MWP

Chapter 02 Description of the Proposed Development

Carrownagowan 110kV Grid Connection

2. Description of the Proposed Development

2.1 Introduction

The Proposed Development comprises a 25 km long 110kV underground cable connection from the consented Carrownagowan Wind Farm substation (Planning Ref An Board Pleanála (ABP) 308799-20) to the existing ESB owned 110kV Gas Insulated Substation (GIS) at Ardnacrusha, County Clare which will allow the electrical energy generated from the wind farm to be exported onto the national grid.

This chapter describes the main components of the Proposed Development. The description includes all phases of the development including the construction and operation of the Proposed Development.

Details of the Proposed Development are set out in the following documents:

- EIAR Chapter 3 Civil Engineering;
- Construction Methodology (Appendix 2-1, Volume III,)
- Construction Environmental Management Plan (Appendix 2-2, Volume III,); and
- Planning Application Drawings.

2.2 Overview of Proposed Development

The individual turbines within the consented Carrownagowan Wind Farm will be connected electrically by underground cables to a new 110kv substation to be constructed within the wind farm site. The Carrownagowan Wind Farm substation will in turn be connected via an underground grid connection cable to the existing ESB owned 110kV substation at Ardnacrusha, County Clare which will allow the electrical energy generated from the wind farm to be exported onto the national grid.

The full length of the Proposed Development is approximately 25 km.

Table 2-1 below provides an overview and description of various sections of the Proposed Development.

Table 2-1 Summary of Grid Connection Design Route

Section	Description
Section 1	UGC from Ardnacrusha 110kV substation to R-471 Road *(Chainage 0 m to 5000 m)* The underground cable route initially begins within the townland of Ballykeelaun, Co. Clare where from the Ardnacrusha 110kV substation GIS compound, the UGC departs the substation on the northwest boundary, converging onto an existing access track within folio No. CE51663. The proposed UGC route then continues mainly north for a further approx. 300m where it converges onto the L-3056, leaving the Ardnacrusha complex. The underground cable route briefly travels along the L3056 for approximately 165m where it then approaches a crossroad junction, the UGC turns north opposite the main entrance of Ardnacrusha Power Station onto L-3054 (Lackyle Heights Road) and continuing along this route for approximately 2.8km. The UGC will predominantly be installed in the carriageway until encountering another road junction (L-7066) at which point the UGC will traverse to continue north bound. The UGC will carry within another section of localised secondary road carriageway (L7066-1), which in turn will inhibit the first proposed bridge crossing. The river Blackwater (Trough Bridge, denoted as Bridge 1) will be crossed using a horizontal directional drill method (HDD) before continuing within the L-7066-1. The mobilisation of an HDD will require temporary construction areas to be facilitated to complete the tranche of works involved in drilling beneath the riverine feature and bridge abutments. After navigating a path across the river Blackwater and the Trough Bridge, the underground cable infrastructure continues north until reaching the regional road, R471.

