

**Department of Housing, Local Government and Heritage**

# EirGrid Cross Shannon 400kV Electricity Cable Project (FS007083)

Non-Statutory Environmental Appraisal Report

Reference: Rep001

Issue 2 | 20 May 2022

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 284319-00

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# 1. Introduction

Arup with Hartley Anderson has been appointed by the Department of Housing, Local Government and Heritage (the Department) to assess the Foreshore consent application, reference number FS007083, for the installation of the Eirgrid Cross Shannon 400kV Electricity Cable Project, County Clare and County Kerry.

Arup and Hartley Anderson's brief included:

- The examination of environmental aspects of the application, any supplementary information provided, and any relevant information received through consultations, and
- The preparation of an 'Environmental Report (Non-statutory)' with conclusions.

The work includes:

- A comprehensive analysis of all submissions (public and prescribed) received including the provision of expert commentary,
- Where relevant, the drafting of conditions relating to environmental issues for the inclusion in any Foreshore Consent issued as a result of the application to hand.

This report responds to the Department's requirements. This report presents a non-statutory environmental appraisal and a Screening for EIA of the Eirgrid Cross Shannon 400kV Electricity Cable project.

## 2. Methodology

### 2.1 Information Available to Arup

The information regarding the proposed development, which formed the basis for the EIA screening and the non-statutory environmental appraisal, was obtained from the application file (Ref. FS007083) on the Department's website, which was accessed on 27 October 2021.

The information comprised:

- Application form and supporting documents
  - Application form [Applicant: EirGrid PLC, dated 30-07-2020]
  - Subsea Cable Northern Landfall – Moneypoint - Plan Layout & Sections [Mott MacDonald (MMD), dated 10-07-2020]
  - Subsea Cable Southern Landfall – Kilpaddoge - Plan Layout & Sections [MMD, dated 10-07-2020]
  - Foreshore Licence Subsea Cable Northern Landfall - Moneypoint Plan Layout & Sections [MMD, dated 10-07-2020]
  - Foreshore Licence Subsea Cable Southern Landfall – Kilpaddoge Plan Layout & Sections [MMD, dated 10-07-2020]
  - Foreshore Licence Subsea Cable Route - Plan Layout & Sections [MMD, dated 14-10-2020]

- Foreshore Licence Subsea Cable Route - Longitudinal Section [MMD, dated 22-10-2020]
- Project Area – Discovery Mapping [MMD, dated 30-06-2020]
- Proposed Project Area – Orthophotography [MMD, dated 30-06-2020]
- Adjacent Landowner Folios Index Map [MMD, dated 01-07-2020]
- Adjacent Landowner Folios North of the Shannon Estuary [MMD, dated 01-07-2020]
- Adjacent Landowner Folios South of the Shannon Estuary [MMD, dated 30-06-2020]
- Admiralty Chart [MMD, dated 30-06-2020]
- Designated Ecological Sites [MMD, dated 30-06-2020]
- Aquaculture / Fishery Interests [MMD, dated 01-07-2020]
- Foreshore Licence Map [MMD, dated 01-07-2020]
- Foreshore Drawing Register [MMD]
- Electricity Supply Board (ESB) Letter of Consent to An Bord Pleanála [ESB, dated 30-04-2020]
- Landowner Letter of Consent to An Bord Pleanála
- Screening Statement for Appropriate Assessment and Natura Impact Statement [AQUAFAC for MMD, July 2020]
- Planning and Environmental Considerations Report [MMD, dated 30 July 2020]
- Outline Construction and Environmental Management Plan (Outline CEMP) [MMD, dated 30 July 2020]
- SID pre-application ABP-305271-19 - An Bord Pleanála Inspector's Report [An Bord Pleanála, dated 16/04/2020]
- SID application ABP-307798-20
  - Department of Culture, Heritage and the Gaeltacht Submission to An Bord Pleanála, dated 25/09/2020
  - Clare County Council Submission to An Bord Pleanála, dated 25/09/2020
  - Kerry County Council Submission to An Bord Pleanála, dated 02/10/2020
  - Request for further information from An Bord Pleanála to MMD [An Bord Pleanála, dated 23-10-2020]
  - Applicant Response to An Bord Pleanála to the request for further information, dated 03/12/2020
  - An Bord Pleanála Order (Approval decision) [An Bord Pleanála, dated 04/06/2021]
- Public Notice
  - Clare Champion Public Notice, dated 04/05/2021
  - Irish Independent Public Notice, dated 06/05/2021
  - Kerry's Eye Public Notice, dated 04/05/2021
- Prescribed Body Consultation

- FS007083 Prescribed Bodies Observations
- FS007083 Applicant's responses to Prescribed Bodies Observations

Arup also reviewed the relevant information about the EirGrid Cross Shannon Electricity Cable Project on An Bord Pleanála web-site, specifically

- SID application ABP-307798-20 - An Bord Pleanála Inspector's Report, dated 11/01/2021

A request for information was issued to the Applicant by the Department on 2 December 2021. The Applicant responded on the 7 January 2022. A further request was issued to the Applicant on 26<sup>th</sup> January and a meeting was held on the 31<sup>st</sup> January between EirGrid representatives, the Department and their Independent Environmental Consultants (Arup and Hartley Anderson) where EirGrid sought clarification over what information was required to be provided to satisfy the request. The Applicant responded on 22<sup>nd</sup> February 2022.

Arup had regard to the findings of the following reports:

- Hartley Anderson Ltd (2022) *Appropriate Assessment Screening Cross Shannon Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage - updated following RFI's (February 2022)*
- Hartley Anderson Ltd (2022) *Appropriate Assessment Cross Shannon 400 kV Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage (May 2022).*
- Hartley Anderson Ltd (2022) *Article 12 Risk Assessment - Cross Shannon 400 kV Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage (February 2022).*

## 2.2 Methodology

Arup relied on the information from the Applicant and the statutory bodies contained in the application file (the application) on the Department's website, and on the response to the request for information. Arup relied on the description of the baseline environment provided in the Screening for Appropriate Assessment and Natura Impact Statement (NIS) (Aquafact, July 2020), and on the description of the proposed works in the Application Form, the Planning and Environmental Considerations Report (PECR), the Outline Construction and Environmental Management Plan (outline CEMP) and the An Bord Pleanála Inspector's Report. Arup referred to publicly available data sources listed in **Section 18** below. Arup also relied on the NIS, the Application Form, the Outline CEMP and the Applicant's responses to the prescribed bodies' observations regarding the mitigation measures to be implemented in the proposed development.

The impact descriptions used in this appraisal are in accordance with the Environmental Protection Agency *Revised Guidelines on the Information to be contained in Environmental Impact Statements* (Draft August 2017).

## 3. Background

High levels of renewable generation are planned for the South-West of Ireland. In order to allow the integration of the increased renewable generation, EirGrid is planning a suite of reinforcement projects aiming to maximise the capabilities of the existing network in the mid-west. The proposed development, known as the "Cross Shannon 400 kV Cable Project" is part of this suite of projects and involves the installation and operation of submarine electricity cables across the Lower Shannon Estuary. The development includes work in the foreshore for which a Foreshore Licence is required.



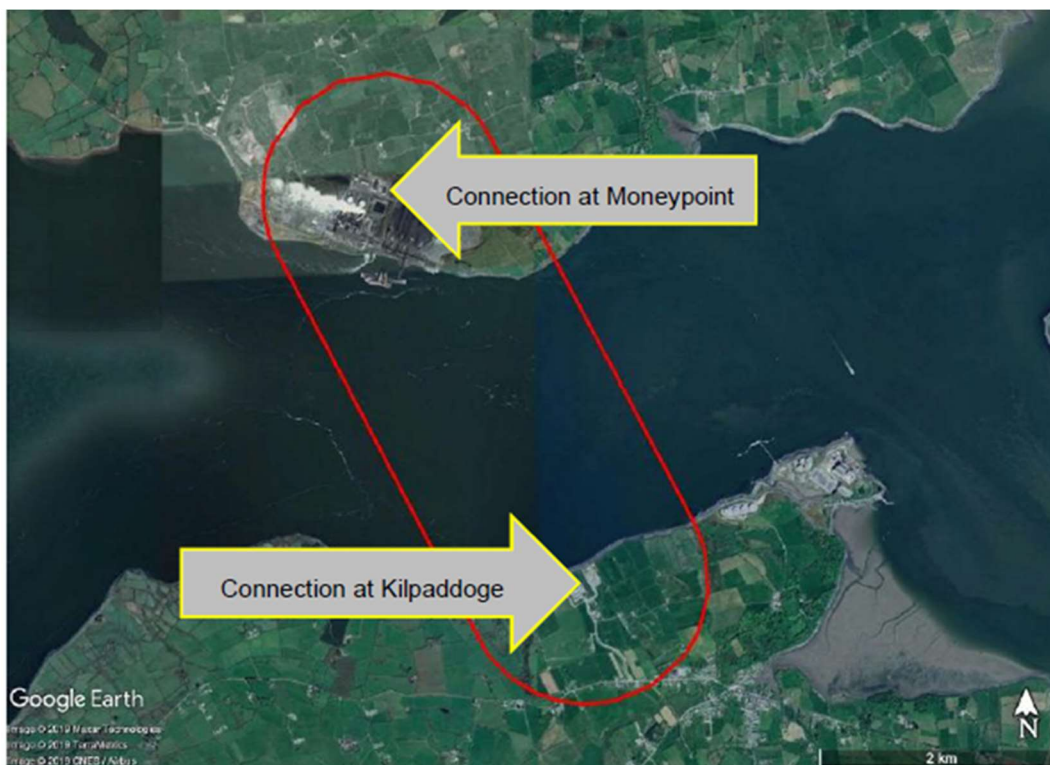
In July 2020, EirGrid applied to the Department of Housing, Local Government and Heritage (formerly the Department of Planning, Housing and Local Government), for a Foreshore Licence (Ref. FS007083) for the installation and operation of the proposed infrastructure. EirGrid appointed Mott MacDonald to prepare the Screening Statement for Appropriate Assessment and NIS, the PECR and the Outline CEMP to accompany the application for the Foreshore Licence.

In July 2020, EirGrid applied to An Bord Pleanála (Ref. ABP-307798-20) for approval for the electricity transmission infrastructure, as a Strategic Infrastructure Development. In June 2021, An Bord Pleanála granted planning approval to EirGrid for the project.

## 4. Description of Proposed Development

### 4.1 Proposed Project Location and Description

The Cross-Shannon 400 kV Cable Project involves the laying of 4 no. 400 kVs cables across the Shannon Estuary in or on the seabed between the Moneypoint 400 kV Electricity Substation in the townland of Carrowdotia 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 a 5,500m<sup>2</sup> extension to the existing substation on ESB lands. Figure 1 below shows in red the project area.



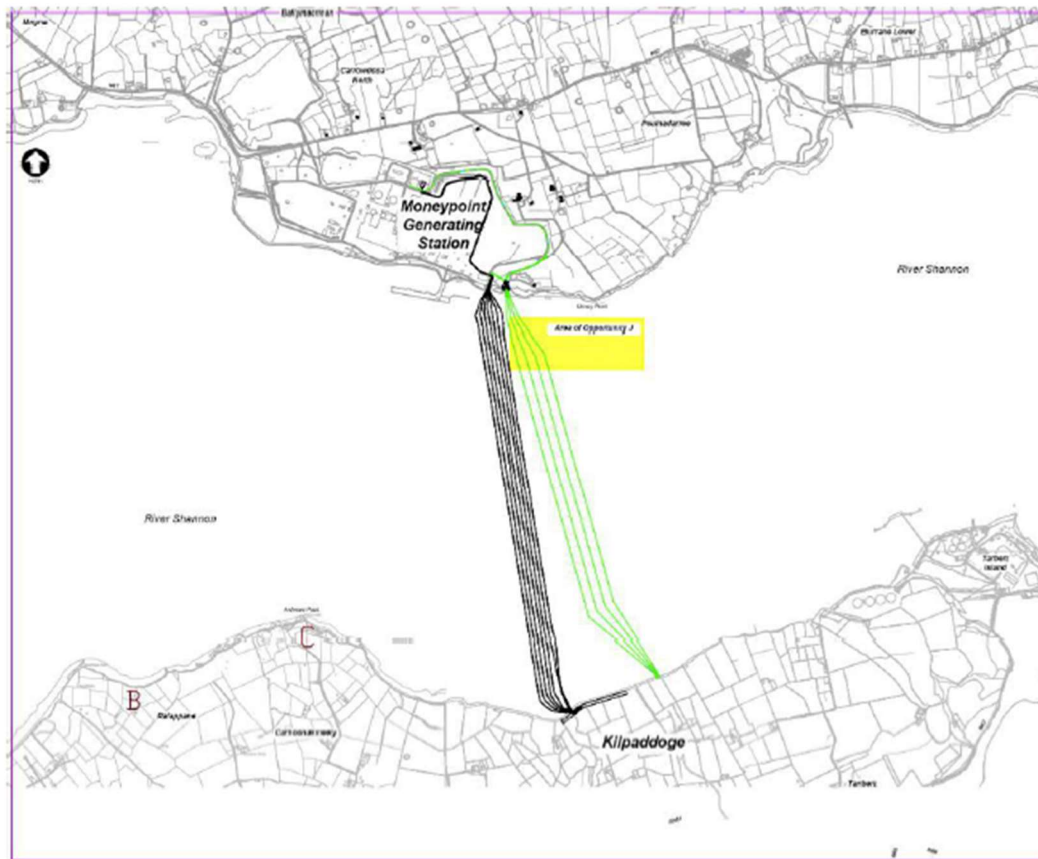
**Figure 1 Overview of the Project Area**

The cable landing area on the southern shore, in County Kerry, is in ESB ownership. The cable landing area on the northern shore, in County Clare, is in private ownership. The landowner consented to the making of the planning application. The cable landing area is to the east of the existing Moneypoint 400kV landholding and substation compound and an onshore cable run of approximately 1.8 km in length will be required to connect into the existing connection point in the 400 kV substation.

## 4.2 Cable Description

As shown in **Figure 2** below, the proposed development consists of:

- Onshore development comprising a connection at the Moneypoint Substation and a connection at the Kilpaddoge Substation, and
- A submarine development, consisting of the laying of 4 no. 400 kV submarine cables across the Lower Shannon Estuary. The application refers to this part of the proposed development, specifically the cables located below the line of high-water of ordinary or medium tides.



**Figure 2 Proposed 400kV Cables (Green) and Existing 220kV Cables (Black). Source: PECR**

### 4.2.1 Onshore Development

#### 4.2.1.1 Connection at Moneypoint Substation

Moneypoint Electricity Generating Station is an existing operational coal fired power station which consists of three generators to produce electricity to supply the main transmission network. Moneypoint 400kV 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.

The landfall is the location where the submarine cable is brought ashore. The landfall comprises concrete cable troughing, associated civil works and transition joint bays. The joint bays enclose 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 in the Moneypoint Electricity Generating Station. The proposed landfall is located east of the existing Moneypoint-Kilpaddoge 220 kV cable landfall. Refer to **Figure 2**. The proposed cable route will head north from the proposed landfall, turn north-east for approximately 280m along third-party land before joining the access road, which is elevated, and will skirt the perimeter of the ash depository and the power station. This route continues north / northeast along the road and then turns west towards the 400 kV substation when it will join another access road which runs in front of the substation compound. The route of the proposed 400kV cables onshore from the northern landfall are shown in **Figure 2**.

The cable route runs parallel to the Kilpaddoge-Moneypoint 220 kV cable circuits on approach to the substation. It then crosses these cable circuits before entering the 400 kV GIS building. Three precast concrete joint bays will be installed along the cable route during these works and the approximate footprint of each joint bay is 10m length, 3m wide and 2m deep.

#### **4.2.1.2 Connection at Kilpaddoge Substation**

Kilpaddoge station is a relatively newly constructed 220 / 110 kV GIS substation to the south of the Shannon Estuary in County Kerry. 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.

The transformer will convert the voltage from 400 kV to 220 kV and a cable connection will be 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.

An extension to the existing Kilpaddoge Electrical Substation of approximately 5,500m<sup>2</sup> will be required to facilitate new 400 / 220 kV AIS equipment and associated compound.

