



# **Outline Construction and Environmental Management Plan**

Cross Shannon 400 kV Cable Project (Capital  
Project 0970)

30 July 2020



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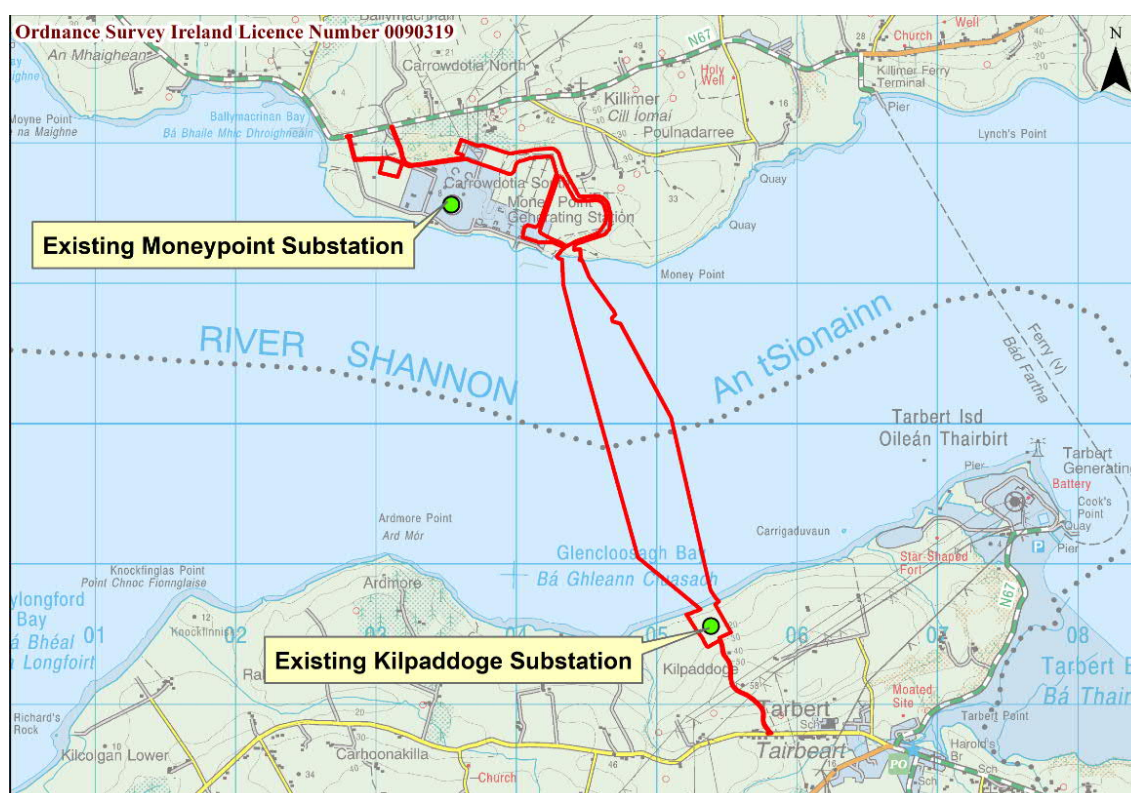
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# 1 Introduction

## 1.1 Overview of the Proposed Development

The Cross-Shannon Cable 400 kV Project (Capital Project Reference 0970) involves the laying of a new 400 kV cable across the Shannon Estuary (in the seabed) between the Moneypoint 400 kV Electricity Substation in the townland of Carrowdottia South County Clare and Kilpaddoge 220/110 kV Electricity Substation in the townland of Kilpaddoge County Kerry. The connection at Moneypoint will be at the existing substation on ESB lands. The connection at Kilpaddoge requires an extension of 5,500m<sup>2</sup> to the existing substation on ESB lands.

**Figure 1.1: Project Location**



Source: Mott MacDonald

EirGrid Plc (EirGrid), with the consent and approval of the Electricity Supply Board (ESB), gives notice of its intention to seek the Approval of An Bord Pleanála in relation to a proposed development.

The Marine and Foreshore Licence Section of the Department of Housing, Planning and Local Government requires that a foreshore licence is applied for under the Foreshore Acts 1933 as amended before commencement of any works or activity in relation to a development can take place. Foreshore is the land and seabed between the high water of ordinary or medium tides (shown HWM on Ordnance Maps) and the twelve-mile limit (twelve nautical miles is appropriately 22.24 kilometres). EirGrid, with the consent and approval of the ESB, has also applied for consent under the Foreshore Acts.

The proposed development comprises 3 main elements:

- Connection of a 400 kV UGC Installation at the Moneypoint 400 kV Electricity Substation (Co. Clare), including:
  - the laying of 3 no. 400 kV UGC (approx. 1.8 kilometres (km) each) between the existing Moneypoint 400 kV Electricity Substation and 3 no. land-submarine transition joint bays located east of the existing Moneypoint Generation Station. The UGC will be installed by standard trenching and includes the provision of 3 no. joint bays along their length and the associated provision, upgrading and/or extension of existing internal access tracks to provide operational vehicular access.
  - the provision of 4 no. land-submarine transition joint bays located east of the existing Moneypoint Generation Station to connect the land cables to submarine cables (this arrangement also includes a land-submarine transition joint bay for the spare submarine cable).
- Laying of 400 kV Submarine Cables across the Lower Shannon Estuary, including:
  - the laying of 4 no. 400 kV submarine cables (approx. 2.8 km each) from the proposed land-submarine transition bays located east of the existing Moneypoint Generation Station in Co. Clare across the Lower Shannon Estuary to the proposed 400 kV Air Insulated Switchgear (AIS) Compound at the existing Kilpaddoge 220/110 kV Electricity Substation in Co. Kerry. The submarine cables will be installed by standard submarine installation techniques, which primarily involves them being buried in the seabed.
  - the installation of communication links between both substations, this will take the form a fibre optic cable that will be integrated into each of the proposed 400 kV cables.
  - The installation of fibre optic cables for maintenance and cable monitoring, this will take the form of an armoured fibre cable wrapped helically around each of the proposed 400 kV cables..
  - Associated works in the foreshore include the reinforcement of the ground beneath and around the cables by various methods including concrete ramps, concrete cable channels, infilling with gravel/concrete, articulated pipes, gabion wall and rock protections where required.
- Connection of a 400 kV UGC Installation and substation extension at the Kilpaddoge 220/110 kV Electricity Substation (Co. Kerry) including:
  - the laying of the 4 no.400 kV UGC [approx. 51 metres (m) in length] from the southern Foreshore of the Lower Shannon Estuary, to a proposed extension (approx. 5,500 m<sup>2</sup>) to the north of the existing Kilpaddoge 220/110 kV Electricity Substation.
  - the provision, within the proposed substation extension, of a 400/220 kV AIS compound, containing electrical equipment and apparatus to connect the submarine cables to the existing Kilpaddoge 220/110 kV Electricity Substation including the following:
    - 9 no. surge arrestors (approx. 7.9 m high);
    - 6 no. cable sealing ends (approx. 7.4 m high);
    - 1 no. 400 / 220 kV transformer (approx. 8.9 m high);
    - 9 no. post insulators (approx. 9.8 m high);
    - 1 no. disconnecter (approx. 8.6 m high);
    - 9 no. instrument transformers (approx. 7.6 m high);
    - 3 no. circuit breakers (approx. 7.5 m high);
    - 5 no. lightning protection masts (approx. 25 m high);
    - a control building (approx. 14.6m x 6.6m x 4.6m high);
    - an associated access track (approx. 155 m in length and 5 m in width);
    - 12 no lighting poles (approx. 9 m high);
    - 3 no. 220 kV UGC (approx. 151 m in length);

- The AIS compound will be enclosed by a palisade fence (approx. 2.6 m in height).

The proposed development includes all associated and ancillary development, including communication links, temporary construction compounds, temporary construction tracks, site development, landscaping works and vegetation removal. Access to the existing electricity substations will be retained from their existing entrances onto the N67 Road in Co. Clare and the L1010 Tarbert Coast Road in Co. Kerry.

ESB Moneypoint Generation Station is licensed by the Environmental Protection Agency (EPA) under an Industrial Emissions (IE) Licence (Ref: P0605-04).

The proposed development includes works located within ESB Moneypoint Generation Station which is an Upper-tier establishment to which the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (the COMAH Regulations) apply. Article 215 of the Planning and Development Regulations 2001 (as amended) applies to this development. A Foreshore Licence is separately required to be obtained in respect of this proposed development. A Natura Impact Statement has been prepared in respect of this application for Approval.

## 1.2 Purpose of this Outline CEMP

The purpose of this Outline Construction Environmental Management Plan (CEMP) is to document and describe the main activities that will be undertaken to facilitate the proposed development and to provide a framework of environmental protection measures that will be implemented prior to commencement of, and throughout the duration of, the proposed works.

The works will be undertaken by Contractors engaged by the Electricity Supply Board (ESB). This Outline CEMP will be provided to the appointed Contractor prior to the commencement of works and will form the basis of the Contractors Project CEMP, which the appointed Contractor will be required to prepare for approval by ESB prior to commencement of any works.

The project CEMP will be prepared by the appointed contractor following the consenting of the development (assuming this occurs) but in advance of commencement of works.

The project CEMP will set out the approach and methodology which the Contractor will follow in scheduling and undertaking the work and will incorporate the control (mitigation) measures detailed in this Outline CEMP in addition to specified conditions that may be prescribed in any grant of development consent for the proposed development, the measures provided in the Natura Impact Statement and the Planning and Environmental Considerations Report and any commitments given by EirGrid in relation to environmental protection associated with the activities described in this Outline CEMP.

## 1.3 Roles and Responsibilities

The statutory roles and responsibilities of EirGrid and ESB have been established under a legally binding Infrastructure Agreement (IA) between the two companies.

Under the IA, EirGrid as national Transmission System Operator (TSO) has the statutory responsibility for obtaining the necessary consents for any transmission infrastructure development, however, it is ESB who are responsible for constructing the development. ESB is the national Transmission System Owner (TAO), while EirGrid operates the transmission system. As such, the proposed development, while the subject of a planning application and foreshore licence submitted by EirGrid, will be undertaken by ESB and contractors engaged on their behalf. While the specific works are normally carried out by ESB and their contractors, EirGrid retains a Client Engineering function during construction.

The Roles and Responsibilities of both parties are outlined below with particular regard to management of environmental impacts.

### 1.3.1 EirGrid

- Prepares the planning application and foreshore application in accordance with EirGrid's Framework for Grid Development, including decision-making on the nature and extent of the proposed development, and setting out of environmental mitigation measures, included in this Outline CEMP.
- Post-consent, manages the process towards construction including liaison with key environmental agencies and stakeholders.
- Undertakes a Client Engineering function, including inspections to ensure that detailed designs, plant, materials and works including scheduling meet the requirements of its Development Plan, its functional specifications, its outline designs and its generic standards.
- Liaises with landowners and local residents, as required.

### 1.3.2 ESB

- Leads detailed design and construction of the development, including environmental oversight of construction.
- Implements a scope of work, agreed with EirGrid, including environmental mitigation measures.
- Discharges the conditions of permission, including preparation of any details to be submitted to, and agreed with the consenting /planning authorities prior to commencement of development, in collaboration with EirGrid as required.
- Appoints an Environmental Clerk of Works (EnCoW).
- Appoints a Contractor to undertake the construction of the development, with the scope of the contract including preparation of the project CEMP and associated Method Statements. The project CEMP and Method Statements will be approved by ESB, the EnCoW, and project agronomist (where appropriate) prior to commencement of any works.
- Appoints a Clerk of Works, who will monitor the construction phase of the proposed development and ensure works are being carried out in accordance with the Contractors agreed method statements, safety procedures, etc.
- Monitors the environmental performance of the Contractor through site inspections and audits. The programme of same will be set out in the Contractors Schedule of Commitments documentation.

