then they shall be scrapped. This shall involve the removal of all components to an approved waste handling/recycling facility where components will be sorted according to their material of construction. Turbine components are mainly inert steel/ferrous metals which can be reused or recycled.

The turbine blades are constructed of fibreglass which is not readily re-used or recyclable. Due to the large number of turbine blades currently being decommissioned globally, extensive research⁶ is being undertaken to find an

⁶ [Re-Wind](#) and [SusWIND](#).

alternative use for the fibreglass. There are a number of emerging innovations for fibreglass recycling including the re-purposing of fibreglass for other civil engineering projects (e.g. as a component in concrete production, roofs for social housing and incorporation to the construction of electrical powerline masts/structures.) Given the extensive research being undertaken to find a means of recycling decommissioned wind turbine blades, this EIAR assumes that, at the proposed date of decommissioning, all blades will be fully re-purposed and that no disposal, to landfill, will be required.

3.8.2 TURBINE FOUNDATIONS

Wind turbine foundations are likely to be grubbed⁷ to a depth of 1m below ground level using conventional mechanical diggers. Exposed rebar and holding down bolts shall be burned off and removed off-site to an approved waste handling facility for recycling where possible. The broken concrete will be removed from site and disposed of at an approved waste management facility. Alternatively, it may be used on site as an inert fill to make up levels as part of the wider decommissioning/restoration plan, reducing the need for the importation of additional material onto the site. Excavated areas shall then be soiled over and allowed to vegetate naturally.

3.8.3 CRANE HARDSTANDINGS

Hardstands and access tracks shall be removed with all aggregates and geotextile exposed and removed from site. As the hardstands and access tracks will be of floated construction, substantial excavations are not assessed as likely to be required and minimal earthworks are likely to be required. Additional inert material derived from decommissioning activities in other areas of the site may be used if required. Once the area has been profiled to match the surrounding ground, if required, the area shall be allowed to revegetate naturally.

3.8.4 ACCESS TRACKS & SITE ENTRANCES

All access track at the project site will be of a 'floated' construction type. If it is decided not to retain the access tracks on site for future use, all aggregates shall be removed and used elsewhere at the project site as part of the restoration process, removed from site for use in other construction projects or removed to an approved waste management facility.

Depending on the proposed future use of the site, site entrances (and associated fencing, gates and hedgerows) are likely to be retained to prevent unauthorised access.

3.8.5 ELECTRICAL & COMMUNICATIONS CABLING

The majority of cables used in wind farm construction contain a core of either copper or aluminium. Both of these materials can be recycled. Any cable off-cuts shall be removed off site to an approved waste handling facility where the cores shall be recycled and the remaining material shall be disposed of at an approved facility. Cables will be pulled from the existing ducting and removed to an approved waste handling facility where the cores shall be recycled, and the remaining material shall be disposed of at an approved facility.

⁷ Materials broken up and loosened to allow for vegetative re-growth.

3.8.6 ELECTRICAL SUBSTATION & ELECTRICITY LINE

The electricity substation and electricity line will, once operational, be 'taken-in-charge' by EirGrid/ESB Networks, who will operate and maintain the infrastructure as part of the national electricity network. As a result, the substation and electricity line do not have a specified operation period and may continue to be operated following the decommissioning of the wind farm (i.e. after its 40-year operation period). However, for the purposes of this EIAR, full decommissioning of the substation and grid connection have been assumed.

The decommissioning of the substation will involve the strip-out and removal of steel, conductors, switches, transformer and other materials and equipment that can be reconditioned and reused or sold as scrap. A soft strip of the building shall ensure that all fixtures and fittings are removed prior to demolition.

Demolition of the building shall take place using conventional methods. Foundations and building services shall be grubbed up to a depth of 1m below ground level. The demolition waste shall comprise mainly rubble (bricks, block, broken concrete, plaster etc.) and timber. Rubble can be processed to provide an aggregate material to be used elsewhere in construction projects. Alternatively, it could be used on site as fill elsewhere on the subject site.

Timber and other waste shall be segregated according to material type with a view to recycling where possible or disposal. All demolition materials which cannot be reused on site shall be removed off site to a licensed waste handling facility for recycling or disposal. Excavations shall be backfilled with suitable material, soiled over and seeded out or allowed to revegetate naturally.

Decommissioning of the electricity line will involve the removal of the cabling from the ducting; however, the ducting will remain *in situ* to avoid further excavations. The majority of cables used in wind farm grid connections contain a core of either copper or aluminium, both of which can be recycled. All cables will be removed to an appropriate licensed facility for recycling; while the ducting will remain *in situ* to avoid the requirement for further excavations.

3.9 MONITORING

A monitoring period of 2-years immediately following the decommissioning and restoration activities will be implemented. The monitoring period allows for the subject site to experience seasonal changes and to determine if additional restoration works are required. If, during this time, any failure of works or reinstatements carried out were to occur, they shall be made good using similar methods as described above, or as agreed with the Planning Authority.