The proposed 400 kV cable circuit will run south from the southern landfall to the existing Kilpaddoge 220 kV GIS substation via a 400 kV AIS bay and a 400 / 220 kV power transformer. The proposed landfall is located approximately 60m north of the existing substation.

#### **4.2.2 Submarine Cable**

##### **4.2.2.1 Cable Configuration**

The Shannon Estuary is approximately 100km in length and has a tidal range of approximately 5m 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 circa 1.8km to the east of the Moneypoint Electricity Generating Station on the northern side of the Shannon Estuary to a landfall at Glencloosagh Bay, directly north of Kilpaddoge substation, on the southern side. The overall estimated submarine cable route length is approximately 2.8km. At the crossing point the Estuary is designated as the Lower River Shannon Special Area of Conservation (SAC) and the River Shannon and River Fergus Estuaries Special Protection Area (SPA). The area of the proposed submarine cable corridor between the high-water mark of ordinary or medium tides on each shoreline is approximately 0.737km<sup>2</sup>.

A communication link will also be provided between the two substations. This will take the form of two fibre optic cables laid alongside or integrated into the proposed 400 kV cables.

The proposed cable configuration in the submarine area will comprise four cables, spaced up to 60m apart. At a point approximately 500m from the Low Water Mark at each landfall, the cable spacing will gradually reduce until they are equidistantly spaced approximately 4m apart.

#### **4.2.2.2 Cable Protection**

The riverbed varies along the proposed route alignment from fine to coarse gravelly sand to fine sand. Gravelly clay is limited to the near shore areas. Where the estuary bed is soft, the cables will be buried to a depth between 1m and 3m. This will be achieved using water jetting and/or a cable trenching machine. Where the estuary bed is too hard to allow burial to be achieved, the cables will be laid on the bed and covered with a 0.5m layer of protective rock. The preferred protection measure is the use of rock-filter bags.

Rock filter bags were used for the protecting the existing 220 kV cables and are the preferred protection solution as they are inert material, have a high flexibility and it is possible to install many filter bags at a time. Based on the preliminary burial risk assessment and the results of the marine surveys, approximately 1,000m of additional protection will be required at the approach to northern landfall, near the centre of the channel and at the approach to the southern landfall.

Local rock supplies will be used as the priority but imported rock may be necessary. In either case it is common practise that the rock characteristics, such as grade and quality, are screened and tested such that it meets the design specification as defined at the detailed design stage. A rock specification will ensure that fines are removed, and the rock is washed as necessary.

The submarine installation process will not require the deliberate dredging or disposal of material within the maritime area.

#### **4.2.2.3 Cable Protection at the Landfalls**

##### ***Northern Landfall***

Approaching the northern landfall, the cables will be laid on the seabed. The cables will have the protection of cylindrical metallic cable protectors / articulated pipes / split pipes in this area and the protection will extend from above the low water mark to almost the high-water mark. The cable articulate pipe protector casing is typically made of cast iron shells that protect the minimum bend radius of the cable, as well as providing protection against third party contact. The cable protector will probably be installed onto the cable on board the cable lay vessel prior to cable float out and installation. The cables, encased in the articulated pipe protection, will also have rock protection on the underwater approach to the northern landfall. The rock protection will form a continuous layer over the cables where the cables are circa 4m apart. This rock protection layer will extend to the high-water mark.

The low cliff at the landfall will be excavated from a point between the high and low water marks and an inclined ramp will be formed, which will be 16m wide and will extend onshore for circa 32m. A reinforced concrete slab will be constructed on the ramp. The cables' articulated pipe protection will finish at the seaward end of the ramp, and the cables will be installed in reinforced concrete cable channels, which will have reinforced concrete covers and which will be placed on the concrete slab. The rock protection will be extended on top of the reinforced concrete cable channels to just above the high-water mark.

A crushed stone ramp will extend for circa 22m on the northern side of the concrete slab. The reinforced concrete cable channel protection to the cables will extend on the crushed stone ramp as far as the transition joint bays.

### ***Southern Landfall***

At the southern landfall, the cables will be trenched circa 1m below the seabed as they approached the shore. They will be encased in articulated pipes, as described above, and have the additional protection of a circa 0.5m layer of rock, which will extend to above the high-water mark.

The shoreline at the southern landfall location has a much lower profile than at the northern landfall, and just minor re-grading will be undertaken. A crushed stone ramp will be constructed on the re-graded shore. The cables' articulate pipe protection will finish at the seaward edge of the crushed stone ramp. The cables will be installed in reinforced concrete cable channels, which will have reinforced concrete covers, and which will be placed on the crushed stone ramp. A gabion wall will terminate the rock protection layer at the seaward edge of the ramp, which will be above the high tide mark.

#### **4.2.2.4 Submarine Cable**

The submarine cable will be a cross linked polyethylene (XLPE) cable as shown in **Figure 3**. 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.



**Figure 3 Cut-away Section of Typical Submarine Cable**  
(Source: FS007083 Application Project Report)

## **4.3 Cable Installation**

### **4.3.1 Sequence of Works**

The sequence of construction activities will be pre-construction, civil construction activities, and commissioning and testing activities in the substations and equipment. The maximum number of construction workers required in the construction phase will be 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.



Specifically, for the submarine development, the cable installation in 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. These works will be carried out seven days a week, 24 hours a day.

The overall installation time will be minimised by using the tidal windows. The highest current velocities along the proposed cable route occur close to the northern shoreline. Therefore, by starting the cable pull-in and installation at the northern landfall, works can commence closer to times when the strength of the tidal currents should be at their weakest, i.e., during neap tides instead of spring tides, and at slack water. The cable pull-in can also be programmed to coincide with high water to reduce landing time (and therefore risk) and minimise the cable elevation difference during the pull in operation. These considerations should minimise risks and downtime, reduce pull-in cable loads and ensure a more efficient cable installation programme.

#### **4.3.2 Landfalls**

The proposed cable installation sequence can be separated into two work areas, the landfall works, which is all construction above lowest astronomical tide level (LAT) and submarine works, which is all construction below LAT.

LAT is defined as the lowest water level that can be expected to occur under average meteorological conditions and under any combination of astronomical conditions.

Landfall works at Moneypoint and Kilpaddoge will be undertaken ahead of the cable installation.

The proposed landfall works at Moneypoint will include:

- Excavation of the 8m to 10m rock cliff at the shore,
- Excavation of the foreshore to create a ramp,
- Construction of a concrete ramp structure, which will be a permanent structure,
- Installation of pre-cast concrete cable channels on the concrete ramp,
- Backfilling (including reuse of excavated material), around the ramp but not over it
- Installation of a temporary anchored cable quadrant on the foreshore to assist with the cable pull-in operations, and
- Placing rock protection.

The proposed landfall works at Kilpaddoge will include:

- Excavation and re-grading of the upper shore,
- Excavation of the foreshore and upper shore to create four trenches for the cable installation,
- Placing crushed stone to form a base for the pre-cast concrete cable channels
- Installation of pre-cast concrete cable channels on the crushed stone base,
- Backfilling around the pre-cast concrete cable channels (including reuse of excavated material),
- Installation of rock/gravel filled gabions, and
- Placing rock protection.

#### **4.3.3 Submarine Works**

The submarine works will include the following steps for all four cables.

#### **4.3.3.1 Seabed Clearance Along All Four Cable Alignments**

Seabed clearance will be carried out using a pre-lay grapnel tool (PLG). In this operation, a grapnel will be lowered to the seabed and towed along the cable alignments.

The PLG will be utilized along the four cable alignments to clear any obstacle that could obstruct the cable burial tool such as end-of-life cables, fishing nets, ropes and lines.

#### **4.3.3.2 Seabed Preparation Works Along All Four Cable Alignments**

The cable alignment has been designed to run parallel to the fall of the steepest seabed slopes (i.e., perpendicular to the seabed contours). An alignment parallel to the slope reduces the complexity and risk of the cable installation operations. Seabed slopes between 10-25 degrees were 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 preparation works, such as rock filter bag placement, may be required to reduce the slope angles.

#### **4.3.3.3 Sand Wave Re-Profiling/Dispersal By Mass Flow Excavation (MFE)**

A MFE 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. A MFE tool will be deployed along the cable to prepare the seabed. This tool will be used to flatten sand waves with amplitudes of more than 0.5m on the seabed and to allow a cable burial tool to bury the cable to a controlled and determined depth.

#### **4.3.3.4 Post-MFE Route Clearance (Secondary Pre-Lay Grapnel Run)**

A secondary route clearance with a PLG tool will take place along the cable route 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.

#### **4.3.3.5 Moneypoint Landfall Cable Pull-In**

A cable winch, cable rollers and a cable quadrant will be set up onshore at the landfall. The cables will be loaded onto a cable laying barge (CLB) or cable laying vessel (CLV) at a suitable facility. Other vessels that will be required include a launch vessel and guard/support vessel. It is expected that a cable laying barge or vessel of approx. 125m in length will be employed to carry out cable laying and 15m water depth is likely to be the closest the CLB/CLV will approach the shore. 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. The TJB is where the submarine cable is terminated and joined to the land cable. Once in the TJB, the cable armouring will be 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 total cable pull length will be approximately 150m.

Additional cable protection, such as cylindrical metallic cable protectors, for post installation protection, will be installed onto the cable as it is paid out from the CLB/CLV. Floats will also be attached to the cable as it is paid out to keep it afloat during the pull-in.

#### **4.3.3.6 Submarine Cable Installation**

Each cable will be installed in a trench on the seabed or, where the bed material is too hard, laid on the seabed and covered with rock protection. Cable burial techniques can be used in areas of coarse and more mixed, sediment, gravel and cobble seabed areas.

There are several cable laying tools which can be used for laying and burying a cable. 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 alongside it. 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 by the 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 burial tools 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 and thus causing 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.

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 underwater vehicle (ROV) but can be mounted on a sled. A ROV is capable of operation in shallow water, close inshore. The typical cable burial depths that can be achieved using modern water jetting tools are in the region of 3m where the seabed is sand or clay. Burial speeds up to 400m/hr can be achieved in optimal conditions using a ROV.

Using one of the above techniques, the CLB/CLV will lay each cable southwards across the estuary to the 15m depth contour, approximately 600m from the Kilpaddoge landfall. Each cable will be pulled the 600m ashore, to the cable sealing ends, which are located in the new Kilpaddoge 400kV AIS Substation, described in Section 4.2.1.2 above. The pull in technique will be the same as for the pull-in at the northern landfall.

#### **4.3.3.7 Post-Lay Submarine Cable Installation**

The final activity for the submarine works will be to bury the cables to the target depth, where burial is proposed. If burial to the required depth is not achieved, when the cable is being laid, post-lay burial will be required. A cable burial tool, either jetting or ploughing which will be remotely operated or pulled by a combination of the onshore winch and marine vessel, will be used.

Where the required burial depth is not achieved by the post-lay burial operation, additional protection will be installed over the cable by a specialist marine contractor.

#### **4.3.3.8 Post Construction Survey Campaigns**

Following completion of the cable installation works, a programme of post-construction surveys will be undertaken to confirm the target burial depth has been achieved. Further surveys will be undertaken to monitor the cables over their life. Typically, this will be a series of bathymetric surveys over the cable route. The frequency of surveys will be informed by analysis of the previous survey results but will be expected to decrease over the cable life.

#### **4.3.4 Commissioning**

A number of electrical tests will be carried out prior to the cables being made operational. These tests include tests of phasing and electrical integrity. Many of the tests will be carried out as the construction phase progresses.

#### **4.3.5 Construction Laydown Areas**

Temporary laydown areas will be located in Moneypoint Electricity Generating Station and on land adjacent to the existing Kilpaddoge substation compound. Access will be gained via the existing entrance to the existing Kilpaddoge substation and the main and secondary entrances to the Moneypoint Electricity Generating Station. All construction works will use the existing entrances only.



Temporary facilities will be provided which will include construction phase car parking, welfare facilities and laydown areas as necessary. Wastewater 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, approximately 1,585m<sup>2</sup> and 3,173m<sup>2</sup> in area, will be provided in proximity to the proposed landfalls either side of the Shannon Estuary. The location of these areas is shown on the application drawings.

Storage of fuel and refuelling will be undertaken within bunded hardstanding areas. Water will be brought to site by tanker site as required.

#### **4.3.6 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 during the construction phase is expected to peak at approximately 45 persons. Aside from the delivery of the transformers, no abnormal loads are required. It is envisaged the cable laying barge vessel will come from Norway to the Shannon Estuary.

#### **4.3.7 Construction Environmental Management Plan**

A copy of the Outline Construction Environmental Management Plan (OCEMP) accompanies the application. This will form the basis for the Construction Environmental Management Plan (CEMP). All conditions of the consents will be included in the CEMP.

The CEMP will be prepared and implemented during the construction phase in consultation with the Planning Authorities and the Department of Housing, Local Government and Heritage. The CEMP will remain a 'live' document which will be reviewed regularly and revised as necessary to ensure that the measures implemented are effective.

The primary objective of the CEMP will be to safeguard the environment, site personnel and nearby sensitive receptors, i.e., occupiers of residential and commercial properties, from site activity which may cause harm or nuisance. The CEMP will set out a project framework to ensure key mitigation measures and conditions proposed as part of the planning and foreshore consent process are translated into measurable actions and are implemented during the construction phase of the proposed development. As part of this framework, transparent and effective monitoring of the receiving environment during construction will be used to inform and manage on-going activities on site and to demonstrate the effectiveness of the measures being implemented.

ESB will have the overall responsibility for the compliance of the CEMP with the requirements of the Planning Authorities and the Department of Housing, Local Government and Heritage. A technically competent contractor will be appointed by ESB with responsibility for the construction of the proposed development. A contractual obligation will be included within ESB's tendering processes and implemented on appointment to ensure that the proposed works will be undertaken in compliance with the requirements of the CEMP, and the methods, monitoring and mitigation proposed in the PECR.

The ESB will monitor the contractor(s) performance on a regular basis and will undertake the following compliance checks throughout the duration of the construction period:

- Review contractor documents against the requirements of the CEMP,
- Undertake regular audits,
- Continuously check records,
- Set up a contractor reporting structure, and
- Conduct regular meetings where Environmental, Health and Safety is an agenda item.

It is proposed that records of the implementation of the measures identified in the CEMP will be provided if required to the Planning Authorities and the Department of Housing, Local Government and Heritage at a time to be agreed with them.

#### **4.3.8 Environmental Clerk of Works**

The Environmental Clerk of Works will form part of the ESB's Site Representative Team. The Environmental Clerk of Works will have suitable environmental qualifications and the necessary experience and knowledge appropriate to the role.

ESB will ensure that the Environmental Clerk of Works 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/clean-up operations. The Environmental Clerk of Works will also review consultation with environmental bodies including the National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland and Irish Whale and Dolphin Group (IWDG). The Environmental Clerk of Works will be responsible for carrying out regular monitoring of the Contractor's CEMP.

#### **4.3.9 Traffic Management Plan**

Prior to commencement of the development, the Contractor appointed by ESB to undertake the works will prepare a Traffic Management Plan which will be developed and implemented to mitigate any potential construction traffic impacts on the local road network. All construction activities, including construction traffic, will be managed through the site Construction Environmental Management Plan (CEMP).

#### **4.3.10 Construction Waste Management Plan**

Prior to commencement of the development, the Contractor appointed by ESB to undertake the works will prepare a Construction Waste Management Plan (as part of the overall 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.

The plan will be prepared in accordance with waste management guidance and principles as outlined in *Design Out Waste: A design team guide to waste reduction in construction and demolition projects* (EPA, 2015).

All operations on site will be managed and programmed to prevent or minimise waste production and maximise waste management in compliance with the upper tier of the Waste Hierarchy (i.e., re-use, recycle, and recovery), where technically and economically feasible. The Plan will also deal with any litter arising during the construction phase of the development.

Waste 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 manner which will not adversely affect the environment. All employees will be made aware of the obligations under the Plan. The Plan will be available for inspection at the site office at all reasonable times for examination by the consenting authority.

### **4.4 Electromagnetic Field**

The cables will give rise to a permanent electromagnetic field (EMF) being generated along their length. EMFs surround any object that is generating, transmitting or using electricity, including appliances, wiring, office equipment, batteries and any other electrical devices. Electric and magnetic fields are common in modern life. In many cases, domestic electrical appliances and tools can generate much higher magnetic and electric fields, near a sensitive receptor, than transmission lines at standard separation distances.