## 1.4 Contractor

A technically competent contractor will be appointed by the ESB with responsibility for constructing the proposed development. A contractual obligation will be included within the tendering processes and implemented on appointment to ensure that the proposed development is compliant with the requirements of this outline CEMP. It will be the responsibility of the appointed contractor to implement the construction phase mitigation measures within this CEMP. The Contractor will establish an Environmental Training and Awareness Programme and ensure all personnel receive necessary training prior to the commencement of the construction activities. The contractor will be required to undertake regular monitoring and inspections and will be required to keep up to date records as prescribed with regular reporting to the ESB.

## 1.5 Role of the Environmental Clerk of Works (EnCoW)

An Environmental Clerk of Works (EnCoW) will be appointed by the ESB to ensure that the mitigation measures outlined in this document and any associated Method Statements are implemented in full. In addition to the EnCoW, ESB will engage a team to monitor the construction phase of the project and ensure works are being carried out in accordance with the agreed Contractors Construction and Environmental

Management Plan (CEMP), method statements, safety procedures etc. A Senior Resident Engineer will also be appointed by ESB to liaise with the landowners along the development works area.

The EnCoW will form part of the Employers Site Representative Team. The EnCoW will have suitable environmental qualifications. ESB will ensure that the EnCoW is delegated sufficient powers under the construction contract so that she/he will be able to instruct the contractor to stop works and to direct the carrying out of emergency mitigation/cleanup operations. The EnCoW will also be responsible for consultation with environmental bodies including the National Parks and Wildlife Services (NPWS) and Inland Fisheries Ireland (IFI). The EnCoW will be responsible for carrying out regular monitoring of the Contractors Construction and Environmental Management Plan.

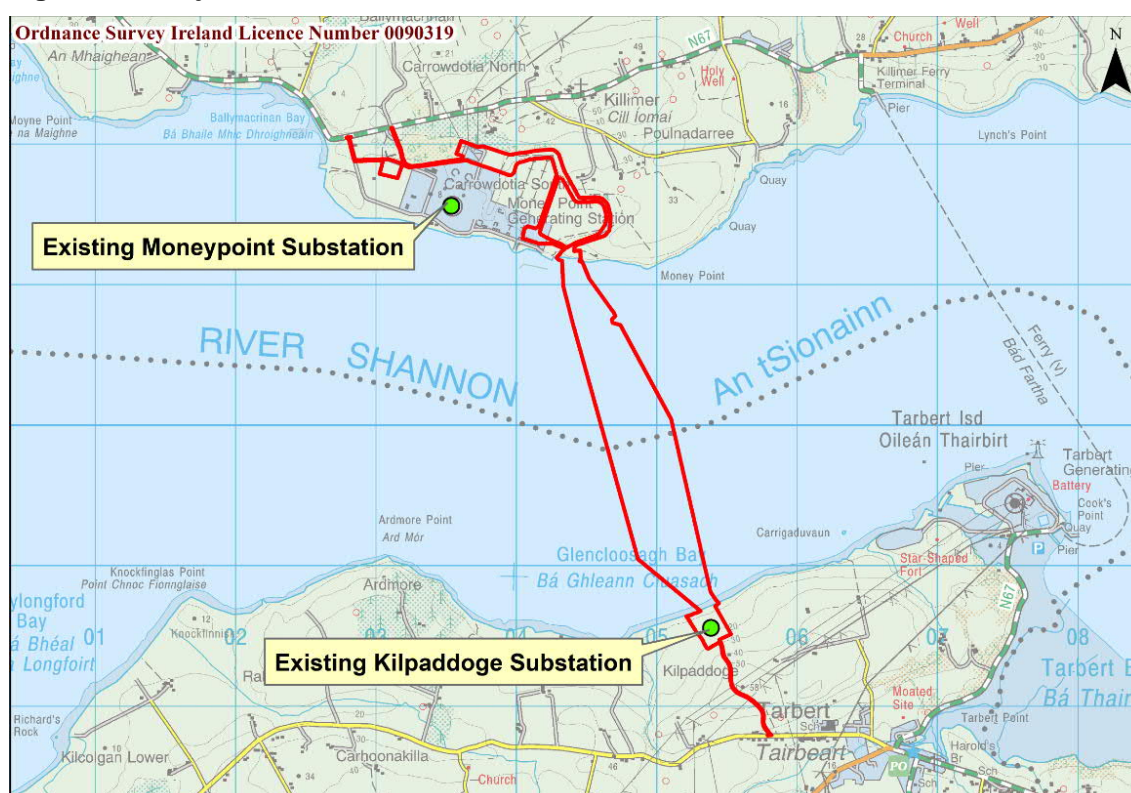
## 2 Project Context

### 2.1 Introduction

The following sections describe the proposed development and Nearest Sensitive (Residential) Receptors under the following headings;

- Connection at Moneypoint 400 kV GIS Station;
- Connection at Kilpaddoge 220 kV GIS Station; and
- Submarine/River Shannon Crossing.

**Figure 2.1: Project Location**



Source: Mott MacDonald

### 2.2 Connection at Moneypoint 400 kV GIS Station

Moneypoint Electricity Generation Station is an existing operational coal fired power station which consists of three generators to produce electricity to supply the main transmission network. In addition to the three generators, the power station comprises High Voltage (HV) electrical infrastructure, associated ancillary process plants and an extensive coal yard connected by a network of internal access roads. There are also a number of wind turbines located around the perimeter of the site with associated underground cable systems connected into the electrical infrastructure on site.

Moneypoint 400 kV substation is a Gas Insulated Switchgear (GIS) type substation and is located inside the existing operational Moneypoint Electricity Generating Station. The substation is the marshalling point for the electricity, and it acts as a node on the transmission network.

The proposed development will terminate with a cable connection at an existing spare bay in Moneypoint 400 kV GIS Substation. The outdoor cable trench will run to the outside wall of the GIS building and the ducts will enter the cable basement via an existing opening. The cables will then be routed through the basement to terminate at the allocated spare bay.

Both the temporary construction and operational access will be provided via the existing Moneypoint Electricity Generating Station and via existing established tracks within ESB lands. A temporary laydown area and welfare facilities will also be provided within the existing Moneypoint Electricity Generating Station complex, a smaller laydown area will be provided at the northern landfall located within ESB lands. Ancillary car parking will be provided within the GIS compound area.

The most proximate dwellings to the proposed development site boundary are approximately 50m southeast and approximately 145m south. Killimer is the closest settlement to the proposed development, located approximately 2 kilometres to the east.

### 2.3 Connection at Kilpaddoge 220 kV GIS Station

The proposed extension at the existing Kilpaddoge substation will be required to facilitate the new AIS equipment and compound. The proposed site comprises a rectangular area of ground on the northeast extent of the existing substation. Access to the site will be provided via a new internal access track along the eastern boundary. The footprint of the proposed extension will require clearing and levelling. It is expected that the site will be elevated to between 17m and 10m AOD.

The closest village to the development boundary is Tarbert which is located approximately 1.3 kilometres south east of the existing Kilpaddoge substation. Tarbert Comprehensive School and Tarbert Health Centre are located approximately 800m and 1km south east of the proposed development boundary respectively

The most proximate dwellings to the existing substation are approximately 650m southwest and approximately 700m south of the proposed extension works situated adjacent to the existing access road.

### 2.3 Submarine/River Shannon Crossing

The Shannon Estuary is approximately 100 kilometres (km) in length and has a tidal range of approximately 5 metres (m) during spring tides. Therefore, there is a large discharge of water volume in a relatively short period. Tidal currents can reach peak velocities of 6 knots during the ebb tide.

The new 400 kV submarine cable route runs from a landfall adjacent to the Moneypoint Electricity Generating Station on the north side of the Shannon Estuary to a landfall at Glencloosagh Bay, directly in front of Kilpaddoge substation on the south side. The overall submarine cable route length is approximately 2.8 km. The proposed submarine cable corridor between the Mean High Water Mark (MHWM) on each shoreline is approximately 0.737km<sup>2</sup>.

The Foreshore area is outlined in red in Figure 2.2 and the grid coordinates defining the foreshore area is provided in Table 2.1 . Figure 2.2 shows the proposed alignment of the submarine cable route. The sea bed varies along the proposed route alignment from fine to coarse gravelly sand to Fine sand. The gravelly clay is limited to the near shore areas. The proposed installation techniques described in the Planning and Environmental Considerations Report (PECR) and summarised in the Chapter 2 of this report are suitable given the sediment conditions encountered along the corridor.

**Table 2.1: Grid coordinates defining the proposed submarine cable route for the purpose of defining the Foreshore Area**

Easting	Northing
104335.1259E	151194.8673N
104662.4924E	151164.1788N

Easting	Northing
105350.9328E	148707.3908N
105386.0020E	148717.1260N
104335.1259E	151194.8673N
104662.4924E,	151164.1788N

Figure 2.2: Proposed Alignment of the submarine cable route



Source: Mott MacDonald



## 3 Proposed Construction Activities

### 3.1 Introduction

The following sections provide an outline of the proposed construction phase activities. Subject to the grant of statutory approvals, it is programmed that construction will commence in 2022, for it to become fully operational at the end of 2023.

### 3.2 Temporary Laydown Areas

A temporary laydown area will be located within Moneypoint Electricity Generating Station (approximately 13,900m<sup>2</sup> and 8300m<sup>2</sup>) and available lands adjacent to the existing Kilpaddocke substation compound (approximately 10,500m<sup>2</sup>, and 3,7506m<sup>2</sup> respectively). Access will be gained initially via the existing entrance to the existing Kilpaddocke substation and the main and secondary entrances to the Moneypoint Electricity Generating Station. All construction works will be directed to use these existing entrances only. The location of the proposed entrances are shown on the planning drawing ref; 229379408-MMD-00-XX-DR-E-1300 to . 229379408-MMD-01-XX-DR-E-1302.

Temporary facilities will be provided which will include construction phase car parking, welfare facilities and laydown areas as necessary. Any discharges from temporary welfare facilities will be connected to a sealed holding tank to be emptied and disposed of off-site by a licenced contractor to an approved licenced facility.

Additional laydown areas will be located in proximity to the proposed landfall locations either side of the Shannon Estuary. The location of these areas are shown on the accompanying planning drawings 229379408-MMD-01-XX-DR-E-1300 to . 229379408-MMD-01-XX-DR-E-1302.

A temporary surface will be provided comprising granular stone material with passing bays provided as required, however, storage of fuel and refuelling will be undertaken within bunded hardstanding areas. Water will be tankered onto site as required.

### 3.3 Construction Traffic

#### 3.3.1 Onshore Construction Traffic

It is expected that a maximum of approximately 30 Heavy Good Vehicles (HGV) movements per day will be required during the construction phase at either side of the Shannon Estuary. The number of construction workers required is expected to peak at approximately 45 persons. No abnormal loads are required. It is envisaged the cable laying barge vessel will be routed from Norway to the Shannon Estuary.

#### 3.3.2 Offshore Construction Traffic

Appropriate marine traffic notices will be issued to all stakeholders in accordance with any requirements specified in the Foreshore Licence. The Contractor's method statements will consider the safety of users of the Shannon Estuary and foreshore when preparing and carrying out the construction works. Works will be coordinated to minimise impact on marine traffic.

Navigational impacts will be minimised through consultation with the Shannon Foynes Port Company and other stakeholders as part of the Foreshore Licence process as specified in the Foreshore Licence.

### 3.4 Connection at Moneypoint 400 kV GIS Station

The proposed development will terminate with a cable connection at an existing spare bay in Moneypoint 400 kV GIS Substation. The outdoor cable trench will run to the outside wall of the GIS building and the

ducts will enter the cable basement via an existing opening. The cables will then be routed through the basement to terminate at the allocated spare bay.