Section	Description
	Features *Section 1 contains 8 no. joint bays*. Joint bays will be located below ground and finished/reinstated to the required roads specification. Joint bays will have associated communication chambers and link boxes which will have a surface access hatch which will match existing ground levels. Joint Bay 01 (JB01) will be located adjacent to the entry to Ardnacrusha 110kV Station. *Chainage – 60m* Joint Bay 02 (JB02) will be located north of JB01. The joint bay will be installed within a secondary access road into Ardnacrusha Power Station. *Chainage – 480m* Joint Bay 03 (JB03) will be located north of JB02 within the local road network situated within Lackyle Road network. *Chainage – 1125m* Joint Bay 04 (JB04) will be located north of JB03 positioning the joint bay within the Lackyle Road network. *Chainage – 1760m* Joint Bay 05 (JB05) will be located north of JB04 positioning the joint bay within the local road network. A temporary construction passing bay will be facilitated at this joint bay with consents in place with relevant landowner(s). *Chainage – 2350m* Joint Bay 06 (JB06) will be located north of JB05 within the local road carriageway. The joint bay will be positioning within the shoulder of the roadway. *Chainage – 3130m* Joint Bay 07 (JB07) is located northwest of JB06 within the shoulder of a section of public roadway. *Chainage – 3860m* Joint Bay 08 (JB08) will be located north of JB07 within the shoulder of an unpaved section of public roadway. JB08 is located immediately north of the first proposed Bridge crossing and located outside of the flood zone for the blackwater river. This joint bay will be situated at the proposed receptor area for the first proposed directional drill. *Chainage – 4610m* *Section 1 has 1 No. watercourse crossings:* Bridge 1 (Trough Bridge - *Chainage – 4475m*) has been surveyed with the result of insufficient clearance existing within this structure. To cross the Blackwater River, it will be required to utilise a Horizontal Directional Drill within the roadway to cross beneath with a satisfactory clearance to the waterway and bridge structure. The HDD crossing will require a transition chamber to be installed at either side of the drill following the works, the location of these chambers is to be determined by the drilling contractor following site investigation. The launch and receptor pits will reside within the curtilage of the local roadway (L-7066-1). Refer to Drawing 05641-DR-231-P4 for further Bridge 1 details. *Section 1 will encounter a multitude of service crossings:* Existing utility infrastructure (inclusive of ESB, Irish Water, Gas and Telecoms) will be encountered, and the crossing schedules will be prepared at detailed design to identify under or over methods to cross these existing buried services. *Section 1 has 2 No. culvert crossings:* Refer to *Appendix A* appended to the Construction Methodology (Appendix 2-1) and also refer to drawings 05641-DR-224-P4 & 05641-DR-259-P4 for crossing details.
Section 2	UGC within R-471 and L-3046 Carriageway *(Chainage 5000 m to 11850 m)* The UGC converges upon the regional road (R-471) with the underground cable infrastructure merging and heading east. continuing eastwards, the UGC route passes “Mary Mother of God church” in the townland of Trough before encountering a junction that will require the UGC route to converge but remains on the R-471 regional roadway. Within this section of regional road, a second bridge crossing will be encountered. This bridge (Bridge 2) was surveyed during field investigatory works and found to have insufficient cover. With this information, it is intended to mobilise an HDD to cross beneath the riverine feature whilst maintaining the drill corridor within the curtilage of the public road. Continuing east bound for an additional 660m, the UGC route will approach a regional crossroads junction, at chainage 6200 m respectively. At this junction the UGC will be required to cross underground services (water, telecoms, etc) which are evident within the surrounding area. These utilities are contained within the existing road curtilages of the R471 and R476 prior to continuing east bound. The UGC route encounters a third bridge crossing, the Glenmora Wood Stream (Bridge 3) which will be crossed again using HDD. Third party consents have been acquired from proprietors (folio No. CE3940 & folio No. CE24089F) if the need to align the UGC route away from the structural makeup of the bridge. The composition of the ground conditions in this vicinity is wet, and predominantly marshy land. Once the UGC crosses this structure, the route continues for a further 905m before making the approach onto the local road (L-3046) at Carmody’s cross, at chainage 7600m. The underground cable will carry north along this route for approximately 4.25km. *Features* *Section 2 contains 10 no. joint bays*. Joint bays will be located below ground and finished/reinstated to the required roads specification. Joint bays will have associated communication chambers and link boxes which will have a surface access hatch which will match existing ground levels. Joint Bay 09 (JB09) will be located north of JB08 on the regional road (R-471) within the shoulder of this roadway. *Chainage – 5130m* Joint Bay 10 (JB10) will be located within the R-471 roadway, east of JB09. *Chainage – 5775m.*