Independent and authoritative international panels of scientific experts have reviewed studies on possible human health effects from Electromagnetic Fields (EMFs).

These have concluded, based on the weight of the evidence available, that the power frequency electric and magnetic fields encountered in normal living and working conditions do not cause adverse health effects in humans when properly designed and constructed. These form the basis for guidelines published by the International Council on Non-Ionising Radiation Protection (ICNIRP) for EMF. EirGrid and ESB Networks have had strict regard to the ICNIRP guidelines in the design and operation of the transmission system.

The design of the Cross-Shannon Cable 400 kV Project has ensured that the strength of the electric and magnetic fields generated by it during operation will comply with the ICNIRP and EU guidelines on exposure of the general public to EMF.

#### **4.5 Operation of the Cable**

The project will be operated and monitored by remote control from EirGrid offices. The cables will be monitored in accordance with EirGrid's Asset Maintenance Policy. The maintenance operations of the cables will be undertaken by ESB Transmission Asset Owner.

Typically, once installed, the subsea fibre optic cable will have no requirement for operational maintenance. However, repair or maintenance activities may be required to monitor burial depths and the integrity of the rock placement. 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 operational life of the cable. The assessment considered different survey datasets of the study area. However, predicting long term change in the River Shannon is complex even with sediment modelling. A full cable risk assessment will be carried out as a post consent verification survey and a post construction monitoring protocol will be implemented.

If a fault/break occurs in the cable, a repair operation would be undertaken by a cable vessel, retrieving the faulted section of cable to the vessel and repairing it on board. The repaired cable would then be returned and reburied in the seabed, using the ROV mounted cable burial technique, to the approximate original location.

#### **4.6 Decommissioning of the Cable**

Subject to the granting of statutory approval, it is expected that the proposed connection to both Moneypoint 400 kV GIS Substation and Kilpaddoge 220 / 110 kV Substation will remain a permanent part of the national electricity transmission network and will be refurbished and / or redeveloped as required rather than be decommissioned. Both Moneypoint 400 kV GIS Substation and Kilpaddoge 220 / 110 kV Substation have only been recently commissioned and have design lives of approximately 40 years.

#### **4.7 Related Projects and Other Projects with Potential for Cumulative Effects**

##### **4.7.1 High Voltage Transmission Network**

The EirGrid Group Strategy 2020-2025 aims to transform the power system in Ireland, with the primary goal being to lead the transition of Ireland's electricity sector to low carbon-renewable energy. The Strategy involves a €2 billion investment over five years aiming to ensure that renewable energy accounts for 70% of all electricity in Ireland by 2030. Key to the new strategy is upgrading the power system so that it can handle world-leading levels of renewable energy, supplied through a combination of offshore and onshore wind, along with solar energy.

High levels of renewable generation are currently being installed in the southwest of Ireland. At times of medium to high wind generation output, it is expected that the southwest of Ireland will export the excess generation to areas where it is needed, typically on the east coast. This will create large power flows from the west and south-west towards the east coast.

To facilitate this and to utilise the existing 400 kV network better, a system reinforcement across the Shannon is required, which is the Cross Shannon 400 kV cable circuit. This reinforcement forms part of the ‘regional solution’ consisting of a suite of reinforcement projects designed to maximise the capabilities of the existing network.

The regional solution will consist of the following individual components:

- Moneypoint-Kilpaddock 400 kV Circuit,
- Series Compensation Oldstreet 400 kV Station,
- Series Compensation Moneypoint 400 kV Station,
- Series Compensation Dunstown 400 kV Station,
- Wexford 110 kV Station Upgrade,
- Great Island-Wexford 110 kV OHL Upgrade, and
- Great Island-Kilkenny 110 kV OHL Upgrade.

#### **4.7.2 Other Projects with Potential for Cumulative Effects**

The following projects and activities have been identified as having the potential for a cumulative impact with the proposed development:

- Commercial Shipping,
- Dredging activity,
- Energy Storage,
- Geophysical survey and Moneypoint Synchronous Condenser

#### **4.7.3 Commercial Shipping**

Approximately 1,800 vessel movements are made in the Shannon Estuary, equating to 900 different vessels travelling into and out of the estuary, annually. The temporary additional vessel activity required to carry out the proposed project will not represent a significant increase in vessel activity in the area.

#### **4.7.4 Dredging Activity**

When consulted in 2020 for the purpose of providing updated information on the project development and seek observations on the potential planning and environmental considerations within the Shannon, Shannon Foynes Port Authority stated that it does not believe any dredging activities have been carried out and that no Dumping at Sea permit, for dredge spoil or other materials, had been issued for the project area.

A search of the EPA website

<https://epawebapp.epa.ie/terminalfour/DaS/index.jsp?disclaimer=yes&Submit=Continue> (accessed in January 2022) showed that two Dumping at Sea Permits were granted for the western part of the Shannon Estuary. A Dumping at Sea permit, reference S0020-02, was granted for dumping dredge spoil immediately to the west of the entrance to Kilrush Harbour. A Dumping at Sea permit, reference S0008-01, was granted for dumping dredge spoil immediately to the northeast of the Tarbert Power station cooling water intake. Neither these dredge nor disposal sites were in the area of the Eirgrid Cross Shannon 400kV Electricity Cable Project.

#### 4.7.5 Energy Storage

Shannon Clean Tech Ltd has applied for a 10-year permission for the development of a Battery Energy Storage System (BESS) Facility on a site of approximately 0.6ha in the townland of Kilpaddoge. The BESS facility will provide balancing services to the Irish national grid allowing short term battery energy storage for surplus energy which can be subsequently transferred back into the grid at peak energy demand periods. The facility will contain a series of 26 no. BESS units with associated heating, ventilation and air conditioning system and control building, together with associated site works including an ESB sub-station installation, transformer, access roadways, footpaths, paving, site security lighting and CCTV systems, drainage and landscaping. The development area is currently used for agriculture and has low biodiversity value. The development is located 300m from the boundary of the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA.

#### 4.7.6 Geophysical Survey

There are plans to carry out a geophysical survey of the Prospect Tarbert pipelines which extend across the River Shannon estuary from Tarbert Generating Station in Co. Kerry to Kilkerin Point in Co. Clare. This survey is planned to be carried out at a time that will not coincide with the proposed development.

#### 4.7.7 Moneypoint Synchronous Condenser

The ESB is proposing to develop a Synchronous Condenser on a plot of land at Moneypoint Power Station, Carrowdotia, Co. Clare. The 2020 planning application (Ref: 20/318 Clare County Council) is a resubmission of a 2019 application but located in a different location within the Moneypoint Power Station. The synchronous condenser compound will be approximately 100m by 40m in total. The proposed development will comprise a main building and ancillary equipment such a cooling equipment, electrical and control equipment, transformer, circuit breaker, connections to existing site services networks including electrical, water and wastewater and an underground surface water attenuation tank connecting to existing surface water drains, and fencing. The proposed development lands are located approximately 800m west of the proposed cable landfall at Moneypoint.

## 5. Consultation

A public consultation pursuant to Section 19 of the Foreshore Act, 1933 was undertaken from 7 May 2021 to 7 June 2021. A notice of the application was published in one national and two local newspapers. The Department received no submissions from the public in response to the notices.

**Table 5.1** presents a summary of the observations made by the prescribed bodies in 2021 and the response from the Applicant to those observations.

A public consultation was undertaken from 31 March 2022 to 29 April 2022 under Article 42 of the European Communities Birds and Natural Habitats Regulations 2011, as amended. A notice of the application was published in one national and two local newspapers. The Department received no submissions from the public in response to the notices.

**Table 5.2** presents a summary of the observations made by the prescribed bodies in 2022 and the response from the Applicant to those observations.

**Table 5.1 Summary of Observations made by Prescribed Bodies in 2021 and Applicant's Response**

Statutory Body	Applicant's Response
<p><b>Marine Survey Office</b></p> <p>The Marine Survey Office had no objection to the application from a navigational safety perspective. However, it made the following points:</p> <ul style="list-style-type: none"> <li>• The applicant shall engage with Shannon Foynes Port company throughout the construction phase of the subsea cables to ensure the safety of navigation is maintained for all mariners within the sea area covered by the application.</li> <li>• An appropriate Marine Notice detailing the works and vessels engaged in said works shall be published for the information of all marine users in the Shannon Estuary.</li> <li>• The applicant shall ensure the information regarding the final location, depth and shore markings of submarine cables is submitted to the UKHO for inclusion on relevant navigation charts.</li> </ul>	<p>The Applicant acknowledged the observations made by the Marine Survey Office and accepted the recommendations made by the Marine Survey Office.</p>
<p><b>Department of Defence (DOD)</b></p> <p>Following consultations with the Naval Service, the Department of Defence had the following observations:</p> <ul style="list-style-type: none"> <li>• A Temporary Notice to Mariners (NTM) should be issued during the cable laying operation to inform vessels transiting through the area that the operation is taking place.</li> <li>• In addition, a NTM will should be issued once the work is complete clearly indicating the cables' location on the river bed to indicate that vessels should not anchor in the location of the cable.</li> </ul>	<p>The Applicant acknowledged the observations made by the Department of Defence and accepted the recommendations made above by the Department of Defence.</p>
<p><b>Geological Survey Ireland (GSI) Observation 1</b></p> <p>The Geological Survey Ireland (a division of the Department of the Environment, Climate and Communications) made the following comments.</p> <p>Geoheritage</p> <p>Geological Survey Ireland is in partnership with the National Parks and Wildlife Service (NPWS, Department of Housing, Local Government and Heritage), to identify and select important geological and geomorphological sites throughout the country for designation as geological NHAs (Natural Heritage Areas). This is addressed by the Geoheritage Programme of Geological Survey Ireland, under 16 different geological themes, in which the minimum number of scientifically significant sites that best represent the theme are rigorously selected by a panel of theme experts.</p> <p>County Geological Sites (CGSs), as adopted under the National Heritage Plan, include additional sites that may also be of national importance, but which were not selected as the very best examples for NHA designation. All geological heritage sites identified by Geological Survey Ireland are categorised as CGS pending any further NHA designation by NPWS. CGSs are now routinely included in County Development Plans and in the GIS of planning departments, to ensure the recognition and appropriate protection of geological heritage within the planning system. CGSs can be viewed online under the Geological Heritage tab on the online Map Viewer.</p>	<p>The Applicant acknowledged the observations made by Geological Survey Ireland and will make available reports on any site investigations.</p>



Statutory Body	Applicant's Response
<p>The CGSs for Kerry remain unaudited and as such there is limited detailed information on each site available publicly. The sites are listed in a master list of unaudited sites and are presented on Geological Survey Ireland's Map Viewer as sites with buffer zones but no specific site boundary. The audit for Co. Clare was completed in 2005. The full report details can be found here. Our records show that there are no CGSs in the vicinity of the Cross Shannon Electricity Cable.</p> <p><u>Groundwater</u></p> <p>Groundwater is important as a source of drinking water, and it supports river flows, lake levels and ecosystems. It contains natural substances dissolved from the soils and rocks that it flows through and can also be contaminated by human actions on the land surface. As a clean, but vulnerable, resource, groundwater needs to be understood, managed and protected.</p> <p>Geological Survey Ireland's Groundwater and Geothermal Unit, provides advice, data and maps relating to groundwater distribution, quality and use, which is especially relevant for safe and secure drinking water supplies and healthy ecosystems.</p> <p>Proposed developments need to consider any potential impact on specific groundwater abstractions and on groundwater resources in general. We recommend using the groundwater maps on our Map viewer, which should include wells; drinking water source protection areas; and the national map suite - aquifer, groundwater vulnerability, groundwater recharge and subsoil permeability maps. For areas underlain by limestone, please refer to the karst specific data layers (karst features, tracer test database; turlough water levels (gwlevel.ie). Background information is also provided in the Groundwater Body Descriptions. All disclaimers should be read carefully when using Geological Survey Ireland data.</p> <p>Groundwater flooding maps (historic &amp; predictive) are available through our web viewers. The historic flood maps provide information of historic flooding, both surface water and groundwater. The predictive groundwater flood map provides information on the probability of future karst groundwater flooding (where available). For information on the development and limitations of these flood maps, the user guidance notes on the website should be checked.</p> <p><u>Geological Mapping</u></p> <p>Geological Survey Ireland maintains online datasets of bedrock and subsoils geological mapping that is reliable and accessible including depth to bedrock and physiographic maps. These datasets include bedrock data and subsoil classifications. The Applicant was advised to use these data which can be found here, in future assessments.</p> <p>Geological Survey Ireland is continually developing new 3D models and improving upon existing models, as new geological data and software tools emerge. The 3D models are accessible on the model viewer, where they can be interrogated, faults and stratigraphic units examined, virtual cross-sections and boreholes created.</p> <p>Depending on their intended application and audience, models are developed at different scales and to different depths below the ground surface. The 3D models offer a key element of geotechnical risk management by identifying areas requiring more site investigation.</p> <p><u>Geohazards</u></p> <p>Geohazards can cause widespread damage to landscapes, wildlife, human property and human life.</p>	

Statutory Body	Applicant's Response
<p>In Ireland, landslides, flooding and coastal erosion are the most prevalent of these hazards. The Geological Survey Ireland recommended that geohazards be taken into consideration, especially when developing areas where these risks are prevalent, and encourages the use of our data when doing so.</p> <p>Geological Survey Ireland also engaged in a national project on Groundwater Flooding. The data from this project may be useful in relation to Flood Risk Assessment (FRA) and management plans and is described in more detail under 'Groundwater' above.</p> <p>Coastal Vulnerability while seen as a potential geohazard, is discussed in more detail under our marine and coastal unit information below.</p> <p><u>Natural Resources (Minerals/Aggregates)</u></p> <p>Geological Survey Ireland provides data, maps, interpretations and advice on matters related to minerals, their use and their development in our Minerals section of the website. The Active Quarries, Mineral Localities and the Aggregate Potential maps are available on the Map Viewer. Geological Survey Ireland would recommend use of the Aggregate Potential Mapping viewer to identify areas of High to Very High source aggregate potential within the area.</p> <p>In keeping with a sustainable approach Geological Survey Ireland would recommend use of its data and mapping viewers to identify and ensure that natural resources used in the proposed development are sustainably sourced from properly recognised and licensed facilities, and that consideration of future resource sterilization is considered.</p> <p><u>Geotechnical Database Resources</u></p> <p>Geological Survey Ireland continues to populate and develop its national geotechnical database and viewer with site investigation data submitted voluntarily by industry. The current database holding is over 7500 reports with 134,000 boreholes; 31,000 of which are digitised which can be accessed through downloads from our Geotechnical Map Viewer. Geological Survey Ireland would encourage the use of this database as part of any baseline geological assessment of the proposed development as it can provide invaluable baseline data for the region or vicinity of proposed development areas. This information may be beneficial and cost saving for any site-specific investigations that may be designed as part of the project.</p> <p><u>Marine and Coastal Unit</u></p> <p>Ireland's marine environment is hugely important to our bioeconomy, transport, tourism and recreational sectors. It is also an important indicator of the health of our planet. Geological Survey Ireland's Marine and Coastal Unit in partnership with the Marine Institute, jointly manages INFOMAR, Ireland's national marine mapping programme, providing key baseline data for Ireland's marine sector. The programme delivers a wide range of benefits to multi-sectoral end-users across the national blue economy with an emphasis on enabling our stakeholders. Demonstrated applications for the use of INFOMAR's suite of mapping products include Shipping &amp; Navigation, Fisheries Management, Aquaculture, Off-shore Renewable Energies, Marine Leisure &amp; Tourism and Coastal Behaviour.</p> <p>INFOMAR also produces a wide variety of seabed mapping products that enable public and stakeholders to visualize Ireland's seafloor environment <a href="https://www.infomar.ie/maps/downloadable-maps/maps">https://www.infomar.ie/maps/downloadable-maps/maps</a>.</p>	