Both the temporary construction and operational access will be provided via the existing Moneypoint Electricity Generating Station. Ancillary car parking will be provided within the GIS compound area.

**Figure 3.1: Moneypoint 400 kV GIS Substation building**

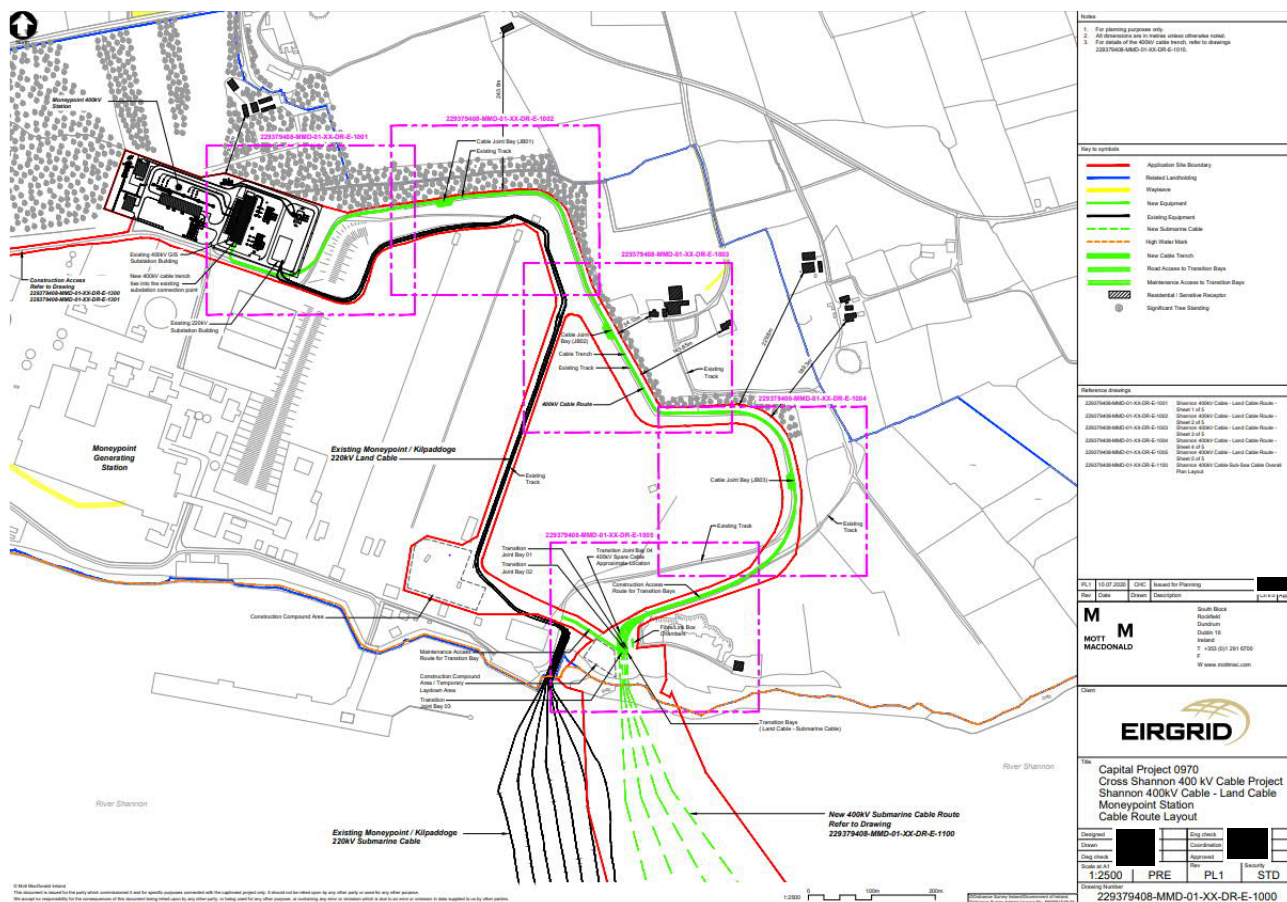


Source Mott MacDonald

The landfall is the location where the submarine cable is brought ashore. The landfall generally comprises concrete cable troughing, associated civil works and a transition joint bay. The joint bay encloses the connections made between the land-based cables and the submarine cables.

The proposed northern landfall is located to the south of the main coal yard/ash storage area within Moneypoint Electricity Generating Station. The proposed landfall is located east of the existing Moneypoint-Kilpaddocke 220 kV cable landfall. The alignment of the route can be seen on drawing 229379408-MMD-00-XX-DR-E-1000 which is reproduced in Figure 3.2. The overall land route length is approximately 1.8km.

**Figure 3.2: Proposed Land Cable Route (Moneypoint)**



Source: Mott MacDonald

The construction works for the 400 kV cable route will comprise the following main activities:

- Cable trench excavation
- Removal of ground material
- Installation of trench supports
- Installation of ducts
- Installation of concrete
- Reinstatement of trench
- Installation of precast joint bays.

The above works can be carried out on a phased basis with the work area confined to a specific location along the cable route (i.e. the full cable route does not need to be excavated all at once).

Three precast concrete joints bays will be installed along the cable route during these works at approximately 700m distance internals. The approximate footprint of each is 10 m (length), 3m (wide) and 2m (deep).

Following the installation of the cable ducts and the joint bays, cable drums will be positioned at the joint bays and the cables will be pulled through the ducts with a winch. The cable ends will then be connected together in the joint bays with the final connection being made in the basement of the existing 400 kV GIS substation.

### 3.5 Connection at Kilpaddoge 220 kV GIS Station

The proposed extension at the existing Kilpaddoge substation will be required to facilitate the new AIS equipment and compound. The proposed site comprises a rectangular area of ground on the northeast extent of the existing substation. Access to the site will be gained via the existing established access road to the existing Kilpaddoge Substation compound from the L1010 Tarbert Coast Road. A new internal access track will be located along the eastern boundary of the existing substation compound. The footprint of the proposed extension will require clearing and levelling. The existing ground levels on the site are currently range north to south between 6m and 17m AOD. The site will be elevated to between 17m and 10m AOD. A separate maintenance access will be provided to the proposed transformer located at the southern extent of the site as shown on planning drawing reference 229379408-MMD-01-XX-DR-E-1300.

The AIS compound will be surfaced with permeable stone with an area of hardstanding along the internal access road.

In order for the 400 kV cable circuit to connect to the station at Kilpaddoge a power transformer is required. This transformer is a piece of outdoor electrical plant that is used to change the system voltage from 400 kV to 220 kV, which is the operating voltage at Kilpaddoge. Since the transformers main insulating medium is mineral oil, the transformer will be located within a bund. The approximate overall footprint of the transformer and bund is 25m x 10m. Prior to connecting to the transformer, the 400 kV cable is connected through switchgear and measuring devices to allow the circuit to be switched off for maintenance or for a circuit fault.

The transformer converts the voltage from 400 kV to 220 kV and a cable connection is required on the 220 kV side to connect the transformer to an existing bay in Kilpaddoge substation. For this cable connection, the outdoor 220 kV cable trench will run right up to the outside wall of the GIS building and the ducts will enter a cable basement located below the outdoor final ground level. The cables can then be routed through the basement in air to terminate at the allocated spare bay.

The cable design within the Kilpaddoge 220 kV substation compound has considered existing buried HV cables, other buried services and existing items of electrical plant. There is an existing stormwater network on site which will be required to be rearranged in order to accommodate the proposed Air Insulated Switchgear (AIS) equipment and compound layout. The proposed extension is entirely within ESB lands.

### 3.6 Timing of Works

Construction will occur during normal construction working hours, with the exception of works associated with the submarine installation works within the Shannon Estuary. Normal construction hours are expected to be Monday to Friday 7 am to 7 pm and Saturday from 7 am to 2pm. There may be instances where extended hours/days are required however should working outside these hours/days be required they will only be undertaken with prior agreement with the statutory authorities.

The submarine cable installation within the Shannon Estuary is expected to take approximately three weeks to complete. Each cable installation run is anticipated to take approximately 3 -5 days to complete. The duration of the works is indicative only, safety requirements for the installation operations/procedures and weather condition may ultimately dictate the final programme. These works will be carried out seven days a week, 24 hours a day.

### 3.7 Outline Construction Schedule and Timing of works

Construction activities will gradually phase out from pre-construction to predominantly civil activities followed by commissioning and testing of the substations and equipment. It is expected that the number of construction workers required throughout the duration of the construction phase will peak at approximately 45 persons.

The duration of the civil and electrical construction phase is expected to be approximately six months, with the installation and commissioning carried out thereafter over approximately six months. The overall duration will be approximately one year. The overall duration will be approximately one year. Some of the activities noted in Table 3.1 will be carried out in parallel.

A preliminary construction programme has been included using an arbitrary commencement date. The durations included in the programme are indicative only. Whilst these are based on input from submarine cable contractors and specialists they should not be considered as minimum nor maximum durations for each sequence. Works associated with the submarine cable installation will be required to be carried out outside of the peak dolphin calving season (August) depending on weather conditions, refer to Chapter 7 *Biodiversity* of the Planning and Environmental Considerations Report.

The majority of the construction activities are not dependant on outages on the existing transmission system, however, activities associated with connections to the existing 220 kV network will be planned in line with EirGrid's scheduled outage programme. The safety requirements for the installation operations/procedures may ultimately dictate whether 24/7 working is conducted.

In addition, clearance of vegetation along the onshore cable route, where required, will take place between 1<sup>st</sup> September and 1<sup>st</sup> March in order to protect breeding birds, i.e. outside of the bird breeding season.

A preliminary indicative construction schedule for the proposed development is outlined below (some of the activities noted will be carried out in parallel). It is noted that unavoidable delays and changes to the project programme may occur due to weather and sea conditions. These delays are to be minimised where possible and interested parties are to be kept notified where possible or necessary.

Electrical installation and commissioning of equipment will be carried out thereafter over the remaining six month period. Details on the submarine cable installation are set out in Section 3.7 below.

**Table 3.1: Indicative Construction Schedule for Onshore Works**

Phase	Activity	Anticipated Date/Duration:
<b>Construction Phase Kilpaddoge 400 kV AIS Equipment and compound and cable ducting</b>		
Construction of Access Road & Site Compound	Removal of excavated material	Approximately 2 month period
	Delivery of type 1 fill for site compound and access road (including lay down area)	Approximately 2 month period during Month 1 to Month 2
	Miscellaneous (civil materials, fencing)	Approximately 3 month period during Month 1 to Month 2
Construction of 400 kV compound Civil Works	Removal of excavated material	Approximately 4 month period Month 3 to Month 6
	Delivery of Concrete	Approximately 4 month period Month 3 to Month 6
	Delivery of type 1 fill for site compound	Approximately 4 month period Month 3 to Month 6
	Miscellaneous (civil materials)	Approximately 4 month period Month 3 to Month 6
Cable trench and duct installation on Kilpaddoge shore	Removal of excavated material	Approximately 4 month period Month 3 to Month 6
	Delivery of cable ducts concrete backfill.	Approximately 4 month period Month 3 to Month 6
	Delivery of type 1 fill for cable route access road.	Approximately 4 month period Month 3 to Month 6
	Miscellaneous (delivery of cable, ducts and accessories)	Approximately 4 month period Month 3 to Month 6
<b>Construction Phase Connection to the Moneypoint 400 kV bay and cable ducting</b>		

Cable trench and duct installation on Moneypoint shore	Removal of excavated material	Approximately 4 month period during Month 1 to Month 4
	Delivery of Cable ducts Concrete backfill.	Approximately 4 month period during Month 1 to Month 4
	Delivery of Type 1 Fill for cable route access road.	Approximately 4 month period during Month 1 to Month 4
	Miscellaneous (delivery of cable, ducts and accessories)	Approximately 4 month period during Month 1 to Month 4

### 3.8 Submarine/River Shannon Crossing

#### 3.8.1 Submarine Protection

The cable will be a cross linked polyethylene (XLPE) cable. XLPE is an extruded polyethylene material that is thermoset after extrusion through a controlled heating process.