Section	Description
	Joint Bay 11 (JB11) will be located within the R-471 roadway, approx. 640m east of JB10 and circa. 200m after crossing the regional carriageway (R-465). *Chainage – 6410m* Joint Bay 12 (JB12) will be located within the R-471 roadway, east of JB11. The Joint Bay will reside within a gated agricultural entrance. *Chainage – 7050m* Joint Bay 13 (JB13) will be located within the L-3046 local roadway, northeast of JB12. A temporary construction passing bay will be facilitated at this joint bay with consents in place with relevant landowner(s). *Chainage – 7860m* Joint Bay 14 (JB14) will be located within the L-3046 local roadway, north of JB13. *Chainage – 8640m* Joint Bay 15 (JB15) will be located within the L-3046 local roadway, north of JB14. *Chainage – 9420m* Joint Bay 16 (JB16) will be located within the L-3046 roadway, north of JB15. The Joint Bay will reside within a bell mouth, forestry entrance to Coillte owned lands. *Chainage – 10210m* Joint Bay 17 (JB17) will be located within the L-3046 local roadway, north of JB16. *Chainage – 10880m* Joint Bay 18 (JB18) will be located within the L-3046 local roadway, north of JB17. *Chainage – 11660m* *Section 2 has 2 No. watercourse crossings:* Bridge 2 (*Chainage – 5580m)* has been surveyed with the result of insufficient clearance existing within this structure. To cross the Knockdonagh River, it will be required to utilise a Horizontal Directional Drill within the roadway (R471) to cross beneath with a satisfactory clearance to the waterway and bridge structure. Refer to Drawing 05641-DR-232-P4 for further Bridge 2 details. Bridge 3 (*Chainage – 6660m)* has been surveyed with the result of insufficient clearance existing within this structure. To cross the Glenmora Wood Stream, it will be required to utilise a Horizontal Directional Drill beneath bridge abutments, satisfactory clearance to the water way to adhere to Inland Fishery Ireland requirements whilst the possible inclusion of executing the drill shot within third party consenting lands. The launch and receptor pits will reside within the curtilage of the roadway (R471). Refer to Drawing 05641-DR-233-P4 for further Bridge 3 details. Both HDD crossings will require a transition chamber to be installed at either side of the drill following the works, the location of these chambers is to be determined by the drilling contractor following site investigation but will be contained within the curtilage of the public road. *Section 2 will encounter a multitude of service crossings:* Existing utility infrastructure (incl. ESB, Irish Water, Gas and Telecoms) will be encountered, and the crossing schedules will be prepared at detailed design to identify under or over methods to cross these existing buried services. *Section 2 has 5 No. culvert crossings:* Refer to *Appendix A*, appended to the Construction Methodology (Appendix 2-1) and also refer to drawings 05641-DR-224-P4 & 05641-DR-259-P4 for crossing details.
Section 3	UGC within R466 & L-3022-8 roadways, through Kilbane Village *(Chainage 11850 m to 17500 m)* Section 3 of the grid connection route converges onto the regional route R-466 and carries within the verge way of this carriageway for approximately 950m. At this point the UGC route converges onto a localise secondary road (L-3022-8). The UGC route carries within this curtilage for circa 470m, before encountering a fourth bridge (Bridge 4, *Chainage – 13300m*). This crossing will be carried out by means of installing the UGC within the bridge deck as it has been found that sufficient cover exists in the structure which spans over the Broadford River. Continuing along the proposed route, a fifth proposed bridge (Bridge 5, *Chainage – 14350m*) crossing over the Cloonconry Beg River which will be crossed using the deployment of an HDD. On navigating a path across this structure, the UGC continues for an additional 900m on approach to a sixth bridge crossing, at *chainage – 15270m.* This bridge is situated within Kilbane village, in which the Kilbane Stream flows through. The demobilisation of the HDD will be carried out entirely within the curtilage of the road and will be enabled with the use of residual fluid to drill within a rock formed composition which was evident from field investigation works. Once passed the sixth bridge structure, the UGC exits the Kilbane village and continues toward the windfarm in a north-westerly direction. The UGC route carries through the townland of Upper Kilbane, encountering a seventh bridge crossing over the Kilbane stream (Bridge 7, *Chainage – 15720m*). It is proposed to cross this bridge by means of HDD, given the insufficient cover found within the existing bridge deck. A further bridge structure is situated circa 440m after the aforementioned bridge which crosses over the Clonagaheen east stream (Bridge 8, *Chainage – 16670m*). It is proposed to cross this bridge using HDD. The final bridge structure is situated circa 215m subsequent to this bridge which crosses beneath the Clonagaheen west stream (Bridge 9, Chainage – 16875m). *Features* *Section 3 contains 7 no. joint bays*. Joint bays will be located below ground and finished/reinstated to the required roads specification. Joint bays will have associated communication chambers and link boxes which will have a surface access hatch which will match existing ground levels. Joint Bay 19 (JB19) will be located northeast of JB18 on the regional road R-466. *Chainage – 12420m* Joint Bay 20 (JB20) will be located within a paved local roadway (L-3022-8), northeast of JB19. *Chainage – 13180m*