Statutory Body	Applicant's Response
<p>Story maps have also been developed providing a different perspective of some of the bays and harbours of the Irish coastline <a href="https://www.infomar.ie/maps/story-maps/exploring-dingle-bay-different-perspective">https://www.infomar.ie/maps/story-maps/exploring-dingle-bay-different-perspective</a>. We would therefore recommend use of the Marine and Coastal Unit datasets available on the website and Map Viewer.</p> <p>The Marine and Coastal Unit also participate in coastal change projects such as CHERISH (Climate, Heritage and Environments of Reefs, Islands, and Headlands) and are undertaking mapping in areas such as coastal vulnerability and coastal erosion. Further information on these projects can be found at <a href="#">here</a>.</p> <p><u>Other Comments</u></p> <p>Should development go ahead, all other factors considered, Geological Survey Ireland would much appreciate a copy of reports detailing any site investigations carried out. Should any significant bedrock cuttings be created, we would ask that they will be designed to remain visible as rock exposure rather than covered with soil and vegetated, in accordance with safety guidelines and engineering constraints. In areas where natural exposures are few, or deeply weathered, this measure would permit on-going improvement of geological knowledge of the subsurface and could be included as additional sites of the geoheritage dataset, if appropriate. Alternatively, we ask that a digital photographic record of significant new excavations could be provided. Potential visits from Geological Survey Ireland to personally document exposures could also be arranged.</p> <p>The data would be added to Geological Survey Ireland's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector.</p>	
<p><b>Geological Survey of Ireland (GSI) Observation 2</b></p> <p>Having reviewed An Bord Pleanála's further information request and the subsequent information submitted by the applicant, Geological Survey Ireland had no further response or submission to make in light of this information and its original comments and observations remain unchanged.</p>	<p>The Applicant acknowledged the observations made by Geological Survey Ireland and will make available reports on any site investigations.</p>
<p><b>Geological Survey of Ireland (GSI) Observation 3</b></p> <p>The Geological Survey of Ireland had no further comments or observations to make on the matter.</p>	<p>The Applicant had no further comment to make in response to same.</p>
<p><b>Marine Institute Observation 1</b></p> <p>A foreshore application has been submitted for the Cross Shannon Subsea Cable project development by EirGrid Plc. The development comprises the installation of a 400kV circa 5km AC (alternating current) underground cable between the existing Moneypoint 400kV GIS substation in County Clare and the existing Kilpaddoge 220kV substation.</p> <p>Laying of 400 kV Submarine Cables across the Lower Shannon Estuary, including:</p> <ul style="list-style-type: none"> <li>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.</li> </ul>	<p>The Applicant noted that the issue of EMF was responded to in the further information submitted to An Bord Pleanála (Planning Permission - Applicant Response to ABP, December 2020). The following further information was provided.</p> <p>Electric and magnetic fields, often referred to as EMFs, are produced both naturally and as a result of human activity.</p>

Statutory Body	Applicant's Response
<p>Kerry. The submarine cables will be installed by standard submarine installation techniques, which primarily involves them being buried in the seabed.</p> <ul style="list-style-type: none"> <li>• The installation of communication links between both substations, this will take the form of a fibre optic cable that will be integrated into each of the proposed 400 kV cables.</li> <li>• 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.</li> <li>• 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.</li> </ul> <p>A Planning and Environmental Considerations Report and Natura Impact Statement (NIS) were prepared and submitted with the application. These documents consider both the onshore and foreshore aspects of the overall project.</p> <p>The NIS identifies the likely interactions between the proposed project and the conservation features of all Natura 2000 sites in the vicinity. With certain mitigation measures, the interactions identified during construction conclude that the construction phase of the development is unlikely to impact on the integrity of the conservation sites.</p> <p>What does not appear to have been considered in the NIS is the operational aspects of the development and if this may have an impact on certain conservation features. In particular, no consideration is given to the likely impact of the operation of 400 kV DC transmission line and if this will be any different to the current configuration that uses 220 kV. In particular, the impact that magnetic fields may have on designated fish species (Salmon, lamprey) and marine mammals (Bottlenose dolphin) should have been considered.</p> <p>The closest licenced aquaculture site (T06/233) to the proposed development is approximately 4km. On the basis of the information provided in the planning report, the development is unlikely to impact on any licenced aquaculture activities. There are no known fisheries in the area. It should be noted the closest aquaculture site indicated in the Planning and Environmental Considerations Report is identified as T08/004BO and while this is correctly identified as a fishery order area, it should be noted that this is not a licenced aquaculture site and is not governed by DAFM aquaculture licencing legislation (Fisheries Act 1997).</p>	<p>EirGrid designs, develops and operates the transmission grid in accordance with stringent safety recommendations which are made by national and international agencies. The proposed cable will include a sheath covering that will act to reduce the emission of electric fields to negligible levels. The following sections therefore relate to static magnetic fields produced by the transmission of electricity.</p> <p>The environmental assessment of the potential effect of EMF fields on behaviours of marine species was informed by a review of available literature.</p> <p>Reviews of studies on the effects of EMF emissions in migratory fish species have reported a lack of data on Atlantic salmon (<i>Salmo salar</i>) and sea trout (<i>Salmo trutta</i>) (e.g., Waterside Ecology, 2017; Gill and Bartlett 2010). To overcome this lack of data, Gill and Bartlett (2010) appraised the likely responses of Atlantic salmon and sea trout to EMF based on documented responses of other salmonid species, (e.g., Lohmann et al., 2008; Putman et al., 2014). Studies undertaken by Lohmann et al. (2008) and Putman et al. (2014) on salmonid species including sockeye salmon (<i>Oncorhynchus nerka</i>), chinook salmon (<i>Oncorhynchus tshawytscha</i>), chum salmon (<i>Oncorhynchus keta</i>) suggested that the earth's magnetic field combined with other directional information, such as stellar cues, are used to identify particular coastal or oceanic regions. If salmonids do use magnetic cues for orientation or navigation it is likely that these cues are used at a large spatial scale and during the oceanic phase of outward and homeward migrations (Lohmann et al., 2008; Putman et al., 2014).</p> <p>Once an appropriate coastal region is identified, migration to home (natal) rivers is likely dependent on olfactory cues, with chemical cues extending from natal rivers strongly implicated in the final phases of salmonids migrations (Stabell, 1984; Johnstone et al., 2012).</p>

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	<p>Thorstad et al. (2011) suggested that once salmon have reached sheltered fjords and sea lochs olfactory cues are the most important sense for homing.</p> <p>Given that the last phase of the spawning migration in salmonids is primarily governed by olfactory cues (Thorstad et al., 2011) it can be concluded that salmonid species migration will not be significantly affected by EMF produced by the Cross Shannon cable.</p> <p>As for salmonid species, cross ocean migration in European eel (<i>Anguilla anguilla</i>) is likely to be influenced by the species ability to detect the earth's magnetic field (Durif et al., 2013; Naissbett-Jones et al., 2017), when located closer to the coast olfaction play a large part in locating river and streams (Waterside Ecology, 2017).</p> <p>A number of studies have reported no evidence that EMF presents obstructions to eel migrations. Westerberg and Lagenfelt (2008) assessed migration behaviour of the European eel passing an underwater high voltage cable extending between the Swedish mainland and the island Öland. The study reported that while eel reduced its swimming speed when crossing the cable there was no evidence that the cable was acting as an obstruction to migration. Similarly, a two-year field study of migrating Silver eels passing the Baltic Cable showed the species crossed the cable with the same probability as if it were absent (Westerberg 2000). While a number of individuals changed their course slightly when passing the cable, it was concluded that the cable did not pose a threat to migration. Given the above, it can be concluded that European eel migration will not be significantly affected by the proposed development.</p> <p>The review by Gill and Bartlett (2010) reported that there was no evidence that sea lampreys possess an ability to detect magnetic fields. Furthermore, the review reported no evidence that EMF plays any role in species migration during their homeward migrations to coasts and estuaries. Once at the coast, lamprey appear to locate streams using a three-phase strategy (Vrieze et al., 2011).</p>

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	<p>The first phase is the initial vertical and horizontal exploration of shorelines. This brings the species close to the mouth of rivers. Once at a river mouth the species turn to face into oncoming currents (rheotaxis). The last phase involves using olfactory cues, whereby adult sea lampreys 'sniff out' rivers populated with juvenile lampreys (Bjerselius et al., 2000; Polkinghorne et al., 2001; Waterside Ecology, 2017). Given the above, sea lamprey migration will not be significantly affected by the proposed development.</p> <p>In studies investigating the effect of EMF on the decapod crab <i>Cancer pagurus</i>, Scott et al. (2019) investigated reported crabs showed a clear attraction to EMF and significantly reduced their time spent roaming. Experiments have reported varied responses in elasmobranchs to EMF. For example, Gill et al. (2009) reported the lesser spotted dogfish (<i>Scyliorhinus canicula</i>) were more likely to be found close to the energized cable. The study also showed some thornback ray (<i>Raja clavata</i>) individuals moved more in the vicinity of the EMF. Hutchison et al. (2018 and 2020) investigated the effect of EMF associated with high voltage cables on the decapod American lobster (<i>Homarus americanus</i>) and the elasmobranch Little skate (<i>Leucoraja erinacea</i>). The studies showed that when exposed to EMF American lobster exhibited a subtle change in exploratory behavioural activity while little skate exhibited a strong exploratory/ foraging behavioural activity. While the behavioural changes are likely to have biological relevance in terms of how the animals will move around and be distributed within a cable EMF zone, it is considered that EMFs did not constitute a barrier to movements across the cable for either lobsters or skates. Consequently, it can be concluded that EMF produced by the proposed development is unlikely to significantly affect decapod (e.g. crab, lobster) or elasmobranch species (e.g. dogfish, skate, ray).</p>

Statutory Body	Applicant's Response
	<p>No data were found that marine mammals are negatively impacted by EMF.</p> <p>With regard to the nearest aquaculture site, the information provided by the Marine Institute is noted.</p>
<p><b>Marine Institute (MI) Observation 2 in light of Applicant's response of 08 June 2021</b></p> <p>Having reviewed the response from the applicant, the Marine Institute had a number of observations:</p> <ol style="list-style-type: none"> <li>1. The NIS is supposed to be a stand-alone document and should not have to rely on information derived from a communication during a separate licencing process.</li> <li>2. Furthermore, it is important to note that in relation to the submission as it related to aquatic species, that the lack of evidence of impact is not evidence of no impact. While the Marine Institute accepts that, for some species, magnetic fields as navigational aids may be replaced by olfactory cues in riverine situations, this does not mean that the sensitivity to magnetic fields is disabled.</li> <li>3. The Marine Institute suggests that the operators, if licenced, engage in research to address the issues raised in the attached (see Appendix 1) reprint which have direct relevance to the issues highlighted. The recommendations therein will help identify (and model) specific interactions and behavioural modification (if any) between aquatic species and EMF.</li> </ol> <p>Notwithstanding and specifically in relation to the Foreshore licencing process, the Marine Institute was broadly satisfied with the response and had no further observation</p>	<p>The Applicant noted that, in line with its strategic commitment to update the EirGrid Evidence-Based Studies, to reflect marine receptors in 2023, EirGrid commits to engage with all relevant stakeholders, including the Marine Institute, in the coming years.</p> <p>The updates will include reviewing the evidence base for, and potential options to conduct primary research in, EMF.</p> <p>It is noted that, in their submission of 21 July 2021, the Marine Institute has stated that it is broadly satisfied with the response and have no further observations in relation to the Foreshore licencing process.</p> <p>EirGrid has no further response to make in this regard.</p>
<p><b>Marine Institute (MI) Observation 3 in light of Applicant's response of 23 August 2021</b></p> <p>The Marine Institute welcomed the commitment for future research with regard to EMF and will engage where relevant.</p> <p>The Marine Institute had no more observations on this application</p>	<p>There were no further comments.</p>
<p><b>Environmental Protection Agency (EPA)</b></p> <p>In accordance with the requirement as set out the Foreshore Regulations 2011 (S.I. No. 353 of 2011), the Agency advised as follows:</p> <ol style="list-style-type: none"> <li>1. The Agency notes from the Planning and Environmental Considerations Report (30th July 2020) submitted with the Foreshore application (page 6) that - "There are no planned dredging and/or 'Dumping at Sea' activities associated with the project. A Dumping at Sea permit is not required." Furthermore, the Natura Impact Statement (July 2020) notes on page 93 that "for the construction phase of the proposed project there will be no marine dredging or 'Dumping at Sea'" and has ruled out the potential for significant effects from the proposed project in combination with ongoing maintenance dredging activities in the Shannon estuary.</li> <li>2. Shannon Foynes Port Company was granted a Dumping at Sea Permit, Reg. No. S0009-03, on 21st December 2020 for dumping at sea activities associated with maintenance dredging in the Shannon Estuary over the period 2020 - 2026.</li> </ol>	<p>The Applicant acknowledged the observations made by the Environmental Protection Agency and will ensure that the proposed development will not result in a contravention of the Water Framework Directive 2000/60/EC, Habitats Directive 92/43/EEC, Bathing Water Directive 73/160/EEC or Environmental Liabilities Directive 2004/35/EC.</p>

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<p>This permit authorises the loading of dredged material at Ted Russell Dock and approaches, Limerick and at Foynes Harbour and the dumping of the dredged material at three established dumping sites in the upper and lower Shannon Estuary.</p> <ol style="list-style-type: none"> <li>3. L&amp;M Keating Maritime Limited was granted a Dumping at Sea Permit, Reg. No S0020-02, on 5th December 2017. This permit authorises plough dredging at Kilrush marina approach channel until 30th September 2024 to maintain sufficient draft for vessels using the marina.</li> <li>4. Aughinish Alumina Limited was granted a Dumping at Sea Permit, Reg. No S0026-01, on 28th July 2016, which authorises plough dredging activities adjacent to the jetty at Aughinish until 31st August 2024 to maintain navigational depths and berthing access for ships.</li> <li>5. All three permits and all associated application and enforcement documentation, including Annual Environmental Reports, are available to view on the Agency's website at the following web link: <a href="http://www.epa.ie/terminalfour/DaS/index.jsp">http://www.epa.ie/terminalfour/DaS/index.jsp</a></li> </ol> <p>The Agency would further advise:</p> <ul style="list-style-type: none"> <li>• That the proposed activity shall not result in a contravention of the Water Framework Directive 2000/60/EC, Habitats Directive 92/43/EEC, Bathing Water Directive 73/160/EEC or Environmental Liabilities Directive 2004/35/EC</li> </ul>	
<p><b>Commissioners for Irish Lights (CIL)</b></p> <p>The Commissioner for Irish Lights reviewed the application for the above development and had the following observations:</p> <ul style="list-style-type: none"> <li>• In relation to mitigation aspects with respect to marine traffic, it is stated in the Planning and Environmental Considerations Report (PECR) Section 15 Summary of Mitigation Measures' (Material Aspects, Including Traffic, P255) that "Navigational impacts will be minimised through consultation with the Shannon Foynes Port Company (SFPC) and other stakeholders as part of the Foreshore Licence process. These will be stipulated in the granted Foreshore Licence process". No specific mention is made of any possible installation of aids to navigation, or consideration if this may be required. Irish Lights recommends that SFPC as the Local Lighthouse Authority be consulted specifically on any requirements for installation of aids to navigation which will require Statutory Sanction from Irish Lights.</li> <li>• In relation to marine traffic movements in the estuary, the application and PECR note (section 14.2.2.1) approximately 1800 vessel movements annually, the majority of which are bulk carriers, cargo ships or chemical/oil tankers. The report notes that SFPC confirmed that there is "no defined navigational channel" and that the largest vessels tend to use the centre and northern parts of the estuary. Given the relatively narrow operational channel area for deep-draught vessels in this section of approximately 0.5NM/900m (due to the shallows to the west of Tarbert) and the requirement for vessels to maintain a safe distance of 500m from installation vessels, it will be important to manage and account for traffic movements during construction, particularly deep-draught vessels, so that safety of navigation is maintained. Irish Lights recommends that mitigation measures to account for traffic movements be agreed with SFPC in advance.</li> <li>• The PECR notes that the Shannon Estuary is "predominantly a commercial estuary, with little recreational boats accessing the estuary". Nevertheless, the applicant should be cognisant of the charted anchorage areas for smaller vessels at Glencloosagh Bay close to the existing 220kV cables immediately to the west of the southern landfall and how availability of this anchorage location for smaller vessels might be impacted by the works, particularly during the construction phase."</li> </ul>	<p>The Applicant acknowledges the observations made by the Commissioner for Irish Lights. The Applicant has and will continue to engage with Shannon Foynes Port Company to agree mitigation with regard to traffic movements in advance of construction. The Applicant noted the charted anchorage area for smaller vessels at Glencloosagh Bay and will ensure that effects on the use of the anchorage area are minimised during construction.</p>