For the submarine cable, the sheath is made of lead as it will provide water blocking capabilities and decrease the buoyancy of the cable. The submarine cable has an additional layer of armour made up of typically of copper or stainless-steel wires in the case of single core cables which increases the cables tensile strength. This armouring increases the weight and overall diameter of the submarine cable in comparison to the land-based cable. The cable is then surrounded by an outer serving of polypropylene yarn.

For the purpose of this report, chainage is the horizontal distance as measured along straight lines between two points. The beginning denoted by KP 0.0 at Moneypoint and ending denoted by KP 2.8 at Kilpaddoge. The maximum water depth reaches 58 m CD<sup>1</sup>, at the centre of the Shannon Estuary, east of the Bridge feature, at approximately Chainage<sup>2</sup> KP 0.95. Maximum slope angles are up to 15 degrees, mostly confined to the northern half of the route. The maximum slope angle is found close to KP 0.8.

Additional protection is required to reduce the risk of anchor strike or third-party damage to acceptable levels. Approximately 1,000 m of additional protection is identified as required at the approach to northern landfall (KP 0 to 0.2), near the centre of the channel (KP 0.65 to 0.85) and southern landfall (KP 2.2 to 2.8). Additional protection is typically provided by rock placement, installation of concrete mattresses or rock filter bags over the cable for resilience and security (see Figure 3.3). Rock filter bags were used for the protection over the existing 220 kV cables and are the preferred protection solution at this stage of the project as they are inert material, have a high flexibility and it is possible to install many filter bags at a time.

In addition, cylindrical metallic protector such as articulated pipes / split pipes can be used as additional protection in areas above and also below the lowest astronomical tide (LAT) mark (see Figure 3.4). The cable protector casing is typically made of cast iron shells that protect the minimum bend radius of the cable, along with providing another layer of defence against third party contact. The cable protector is likely to be installed onto the power cable prior to cable float out / installation (likely on board the vessel). Figure 3.5 shows a typical design cross section for a rock placement solution.

<sup>1</sup> CD-Chart Datum

<sup>2</sup> Chainage - is the horizontal distance as measured along straight lines between two points. The beginning denoted by KP 0.0 at Kilpaddoge and ending denoted by KP 2.8 at Moneypoint). KP- Kilometre Point

**Figure 3.3: Example of Cable Protection Rock Filter Bags**



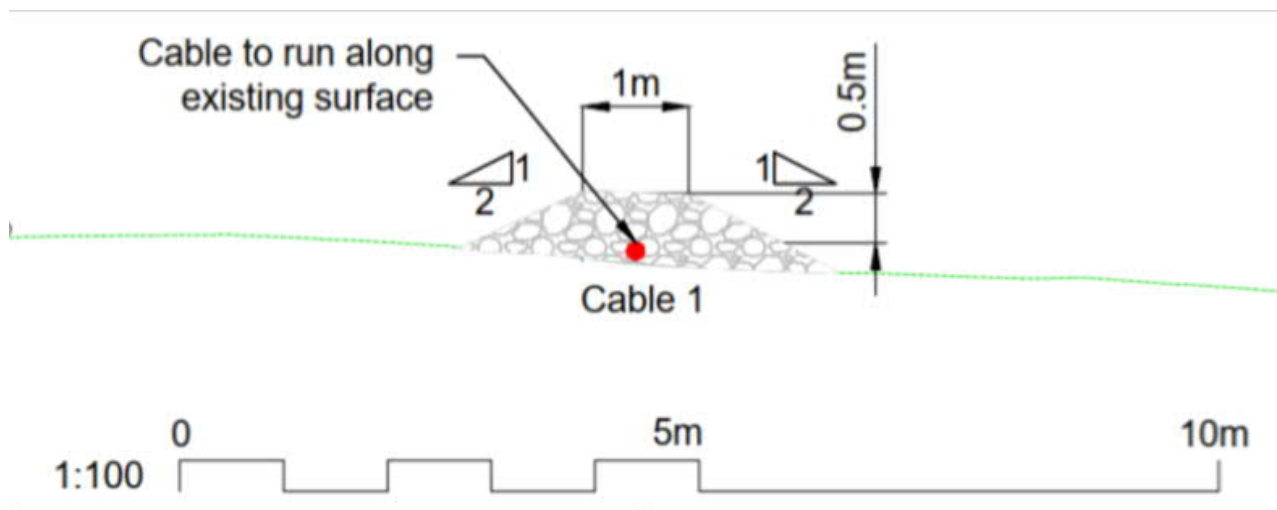
Source: <https://www.sps-solutions.co.uk>

**Figure 3.4: Typical Cable protector -Articulated pipes**



Source: [www.vos-prodect.com](http://www.vos-prodect.com)

**Figure 3.5: Typical section of rock protection overlaid on the submarine cable**



Source: Mott MacDonald

### 3.8.2 Cable Design Philosophy

For the purpose of this assessment an indicative north to south cable installation direction approach is assumed. A cable installation sequence of west to east (cable no.1, most westerly to cable no.4, most easterly) is assumed. This ensures that each cable installation works is only constrained on the west side, either by the existing 220 kV cables (west of the alignment for the 400 kV cable location), or by a 400 kV cable as they are installed in the proposed west-east manner.

A minimum separation distance of one time the water depth (1\*WD) is proposed between each cable and between cable no.1 and the existing 220 kV circuits. This allows sufficient space for cable repairs to the 400 kV cables or to the existing 220 kV circuits if required during the lifetime of the asset. A 1\*WD offset was used instead of the initially proposed two times water depth (2\*WD) because of the planned redundancy in the 400 kV circuits (one of the four cables will be a spare). The separation distance between each 220 kV cable is typically a consistent 25m, which is less than one time the water depth.

### 3.8.3 Submarine Cable Installation Activities

The development of landfall, intertidal and subtidal cable installation and burial methodologies described in this section have been informed by geophysical and hydrographic marine surveys, onshore and marine ground investigations, lessons learnt from previous submarine cable projects at Moneypoint, and early engagement with submarine cable installation contractors and submarine cable installation specialists.

The methods and installation sequence described are the proposed methods at the current stage of the project. The actual methods and sequence of the cable installation are subject to detailed design and review by stakeholders, authorities and contractors.

All plant and equipment (excluding vessels) will be cleaned and disinfected in advance of coming to site and post works in accordance with Inland Fisheries Ireland (IFI) Biosecurity Protocols. All operatives will be briefed on IFI Biosecurity Protocols, and all disinfection / cleaning of plant and equipment must be witnessed by the EnCoW or said plant / equipment will not be permitted onto the site. Vessels travelling from outside of Irish waters will be required to have a certified Ballast Water Management System

Landfall works at Moneypoint and Kilpaddoge are required ahead of the cable installation. A preliminary list of key plant and equipment that is required for the cable installation works at either side of the estuary at the landfall locations set out and is illustrated below. Images of typical plant are also provided below.

- Cable winch (one at each landfall)
- Cable quadrant
- Excavators
- Dumper trucks
- Pilling plant (may be required to anchor the winch in place)
- Ancillary plant and tools
- Articulated pipe cable protection

The proposed submarine equipment includes;

- Primary Cable Laying Barge (CLB) or Cable Laying Vessel (CLV);
- Cable floatation devices for submarine-landfall pull in
- Cable plough tool
- Pre-lay Grapnel (PLG) and launch vessel
- Mass Flow Excavator (MFE) tool and launch vessel
- Support/guard vessel(s)
- Rock protection installation vessel
- Cable protection.

It is anticipated that the launch vessel for the PLG and MFE will be the same vessel.

**Figure 3.6: Example of a primary Cable Laying Barge [approximate size 125m (l) x 32m (b)]**



Source: <http://www.marinetraffic.com>

**Figure 3.7: Example of a cable plough tool**



Source: <https://atlantic-cable.com/Article/SA/52/index.htm>

A typical cable burial tool is shown in Figure 3.7. Cable techniques can be used in areas of coarse and more mixed sediment, gravel and cobble seabed areas. A displacement technique creates an open V-shaped

trench in which the cable is placed. This technique requires high pulling forces. The sediment that is excavated from the V-shaped trench is displaced directly next to the trench that is created. This trench is left to refill naturally through sedimentation and sediment movement processes. The burial tool itself is supported on a sled, which is towed from a CLB or CLV. A burial tool such as sled plough can bury cables in soils and rock, creating comparatively low levels of turbidity. A typical burial speed is in the region of 200m/hr.

Modern cable ploughs use a non-displacement approach, where the cable is lead through a thin-bladed ploughshare, directly laying the cable below the seabed avoiding an open trench with minimal disturbance to the seabed. This technique uses fluid assistance to lubricate the blade and produces less resistance to bury the cable to the same depth as a classic plough share.

The Pre-Lay Grapnel (PLG) tool will be deployed and recovered from a dedicated marine vessel. Typically, PLG tools are fully modular and use a connected saddleback and a running line system, monitored from the marine vessel. The system is used to monitor the line tension from the grapnel (or any other wire/rope), where a significant increase may indicate an obstruction encountered by the PLG tool on the seabed.

**Figure 3.8: Example of a Pre-Lay Grapnel launch vessel**



Source: <https://www.marinetraffic.com>

A jetting technique achieves burial by fluidising the soil beneath the cable, thus allowing the cable to fall through the loosened soil under its self-weight to the base of the fluid zone. This results in the cable sinking to the required burial depth. The water jetting equipment is usually mounted on a remotely operated vehicle (ROV) but can be put on a sled. An ROV is capable of operation in shallow water, close inshore.

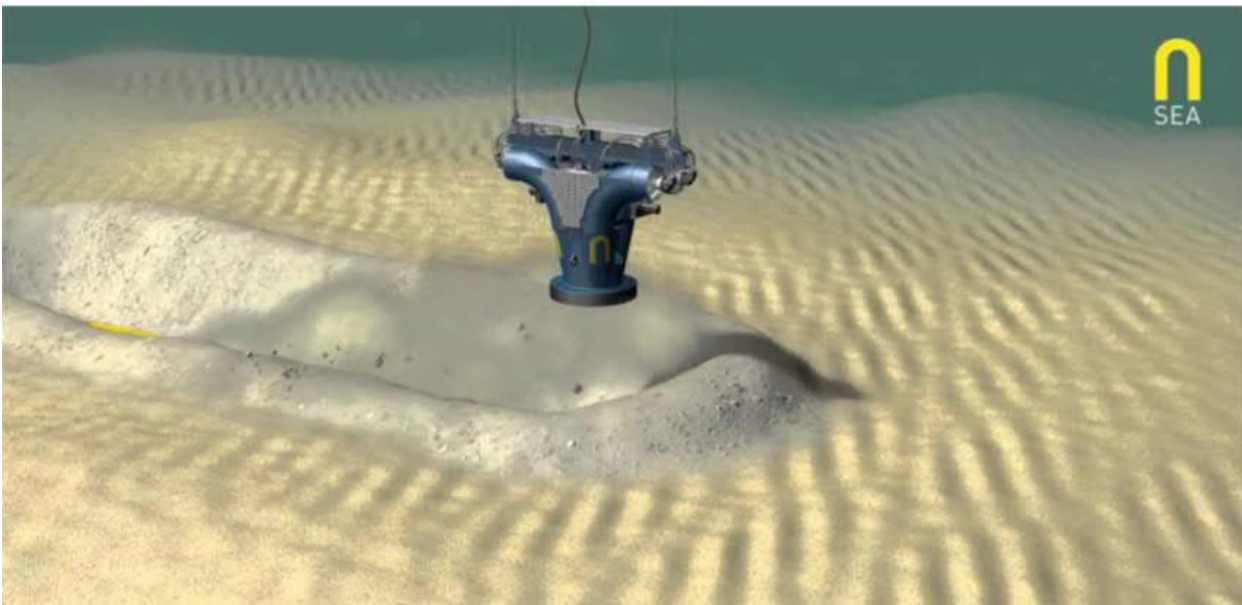
The typical cable burial depths that can be achieved using modern water jetting tools is in the region of 3m with a soil capacity being sand and clay up to 100kPa. Burial speeds up to 400m/hr can be achieved in optimal conditions using an ROV

MFE is a process used for seabed preparation and sediment wave clearance, rock dispersal, cable trenching and reburial of the seabed. Figure 3.9 shows a typical MFE tool. From a near-stationary vessel, the MFE device is lowered to a controlled position just above the seabed. The tool uses counter-rotating impellers to

generate a large volume column of water, propagating towards the seabed at a velocity of up to 10m/s. This high volume, low pressure column of water fluidises and disperses the seabed material. This technique is generally suitable for a range of soil types, including sand and gravel, loose rock, silt and soft clays up to 300+kPa shear strength. The main advantages of using an MFE are:

- Non-contact excavation method
- Excavation in a wide range of seabed conditions (e.g. slopes, sand waves)
- Modern day MFE tools incorporate the use of gyroscopic stability, variable motors and real-time sonar monitoring with sub-sea cameras to allow for greater monitoring and control from the operating crew on deck.