Section	Description
	Joint Bay 21 (JB21) will be located within the L-3022-8 roadway, north of JB20. *Chainage – 13975m.* Joint Bay 22 (JB22) will also be located within the L-3022-8 roadway, north of JB21. *Chainage – 14750m* Joint Bay 23 (JB23) will also be located within the L-3022-8 roadway, northwest of JB22. JB23 is located approx. 265m northwest of Kilbane village. *Chainage – 15570m* Joint Bay 24 (JB24) will also be located within the L-3022-8 roadway, west of JB23. The Joint bay will reside within a shouldered road junction within this paved carriageway. *Chainage – 16320m* Joint Bay 25 (JB25) will also be located within the L-3022-8 roadway, west of JB24. *Chainage – 17050m* *Section 3 has 6 No. watercourse crossings:* The first bridge crossing within this section is Bridge 4, *Chainage – 13300m* which spans over the Broadford River. This crossing will be carried out by means of installing the UGC ducting within the bridge deck as it has been found that sufficient cover exists in the structure. Refer to Drawing 05641-DR-234-P4 for further Bridge 4 details. The second bridge in this section is Bridge 5 *Chainage – 14350m* where the bridge crosses over the Cloonconry Beg River. Insufficient clearance exists within the bridge structure, and it is proposed to cross this bridge adopting the HDD method. Refer to Drawing 05641-DR-235-P4 for further Bridge 5 details. The third bridge crossing within this section is Bridge 6, *Chainage – 15250m*, where the proposed route crosses over the Kilbane Stream within the village of Kilbane. Insufficient clearance exists within the bridge structure and it is proposed to cross this bridge adopting the HDD method before proceeding. Refer to Drawing 05641-DR-236-P4 for further Bridge 6 details. The fourth bridge crossing within the section is Bridge 7, *Chainage – 15720m* where the UGC route crosses over the Kilbane stream. Insufficient clearance exists within the bridge structure and it is proposed to cross this bridge adopting the HDD method before proceeding. Refer to Drawing 05641-DR-237-P4 for further Bridge 7 details. The fifth bridge crossing within this section is Bridge 8, *Chainage – 16700m*, where the roadway crosses over the Clonagaheen east stream. Insufficient clearance exists within the bridge structure and it is proposed to cross this bridge adopting the HDD method before proceeding. Refer to Drawing 05641-DR-238-P4 for further Bridge 8 details. The sixth bridge crossing within this section is Bridge 9, *Chainage – 16900m*, this structure is the crossing point over Clonagaheen west stream. Insufficient clearance exists within the bridge structure and it is proposed to cross this bridge adopting the HDD method before proceeding towards the Windfarm site. Refer to Drawing 05641-DR-239-P4 for further Bridge 9 details. All HDD crossings will require a transition chamber to be installed at either side of the drill following the works, the location of these chambers will be within the HDD launch and receptor pit which will be determined by the drilling contractor following site investigation . *Section 3 will encounter a multitude of service crossings:* Existing utility infrastructure (incl. ESB, Irish Water, Gas and Telecoms) will be encountered, and the crossing schedules will be prepared at detailed design to identify under or over methods to cross these existing buried services. *Section 3 has 3 No. culvert crossings:* Refer to *Appendix A*, appended to the Construction Methodology (Appendix 2-1) and also refer to drawings 05641-DR-224-P4 & 05641-DR-259-P4 for crossing details.
Section 4	UGC within Consenting 3rd party folios to Windfarm *(Chainage 17500 m to 25000 m)* The UGC route will avail of third party land (folio No. CE13253F) to carry northwards traversing grassland parcel, for approximately 325m with the latter running adjacent to the existing local tertiary roadway on a upward terrain. Another grassland parcel will be traversed, folio No CE26625 before re-entering the local road networks at chainage 18300m. Subsequent to carrying within the road curtilage for a minor portion, the UGC route re-enters into another third party with consents. Folio NoCE759F will also allow for the UGC route to run adjacent to the existing tertiary roadway along the L-3022-8 local roadway subsequent to Joint Bay 25 for an additional 512m in a westerly direction until reaching a local roadway on the right-hand side. Thus, the UGC accesses this route and continues north uphill for approximately 1.74km before the road becomes unpaved. From this point on, the unpaved roadway forms along an existing forestry access road continuing in a north-eastern direction. On this route, the cable accesses the permitted Carrownagowan Wind Farm site boundary within, carrying on the use of these existing forestry access roads and also some permitted new wind farm internal roads for approximately 5km until reaching the permitted location for the wind farm substation. *Features* *Section 4 contains 10 no. joint bays*. Joint bays will be located below ground and finished/reinstated to the required roads specification and as per Forestry Road Manual (Guidelines for the design, construction and management of forest road) Joint bays will have associated communication chambers and link boxes which will have a surface access hatch which will match existing ground levels. Joint Bay 26 (JB26) will be located adjacent to the local tertiary road, heading in a north westerly direction. *Chainage – 17760m* Joint Bay 27 (JB27) will be located adjacent to the local tertiary road, northwest of JB26. *Chainage – 18460m* Joint Bay 28 (JB28) will be located within the local tertiary road, northwest of JB27. *Chainage – 19150m*