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<p><b>Commission for the Regulation of Utilities (CRU)</b></p> <p>The CRU stated that it was aware of the project and the project is present in the latest version of Eirgrid's transmission development plan (project no. CP0970). However, regarding EirGrid's foreshore application itself, the CRU did not have any comments.</p>	<p>The Applicant acknowledged the response from the Commission for the Regulation of Utilities.</p>
<p><b>Inland Fisheries Ireland (IFI) Observation 1</b></p> <p><u>Overview:</u></p> <p>The proposed works involves the laying of 400kV underground cables across the Lower Shannon Estuary between the existing Moneypoint 400kV Electricity Substation in the townland of Carrowdotia South Co. Clare and the existing Kilpaddoge 220/110 kV Electricity Substation in the townland of Kilpaddoge, Co. Kerry.</p> <p><u>IFI comment:</u></p> <p>IFI noted the correspondence received to date in regard to this work. This application has a detailed mitigation measures for pollution and for the construction works. Section 3.6.2 of NIS details mitigation measures in terms of pollutants, sediment and biosecurity. If all mitigations measures are put in place this should reduce the risk of any incident affecting the estuarine environment.</p> <p>In terms of noise, while the NIS details no significant adverse effects of the noise to the diadromous species (salmon or lamprey) as species will move out of the vicinity. These species are migratory and will potentially need to pass through the site on the migrations either upstream or downstream. The NIS document does not mention the European Eel which is protected under Eel Regulation 1100/2007 and should be taken into account, glass eels will be arriving in December-February, but a cohort of the population will remain in the estuary for the duration of the continental phase of lifecycle, while silver eels will be migrating out to sea from August to January.</p> <p>While the reference to the Habitats Annex II species is noted there are other fish species inhabiting the vicinity of the works sites and IFI would point out that the mitigation measures and guidance of NPWS in regard to marine mammals are not transferrable to fish species. The fish remain invisible to any shore or boat-based observer. Mitigation measures should aim to reduce the sound generated, in intensity and duration. The use of soft-start and ramp-up procedures for any sound generating surveys undertaken – both on a day-to-day basis and on re-start after any stoppages within any day should be undertaken. This measure should be a condition of the foreshore licence. The comments of IFI in this regard relate to fish species of conservation significance and of leisure angling significance all of which constitute part of IFI's brief.</p> <p>It is recommended to contact the Sea Fisheries Protection Agency (SFPA) to seek advice regarding the timing of survey works to avoid clashing with spawning periods of commercial fish in the area. This will reduce any potential for noise damage to larval and juvenile life stages of fish when they are more susceptible to noise damage than adults.</p> <p>The timings of the work should be cognisant of the migratory window of diadromous species.</p>	<p>The Applicant noted:</p> <p><u>Eels</u></p> <p>As eel is not a Qualifying Interest species for the Shannon SAC, it is not an issue that can be considered for the NIS. However, a number of studies have reported no evidence that EMF presents obstructions to eel migrations. Westerberg and Lagenfelt (2008) assessed migration behaviour of the European eel passing an underwater high voltage cable extending between the Swedish mainland and the island Öland. The study reported that while eel reduced its swimming speed when crossing the cable there was no evidence that the cable was acting as an obstruction to migration. Similarly, a two-year field study of migrating Silver eels passing the Baltic Cable showed the species crossed the cable with the same probability as if it were absent. While a number of individuals changed their course slightly when passing the cable, it was concluded that the cable did not pose a threat to migration. Given the above, it can be concluded that European eel migration will not be significantly affected by the proposed development.</p> <p><u>Soft start/ramp up procedures</u></p> <p>Trenching vessels and associated support vessels e.g., tugs will generate noise in the water even before trenching or tunnelling commences, and these noise sources will act as soft start/ramp up noises. Where possible, trenching and tunnelling equipment will be started in sequence so that there will be gradual increase of noise.</p>



Statutory Body	Applicant's Response
<p>We would like to clarify how the construction works will progress across the channel. It will be important to ensure that there is free passage for fish species along one bank to allow species migrating up and downstream. While some works will take place during the 7am - 7pm time period others will be over 24 hours which could interfere with fish migrations.</p> <p>We note the additional information supplied to An Bord Pleanála in relation to the electromagnetic field and the documented effects on different fish species.</p> <p>The local IFI office in Limerick should be notified one (1) week in advance of the commencement of works</p>	<p><u>SFPA and spawning/nursery areas</u></p> <p>The SFPA was contacted and commented that as the area is neither a spawning nor a nursery site, it does not require an assessment for same.</p>
<p><b>Observations received from Inland Fisheries Ireland (IFI) Observation 2</b></p> <p>Inland Fisheries Ireland (IFI) considered the application and had the following further observations and recommendations to make. IFI acknowledged that considerable pre-planning consultation has taken place between the project proponents and Inland Fisheries Ireland and that the outcome of this consultation is reflected throughout the CEMP and NIS.</p> <p>During construction, IFI require that:</p> <ul style="list-style-type: none"> <li>• All discharges to and through the surface water collection and disposal system to groundwater and thence to surface water shall not be of environmental significance.</li> <li>• All mitigation measures identified in the CEMP and NIS are implemented in full.</li> <li>• IFI recommend that all marine activities begin with a ramp-up or 'soft-start' procedure to more fully mitigate the impact of any noise on the movement of fish species through the works area.</li> <li>• There shall be no permitted discharges to surface water resources of contaminated water or surface water run-off from the development.</li> <li>• Servicing including refuelling of plant and equipment shall only be undertaken on impermeable hard standing areas.</li> <li>• All plant and equipment used within the subject site shall carry spill clean-up kits and not be used or operated if there is evidence of leakage or damaged oil seals.</li> <li>• There shall be no discharge during the construction period of cementitious materials or residues thereof to the surface water or drainage network.</li> <li>• When cast-in-place concrete is required, all works shall be undertaken in the dry and effectively isolated from entering any receiving surface or foul sewers for a period sufficient to cure the concrete.</li> <li>• Concrete delivery vehicles shall be precluded from washing out at locations that could result in a discharge to the surface or foul sewers.</li> <li>• Where cement or lime is stored on site, it shall be held in a dry secure area.</li> <li>• All oils and fuels used on or within the site shall be stored in secure bunded areas and servicing including refuelling of plant and equipment shall only be undertaken on impermeable hard standing areas.</li> <li>• Where temporary diesel or petrol driven pumps are used within the site, they shall be positioned within portable bunded units.</li> </ul>	<p>The Applicant acknowledged the recommendations made by Inland Fisheries Ireland and accepted the recommendations made by Inland Fisheries Ireland.</p> <p>Prior to commencing any work with subsea equipment, where such equipment has adjustable power levels the following soft start procedure will be conducted: -</p> <ol style="list-style-type: none"> <li>1. Conduct MMO watch as per the marine mammal observation plan in place.</li> <li>2. Once observation watch has been completed inform onboard MMO of intention to soft start subsea system.</li> <li>3. Turn on the subsea equipment.</li> <li>4. Select low power setting initially.</li> <li>5. Over the next 5 minutes gradually increase power to working power level.</li> </ol>



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<ul style="list-style-type: none"> <li>Any silt curtains to be deployed should comply with the relevant European Standard CE 1137-CPR-0613/29.</li> </ul> <p>In relation to the Emergency Response Plan, IFI suggest that all staff working in the vicinity of watercourses are aware of procedures to prevent silt or other pollutants from reaching watercourses. Sufficient materials to aid in diversion/containment on any such spillage should be readily available and stored at close distance. Contact details for local IFI staff can be supplied to the contractor once appointed to be added to the Emergency Response Manual.</p> <p>IFI will require consultation on the final CEMP, EOP and specific works method statements with the contractor as appointed</p>	
<p><b>Inland Fisheries Ireland (IFI) Observation 3 in light of applicant's response of 08 June.</b></p> <p>IFI was happy with the response and have no further comments to make</p>	<p>The Applicant had no further comment to make in response to same.</p>
<p><b>Department of Housing, Local Government and Heritage Water and Marine Advisor (WMA)</b></p> <p><u>Project Description:</u></p> <p>As part of the Cross Shannon Cable Project Eirgrid propose laying 4 no. 2.8km long 400kV Electricity Subsea Cables across the Shannon Estuary between Moneypoint Co. Clare and Kilpaddoge, Co Kerry. The cables will be installed by standard installation techniques, which in the most part involves them being buried in the seabed. Two (2) no fibre optic cables will be included with each of the 400 kV cables, 1 of the fibre optic cables for communication links between both substations which will be integrated into the 400 kV cables and the second fibre optic cable for maintenance and cable monitoring which will be an armoured cable wrapped around the 400 kV cable. The associated works will include the reinforcement of the ground beneath and around the cables by various methods including concrete ramps, infilling with gravel/concrete, articulated pipes and rock armour protection.</p> <p><u>Site Inspection:</u></p> <p>The site of the southern landfall was inspected on 15 October 2020 and the site of the northern landfall on 03 December 2020. The northern landfall is directly adjacent to the Moneypoint Power station and an existing cable crossing landfall similar to the one now proposed. The foreshore at this location is very inaccessible and rocky. The southern landfall is at Kilpaddoge north of the under-construction Electricity Substation. The shore and foreshore at Kilpaddoge are a cobble beach and are accessible to public from a public road 1km to the east.</p> <p><u>Assessment:</u></p> <p>The foreshore of the Shannon Estuary is State-owned and the works as proposed are part of Eirgrid's development of the national electricity transmission infrastructure and so are in the public interest. Considering the shore and foreshore on the southern landfall is a cobble beach and assessable to the public it is important that when completed the proposed works do not impede access along the shore or foreshore and following the works the foreshore should be restored to a natural like condition. The works if completed as proposed and in compliance with the conditions set out below will not have significant adverse impacts on navigation, fisheries or the environment.</p>	<p>The Applicant acknowledged the recommendations made by the Water and Marine Advisory Unit and accepted the recommendations made by the Water and Marine Advisory Unit.</p>

Statutory Body	Applicant's Response
<p><u>Recommendation:</u></p> <p>The Water and Marine Advisory Unit (WMAU) recommends approval of the application for a foreshore licence for 4 no. 400kV Electricity Subsea Cables across the Shannon Estuary between Moneypoint Co. Clare and Kilpaddoge, Co Kerry subject to the following conditions:</p> <ul style="list-style-type: none"> <li>• The Drawing Titled “Foreshore Licence Map”, Drawing No: 379408-MMD-XX-00-GIS-N-1009 Rev. 2 Dated: 01/07/2020 should be attached to and referenced in the licence document</li> <li>• Following burial of the cables on the foreshore at the southern landfall the foreshore shall be back filled with native beach material at pre works beach grade level and foreshore restored to natural like condition so as to not impede public access along the foreshore and to reduce the visual impact of the works.</li> <li>• The works shall be conducted in accordance with documents and drawings submitted with the application.</li> </ul> <p>The Department shall be notified 2 weeks prior to any works proceeding</p>	
<p><b>Underwater Archaeology Unit (UAU)</b></p> <p>The UAU noted the response from the Applicant and the further information submitted to ABP. The submission made as further information as in response to the National Monuments Service's (NMS) requirements is confusing and contradictory.</p> <p><u>Dive Survey/Archaeological Assessment: SS12:</u></p> <p>It is unclear how the recommended exclusion zone of 100m can be narrowed to 60m until the archaeological assessment has been undertaken to inform on whether the potential anomaly SS12 is cultural in nature or not. EirGrid suggests that the depth of the water in the area precludes diving as it is at the safety limits and propose further remote sensing survey (without specifying what type of remote sensing will be employed). However, at the end of the paragraph, the submission states that a hand-held metal detection survey will accompany the dive survey. It is therefore unclear if an archaeological dive survey will be carried out or not. While remote sensing can be undertaken again to more closely assess this area, our previous recommendations (see below) as issued remain unchanged, i.e., for visual survey of SS12.</p> <p><u>Dive Survey and Archaeological Testing: M10 &amp; S1:</u></p> <p>The response as submitted as further information as by EirGrid suggests that archaeological testing can be done via remote sensing survey – which is an impossibility as both activities are completely different. It refers to the proposed survey methodology for SS12, as recommended by EirGrid. This is contradictory as remote sensing is, as the name suggests – remote, non-invasive assessment, while archaeological testing requires physical excavation by the archaeologist to assess and interpret directly the area under question. It is therefore also unclear as stated by EirGrid whether archaeological testing will be carried out, though there is reference to ‘...proposed test trenches for both sites will be included in a licence Application Report’ to NMS. As above, if further geophysical survey is considered then that is fine, but our requirements for archaeological testing remains unchanged (see below).</p>	<p>The Applicant noted that the detailed design for the landfall and cable routes will be developed following the appointment of a Contractor. The archaeological testing at both landfalls and in the vicinity of magnetometer target M10 will be undertaken following the development of the detailed design and prior to commencement of construction.</p> <p>The Applicant accepted the recommendations of the UAU and will continue to liaise with the UAU throughout the project.</p>

Statutory Body	Applicant's Response
<p>To reiterate NMS's and Kerry County Council's Archaeologist's observations, as issued previously: this is an area of extremely high archaeological potential and therefore requires more detailed archaeological assessment in the form of further archaeological assessment and testing.</p> <p><u>Archaeological dive survey &amp; Archaeological Testing:</u></p> <p>It is stated that the report on the results of further archaeological assessment and testing will be submitted 'in advance of any proposed works taking place'. As previously recommended by NMS: It is strongly advised that the archaeological dive survey and archaeological testing is carried out in advance of the works contractor being engaged, to ensure that results inform final details for cable placement/completion, particularly if significant archaeological remains are identified, and thus prevent any risk of delays to works when plant and machinery are on site.</p> <p>It should be borne in mind that, should significant archaeological remains be identified, further archaeological mitigation may be required by way of preservation in situ/avoidance or full archaeological excavation.</p> <p>As previously stated, the National Monuments Service has no objections to the foreshore licence being granted once the following is included as conditions of any grant of permission:</p> <p><u>Dive Survey and Archaeological Testing: M10 &amp; S1:</u></p> <ul style="list-style-type: none"> <li>• A 100m exclusion zone shall remain in place until such time as SS12 has been fully and more closely assessed. Based on the results submitted to and consideration by the NMS of the results, the exclusion zone may remain in place (i.e., 100m), may be reduced (to 60m) or indeed prove to be unnecessary should the anomaly not be of cultural significance.</li> <li>• If, on safety grounds, there cannot be an archaeological dive survey, then an ROV survey should be undertaken to ensure the anomaly is visualised and can be fully assessed in real time by the archaeologist engaged for the project. The ROV survey shall assess the wider area around SS12 to ensure there is no associated material in the immediate area.</li> <li>• The archaeologist should be on board the vessel when the ROV survey is being undertaken to ensure they can assess the results in real time.</li> </ul> <p><u>Dive Survey and Archaeological Testing: M10 &amp; S1:</u></p> <ul style="list-style-type: none"> <li>• A detailed plan for the archaeological testing in the area of the south landing S1 is to form part of the licence application and shall follow the route of the cables to the existing substation.</li> <li>• The area where the localised magnetometer anomalies M10 are located on the nearshore/onshore area at Moneypoint for the northern landing N2 to be the subject to archaeological testing.</li> <li>• The location, nature and extent of all test trenches should be provided, and sufficient trenches should be put in place to assess fully the area from the foreshore (at low water) and inshore for N2 to identify what the magnetometer anomalies are on the foreshore (at low water) to the green field areas and on to the substation for S2 to ensure the line of the cables are fully archaeologically tested.</li> <li>• The methodology submitted should include a detailed finds retrieval strategy.</li> </ul>	