**Figure 3.9: Illustration of a Mass Flow Excavator (MFE) tool used to excavate the seabed surface**



Source: <https://www.n-sea.com/en>

**Figure 3.10: An example of a jetting tool**



Source: [http://www.eta-ltd.com/jettingsleds\\_power\\_cable\\_laying.html](http://www.eta-ltd.com/jettingsleds_power_cable_laying.html)

#### 3.8.3.1 Submarine Cable Installation Sequence

The proposed indicative cable installation sequence is listed below. These can be separated spatially into two work areas:

1. Landfall works – All construction above Lowest Astronomical Tide (LAT); and
2. Submarine works – All construction below LAT.

For the purpose of this report, the LAT is defined as the lowest level that can be expected to occur under average meteorological conditions and under any combination of astronomical conditions. The LAT is often referred to as the common chart datum (relative to m CD).

The following sections broadly follow the proposed installation sequence listed below and refer to construction activities within the ‘landfall works’ area and ‘submarine works’ area. Pre construction surveys will also be carried out to inform the detail design of the cable route

1. Moneypoint and Kilpaddoge landfall works (excavation and civil works);
2. Route clearance (pre-lay grapnel run) along all four cable alignments;
3. Seabed preparation works along all four cable alignments;
4. Submarine works for each cable alignment (starting with Cable No.1, most westerly alignment):

- a. Sand wave re-profiling/dispersal by Mass Flow Excavation (MFE)
  - b. Post-MFE route clearance (secondary pre-lay grapnel run)
  - c. Moneypoint landfall cable pull-in.
  - d. Submarine cable installation;
5. Repeat step 4 for cable no.2, no.3 and no.4;
6. Post lay submarine cable installation for all four cables;
7. Landfall and submarine cable protection installation for all four cable alignments; and
8. Post construction survey campaigns (cable burial depth and bathymetric surveys).

### **Moneypoint Landfall (Northside of the Shannon Estuary) (Step 1)**

Site preparation works including civil and earthworks are required at Moneypoint to re-profile the existing coastline to the final design profile to enable the cable pull in to take place. The existing profile of the coastline is at the proposed landfall. The coastline at this location is typically between 8m and 10m AOD high with exposed rock at the cliff face.

Following cable installation, the concrete slipway structure will be backfilled (where appropriate) and encased by a pre-cast concrete slab that will sit on top of the backfilled material. Rock protection will be installed in front of the coastline at the toe of the concrete slipway to prevent the risk of erosion underlying or outflanking the new structure.

The proposed landfall works at Moneypoint include;

- excavation at the cliff;
- excavation at the foreshore to create four trenches for the cable installation;
- backfilling (including reuse of excavated material);
- construction of a permanent concrete 'slipway' structure;
- installation of pre-cast concrete cable troughs to be installed within the permanent concrete structure; and
- installation of a temporary anchored cable quadrant on the foreshore to assist with the cable pull-in operations.

### **Kilpaddoge Landfall Works (Step 1)**

Earthworks are required at Kilpaddoge landfall location to re-profile the existing coastline to the final design profile for the cable arrangement and to enable the cable pull in to take place. This will likely involve installation of rock / gravel filled gabion bags or backfill material to prevent deep burial of the cable that could induce the risk of cable de-rating.

Following cable installation, the existing coastline will be reinstated to its original profile and level. Rock protection may be installed in front of the coastline.

The coastline at this location typically between 3m and 4m AOD high with the geology of the coastline typically a glacial till material.

The proposed landfall works at Kilpaddoge include:

- excavation at the cliff;
- excavation at the foreshore to create four trenches for the cable installation;
- installation of rock/gravel filled gabion bags and/or backfilling (including reuse of excavated material; and
- rock protection.

### **Route clearance – All Cable Alignments (Step 2)**

Seabed clearance will be carried out by use of a Pre-Lay Grapnel tool (PLG), known as a pre-lay grapnel 'run'. At step 2, the PLG will be deployed along all four cable alignments to clear any obstacle that could obstruct the cable plough such as end-of-life cables, fishing nets, ropes, lines etc.

### **Seabed preparation – All Cable Alignments (Step 3)**

The cable alignment has been designed to align parallel to the fall of the steepest seabed slopes (i.e. perpendicular to the seabed contours). A slope parallel alignment reduces the complexity and risk of the cable installation operations. Seabed slopes between 10-25 degrees are observed in marine survey data near to the northern landfall. The steepest slopes angles occur for approximately 25-50m, between the 5m and 10m bathymetry contour. At these locations, seabed preparational works, such as rock filter bag placement, may be required to reduce the slope angles for cable installation purposes.

### **Submarine works – cable no.1 (Step 4)**

This section summarises the sequence of installation activities for cable no.1 only. The steps for cable no.1 will be repeated for cable no.2, no.3 and no.4 prior to final cable installation activities at the southern landfall.

#### **Sand wave re-profiling / dispersal– cable no.1 (Step 4a)**

A Mass Flow Excavation (MFE) tool will be deployed along cable no.1 for the purpose of sea-bed preparation only. This tool will be used to flatten sand waves with amplitudes of more than 0.5m and allow a cable plough to bury the cable to a controlled and determined depth. The MFE tool will be deployed for one cable alignment at a time to reduce the risk of sand waves re-establishing before cable installation. Sand wave reprofiling is required along approximately a 2km chainage of each cable alignment. The excavation width will be wide enough to allow the cable plough to pass and therefore will involve several passes with the tool. The duration will vary depending on ground conditions and target excavation depth.

#### **Post-MFE route clearance – cable no.1 (Step 4b)**

A secondary route clearance with a PLG tool will take place along cable no.1 following the recovery of the MFE tool. This will clear obstructions that may have become exposed after the MFE deployment. The PLG deployment will be the same as described above for the MFE tool.

#### **Cable pull-in: Moneypoint landfall – cable no.1 (Step 4c)**

The cables used in this operation will be loaded onto the CLB/CLV at a suitable port/facility pre-determined by the submarine cable installation contractor, subject to contractor's mobilisation risk assessment.

The CLB/CLV will start from a position approximately over the 15m bathymetry contour (less than 100m from the shoreline at Moneypoint). A messenger wire will be transported by a support vessel to shore and passed through the cable quadrant, over onshore cable rollers, and up to the cable winch. The winch will then pull the cable from the CLB/CLV to beyond the transition joint bay (TJB) at the top of the cliff. Here, the cable armouring is removed and secured to an armour clamp which will likely be incorporated into the seaward concrete wall of the TJB (subject to the Contractors design). The TJB is where the submarine cable is terminated and jointed to the land cable. Under this scenario, the total cable pull length is approximately 150m.

- Additional cable protection, such as cylindrical metallic cable protectors will be installed onto the cable as it is payed out for post installation protection requirements. Floats will also be attached to the cable as it is payed out from the CLB/CLV to keep the cable afloat during the pull-in. The pull-in will be programmed to coincide with high water on the neap tidal cycle to minimise current velocities and the vertical offset between the winch and CLB/CLV. The latter helps reduce the loading on the cable winch.
- The cable quadrant will assist in minimising the vertical free span of the cable above the ground. This helps from a cable management perspective but also reduces the cable loading as the cable is floating on the sea surface for a longer length. The quadrant will be designed to ensure the cable does not exceed the maximum bending radius.
- The cable alignments at Moneypoint have been designed to keep the alignment as straight as possible. A straight pull is preferred. To achieve a completely straight pull the CLB/CLV may position itself further west than the final installation position of the cable. This is more likely for the more easterly cables as the alignment fans out in a more easterly direction.

- The pull in installation programme will be co-ordinated to maximise the installation window around the neap tidal cycle, however, additional considerations, such as weather and daylight will be factored into the final installation contractors programme, risk assessments and procedures.

#### **Submarine cable no.2, no.3 and no.4 (Step 5)**

All sequences detailed in steps 4a to 4f above will be repeated until all four cables have been installed to KP2.2 and pulled ashore to Kilpaddock. The final steps of the works describe the final activity to bury the cables to their target depth between KP2.2 and 2.8.

#### **Post lay submarine cable installation – all cable alignments: KP2.2 to 2.8 (Step 6)**

After all four cables have been installed (buried) between KP0.0 and 2.2, post-lay burial of all four cables between KP2.2 and 2.8 will take place. A cable plough or jetting tool, either remotely operated (ROV) or pulled by a combination of the onshore winch and marine vessel. Figure 3.10 shows an example of a jetting tool. As noted previously above, based on the preliminary burial risk assessment and the results of the marine surveys additional protection is likely. This is described below in Step 7.

#### **Landfall and submarine cable protection installation (Step 7)**

The likely requirement for where additional cable protection has been identified by the preliminary burial risk assessment carried out to inform the proposed development subject to grant of statutory consent. This is subject to further design as the project progresses to detailed design and construction.

Additional protection over the buried in submarine works areas (below LAT) will be installed by a specialist marine contractor with a marine vessel. Installation of the rock protection will occur after the completion of the cable burial works described in the sections above.

#### **Post construction survey campaigns (Step 8)**

Following completion of the cable installation works, a programme of post-construction surveys will be required to confirm the target burial depth has been achieved. Future marine surveys will assist in monitoring the performance of the cables over the life of the new asset. It is anticipated that the rights to maintain and survey the cables over the life of the asset will be subject to the conditions of the grant of Foreshore licence approval. Typically, this is a series of bathymetric surveys over the entire cable route with the frequency of surveys decreasing over the asset life (but informed on the analysis of the previous survey results).

## 4 Control Measures

### 4.1 Introduction

The following sections detail the minimum control (mitigation) measures that will be implemented prior to commencement and throughout the duration of the proposed works.

As detailed in Section 1.2 *Purpose of this Outline CEMP*, the Project CEMP to be prepared by the appointed Contractor will incorporate the control measures detailed in this Outline CEMP in addition to specified conditions that may be prescribed in any grant of planning consent for the project, measures outlined in the Natura Impact Statement and the Planning and Environmental Considerations Report and any commitments given by EirGrid/ESB in relation to environmental protection associated with the activities outlined in this Outline CEMP.

All mitigation measures will be implemented under the supervision of an Environmental Clerk of Works (EnCoW). EnCoW will carry out daily inspection of the Shannon Estuary for evidence of pollution from the proposed development site.

### 4.2 Public Consultation

Community engagement will be undertaken before works commence on site explaining the nature and duration of the works to local residents.