Section	Description
	Joint Bay 29 (JB29) will be located northwest of JB28, the joint bay will be located on access to the existing forestry access roads. *Chainage – 19860m* Joint Bay 30 (JB30) will be located within existing forestry access roads within the Coillte-owned forestry. Its location will exist at Chainage 20460m. Joint Bay 31 (JB31) will be located within existing forestry access roads within the Coillte-owned forestry. Its location will exist at Chainage 21200m Joint Bay 32 (JB32) will be located within the Coillte-owned forestry access tracks and located will exist at Chainage 21880m Joint Bay 33 (JB33) will be located within the Coillte-owned forestry access tracks. Its location will exist at Chainage 22660m Joint Bay 34 (JB34) will be located within permitted haul road routes for the wind farm development, located at Chainage 23450m. Joint Bay 35 (JB35) will be located within permitted haul road routes for the wind farm development, located at Chainage 24250m. *Section 4 will encounter a multitude of service crossings:* Existing utility infrastructure (incl. ESB, Irish Water, Gas and Telecoms) will be encountered, and the crossing schedules will be prepared at detailed design to identify under or over methods to cross these existing buried services. *Section 4 has 15 No. culvert crossings:* Refer to *Appendix A*, appended to the Construction Methodology (Appendix 2-1) and also refer to drawings 05641-DR-224-P4 & 05641-DR-259-P4 for crossing details.
Refer to Figure 1 and to the planning drawings submitted for location details.	

A 3m wide (in peatland) and a 4m wide (in non-peatland), paved and gated service track designed for heavy traffic will be installed to provide safe access for inspection, maintenance and fault repair along the cable route where it deviates from the public road. The service track which accompanies the cable route will be suitably designed (i.e., if the road is to be used by heavy vehicles or machinery this should be reflected in the structural design for the road). Joint bays and communication chambers are to be located adjacent to the service track.