Statutory Body	Applicant's Response
<p><u>Archaeological Dive and Testing Report:</u></p> <p>Once all surveys and testing have been completed, the full information should be compiled into a Report submitted to the Underwater Archaeology Unit, National Monuments Service for review and further comment in advance of any works taking place. The Applicant shall be prepared to be advised by the Department in this regard</p>	
<p><b>Department of Agriculture, Food and the Marine (DAFM)</b></p> <p>The DAFM had no specific conditions to be included.</p> <p>BIM had expressed concern as it appears the proposed activity may cut through the eastern end of the oyster fishery order T08/004BOFO, which is owned by Atlantic Shellfish Ltd. This needs to be brought to the attention of Eirgrid and BIM suggest that the EirGrid Project Liaison Officer make contact with local stakeholders in this regard</p>	<p>The Applicant drew attention to Table 5.1 of the Planning and Environmental Considerations Report that supports the application. As noted therein, EirGrid has engaged with Atlantic Shellfish Ltd since 2017 in respect of the proposals. It is however noted that Atlantic Shellfish Ltd has previously advised EirGrid that in their opinion the proposals will not cause any significant harm to their oyster beds in the area. The applicant will continue to engage with relevant stakeholders during construction and operation.</p>
<p><b>Irish Coast Guard (ICG)</b></p> <p>The Irish Coast Guard drew attention to the provisions of the National Maritime Oil/HNS Spill Contingency Plan (and its suite of standard operation procedures), June 2021 and the associated national legislation articulated in the Plan,</p> <p>specifically in terms of contingency preparedness and planning for emergency response and environmental protection for offshore/at sea operations.</p>	<p>The Applicant acknowledged the Irish Coast Guard recommendations with regard to the National Maritime Oil/HNS Spill Contingency Plan and would seek to adhere to same.</p>
<p><b>Sea Fisheries Protection Authority (SFPA)</b></p> <p>Proposed electricity transmission cables (Cross Shannon Cable Project), which includes the laying of 400kV underground cables across the lower Shannon estuary from Moneypoint, Co. Clare and Kilpaddoge, Co. Kerry. Three (3) elements make up the proposed project, connection of the cable at Moneypoint, laying the cable and connection to Kilpaddoge.</p> <p>Within Part 4 (pre-application process) of the application form submitted it is recorded that the SFPA advised that the area is not within their remit and directed the project to IFI for comment.</p> <p>The location of the proposed development is in the lower Shannon Estuary and therefore unlikely to disrupt any wild fisheries in the immediate area.</p> <p>There is a presumed dormant, licenced aquaculture site for oysters on the Clare side of the development (Licence number T08/004BO). The applicant has stated that they are investigating the oyster fishery order and if any plans for developing the aquaculture site.</p> <p>The shellfish production area of Ballylongford is outside and seaward of the proposed development area and should not be affected by the cable laying.</p>	<p>The Applicant acknowledged the response of the SFPA and will report all spillages and pollution events which may cause contamination of seafood to the Dingle SFPA office.</p>

Statutory Body	Applicant's Response
All spillages and pollution events at the development sites which may cause potential contamination of seafood are to be immediately reported to the Dingle SFPA office	
<b>Met Eireann (ME)</b> After studying the application, ME did not envisage that this project would have any negative impact on the Met Eireann observational infrastructure	The Applicant acknowledged the response from Met Eireann.
<b>Health and Safety Authority (HSA)</b> The Health and Safety Authority, in its role as the Central Competent Authority under the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, had advised An Bord Pleanala that it does not advise against the granting of planning permission	The Applicant acknowledged the response from the Health and Safety Authority.
<b>Bord Iascaigh Mhara (BIM)</b> BIM, Ireland's Seafood development Agency wished to use the opportunity to ensure that the current and future needs and concerns of the seafood sector are appropriately considered. BIM noted that fisheries and aquaculture interests had already been identified. The proposed route of the cable intersects with the corner of an oyster fishery order and the proposed route is approximately 5.5km from the nearest aquaculture licence. BIM requested that consultation is carried out with the aquaculture operators in the area and that operators are made aware of construction works and timings in advance of their commencement. It is noted that consultation has been held with Atlantic Shellfish Ltd, who hold the oyster fishery order. Should you require assistance with any further engagement, BIM can provide assistance. Construction and excavation works associated with laying the cables and reinforcement of the ground beneath and around the cables may have the potential for suspension of sediments which together with any pollutants within them, could have a negative impact on filter feeding oysters	The Applicant will consult with the aquaculture operators in the area and ensure that operators will be made aware of construction works and timings in advance of their commencement.
<b>Sustainable Energy Authority of Ireland (SEAI)</b> With regards to this application which is for the installation of 4 x 400 KV submarine cables across the Shannon Estuary from Moneypoint to Kilpaddoge in Co Kerry, SERAI supported the development as it will allow for improved export capability from wind generation projects in South West Kerry into the existing 400KV network. Such work is of benefit to the South West and will ensure more efficient transmission of renewable generation and prevent local constraints on the system	The Applicant had no further comment to make in response to same.
<b>National Parks and Wildlife Service (NPWS)</b> The NPWS had no comment to make on this application	The Applicant had no comment.

**Table 5.2 Summary of Observations made by Prescribed Bodies in 2022 and Applicant's Response**

<b>Statutory Body</b>	<b>Applicant's Response</b>
<b>Marine Survey Office (MSO)</b> The Marine Survey Office had no further observations	The Applicant acknowledges that no further observations have been made by the MSO.
<b>Geological Survey of Ireland (GSI)</b> The Geological Survey Ireland has no additional comments or observations to make	The Applicant acknowledges that no further observations have been made by the GSI.
<b>Marine Institute (MI)</b> The Marine Institute has read over the additional documentation provided and it does not change the view of the Marine Institute first communicated in March 2021 (and subsequent communications).	The Applicant acknowledges that no further observations have been made by the MI.
<b>Environmental Protection Agency (EPA)</b> The Agency has no further observations on the Appropriate Assessment at this time.	The Applicant acknowledges that no further observations have been made by the EPA.
<b>Commissioners for Irish Lights (CIL)</b> The Commissioner for Irish Lights have no further observations to make	The Applicant acknowledges that no further observations have been made by the CIL.
<b>Inland Fisheries Ireland (IFI)</b> IFI had no further comment to make on this application other than to second the comments from the Marine Institute that further research into the topic of electromagnetic fields on fish species behaviour particularly the Annex fish species of sea lamprey and river lamprey is needed.	The Applicant notes that IFI have no further comment to make on this application other than to second the comments from the MI regarding the need for consideration of the effects of Electromagnetic Fields (EMFs) on fish species behaviour, in particular the noted Annex fish species. The Applicant notes that it has previously responded to these comments from the MI as part of the previous prescribed bodies consultation. The Applicant notes that the MI have no further comments for the current consultation, (see MI response above) and thus refer to their previous response, dated October 2021.
<b>Department of Housing, Local Government and Heritage Marine Advisor (Technical/Engineer)</b> The Marine Advisor (Technical/Engineer) had no further observations to make.	The Applicant acknowledges that no further observations have been made by the Department of Housing, Local Government and Heritage Marine Advisor (Technical / Engineer)
<b>Department of Housing, Local Government and Heritage Marine Advisor (Environment)</b>	The Applicant notes that the Department of Housing, Local Government and Heritage Marine Advisor (Environment) has no objection to this application, subject to the completion of the current environmental assessment, which will be informed by the current consultation with prescribed bodies.

Statutory Body	Applicant's Response
<p>The Marine Advisor (Environment) noted that the proposed works will be undertaken within two European sites Lower River Shannon SAC (IE002165) and the River Shannon and River Fergus Estuaries SPA.</p> <p>This Special Area of Conservation includes Shannon and Fergus Estuaries and form the largest estuarine complex in Ireland. It has vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation which are Annex I habitats for which it is designated. Smaller estuaries also feature mudflats which have their own unique characteristics. The SAC is also designated for the priority habitat Coastal Lagoons of which there are a number of examples within the site.</p> <p>It is also designated for Bottlenose Dolphin and this is the only known resident population of this species in Ireland.</p> <p>The River Shannon and River Fergus Estuaries SPA (IE004077) is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of four species, i.e. Light-bellied Brent Goose, Dunlin, Black-tailed Godwit and Redshank. In addition, there are 17 species that have wintering populations of national importance and also supports a nationally important breeding population of Cormorant. Of particular note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit.</p> <p>As the Applicant will note from the Marine Advisor's Screening Stage Report Environmental Report of the 8th of March 2022, the Marine Advisor agreed with and accepted the outcome of the IEC's review of the environmental reports associated with this application.</p> <p>The Marine Advisor (Environment) has no objection to this application subject to a complete environmental assessment. The Marine Advisor (Environment) will provide site specific conditions once the environmental assessment process is complete.</p>	<p>The Applicant acknowledges that "site specific conditions" will be agreed as part of the licencing process.</p>
<p><b>Underwater Archaeology Unit (UAU)</b></p> <p>The UAU had no further comment to make on this application</p>	<p>The Applicant acknowledges that no further observations have been made by the UAU.</p>
<p><b>Department of Agriculture, Food and the Marine (DAFM)</b></p> <p>The DAFM had no additional comments to make but referred the Department to the concerns from both BIM and the SFPA in particular regarding the fishery order that will need to be taken into consideration in granting a licence.</p>	<p>The Applicant refers DAFM to the Applicant responses to observations by BIM and SFPA below.</p>

Statutory Body	Applicant's Response
<p><b>Sea Fisheries Protection Authority (SFPA)</b></p> <p>SFPA had no further issues to make. However, SFPA noted that the proposed development runs through an old fishery order site which covers a large proportion of the Shannon estuary. The order refers to bottom culture and dredging of mussels. This site has not been in operation over the last 20 years but, despite this, it remains in legal existence. Given the recent proceedings in the high court in relation to fishing activities and marine cables on the southern coast (GTT Communications v' O'Flaherty Bros), SFPA advises it may be wise to await judgement in the case before proceeding. On the longer term, the continued existence of this order should be reviewed, and if deemed necessary, consideration should be taken to revoke this order as it impacts other operations and the decision making processes in the Shannon estuary i.e. its existence limits expansion of other aquaculture activities in an SAC as, on paper, a large percentage of the estuary is already dedicated aquaculture.</p>	<p>The Applicant acknowledges that the SFPA have no issues with this specific application.</p> <p>It is the Applicants understanding that the fishery order referred to is order T08/004BOFO, which is owned by Atlantic Shellfish Ltd. As noted in the Applicant response to BIM below, the Applicant has engaged with Atlantic Shellfish Ltd since 2017 in respect of the proposals. It is noted that Atlantic Shellfish Ltd. has previously advised the Applicant that in their opinion the proposals will not cause any significant harm to their oyster beds in the area. Given that, as per the Applicant response to BIM below, Atlantic Shellfish Ltd has confirmed that they had no objection to the making of this application, and given that they have not subsequently made any submission to the Department in respect of the Foreshore Licence application, and given the required urgent delivery timelines of the current project to assist in meeting National Climate Action Plan targets and National policies for security of energy supply, vis-à-vis the likely significantly longer timelines for the conclusion of high court proceedings, the Applicant considers that any delay to granting this Foreshore Licence solely in order to wait for the conclusion of those Legal proceedings to be both untenable and unnecessary.</p> <p>The matter of whether the order stays in existence is irrelevant to the current application and the Applicant does not take any position in this matter.</p>
<p><b>Met Eireann (ME)</b></p> <p>Met Eireann had no further observations</p>	<p>The Applicant acknowledges that no further observations have been made by ME</p>
<p><b>Health and Safety Authority (HSA)</b></p> <p>The HSA had no further observations</p>	<p>The Applicant notes that the HSA have no observations to make regarding the proposed development</p>
<p><b>Bord Iascaigh Mhara (BIM)</b></p> <p>The BIM Aquaculture Development Officer for that area was consulted.</p> <p>That Officers view was that the proposed development would appear to cut through the eastern end of the oyster fishery order T08/004BOFO, which is owned by Atlantic Shellfish Ltd. BIM queried if it is safe to assume that the EIRGRID Project Liaison Officer will be contacting local stakeholders in this regard, if not, then this possible impact will need to be brought to EIRGRID's attention as a matter of urgency.</p>	<p>The Applicant notes that attention is drawn to Table 5.1 of the Planning and Environmental Considerations Report that supports the application. As noted therein, the Applicant has engaged with Atlantic Shellfish Ltd since 2017 in respect of the proposals.</p> <p>It is noted that Atlantic Shellfish Ltd. has previously advised the Applicant that in their opinion the proposals will not cause any significant harm to their oyster beds in the area, and they confirmed that they had no objection to the making of this application; nor indeed have they subsequently made any submission to the Department in respect of the Foreshore Licence application. The Applicant will continue to engage with relevant stakeholders during construction and operation</p>
<p><b>National Parks and Wildlife Service (NPWS)</b></p> <p>The NPWS had no further comment to make on this application</p>	<p>The Applicant acknowledges that no further observations have been made by NPWS.</p>



## 6. Population and Human Beings

Population, human health and the economic aspects of the proposed project are addressed in this chapter.

### 6.1 Baseline Environment

#### 6.1.1 Demographic Profile

The onshore elements of the proposed development are located in Counties Clare and Kerry. The closest settlement to the development boundary is Tarbert which is located approximately 1.3 kilometres southeast of the existing Kilpaddoge substation. The closest settlement to the Moneypoint Generating substation is Killimer, located approximately 2 kilometres to the east.

The proposed development is situated in a rural location. The population of the nearest settlements, Tarbert and Killrush is 540 and 2,719, respectively, according to the 2016 census.

#### 6.1.2 Housing and Community Facilities

On the southern side of the proposed development there are no dwellings situated within 500m, the closest dwelling situated approximately 650m south of the site boundary.

On the northern side, there are 14 dwellings within 500m of the proposed boundary, the closest being approximately 60m to the east of the proposed site boundary.

#### 6.1.3 Land Use

The predominant land use in the vicinity of the northern and southern landfalls is agriculture. The land is subdivided into medium sized fields in pasture, bounded by vegetated earth banks and high hedgerows.

With the exception of works on the northern landfall and approximately 278m of the underground cable connection, most of the land-side works are located on ESB land.

#### 6.1.4 Economic Profile

The estuary is noted as Ireland's premier deep-water resource and an important shipping channel with approximately 12 million tonnes of cargo shipped to the six main port facilities, the largest of which is Shannon Foynes Port, which lies on the southern shore of the estuary, circa 20km to the east of the site boundary.

The ESB (Moneypoint Electricity Generating Station) is a key employer in the study area. Other significant employers in the vicinity include the SSE Electricity Generating Station at Tarbert and Rusal Aughinish, east of Foynes in County Limerick. Agriculture, tourism and aquaculture are also significant employers in the wider region.

#### 6.1.5 Navigation and Shipping

The Shannon Estuary is a deep-water estuary and can facilitate all vessel sizes. Currently commercial vessels travel to Moneypoint Generating Station, Foynes Port, Rusal Aughinish, Limerick and Tarbert. More than 12 million tonnes of cargo, approximately 20% of goods tonnage handled at national ports in Ireland, is handled at the six main port facilities on the estuary.

Shannon Foynes Port Company (SFPC) confirmed that there is no defined navigational channel for vessels along the section of the Shannon Estuary where the proposed development is located. Based on advice from local vessel owners, the experience from the marine survey campaign and analysing freely available marine traffic information, the largest vessels tend to use the centre and northern part of the Shannon Estuary at the proposed development area to navigate upstream and downstream. Vessels may travel anywhere that is practically feasible at any time of the day/night. SFPC also stated that vessel movements are relatively sporadic, and the estuary does not have a defined high season for vessel movements.

The Commissioners for Irish Lights, in its observations, noted that the operational channel area for deep-draught vessels in this section of the estuary is relatively narrow, at approximately 0.5 nautical mile (900m), due to the shallows to the west of Tarbert on the southern side.

According to SFPC approximately 1,800 commercial vessel movements are made in the estuary, equating to 900 different AIS (automatic identification system) tracked vessels travelling into the estuary, annually. SFPC expects this number remain constant from year to year, even though vessel tonnage is forecast to increase. It should be noted that the vessels tracked by AIS are only the vessels with an AIS available on board. All EU flagged vessels over 15 metres are required to have AIS. Typically, smaller vessels, often pleasure crafts, are not tracked and counted. Smaller vessels are considered to have less significance compared to larger vessels as they are less likely to directly impact cable laying operations or risk due to their relatively small size.