Subject to agreement with the Consenting Authorities, a letter drop will be carried out to notify members of the public living near the proposed site, to advise them of any particularly significant upcoming traffic related matters e.g. temporary lane/road closures, key components at night.

A 24-hour emergency phone number will be maintained for the duration of the construction works. This number will be noted on temporary signage at each works area for cable works, and at the site entrance, at a minimum.

As part of the project CEMP, the Contractor will be required to develop and implement a Public and Stakeholder Management and Communication Plan which is to be agreed with the Planning Authorities prior to the construction phase. Appropriate marine traffic notices will be issued to all stakeholders in accordance with any requirements specified in the Foreshore Licence. The Contractor's method statements will consider the safety of users of the Shannon Estuary and foreshore when preparing and carrying out the construction works. Works will be coordinated to minimise impact on marine traffic. A Construction Transportation Plan will also be prepared in consultation with the local authority roads section.

### 4.3 General Site Environmental Rules

- Report any signs of pollution or environmental damage to the site foreman/ EnCoW no matter how small;
- Report any spills, incidents or near misses that occur on site immediately to the site foreman;
- Refuel only in designated areas with spill kits available;
- Do not dispose of anything into the river or stream or onto land. All waste must be sent to the designated site waste management areas;
- Do not throw litter, all waste must be sent to site waste management contractor; and
- Do not diver plant or machinery outside the authorised working boundaries of the site.
- The Contractor will ensure ongoing compliance with the recognised Environmental Management System Standard to which it is registered (e.g. EN ISO 14001 or equivalent European Standards);

- The Contractor will develop Environmental Procedures to control the potential impacts from the construction phase of the development. These procedures will be made available in the main site office and at the main Environment, Health and Safety information points on site;
- All personnel will be familiar with the Environmental Policy which will be made available in the main Contractor office;
- An emergency contact list will be prepared and made available to all construction staff employed. The contact list will be displayed prominently on site as well as at suitable locations where construction activity is being carried out around working areas. The contact list will include key environmental representatives that may need to be contacted in the event of an incident. A 24-hour emergency phone number will be maintained for the duration of the construction works. This number will be noted on temporary signage at each works area for cable works, and at the site entrance, at a minimum; and
- Emergency access routes will be maintained throughout construction and identify site access points for each working area. These will be developed in partnership with the emergency services and documented as part of the detailed CEMP(s) and Emergency Incident Response Plan.

#### 4.3.1 Stockpiling of Material

- To minimise the risk of instability, stockpiling of excavated materials will be undertaken only to heights and slope angles which the material is capable of supporting;
- All excavated material will be stored a minimum of 50m from watercourses and from any drainage ditches hydrologically connection to the Shannon estuary;
- All stockpiled material will be covered in order to prevent surface water run-off; and
- Silt fences or gravel drains will be positioned around stockpiles to prevent surface water run-off.

#### 4.3.2 Concrete Pouring

- No on-site concrete batching will be permitted at the works areas. Concrete will instead be transported to the site within a concrete truck;
- Quick setting concrete mixes will be used to reduce the risk of contaminated run-off;
- Concrete trucks will be washed down in designated wash down areas only. The wash down area will be located within the construction compound and not within 50m of any watercourse or drainage ditch;
- It will be ensured that covers are available for freshly poured concrete to avoid wash off in the event of rain;
- Waste concrete slurry will be allowed to dry and taken to an appropriately licensed waste facility for disposal;
- Concrete works will be scheduled during dry weather conditions only; and
- National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI) will be notified immediately of any concrete spills into sensitive watercourses.

#### 4.3.3 Containment and Storage of Materials

- Where mobile equipment is required e.g. generators, these will be housed in a suitably sized bund such that any leaks / spills are intercepted. No bunds will be located within 50m of any watercourse. Bund specification will conform to the current best practice for oil storage such as 'Best Practice Guide BPGCS005 Oil Storage Guidelines, Enterprise Ireland;
- Fuelling and lubrication of plant and equipment will be restricted to the construction compound site. No refuelling can occur within 50m of any watercourse or drainage ditch;
- All waste fuels, oils, and other hazardous wastes will be disposed of in accordance with the requirements of the Waste Management Acts 1996, as amended;

- Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment; and
- Welfare / hygiene facilities will be located within the construction compound a minimum of 50m from any watercourse / drainage ditch.

#### 4.3.4 Control Measures for Light Spill

- All construction lighting will be placed strategically under the supervision of the EnCoW to ensure there is no light spill on potential bat roosting sites, resting and important foraging sites. All lighting will be positioned away from all ecological sensitive area such as bat roosts, badger setts and the River Shannon. Lighting will be cowed and directional to reduce light splay within the area. Low pressure sodium or LED luminaires should be used. No luminaires with UV elements should be used. Column heights should be carefully considered to minimise light spill but Bat Conservation Ireland recommend a maximum height of 8m.

#### 4.3.5 Biosecurity Measures

- Before and after use, all relevant equipment (e.g. construction/ plant equipment, dumper trucks, etc.) will be thoroughly cleaned using Virkon Aquatic to guard against the spread of fish viruses, bacteria, fungi, and moulds;
- All water used in the cleansing, testing or disinfection of structures or machinery shall be rendered safe prior to discharge to the environment, particularly any chlorinated water;
- A post consent verification invasive species survey will be undertaken by a competent Ecologist during the optimal survey period to determine the presence of invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011;
- In the event that invasive species are identified within the works area a site-specific Invasive Species Management Plan will be developed and implemented by a competent Ecologist on behalf of the Contractor;
- Biosecurity measures will be implemented to ensure the introduction and translocation of invasive species is prevented. The biosecurity measures implemented will have regard to the IFI guidelines;
- Where works are carried out within drainage ditches, all machinery will be inspected and will be completely dry prior to works commencing;
- All machinery will be cleaned following completion of the works;
- To ensure the spread of invasive species are avoided a 'Check, Clean, Dry' protocol will be undertaken with all equipment, machinery and vehicles entering and leaving the proposed development boundary.
- Visual inspection of vehicles and machinery for evidence of attached plant or animal material prior to entering and leaving the works area;
- All machinery and equipment brought onto site should be dry and disinfected (if previously used in a contaminated site);
- The appointed EnCoW will carry out a toolbox talk which will identify invasive species and will also implement biosecurity measures such as the visual inspection of vehicles for evidence of attached plant or animal material prior to entering and leaving the works area;

#### 4.4 Emergency Planning and Response

In the event of an environmental emergency, a procedure for Environmental Emergency Preparedness and Response will be implemented by the Contractor in order to contain environmental impacts. An environmental emergency at the site may include;

- Discovery of a fire within the site boundary;

- Flooding;
- Uncontained spillage/leakage/loss of containment;
- Discharge of potential pollutants in excess of the environmental trigger levels;
- Any emissions that do not comply with the requirements of the contract documentation and relevant licences;

The general required emergency response actions will be posted at strategic locations, such as the site entrances;

As an example of emergency response actions required, in the event of a spillage, the following procedures will be followed;

- If safe, stop the source of the spill and raise the alarm to alert people working the vicinity of any potential dangers;
- If safe, contain the spill using the absorbent spills material provided, do not spread or flush away any spill;
- Cover or bund off any vulnerable areas where appropriate;
- Do not hose the spillage down or use any detergents;
- Contain any used absorbent material so that further contamination is limited;
- The EnCoW will inspect the site as soon as practicable and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The Contractor's EHS Officer will be notified so that used absorbent material can be disposed of using a licenced waste contractor; and
- An accident investigation will be performed in accordance with procedures and the report sent to the EnCoW. The EnCoW will notify the appropriate stakeholders such as Kerry County Council/Clare County Council, NPWS, Department of Communications, Climate Action and Environment and Department of Housing, Planning and Local Government and/or the EPA.

#### 4.5 Construction Environmental Management

The pre-construction phase of development includes preparatory works such as environmental surveys and consultation with statutory bodies and the general public. Following this process, site clearance activities will commence. Typical activities will include preparation of the construction working areas and topsoil stripping as well as the removal of vegetation and services from the proposed development site. Mobilisation activities will include appointing competent personnel on site, temporary facilities, plant and equipment, materials and systems for construction. Temporary facilities will be provided which will include construction phase car parking, welfare facilities and temporary laydown areas as necessary. This section outlines minimum requirements that will be established by the nominated contractor in the project CEMP and subsequent contractor method statements.

- Following engagement with landowners, the siting of the proposed development and the alignment of the underground route and landfalls were optimised to minimise habitat loss. Where the clearance of vegetation cannot be avoided, will be kept to a minimum as far as possible and the proposed works area will be defined at the outset by the erection of temporary fencing to define the limits of site works under the supervision of the EnCoW. The demarcation of the works area will ensure no vegetation clearance will occur outside the proposed development site boundary;
- Pollution prevention measures will be implemented prior to commencement of construction works;
- A "good housekeeping" policy will be employed at all times;
- Prior to commencement of development, the Contractor will prepare a Construction Waste Management Plan (as part of the Project CEMP) which will provide for the segregation of all construction wastes into

recyclable, biodegradable and residual wastes to facilitate optimum levels of re-use, recovery, and recycling operations;

- A full cable risk assessment will be carried out as a post consent verification survey and post construction monitoring protocol will be implemented;
- All work will be carried out having regard to international and national legislation, and best practice guidance, including but not limited to, guidance on preventing pollution from construction sites and pollution prevention guidance; and
- A comprehensive Health and Safety Programme will be put in place on the site prior to commencement of construction to minimise any risks to site personnel and visitors. The requirements of the *Safety, Health and Welfare at Work (Construction) Regulations 2013* (S.I. No. 291 of 2013) will be complied with at all times;

The following tables address individual control measures and monitoring measures as required.

**Table 4.1: Water Quality Control Measures**

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
Construction activities specifically site clearance and excavation	<p>All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for ‘Environmental Good Practice on Site (C741) and Control of water pollution from linear construction projects. Technical guidance’ (C648) C532 Control of water pollution from construction sites: guidance for consultants and contractors (Masters-Williams et al, 2001); SP156 Control of water pollution from construction sites – guide to good practice (Murnane et al, 2002) and under the supervision of an Environmental Clerk of Works (EnCoW).,.</p> <p>No works to occur outside demarcated site boundary.</p> <p>Silt fences will be installed along the length of the underground cable connections located adjacent to the Shannon. The posts will be either erected by hand or by machine. Silt fences will also be installed around the proposed landfall locations and should be positioned around stockpiles of excavated material to ensure no runoff from the stored material discharges into watercourses.</p> <p>The geotextile fabric must be entrenched at least 100mm into the ground with the ends upturned. The fence posts will have a maximum spacing of 2m to prevent sag on the fence, and the geotextile fabric will be anchored to the fence posts as opposed to wrapped. The alignment of silt fences will be identified by the EnCoW and installed under EnCoW supervision. The silt fences must be positioned to allow an appropriate working area within the site while also ensuring that they are located above areas prone to flooding (to ensure the silt fences are not inundated by water). Silt fences will be installed in advance of any ground disturbance. Daily inspection of silt fences will be carried out by the EnCoW to assess the effectiveness of the measures, to carry out maintenance, and to determine if there has been any damage / breach to the control measures. The EnCoW shall have regard inter alia guidance set out in CIRIA guidance. The silt fences will also be inspected immediately following heavy rainfall or strong winds (equating to a yellow weather warning). Where</p>	<p>ESB Lead Contractor and any subcontractors EnCoW</p>	<p>Mitigation and monitoring ongoing throughout construction</p>	<p>Lead Contractor to undertake regular (weekly) visual checks of construction areas record findings on log book</p>	<p>CEMP Pollution Emergency contingency plan Emergency Response Plan</p>