2.2.1 Water Crossings

There are a total of nine (9) no. major watercourse crossings along the Proposed Development, eight (8) will be completed by means of Horizontal Directional Drill (HDD) which will require a service trench (launch pit) for the drill in the road either side of the watercourse; and one (1) of the watercourse crossings will be completed by means of over-bridge in road solution. Details of each water crossing is provided in the Construction Methodology attached at Appendix 2-1, Volume III.

There will be no interactions with any watercourse.

2.2.2 Joint Bays and Communication Chambers

Joint bays are pre-cast concrete chambers which will be required along the grid connection route over its entire length. They are required to join cables together to form one continuous cable. They will be located at various points along the Proposed Development approximately every 700 - 850 metres (m) depending on gradients, bends etc. and as shown on Drawing 05641-DR-200-P6 accompanying the planning application. It is proposed to install approximately 35 no. joint bays and communication chambers along the Proposed Development. Details of the joint bays are provided in the Construction Methodology attached at Volume, III Appendix 2-1, Volume III.

2.3 Construction Phase

2.3.1 Construction Programme

The active construction area will be along a 100-200 m stretch of any roadway at any one time. The construction works are estimated to take 6-8 months. During the first 4 months the cable trenches will be constructed (i.e.. excavated, cable ducts laid and temporary surface is provided). The second 4 months will involve sequentially opening up all joint bays (these are pre-cast concrete chambers that will be required along the Proposed Development over its entire length) and pulling electrical cables through ducts and then joining each cable together.

2.3.2 Construction Hours and Personnel

Standard working hours for construction will be 8.00am to 8.00pm Monday to Friday and 8.00am to 6.00pm on Saturday (if required) (subject to planning consent and local authority stipulated conditions), with no works on Sundays or Bank Holidays except in exceptional circumstances or in the event of an emergency. Any deviations to these times will be agreed in advance with Clare County Council. It is expected that the civil works for the Proposed Development will require at least 10 personnel to complete the cable construction works. The electrical works (i.e. opening up of joint bays, as described above) will require less heavy machinery but more labour personnel, with typically 25 personnel on site to complete the works.

All site personnel will be required to wear project notification labelling on high visibility vests and head protection so that they can be easily identified by all workers on-site.

2.3.3 Construction Methods

Details on the construction methods including underground trenching, horizontal drilling, joint bays installation and culvert crossings are fully set out in the Construction Methodology, Volume III Appendix 2-2 CEMP and outlined in Chapter 3 Civil Engineering.

2.3.4 List of Plant

Mechanical machinery and electrical equipment used for construction projects will be required to facilitate the Proposed Development. The following is a non-exhaustive list of plant that will be used for heavy civil engineering work and to be used in this Proposed Development:

- 1 – HDD 3 Tonne Drilling Rig
- 1 – Duct Reel Trailer
- 4 - vans
- 2 - track machines varying sizes (rubber tyred and 360˚ tracked excavator (13 ton normally, 22 ton for rock breaker)
- 2 - flatback trucks
- 1 - Road sweeping unit
- 2 - dumpers
- 1 - mini – digger

Details of equipment are provided in the Construction Methodology attached at **Appendix 2-1,** Volume III.

2.3.5 Environmental Management

2.3.5.1 Construction Environmental Management Plan

A CEMP has been prepared and in the event planning consent is granted for the Proposed Development, the CEMP will be updated prior to commencement of development to address the requirements of any relevant planning conditions, including any additional mitigation measures, which are conditioned and will be submitted to the planning authority for written approval (**Appendix 2-2,** Volume III). The CEMP will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment, prior to construction, during construction and during operation of the Proposed Development, are implemented. The CEMP will collate and manage the proposed and agreed mitigation measures, monitoring and follow-up arrangements and management of environmental impacts. The environmental commitments of the Proposed Development will be managed through the CEMP and will be secured in contract documentation and arrangements for construction and later development stages.

A number of Environmental Management Plans (EMP), which are included in the CEMP, have been prepared for managing the impacts of Construction Activities associated with the Proposed Development (**Table 2-2**). These plans will be implemented by the Appointed Project Manager and/or Project Contractor(s) as relevant.