Most of the 900 vessels traversing the estuary annually are bulk carriers, cargo ships or chemical/oil tankers. Many of these vessels berth at Rusal Aughinish and Foynes Harbour. The largest vessels berth at Moneypoint Generating Station. A minority of vessels using the estuary, including the project area, are fishing vessels, tugboats or passenger ferries. These vessels generally are smaller and are therefore less significant when compared to the bulk carriers, cargo ships and tankers.

The Shannon Estuary is predominantly a commercial estuary, with few recreational boats accessing the estuary. The largest recreational marina in the proximity of the proposed development is Kilrush Marina, with 120 fully serviced berths accommodating vessels with a maximum length of 30m, a beam of 8m and draft of 3m. The Commissioners for Irish Lights, in its observations, noted that there is a charted anchorage area for smaller vessels at Glencloosagh Bay, close to the existing 220kV cables, immediately to the west of the southern landfall.

The Shannon Ferry Group operates a ferry service, carrying passengers and vehicles, from Killimer Ferry Terminal, located on the northern bank of the Shannon Estuary, to Tarbert Ferry Terminal, located directly opposite on the southern shore of the estuary. The Killimer to Tarbert Ferry connects the N67 at Killimer in County Clare to the N67 at Tarbert in County Kerry. The ferry is a significant local transport and tourism asset, being the only vehicle ferry link on the main spine of the Wild Atlantic Way. The ferry operates all year round with varied schedules throughout the year. The cable alignment is located to the west of the ferry route.

#### **6.1.6 Commercial Fishing**

The Marine Institute, in its observations, stated there are no known fisheries in the area of the proposed project.

#### **6.1.7 Aquaculture**

The estuary is an important area for commercial aquaculture. Most current licensed activities focus on the cultivation of shellfish (in particular Pacific oysters) centred in locations outside of the project area, in or near Rinivella, Carrigaholt, Poulmasherry Bay, Ballylongford Bay, Bunnaclugga Bay and adjacent to Aughinish Island.

There were two licence applications in process for oyster cultivation (application reference T08/94) and mussels/seaweed (application reference Site T06/394B). Both are located outside the proposed development site boundary. A licence has been issued in respect of application reference T08/94 and the application in respect of T06/394B is still in process at the time of writing of the PECR in July 2020.

The only licensed site in the study area is an oyster fishery order area held by Atlantic Shellfish Limited. The northern landfall is located in this oyster fishery order area, Site ID T08/004BO, which relates to an Oyster Fishery Order issued in 1961 to SO Limited. It is understood that this area has not been cultivated to date and there are no known future plans to cultivate this area. The Applicant had discussions with the owners of the Oyster Fishery Order which the Applicant proposes to continue in advance of and during construction works. The Department of Agriculture, Food the Marine, Bord Iascaigh Mhara and the Sea Fisheries Protection Authority in their observations, noted the presence of this oyster fishery order area. The Sea Fisheries Protection Authority referred to it as 'presumed dormant'.

The Marine Institute, in its observations, stated that the closest licensed aquaculture site (T06/233) is approximately 4km from the proposed development. The Marine Institute noted that the closest aquaculture site indicated in the PECR is identified as T08/004BO and while this is correctly identified as a fishery order area, it should be noted that this is not a licensed aquaculture site and is not governed by Department of Agriculture, Food the Marine aquaculture licensing legislation, the Fisheries Act 1997.

### **6.1.8 Tourism and Recreation**

The Shannon Estuary is a strategic tourism asset. Sea angling and dolphin and whale watching tours are important tourism industries in the estuary and on the West Clare Peninsula.

The Wild Atlantic Way is a defined tourist route along the west coast of Ireland, extending from West Cork to Donegal. A section of the Wild Atlantic Way passes through the northern extent of the proposed development area along the N67 national secondary route, which connects Kilrush and Killimer in County Clare. The Wild Atlantic Way connects to the N67 at Tarbert in County Kerry via the ferry connection between Killimer and Tarbert, referred to in **Section 6.1.5** above.

The strategy for Marine Tourism and Leisure, contained in the *Strategic Integrated Framework Plan for the Shannon Estuary* (2013-2020) identifies Kilrush as a service town with well-developed marina facilities. The plan also identifies the potential of tourism to contribute significantly to the economic success of Kilrush and its hinterland.

Sea angling and observational marine tourism are recognised to be of growing importance and Inland Fisheries Ireland observed that it is working to maximise the potential for sea angling and charter boat operations for angling tourism in the estuary.

Other significant tourism and recreational activities in the vicinity include RIB (rigid inflatable boats) tours, Kilrush Creek Adventure Centre, Scatterry Island Ferries and shore angling. There are yachts clubs at Kilrush and Foynes.

The Marine Advisor to the Department, in his/her observations, noted that the shore and foreshore at Kilpaddoge, at the southern landfall, is a cobble beach and is accessible to public from a public road 1km to the east.

## **6.2 Potential Impacts**

### **6.2.1 Construction Phase**

#### **6.2.1.1 Demographic Profile**

Construction is not expected to have a significant impact on the population of the wider environs in terms of changes in population trends or density, or household size. There will be a temporary increase of 45 persons working in the area during the one-year construction phase. The workforce may commute or locate to the area for the construction phase of the project.

#### **6.2.1.2 Housing, Land Use and Facilities**

It is not expected that the construction phase will result in an increased demand for housing (either purchase or lease), land use or facilities which would impact materially on the environs of the proposed development.

The proposed development is predominately located in lands under the control of ESB. However, acquisition of agricultural land to access the northern landfall and cable connection route will be required. During construction there will be a temporary impact on agricultural lands along the cable route from the northern landfall to the Moneypoint generating station site.

#### **6.2.1.3 Human Health**

There is no potential for an effect on human health during the construction phase.

#### **6.2.1.4 Shipping and Navigation**

Several different vessels will be required for the submarine cable installation. These will include a cable laying barge or cable laying vessel, a vessel for the pre-lay grapnel runs and mass flow excavation, a vessel to install the cable protection as well as support/guard vessels. It is expected that the vessels will work 24 hours per day, seven days per week, during the submarine cable installation. The vessels will be in different positions across the estuary during the cable installation works and will move up and down the estuary as required to facilitate safe and efficient installation of the submarine cables. The installation period for each submarine cable is in the order of hours to days with the vessels moving along the cable route, across the estuary, during works.

The Commissioners of Irish Lights noted that, given the relatively narrow operational channel area for deep-draught vessels in this section of approximately 0.5 nautical miles (900m), and the requirement for vessels to maintain a safe distance of 500m from installation vessels, it will be important to manage and account for traffic movements during construction, particularly deep-draught vessels, so that safety of navigation is maintained.

With approximately 1,800 commercial vessel passages annually in the estuary, which equates to less than three vessels per day, but a relative narrow navigational channel at the cable crossing location, the potential impact on shipping and navigation, local to the ESB Moneypoint Electricity Generating Station jetty and along the proposed installation corridor, is expected to be moderate adverse during the works in the estuary.

No potential construction phase impact on marine traffic elsewhere is anticipated to occur. No potential construction phase impact on the Tarbert to Killimer ferry operation is anticipated to occur.

#### **6.2.1.5 Commercial Fishing and Aquaculture**

There are no known fisheries in the area of the proposed project and an impact on fisheries is not expected. Sea Fisheries Protection Authority observed that the proposed development, location in the lower Shannon Estuary, is unlikely to disrupt any wild fisheries in the immediate area.

The nearest active aquaculture site is approximately 4km from the proposed development. The works associated with laying the cables and placing protection around the cables will have the potential to cause suspension of sediments which together with any pollutants within them, could have a negative impact on filter feeding oysters. It is considered that any silt generated by the works is unlikely to be detectable at the nearest aquaculture site. Potential significant effects on aquaculture are unlikely.

The Marine Institute observed that, based on the information provided in the planning report, the development is unlikely to impact on any licensed aquaculture activities. The Sea Fisheries Protection Authority observed that the shellfish production area of Ballylongford is outside and seaward of the proposed development area and should not be affected by the cable laying.

#### **6.2.1.6 Tourism, Recreation and Amenities**

The installation of the submarine cables will take circa 3 weeks. The entire construction project will take one year. The cable laying and support vessels and the onshore works will not be visually obtrusive from the N67 tourist route. There will be no impact on the Killimer to Tarbert Ferry route during the works in the estuary.

The cable laying and support vessels will be visible from the residences, which have views of the estuary. This will be a temporary slight adverse to neutral effect on residential amenity. The onshore works will be visible from the residences, which have views of the estuary shorelines. This will result in a temporary slight adverse to neutral effect on residential amenity.

All vessels, including tourist and recreational craft using the estuary, will be required to stay a minimum of 500m away of the cable laying vessel and supporting vessels during the circa three-week cable laying operations. This will be a temporary slight adverse to neutral effect on the tourist and recreational craft, along the proposed cable corridor only.

The use of the charted anchorage area for smaller vessels at Glencloosagh Bay, close to the existing 220kV cables, immediately to the west of the southern landfall will be within the 500m exclusion zone. There will be a temporary moderate adverse effect on craft proposing to use the anchorage during the three-week cable laying operations.

The shore and foreshore at the southern landfall at Kilpaddoge are a cobble beach and are accessible by the public from a public road 1km to the east. The construction works at the southern landfall will be securely fenced, which will prevent access to the shore at and to the west of the landfall, while construction is underway. This will be a moderate temporary adverse impact. There will be no potential for other adverse effects on recreational amenities.

## **6.2.2 Operational Phase**

### **6.2.2.1 Demographic profile**

Once constructed, the proposed development is not expected to have a permanent impact on the population of the application area and its wider environs in terms of social changes, population trends or density.

### **6.2.2.2 Housing, Land Use and Facilities**

It is not expected that the proposed development will have any impact on housing, land use or facilities in proposed development area and its environs.

### **6.2.2.3 Human Health**

Guideline reference levels for exposure to electro-magnetic fields (EMF) have been set by the International Commission on Non-Ionising Radiation Protection (ICNIRP) which advises the World Health Organisation on non-ionising radiation matters. The design of the Cross-Shannon Cable 400 kV Project has ensured that the strength of the electric and magnetic fields generated by it during operation will comply with the ICNIRP and EU guidelines on exposure of the general public to EMF. EirGrid is satisfied that the proposed development will not have an adverse impact on public health.

### **6.2.2.4 Shipping and Navigation**

The part of the estuary to be crossed by the cables is not a recognised anchorage for commercial vessels or small craft. On completion of construction, anchoring in the vicinity of the cables will be precluded. This will be a permanent not significant adverse impact.

The operation of the proposed development does not have the potential to have an impact on commercial shipping, on navigation in the estuary, on the Tarbert to Killimer ferry or on small craft including recreational craft using the estuary.

It is noted that the Marine Survey Office and the Department of Defence had no objection to the application, provided their proposed recommendations were followed.

### **6.2.2.5 Commercial Fishing and Aquaculture**

The operation of the proposed development does not have the potential to have an impact on commercial fishing or aquaculture.

### **6.2.2.6 Tourism, Recreation and Amenities**

Once construction of the southern landfall is completed, the existing coastline will be reinstated to its original profile and level. The cables in the intertidal area and for a short distance above the high tide mark will be covered with rock protection. Access along the foreshore will not be obstructed but the rock protection may present more difficult underfoot conditions than the original glacial till and gravelly foreshore. This will be a permanent slight adverse impact on public access to the foreshore at this location. It is not expected that the proposed development will result in any other potential adverse effect on tourism in the area nor on its existing community and recreational amenity and facilities.

## **6.3 Mitigation Measures and Monitoring**

It will be the responsibility of the ESB project manager to ensure that the mitigation measures, described below are implemented.

### **6.3.1 Construction Phase**

#### **6.3.1.1 Human Health**

No potential impacts were identified, and no specific mitigation measures required to ameliorate the impacts on human health.

A comprehensive Health and Safety Programme will be put in place on the project site prior to commencement of construction to minimise any risks to site personnel and visitors.

#### **6.3.1.2 Residential Amenity, Recreation and Tourism**

Construction activities have the potential to create a nuisance and cause disruption to local residents and users of recreational amenities. All work will be carried out having regard to best practice guidance, including but not limited to guidance on preventing pollution from construction sites and pollution prevention guidance.

In order to minimise disruption, a Construction Environmental Management Plan (CEMP) will be prepared and implemented by the Contractor. As part of the 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.

#### **6.3.1.3 Commercial Fishing and Aquaculture**

No potential impacts were identified, and no specific mitigation measures required to ameliorate the impacts on commercial fishing and aquaculture during the construction phase.

#### **6.3.1.4 Shipping and Navigation**

Mitigation measures for shipping and navigation for the construction phase will include:

- The applicant will liaise with Shannon Foynes Port Company throughout the installation phase of the subsea cables to ensure the safety of navigation is maintained for all mariners within the sea area covered by the application. Works will be coordinated to minimise impact on marine traffic.
- The cable installation contractor's method statements will address the safety of users of the Shannon Estuary and foreshore when preparing and carrying out the construction works.
- An exclusion zone of 500 metres will be established around the relevant vessel for the duration of the pre-lay preparatory works, the cable laying, the post-lay installation of rock protection and the post-lay surveys.
- Shannon Foynes Port Company, as the Local Lighthouse Authority, will be consulted specifically on any requirements for the installation of aids to navigation for the works. Such aids to navigation would require statutory sanction from the Commissioners for Irish Lights.
- An appropriate Marine Notice detailing the works and vessels engaged in the works will be published for the information of all marine users transiting through the relevant part of the Shannon Estuary.

### **6.3.2 Operational Phase**

#### **6.3.2.1 Shipping and Navigation**

Mitigation measures for shipping and navigation, on completion of construction will include:

- A Marine Notice will be published once the work is complete clearly indicating the cables' location on the seabed to indicate that vessels should not anchor in the location of the cable.
- The information regarding the final location, depth and shore markings of submarine cables will be submitted to the United Kingdom Hydrographic Office for inclusion in relevant navigation charts.



#### **6.3.2.2 Human Health**

The design of the Cross-Shannon Cable 400 kV Project has ensured that the strength of the electric and magnetic fields generated by it during operation will comply with the ICNIRP and EU guidelines on exposure of the general public to EMF. The proposed cables will include a sheath covering that will act to reduce the emission of electric fields to negligible levels.

#### **6.3.2.3 Other Population Aspects**

No potential impacts were identified, and no specific mitigation measures required to ameliorate the impacts on other population aspects during the operational phase.

#### **6.3.3 Monitoring**

The implementation of the CEMP will be monitored by the Environmental Clerk of Works for the duration of the construction phase. Once the proposed development has been completed, there will be no potential for significant impacts on the population and human health and there will be no requirement for monitoring.

### **6.4 Residual Impacts**

With the implementation of the mitigation measures, a significant effect on human health, residential amenity, recreation and tourism, commercial fishing, aquaculture, and shipping and navigation is not likely.

It is noted that the Marine Survey Office and the Department of Defence had no objection to the application, provided their proposed recommendations were followed. The Marine Advisor to the Department observed that the works, if completed as proposed and in compliance with the proposed conditions, will not have significant adverse impacts on navigation, fisheries or the environment.

## **7. Biodiversity**

### **7.1 Baseline Environment**

#### **7.1.1 Methodology**

The desktop assessment of the biodiversity of the study area was informed by an examination of aerial imagery and other available datasets to investigate the potential for connectivity to designated and ecologically sensitive areas. A review of available literature, including the National Parks and Wildlife Service (NPWS) data on European sites, was also undertaken.

Habitats in and/or immediately adjacent to the development area which might be affected by the development were identified and their suitability to support sensitive, rare and protected species was assessed, having regard to the typical ranges of species known to occur in the locality and the zone of influence of the works. These assessments were also informed by the geotechnical and environmental marine surveys carried out under the provisions of Foreshore licence FS 006760. This assessment followed a constraints study and route selection study carried out for the proposed development which informed the consideration of alternatives.

Pre-application consultations were carried out with the prescribed bodies such as NPWS and Inland Fisheries Ireland. The pre-application consultations are described in chapter 5 of the PECR, which supported the application.

Terrestrial, intertidal and subtidal surveys, which were undertaken between 2017 and 2020, informed the determination of the baseline environment and the assessment of impacts on biodiversity.