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	repair is necessary, this will be carried out immediately and may require replacement of any damaged / degraded material. All accumulated silt from silt fences will be removed and disposed of in line with Waste Legislation. The fences should be removed under the instruction and supervision of the project ecologist.				
During the installation of the underground grid connection across drainage ditches	<p>The works area will be completely isolated from the watercourse and any water present will be over pumped via appropriate sediment control i.e. filter bag and released to vegetated ground nearby. Any contaminated water will be removed and disposed of in accordance with Waste Legislation.</p> <p>All machinery used in proximity to the drainage ditches will be stored in bunded areas during the works.</p>	<p>ESB Lead Contractor and any subcontractors EnCoW</p>	Mitigation and monitoring ongoing throughout construction	Lead contractor to carry out regular site inspections to monitor compliance with the cEMP	CEMP
Biosecurity measures	<p>In addition to measures mentioned elsewhere in this OCEMP. All plant and equipment (including vessels) will be cleaned and disinfected in advance of coming to site and post works in accordance with Inland Fisheries Ireland (IFI) Biosecurity Protocols. All operatives will be briefed on IFI Biosecurity Protocols, and all disinfection / cleaning of plant and equipment must be witnessed by the EnCoW or said plant / equipment will not be permitted onto the site.</p> <ul style="list-style-type: none"> <li>• In the event that invasive species are identified within the works area a site-specific Invasive Species Management Plan will be developed and implemented by a competent Ecologist on behalf of the Contractor.</li> <li>• Biosecurity measures will be implemented to ensure the introduction and translocation of invasive species is prevented. The biosecurity measures implemented will have regard to the IFI guidelines.</li> <li>• Where works are carried out within drainage ditches and within the Shannon Estuary, all machinery will be inspected and will be completely dry prior to works commencing.</li> <li>• All machinery will be cleaned following completion of the works.</li> </ul>	<p>ESB Lead Contractor and any subcontractors EnCoW</p>	Mitigation and monitoring ongoing throughout construction	Lead contractor to carry out regular site inspections to monitor compliance with the cEMP	CEMP

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	<ul style="list-style-type: none"> <li>Visual inspection of vehicles and machinery for evidence of attached plant or animal material prior to entering and leaving the works area.</li> <li>All machinery and equipment brought onto site should be dry and disinfected (if previously used in a contaminated site).</li> <li>The appointed EnCoW will carry out a toolbox talk which will identify invasive species and will also implement biosecurity measures such as the visual inspection of vehicles for evidence of attached plant or animal material prior to entering and leaving the works area.</li> <li>To ensure the spread of invasive species are avoided a 'Check, Clean, Dry' protocol will be undertaken with all equipment, machinery and vehicles entering and leaving the proposed development boundary.</li> </ul>				

**Table 4.2: Biodiversity Measures**

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
Offshore activities- Minimise disturbance on Annex II species i.e. Bottle nosed Dolphins, lamprey and salmon	Cable laying operators will implement impact mitigation and monitoring measures in relation to marine mammals as outlined in DAHG Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014). Specifically, the contractor will implement the measures and protocols described in Section 4.3.4 of the guidance. In summary, trenching and cable laying activity will not commence until after the successful completion of pre-start visual monitoring, undertaken by MMOs as per DAHG guidance, with no marine mammals observed over the required monitoring period in the monitored zone. In addition, having regard to consultation with the NPWS advised that this would provide adequate protection, but in addition no works will occur during the month of August which coincides with the peak calving/breeding period for the species. The works will commence with a 'soft-start' procedure to allow lamprey, salmon and marine mammals to vacate the works area. The MMO will consult with the IWDG, prior to, during and after completion of the works unless otherwise agreed with the IWDG.	ESB Lead Contractor and any subcontractors EnCoW	Mitigation and monitoring ongoing throughout construction	Lead contractor to carry out regular site inspections to monitor compliance with the cEMP	CEMP

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
biosecurity measures	<p>Biosecurity measures must be employed during the construction phase. The biosecurity measures will have regard to IFI Biosecurity Protocols including:</p> <ul style="list-style-type: none"> <li>• IFI Biosecurity Protocol for Field Survey Work (December 2010);</li> <li>• IFI Invasive Species Biosecurity Guidelines for Anglers – leaflet (2011);</li> <li>• IFI Invasive Species Biosecurity Guidelines for Boaters – leaflet (2011); and</li> <li>• IFI Invasive Species Biosecurity Guidelines for Scuba Diving (2012)</li> </ul>	<p>ESB Lead Contractor and any subcontractors EnCoW</p>	<p>Mitigation and monitoring ongoing throughout construction</p>	<p>Lead contractor to carry out regular site inspections to monitor compliance with the cEMP</p>	CEMP
Onshore activities-	<p>With the exception of the crossing points and landfall activities no construction works will be undertaken within 10m of any drainage ditch, and this will be subject to careful control. No on-site batching will be undertaken at the proposed works areas. Concrete will instead be transported to the site within a concrete truck. Quick setting concrete mixes will be used to reduce the risk of contaminated run-off to the nearby watercourses. Concrete trucks will be washed down in designated wash down areas. The wash down area will be located within the construction compound and not within 50m of any watercourse or drainage ditch.</p> <p>No chemical and/or hydrocarbons will be stored on site during the construction phase. Instead, fuel tankers will be brought to site when required and will refuel within a designated impermeable, bunded area, within the construction compound and located a minimum of 50m from all watercourses. All hand-held equipment and generators will be stored on site in appropriately sized bunds when not in use.</p> <p>Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and at the site compound, and operators will be fully trained in the use of this equipment. All waste oil, empty oil containers and other hazardous wastes will be disposed of in conjunction with the requirements of the Waste Management Acts 1996, as amended.</p>	<p>ESB Lead Contractor and any subcontractors EnCoW</p>	<p>Mitigation and monitoring ongoing throughout construction</p>	<p>Lead contractor to carry out regular site inspections to monitor compliance with the cEMP</p>	CEMP
	<p>Where the clearance of vegetation cannot be avoided, vegetation removal will be kept to a minimum as far as possible. The proposed works area will be defined at the outset by the erection of temporary</p>	<p>ESB</p>	<p>Mitigation and monitoring ongoing</p>	<p>Lead contractor to carry out regular site inspections to</p>	CEMP

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	<p>fencing to define the limits of site works under the supervision of a qualified ecologist. The demarcation of the works area will ensure no vegetation clearance will occur outside the proposed development site boundary.</p> <p>Planting of any type of vegetation will not occur along the permanent underground cable circuits. Disturbed areas of ground will be reinstated by planting the same types of vegetation that were lost e.g. removed sections of hedgerow will be replanted using the same species such as Gorse, Blackthorn, Ivy and Bracken composition as recorded in the base line survey. This will ensure that following a re-establishment period, baseline vegetation patterns are substantially restored. The same approach will be applied to land cover by replacing agricultural grassland and scrubland on a like-for-like basis.</p> <p>In accordance with Section 40 of the Wildlife (Amendment) Act, all vegetation clearance within the footprint of the proposed development will be undertaken outside of the birds nesting season (1st March to 31st August inclusive) to ensure there are no impacts to protected breeding birds. However, if such periods cannot be avoided, nesting bird surveys should be carried out by a suitably experienced ecologist over a sufficient duration, and in suitable weather conditions, to provide confidence in the findings. Where no nests are recorded, the area may be cleared. Where nests are recorded, these areas (plus a precautionary buffer) should be excluded from disturbance until after birds have fledged as determined by further monitoring by the ecologist.</p> <p>In the event that the construction phase of the development is delayed more than 12 months after the initial surveys, a post consent verification otter survey will be undertaken within the Zol of the proposed development site to establish the presence of any new habitats or species</p> <p>To ensure the spread of invasive species is avoided a 'Check, Clean, Dry' protocol will be undertaken by the appointed EnCoW with all equipment, machinery and vehicles entering and leaving the proposed development boundary</p>	Lead Contractor and any subcontractors EnCoW	throughout construction	monitor compliance with the cEMP	

**Table 4.3: Marine Aspects Measures**

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
Subsea Cable installation	<p><u>Sand Waves</u> - Prior to cable installation another survey will be carried out to locate these sediment features and design the cable route to avoid those areas. As these features are dynamic in nature. A pre-installation clearance technique, proposed as a mass flow excavation (MFE) tool, will be deployed during the construction phase along the cable in order to flatten sand waves with amplitudes of more than 0.5m. This activity will reduce the risk of sand waves re-establishing after the cable installation. In areas where it is not possible to avoid these features, it is recommended to bury the cable deeper in order to avoid the cable damage.</p> <p><u>Seabed Slopes</u> - the use of rock filled bags in areas where the steep slope can't be avoided.</p> <p><u>Sediment Dispersion</u> - Construction activities such as trenching, and cable installation will release sediment and they will be dispersed in the area due to currents. Best practice guidelines will be adopted by the Contractor to avoid unnecessary sediment dispersion during the submarine cable installation.</p> <p>Installation of the cable should be programmed in advance to avoid spring tides. Undertaking the cable installation during neap tides when the tidal flows are smaller is likely to result in the settling of sediment more rapidly and less dispersion of suspended sediment.</p> <p><u>Shoreline Erosion/slope design</u> - As a prevention to avoid shoreline erosion a rock revetment is designed to be installed at the toe of the concrete slipway structure. This rock revetment will limit the amount of erosion and the potential of landslides at the cliff. Monitoring of the structure is recommended on a yearly basis in order to assess any early erosion signs and prevent the potential collapse of the structure.</p> <p><u>Sediment Mobility</u> - A preliminary cable burial risk assessment has been completed to reduce the risk of the cable being exposed or undermined due to sediment mobility over the operation life of the cable. The assessment has considered different survey datasets of the study area however predicting long term change in the River Shannon is complex even with sediment modelling. Post construction monitoring. A campaign of periodic marine survey inspections over the as built location of the cables to monitor the movement of sand waves and determine cable burial depth. Ongoing monitoring allows the cable operator with the data necessary to mitigate the long-term risk of cable burial and exposure of the cable by way of early intervention. The specification of the types of marine</p>	ESB Lead Contractor and any subcontractors EnCoW	Mitigation and monitoring ongoing throughout construction	Lead Contractor to undertake regular (weekly) visual checks of construction areas record findings on log book	CEMP

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	survey techniques and frequency of the surveys will be confirmed prior to completion of the cable installation works. This enables the construction survey data to be part of the assessment.				