Table 2-2 Plans for Managing Impacts of Construction Activities

Ref:	Procedure:
EMP-1	Management of Excavations
EMP-2	Surface Water Runoff Management
EMP-3	Fuels and Oils Management
EMP-4	Management of Concrete
EMP-5	Construction Noise Management
EMP-6	Construction Waste Management
EMP-7	Construction Dust Management
EMP-8	Ecological Management Plan Protection of Habitats and Fauna
EMP-9	Invasive Alien Species Management Plan
EMP-10	Archaeological and Heritage Protection
EMP-11	Emergency Response
EMP-12	Site Environmental Training and Awareness
EMP-13	Monitoring and Auditing
EMP-14	Environmental Accidents, Incidents and Corrective Actions
EMP-15	Environmental Complaints

The primary objective of this CEMP is to provide a framework for actions, responsibilities and protocols associated with environmental management with which the Appointed Contractor(s) are required to adhere in order to construct the Proposed Development and to reduce and/or avoid any adverse environmental impacts. The version

presented sets out the fundamental work practices, construction management procedures, management responsibilities, mitigation measures and monitoring proposals that are required to be adhered to. Chapter 14 of this EIAR documents all of the mitigation measures proposed.

2.3.6 Traffic Management

A detailed Traffic Management Plan (TMP) has been prepared and is included in Appendix 2-3, Volume III. Given that this Proposed Development is to be constructed in 2024, it will be necessary to engage with the Roads and Transportation section of Clare County Council, and with An Garda Siochana and to reflect traffic volumes and local road use at the time.

The purpose of developing and implementing an agreed TMP for the construction phase works is to minimise the impact of the works on local residences and users of the public road networks. In the event ABP decides to grant approval for the Proposed Development, the final TMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by ABP.

2.3.7 Use of Natural Resources

2.3.7.1 Construction Materials

Aggregates (rock, stone, gravel, sand), concrete, and PVC ducting will be used during the construction phase of the works. Please see details in the Construction Methodology in Appendix 2-1, Volume III. The materials will be required for backfilling of trenches back up to road level and to allow for the completion of final surface dressing or Dense Bitumen Macadam. Materials will be delivered by a suitably sized truck or by means of tractor/trailer units and will be delivered in focussed quantities for each 100m to 200m section of grid trench.

Concrete and additional aggregate materials will be sourced from the approved facilities listed below. Concrete will be required for the provision of bedding, surround and cover of the electrical trefoil ducting placed in the trenching along the route. Concrete will be delivered each day by truck for each section of trench.

There are two quarry facilities in the areas which are capable of supplying these construction materials, McGraths quarry in Tulla and O'Connell Quarries in Ballycar, Ardnacrusha. The closest is McGraths in Tulla. The Traffic Management Plan (Appendix 2-3, Volume III) has considered transport of quarry material from the closest quarry; however, the aggregate source will be finalised at a later date.

Table 2-3 sets out the main quantities of materials required including imported stone, concrete and steel and also the quantity of material to be removed off site to licensed facilities as discussed in Section 2.3.8 below.

Table 2-3 Quantities and Volumes of Construction Materials

Construction Material	Quantity
Removal of Excavated Disposable Material	Quantity 22,204 m^3
Sourced Stone / Aggregate	Quantity 13,300 m^3
Sourced Internal access roads	Quantity 5,900 m^3
Reusable Site won Aggregate (Forestry Tracks)	Quantity 4,550 m^3
Imported Stone Cl.804 Aggregate	Quantity 8,900m^3
Total Volume of Stone/Aggregate Required	Quantity 23,400m^3
Concrete	Quantity 8,900 m^3

Construction Material	Quantity
Tarmacadam & Chip Aggregate	Quantity 200 m^3
Total Volume of Sourced Material Required	Quantity 28,000 m^3

2.3.7.2 Water

Water needs for construction activities will be limited to dust suppression. It is proposed that this water requirement will be imported in vacuum tankers. The volumes of water required are minimal and will have no impact on existing water supply utilities.

2.3.8 Production of Waste

2.3.8.1 Excavated Soils/Materials

It has been calculated that there will be approximately 22,204 m^3 of spoil material excavated during the construction of the Proposed Development comprising soils, sub soils and tarmacadam. All soils and sub soils generated from excavation works will be disposed of to one of the licenced facilities listed below. Road excavation, will generate small quantities of tarmacadam which will also require off-site disposal by a permitted waste contractor to one of the listed licensed facilities. Available facilities include Clare Waste & Recycling at Tuamgraney, Inagh Central Waste Management Facility in Ballyduff Beg, Inagh and Enva, located at Smithstown Industrial Estate in Shannon, Co. Clare.

Any excavated topsoil/subsoil associated with the trench and access tracks in off road sections of the Proposed Development that isn't removed off-site to a licenced facility will be temporarily stored near the excavations and reused for reinstatement works.

2.3.9 Emissions and Nuisances

The anticipated residues and emissions likely to be generated during the project lifetime occur during the construction phase and are summarised in Table 2-4. These environmental effects have been identified, assessed and proposals for management of the anticipated nuisances and/or emissions are presented throughout relevant chapters of this EIAR.

Table 2-4 Emissions and Nuisances

Project Phase	Aspect	Potential Emission/Nuisance	Assessment Provided
Construction	Air	The main emissions to atmosphere during the construction stage of the Proposed Development is from fugitive dust associated with the following activities: • Groundworks associated with the construction of the project infrastructure; • Transportation and unloading of crushed stone around the site; and • Vehicular movement over potentially hard dusty surfaces such as freshly excavated and constructed access tracks. The movement of machinery, construction vehicles and the use of generators during the construction phase will also generate exhaust fumes containing predominantly carbon dioxide (CO_2), sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}).	Chapter 9 Air and Climate
	Noise	Traffic flows, excavation, mechanical machinery and electrical equipment typically used for construction projects will generate noise emissions.	Chapter 10 Noise and Vibration

Project Phase	Aspect	Potential Emission/Nuisance	Assessment Provided
	Water	Surface water runoff and discharges from construction working areas are likely during construction, although overall the quantity of surface runoff would not change overall as a result of the construction work. Pollution sources could arise as a result of soil/water runoff or from oil/ fuel or chemical storage and use. Proposals for management of water quality and quantity from the Proposed Development are presented in EIAR Volume III: Appendix 2-1 CEMP.	Chapter 7 Water
	Traffic	The additional traffic, associated with the construction phase, has the potential to cause nuisance to those using the local road networks	Chapter 4 Population and Human Health, Chapter 12, Material Assets

2.4 Operational Phase

2.4.1 Grid Maintenance

It is unlikely that the 110kV underground cable connection to the existing Ardnacrusha Power station will require much maintenance during its operation. The Proposed Development will be under the control of Eirgrid and any operational or maintenance aspects will be completed by them. Operational phase maintenance may relate to opening of joint bays to inspect cabling or to repair a manhole or chamber cover, or to repair/replace part of the cable. The Proposed Development will ultimately be an Eirgrid transmission asset and as such will managed by them.

2.5 Decommissioning

It is not intended that the Carrownagowan Wind Farm electrical substation will be removed at the end of the useful life of the permitted wind farm development. By the time the decommissioning of the Carrownagowan Wind Farm development is to be considered, the permitted on-site substation, the proposed 110kV underground grid connection cabling to the existing Ardnacrusha substation within the hydro power complex will likely form an integral part of the local electricity network. Therefore, it is intended that the Proposed Development (including any new access tracks) and the permitted Carrownagowan Wind Farm Substation (as ESB Networks owned assets) would be retained as permanent structure and would not be decommissioned.

In the event it is required to decommission the cable this would be removed from the ducts and the ducts left in place, and/or the cable would be left in situ and the wind farm side of the 110kv on site wind farm substation would be isolated from the grid side via switchgear and controls. This reflects routine operational maintenance activities, which are assessed in each chapter of this EIAR.