**Table 4.4: Dust Control Measures**

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
Minimise Dust emissions	<p>A Dust Management Plan (DMP) will be prepared as part of the project Construction Environment Management Plan (CEMP). As part of the CEMP, the Contractor will also develop and implement a stakeholder communications plan as part of the CEMP which will facilitate community engagement prior to the commencement of construction. The CEMP will be based on the outline CEMP as provided.</p> <p>The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the construction works.</p> <p>The outline dust management plan, as set out below, has been formulated by drawing on best practice guidance.</p> <ul style="list-style-type: none"> <li>• Communication</li> </ul> <p>Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary.</p> <p>Display the head or regional office contact information</p> <p>It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents.</p> <ul style="list-style-type: none"> <li>• Site Management</li> </ul> <p>Record all dust and air quality complaints, identify causes and take appropriate measures to reduce emissions in a timely manner and record the measures taken.</p> <p>Make a complaint log available to the local authority, when asked.</p> <p>Record any exceptional incidents that cause dust and or air emissions, either on or off site, and the action taken to resolve the situation in the log book.</p> <ul style="list-style-type: none"> <li>• Preparing and maintaining the site</li> </ul>	ESB Lead Contractor and any subcontractors EnCoW	Mitigation and monitoring ongoing throughout construction	Lead contractor to carry out regular site inspections to monitor compliance with the DMP, record inspection results and make an inspection log available to the local authority when asked  Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions	CEMP and DMP

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	<p>Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible.</p> <p>Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles</p> <p>Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.</p> <p>Avoid site runoff of water or mud.</p> <p>Keep site fencing, barriers and scaffolding clean using wet methods.</p> <p>Remove materials that have a potential to produce dust from site as soon as possible unless being re-used on site; if they are being reused on site cover as described below.</p> <p>Cover seed or fence stockpiles to prevent wind whipping.</p> <p>Operating vehicles/ machinery and sustainable travel.</p> <p>Ensure all vehicles switch off engines when stationary – no idling vehicles.</p> <p>Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.</p> <p>Impose and signpost a maximum-speed limit of 15mph on surfaced and 10mph on unpaved surface haul roads and work areas.</p> <ul style="list-style-type: none"> <li>• Operations</li> </ul> <p>Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction.</p> <p>Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation using non-potable water where possible and appropriate.</p> <p>Use enclosed chutes and conveyors and covered skips.</p> <p>Minimise drop heights from conveyors loading shovels hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever available.</p> <p>Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.</p> <ul style="list-style-type: none"> <li>• Measures specific to construction</li> </ul> <p>Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular</p>				

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	<p>process in which case ensure that appropriate additional controls measures are in place.</p> <ul style="list-style-type: none"> <li>Measures specific to trackout</li> </ul> <p>Use water-assisted dust sweepers on the access and local roads, to remove as necessary any material tracked out of site.</p> <p>Avoid dry sweeping of large areas.</p> <p>Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.</p> <p>Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.</p> <ul style="list-style-type: none"> <li>Record all inspections of haul routes</li> </ul> <p>Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).</p> <p>Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit and layout permits.</p>				

**Table 4.5 Noise Control Measures**

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
Minimise construction noise emissions	<p>A Construction Noise Management Plan will be prepared. In this document the Contractor is obliged to give due regard to BS5228:2009+A1:2014 Part 1 and Part 2, which offers details guidance on the control of noise and vibration from construction activities. The proposed development will implement best practical means (BPM) as defined in BS5228 standard to all on site activities. Noise and vibration from construction activities will be limited to the values set out in the BS5228 and adhered to during the construction phase.</p> <p>It is also recommended that a comprehensive noise monitoring protocol be set out within the Noise and Vibration Construction Management Plan. Construction noise and vibration levels will be monitored and assessed at locations representative of sensitive receptors in the vicinity of the works typically at the agreed locations closest to the works;</p>	ESB Lead Contractor and any subcontractors EnCoW	Mitigation and monitoring ongoing throughout construction	On a continuous basis throughout construction, and frequently reviewed As and when required, during critical phases of construction; comprehensive noise and vibration monitoring protocol will be set out within the Noise and Vibration Construction Management Plan. Construction noise and vibration levels will be monitored and assessed In response to the receipt of reasonable	Construction Noise Management Plan CEMP

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	<ul style="list-style-type: none"> <li>On a continuous basis throughout construction, and frequently reviewed by the Environmental Clerk of Works (EnCoW);</li> <li>As and when required, during critical phases of construction; and</li> <li>In response to the receipt of reasonable complaints investigated by the EnCoW.</li> </ul>			complaints investigated by the EnCoW. At locations representative of sensitive receptors in the vicinity of the works typically at the agreed locations closest to the works	

**Table 4.6: Archaeological and Cultural Protection Measures**

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
Protection of unknown archaeological features	<p>All mitigation measures will be undertaken in compliance with national policy guidelines and statutory provisions for the protection of the archaeological, architectural and cultural heritage.</p> <p>All archaeological works will take place under licence to the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DCHG) and the National Museum of Ireland (NMI) in accordance to National Monuments Act 1930, as amended</p>	ESB Lead Contractor and any subcontractors EnCoW	Mitigation and monitoring ongoing throughout construction	Lead contractor will ensure the site preparation groundworks will be archaeologically monitored by a suitably qualified archaeologist	CEMP and archaeological programme of works & licensing if required.

**Table 4.7: Material Assets and Traffic Management**

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
Minimise Construction Traffic Nuisances	<p>Certain aspects of the development of the proposed development to date have already included mitigation in terms of design and route selection, for example.</p> <p>Prior to commencement of the development, a Construction Traffic Management Plan will be prepared in consultation with Kerry County Council and Clare County Council.</p> <p>The CTMP will identify the safety measures required at access and egress locations and will take into consideration the following guidelines, as appropriate:-</p> <ul style="list-style-type: none"> <li>Department of Transport "Guidance for the Control and Management of Traffic at Road Works", (2010); and</li> <li>Department of Transport "Chapter 8: Temporary Traffic Measures and Signs for Roadworks", (November 2010).</li> </ul>	ESB Lead Contractor and any subcontractors EnCoW	Mitigation and monitoring ongoing throughout construction	An update on the implementation of the CTMP will be provided regularly to the planning authorities as part of the implementation of the CEMP	CTMP and CEMP

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	<ul style="list-style-type: none"> <li>• Traffic Management Co-ordinator</li> </ul> <p>The appointed contractor will provide a competent person with responsibility for traffic management coordination for the duration of the project. This person will be the main point of contact for all matters relating to traffic management on the project.</p> <p><u>Site Induction</u></p> <p>All workers will receive a comprehensive site induction which will include, as appropriate, a section on traffic management and clear guidance on the routes which should and should not be used.</p> <p><u>Signage</u></p> <p>A system of clear signage relating to the proposed development, both temporary and permanent, will be agreed with the consenting authorities. These signs will also identify those roads to be used (and not to be used) for accessing the site in line with the objectives of the CTMP.</p> <p><u>On-Site Vehicle Cleaning</u></p> <p>Temporary wheel washing facilities will be located at the site entrance, subject to agreement with the consenting authority, to prevent soil/dirt from being transported onto the public road network.</p> <p><u>Road Cleaning and Maintenance</u></p> <p>Where required, Road sweepers will be utilised to maintain the public roads in a clear condition. This will apply especially during the earthworks stages of the proposed development.</p> <p><u>Cable Route Proofing</u></p> <p>In advance of any works associated with cabling, 'route proofing' will be carried out to define the precise alignment of the cables to be laid, where possible, existing services. This step will allow for the cabling works to be carried out as expeditiously as possible thereby minimising the impact on road users and local residents.</p> <p>A temporary laydown area will be located to the Moneypoint Generating Station Complex and on lands adjacent to the existing Kilpaddoge GIS substation. Temporary laydown areas are also required on either side of the Shannon Estuary at the landfall locations. Car parking will be provided within the temporary laydown area within the Moneypoint Generating Station Complex and Kilpaddoge GIS Substation during the construction phase.</p> <p>All HGV traffic will approach site access from the existing station entrances. The preparation of the CTMP and general matters relating to construction will occur in the context of and having regard to the CEMP and other related matters and deliverables relating to the</p>				

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	development within the Moneypoint Generation Station and the Kilpaddock BESS development The CEMP will be based on the OCEMP which accompanies these applications.				
Minimise service disruptions	<p>All reasonable measures will be taken to avoid unplanned disruptions to any services during the proposed works. This will include thorough investigations to identify and reconfirm the location of all utility infrastructure within the works areas, and the implementation of robust procedures when undertaking works around known infrastructure services.</p> <p>Service disruptions impacting the surrounding residential, social and commercial properties will be kept to a minimum, only occurring where unavoidable. Prior notification of disruptions will be given to all impacted properties. This will include information on when disruptions are scheduled to occur and the duration of the disruption. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruptions.</p>	ESB Lead Contractor	In advance of works	Lead Contractor	CEMP
Waste Management	<p>A Construction Waste Management Plan (as part of the CEMP) will be prepared prior to commencement of development. The plan will provide for the segregation of all construction wastes into recyclable, biodegradable and residual wastes to facilitate optimum levels of re-use, recovery, and recycling operations. The need for concrete, tarmacadam, and other quarry products in the construction of the proposed development is unavoidable. The impact is lessened in that all quarries are registered and have been granted planning permission and should therefore operate to the highest environmental standards.</p> <p>The plan will be prepared in accordance with waste management guidance and principles as outlined in <i>Design Out Waste: A design team guide to waste reduction in construction and demolition projects</i> (EPA, 2015) and <i>Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects</i>, Department of the Environment, Heritage and Local Government (DoEHLG), June 2006.</p> <p>All operations at the site will be managed and programmed in such a manner as to prevent/minimise waste production and maximise upper tier waste management (i.e. re-use, recycle, and recovery) in line with the Waste Hierarchy where technically and economically feasible. The Plan will also deal with any litter arising during the construction phase of the development.</p> <p>Wastes sent off site for recovery or disposal will only be conveyed by an authorised waste contractor and transported from the proposed development site to an authorised site of recovery/disposal in a</p>	ESB Lead Contractor	Mitigation and Monitoring ongoing throughout the construction	Lead Contractor to carry out waste audit during the contract scope Lead contractor to implement Waste Management Plan	CEMP Construction Waste Management Plan

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	<p>manner which will not adversely affect the environment. All employees will be made aware of their obligations under the Plan.</p> <p>The Plan will be available for inspection at the site of the proposed substation at all reasonable times for examination by the Local Authorities.</p> <p>All waste generated during the operational phase will be managed in accordance with the relevant provisions of the Waste Management Act 1996 and associated amendments and regulations, particularly with regard to the use of appropriately permitted waste contractors and destinations for waste materials.</p>				

**Table 4.8: Land, Soil and Geology**

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
Protection of soils and land	<p>To minimise the risk of instability, stockpiling of excavated materials will be undertaken only to heights and slope angles which the material is capable of supporting. These stockpiles will be stored at level ground, with a silt fence inserted at the base, at a minimum distance of 10 metres from a drain or watercourse.</p> <p>Imported materials and any site won materials will be tested prior to use in order to determine their geotechnical and geo-environmental properties in order to assess their suitability for use. This will minimise the potential for instability of finished landforms / stockpiles and prevent importation of contaminated materials to site.</p> <p>Bunds for the storage of chemicals will be lined or constructed of materials resistant to damage by the materials stored therein. Additionally, the capacity of such bunds will be a minimum of 110% of the volume of the largest container stored therein. Bunds will be designed in accordance with Environmental Protection Agency guidance in relation to the storage of potentially polluting liquids ("IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities", 2004).</p> <p>Where refuelling is to take place on site it will be within a designated impermeable, bunded area, away from all drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area.</p> <p>All relevant personnel will be fully trained in the use of this equipment.</p>	<p>ESB</p> <p>Lead Contractor and any subcontractors</p> <p>EnCoW</p>	<p>Mitigation and monitoring ongoing throughout construction</p>	<p>Lead contractor will ensure the site preparation groundworks</p>	<p>CEMP.</p>

Activity	Mitigation	Responsibility	Timescale	Monitoring	Implementation Route
	<p>Drip trays will be used where hydrocarbons are being used for vehicle maintenance/refuelling.</p> <p>Portable chemical toilets will be provided for the duration of the works and all waste material will be removed from site and disposed of to an appropriately licensed facility.</p> <p>Rainfall accumulating in the base of the trenches will be discharged to a designated percolation area (via a fuel interceptor if required to reduce risk of impact to groundwater quality).</p> <p>Concrete material will be stored in bunded areas.</p> <p>Compacted concrete material will be placed around the ducts.</p> <p>For the concrete / road sections of the cable route (i.e. along the internal access tracks) the reinstatement will be carried out in consultation with the landowners, as appropriate.</p> <p>For unsurfaced/grass sections, backfilling with suitable excavated material (gravel/soil) placed and compacted above the top row of ducting to ground level.</p> <p>Excavated material and top soil will be stored and capped for re-use in separate stockpiles alongside the trenches. Surplus material will be stored or reused elsewhere inside the allocated construction boundary. These stockpiles will be stored at level ground, with a silt fence inserted at the base, at a minimum distance of 10 metres from a drain or watercourse.</p>				