### 7.1.2 Designated Sites

The proposed development is located in the Shannon Estuary which has been designated as a special area of conservation (SAC), Lower River Shannon SAC, Site Code: 002165, and as a special protection area (SPA), River Shannon and River Fergus Estuaries SPA, Site Code: 004077.

With regard to other types of nature conservation sites in the area:

- No national parks occur within the proposed development boundary,
- No natural heritage areas (NHA) occur within the proposed development boundary (a proposed NHA at Tarbert is approximately 5km to the east of the site while the closest other NHAs are approximately 20 km away from the area),
- No nature reserves occur within the proposed development boundary
- No Ramsar sites occur within the proposed development boundary,
- No wildfowl sanctuaries occur within the proposed development boundary, and
- No biosphere reserves occur within the proposed development boundary.

#### 7.1.2.1 Lower River Shannon SAC Site

The description of the Lower River Shannon SAC is based on the NPWS Site Synopsis report prepared for the site.

The Shannon SAC represents an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered.

A number of species listed on Annex I of the EU Birds Directive breed within the site. These include Peregrine Falcon, Sandwich Tern, Common Tern, Chough and Kingfisher.

There is a resident population of Bottle-nosed dolphin in the Shannon Estuary, and this is the only known resident population of this EU Habitats Directive Annex II species in Ireland. The population is estimated (in 2006) to be  $140 \pm 12$  individuals. The most recent surveys of the species in the estuary were undertaken during June to early October 2018 and estimated the population to be approximately 139 (Rogan et al., 2018). Otter, a species also listed on Annex II of this Directive, is commonly found in this part of the Shannon.

Five species of fish listed on Annex II of the EU Habitats Directive are found within the Shannon Estuary. These are Sea Lamprey, Brook Lamprey, River Lamprey, Twaite Shad and Salmon. The three lampreys and Salmon have all been observed spawning in the lower Shannon and in its tributaries. The lower reaches of the Fergus are important for spring salmon, while the Mulkear catchment has a grilse fishery, though spring fish are caught on the actual Mulkear River. The Feale/Cashen is also important for salmon.

Two additional fish species of note, listed in the Irish Red Data Book, also occur, namely Smelt and Pollan, with only pollan having been observed spawning in the Shannon.

Because of the rich diversity of habitats (including priority habitat) and species that occur in the estuary, the Lower Shannon Estuary SAC is of very high conservation status and the fact that it supports a resident population of Bottle-nosed Dolphins gives it additional sensitivity.

#### 7.1.2.2 River Shannon and River Fergus Estuaries SPA Site

The River Shannon and River Fergus Estuaries SPA is described below. The description is based on NPWS Site Synopsis report prepared for the site.

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry.

The site is SPA under the EU Birds Directive, and is of special conservation interest for the following species: Cormorant, Whooper Swan, Light-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Scaup, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank and Black-headed Gull. It is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The EU Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland and Waterbirds.

The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (57,133 was the five-year mean for the period 1995/96 to 1999/2000), a concentration easily of international importance. The site has internationally important populations of Light-bellied Brent Goose (494), Dunlin (15,131), Black-tailed Godwit (2,035) and Redshank (2,645). A further 17 species have populations of national importance, i.e., Cormorant (245), Whooper Swan (118), Shelduck (1,025), Wigeon (3,761), Teal (2,260), Pintail (62), Shoveler (107), Scaup (102), Ringed Plover (223), Golden Plover (5,664), Grey Plover (558), Lapwing (15,126), Knot (2,015), Bar-tailed Godwit (460), Curlew (2,396), Greenshank (61) and Black-headed Gull (2,681). The figures are five-year mean peak counts for the period 1995/96 to 1999/2000. The site is among the most important in the country for several of these species, notably Dunlin (13 % of national total), Lapwing (6% of national total) and Redshank (9% of national total).

The site also supports a nationally important breeding population of Cormorant (93 pairs in 2010). Other species that occur include Mute Swan (103), Mallard (441), Red-breasted Merganser (20), Great Crested Grebe (50), Grey Heron (38), Oystercatcher (551), Turnstone (124) and Common Gull (445). The figures are five year mean peak counts for the period 1995/96 to 1999/2000.

### 7.1.3 Records of Protected Species and Habitats

Records of rare or protected flora and fauna within 10km of the proposed development (Grid Squares R04 and R05) were obtained from National Biodiversity Data Centre (NBDC) for bat species only and from the Botanical Society for Britain and Ireland (BSBI). In addition, the Irish Whale and Dolphin Group (IWDG) was contacted to determine which cetacean species occur in the relevant part of the Shannon. The biodiversity study was undertaken by Aquafact Ltd, which had previously worked on several marine survey projects in the Shannon including the environmental marine surveys undertaken to inform the route selection assessment. Results from these surveys were used to inform the assessment.

#### 7.1.3.1 Flora

The Online Atlas of Vascular Plants 2012-2020 and the National Invasive Species Database showed no protected or invasive plant species within the proposed development boundary. It was noted, however, only limited spatial data are available.

#### 7.1.3.2 Marine Invertebrates

The intertidal and subtidal invertebrate species recorded in the surveys is presented Sections 7.1.4.4 and 7.1.4.5 below. None of these are protected species.

#### 7.1.3.3 Vertebrates

Cartilaginous, agnathan and bony fish species and amphibian reptile species that occur in the Shannon, and their International Union for Conservation of Nature (IUCN) status in Ireland and Europe are presented in **Table 7.1** below.

**Table 7.1 Cartilaginous, Agnathan and Bony Fish Species and Amphibian Reptile Species that occur in the Shannon**

Species	IUCN Status – Ireland	IUCN Status - Europe	Habitats Directive [92/42/EEC]
Lesser Spotted Dogfish ( <i>Scyliorhinus canicula</i> )	None	None	No
Sea Lamprey ( <i>Petromyzon marina</i> )	Near threatened	Least concern	Annex II
River Lamprey ( <i>Lampetra</i> )	Least concern	Least concern	Annex II and V

Species	IUCN Status – Ireland	IUCN Status - Europe	Habitats Directive [92/42/EEC]
<i>Fluviatilis</i> )			
Pollack ( <i>Pollachius Pollachius</i> )	None	None	No
Butterfish ( <i>Pholis gunnellus</i> )	None	None	No
Goby ( <i>Gobius paganellus</i> )	None	None	No
Blennie species ( <i>Blennius sp.</i> )	None	None	No
Wrasse species ( <i>Labridae</i> )	None	None	No
Eel ( <i>Anguilla Anguilla</i> )	Critically endangered	Critically endangered	No
Conger eel ( <i>Conger conger</i> )	None	None	No
Lumpsucker ( <i>Cyclopterus lumpus</i> )	None	None	No
Flounder ( <i>Platichthys flesus</i> )	None	None	No
Twaite Shad ( <i>Allosa fallax</i> )	Vulnerable	Least concern	Annex II and V
Smelt ( <i>Osmerus eperlanus</i> )	Least concern (Red list 2011)	Least concern	No
Pollan ( <i>Coregonus autumnalis</i> )	Vulnerable	Endangered	Annex V
Salmon ( <i>Salmo salar</i> )	Vulnerable	Vulnerable	Annex II and V
Common frog ( <i>Rana temporaria</i> )	Least concern (Red list 2011)	Least concern	No
Newt ( <i>Lissotriton vulgaris</i> )	Least concern (Ireland Red list 2011)	Least concern	No
Viviparous lizard ( <i>Zootoca vivipara</i> ) (previously <i>Lacerta vivipara</i> )	Least Concern	Northwest Atlantic subpopulation - Least Concern. Southeast Atlantic subpopulation - Data deficient	No
Leatherback turtle ( <i>Dermochelys coriacea</i> )	Least Concern	Northwest Atlantic subpopulation - Least Concern. Southeast Atlantic subpopulation - Data deficient	Annex 1 and IV

Inland Fisheries Ireland observed that the European Eel is protected under Eel Regulation 1100/2007. Glass eels will be arriving in the estuary in December-February, but a cohort of the population will remain in the estuary for the duration of the continental phase of lifecycle, while silver eels will be migrating out to sea from August to January.

#### 7.1.3.4 Birds

The proposed submarine development area lies within the River Shannon and River Fergus Estuaries SPA (IE004077).

Light-bellied Brent Goose, a feature for which the River Shannon and River Fergus Estuaries SPA is designated, utilise intertidal areas to feed. Suitable intertidal foraging habitat for the species are not found within or immediately adjacent to the proposed development. Consequently, it can be concluded that the species is unlikely to occur near the proposed development.

In contrast, given the deep diving, shallow diving and/ or dabbling marine foraging behaviour of Bar-tailed Godwit, Black-headed Gull, Black-tailed Godwit, Cormorant, Curlew, Dunlin, Golden Plover, Greenshank, Grey Plover, Knot, Lapwing, Pintail, Redshank, Ringed Plover, Scaup, Shelduck, Shoveler, Teal, Whooper Swan, Wigeon, these species could be potentially affected by the proposed development.

As the low-lying terrestrial habitats on both sides of the Shannon, along the onshore cable route in the vicinity of Moneypoint and Kilpaddoge, are agricultural in nature and there are no wetlands or water ways, indigenous bird species are restricted to the commoner species and not rare species.

However, it is possible that Peregrine Falcons (green list) would hunt over the area and both Barn (red list) and Long Eared Owls (green list) have also been recorded in the general area. Ravens (green list) most likely occur sporadically at the location. Summer visitors include Terns, Swallow, House Martin, Swift, Chiffchaff, Willow Warbler, Sedge Warbler and Spotted Flycatcher while winter visitors include Redwing and Fieldfare. Snipe and Woodcock may also be present in the early Autumn and Snipe may occur throughout the Winter. Note that 'red list', 'amber list' and 'green list' refer to the Birds of Conservation Concern in Ireland list indicating the conservation status of these species.

#### **7.1.3.5 Mammals**

The NBDC records the two species of marine mammal, Bottle-nosed Dolphin and Common Dolphin, in the area. Porpoises, although rare, are also present in the area (Berrow, pers. comm.).

In Ireland, five SACs including the Lower River Shannon SAC (002165) have been designated for the Bottle-nosed Dolphin while no SAC has been designated for Common Dolphin. Three SACs have been designated for Common Porpoise. With the exception of the Lower River Shannon SAC, in which the proposed development is located, the SACs designated for Common and Bottle-nosed Dolphin and Common Porpoise are not near enough to the development to be of relevance.

Bat species recorded on either side of the Shannon in the Moneypoint – Kilpaddoge area include Common and Soprano Pipistrelle, Daubenton's, Whiskered, Long eared and Leisler's Bat. Lesser Horseshoe Bats (*Rhinolophus hipposideros*) have been recorded just north of Moneypoint, approximately 500m north of the existing GIS substation, near Kilrush, Co. Clare, approximately 7km West of Moneypoint, and east of Tarbert, Co. Kerry, approximately 8 km East of Moneypoint. All bat species are protected under the EU Habitats Directive 92/43/EEC.

With regard to foraging distances, some researchers have found that Lesser Horseshoe Bats normally forage in woodlands/scrub within 2.5km of their roosts (Bontadina et al., 2002). Thus, for each roost, a 2.5km zone is considered an appropriate distance to foraging areas for the purpose of assessing the potential for a likely significant effect. The 2.5km zone around each known roost is mapped and potential foraging grounds within the zone are identified and mapped for each SAC. There are no SACs for *Rhinolophus hipposideros* within circa 20km of the proposed development.

No terrestrial invasive plant species, as listed in the Birds and Habitats Regulations, were recorded within the area of the proposed development. The non-native Pacific Oyster (*Crassostrea gigas*) has been recorded near Tarbert (Marine Institute, 2016) and it has the potential to successfully compete for space both intertidally and sub tidally with the native epibionts.

### **7.1.4 Results of Field Surveys**

#### **7.1.4.1 Onshore Habitats**

The proposed Kilpaddoge AIS extension and associated underground cable connection is predominately located in agricultural grasslands, parts of which are heavily poached by stock.

Plant species recorded included Gorse (*Ulex europaeus*), Nettle (*Urtica dioica*), Ox eye daisy (*Chrysanthemum leucanthemum*), Bracken (*Pteridium aquilinum*), Red and White Clover (*Trifolium pratense* and *T. repens*), Vetch (*Vecia cracca*), Holly (*Ilex aquifolium*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Daisy (*Belis perennis*), Spanish Chestnut (*Castanea sativa*), Honeysuckle (*Lonicera spp.*).

Bird's foot trefoil (*Lotus corniculatus*), Dock (*Rumex spp*), Thistle (*Cirsium*), Cleavers, (*Geum urbanum*), Iris (*Iris pseudacorus*) Ivy (*Hedera helix*), Perennial rye grass (*Lolium perenne*), Cock's foot (*Dactylus glomerata*), Oat grass (*Arrhenatherum elatius*), Dandelion (*Taraxacum spp*), Knapweed (*Centaurea nigra*), Meadow sweet (*Filipendula ulmaria*), Rush (*Juncus effusus*) and Willow (*Salix spp*).

None of the habitats recorded are Qualifying Interest or Annex 1 habitats for the Lower Shannon SAC. The agricultural grassland was considered as having local low value as the habitat is common throughout the wider environs and contains a low diversity of species.

At the Moneypoint site, the terrestrial habitat is dominated by Gorse, Blackthorn and Ivy with some bracken. The proposed underground cable connection will run along an existing internal track located east of the existing 220 kV Cable connection and north of the existing extensive coal yard and ash storage area, located within the existing Moneypoint Generating Station Complex.

Recolonizing bare ground habitat is present in a patchy mosaic with the dry grassland.

Vegetated sea cliff is a qualifying interest (QI) of the Lower River Shannon SAC. There is no QI sea cliff habitat within the zone of influence of the proposed development. Low hard cliff habitat is present at the Moneypoint landfall. However, Aquafact determined this does not qualify as 1230 Vegetated sea cliff habitat, due to the absence of characteristic maritime plant communities there. By way of contrast to the non-Annex cliff habitat within the zone of influence of the proposed development at the Moneypoint landfall, Aquafact determined there is Annex 1 QI sea cliff habitat present outside the zone of influence of the proposed development, approximately 200m to the east of the landfall site.

#### **7.1.4.2 Protected and Rare Plant Species**

No species listed under the Flora Protection Order (Flora (Protection) Order (2015). S.I. No. 356/2015) or habitats protected under the Habitat Directive were recorded within the footprint of the proposed development site during the surveys undertaken and no protected or vulnerable species have previously been recorded within the area.

#### **7.1.4.3 Invasive Plant Species**

No terrestrial invasive plant species as listed in the Birds and Habitats Regulations were recorded in the onshore cable route study area.

#### **7.1.4.4 Intertidal QI Habitats**

The Conservation Objectives report (NPWS 2012) and the Conservation Objectives Backing Document (NPWS, 2012) prepared by NPWS for the Lower River Shannon SAC (Site code: 002165) maps the intertidal area at the Kilpaddoge landfall as the marine community type (MCT) Furoid-dominated intertidal reef community complex within the Qualifying Interest habitats of Estuaries (1130) and Reef (1170). The spatial extent of the MCT within the Qualifying Interest habitats Estuaries (1130) and Reef (1170) is 678ha and 1,294ha, respectively. The MCT is recorded intertidally in the western reaches of the SAC from Kerry Head to Tarbert in the south and from Ross Bay to Kilkerin Point in the north. Where the MCT occurs in the outer more exposed shores, north of Kerry Head and south of Loop Head, the substrate is predominantly bedrock, while elsewhere the substrate is cobbles or boulders or bedrock or a combination of these. The biota of this MCT community is dominated by the furoid algae *Fucus vesiculosus*, *F. spiralis* and *F. serratus*. The associated flora includes *Ulva sp.*, *Porphyra umbilicalis*, *Ralfsia sp.*, *Corallina officinalis* and encrusting red algae. The associated fauna includes the gastropods *Patella sp.*, *Littorina saxatilis*, *Melarhaphe neritoides* and *Nucella sp.*, the polychaetes *Pomatoceros sp.* and *Spirorbis spp.* and barnacles including *Elminius modestus*, *Chthamalus montagui* and *C. stellatus*.

Vegetated sea cliff is a QI of the Lower River Shannon SAC. There is no QI sea cliff habitat within the zone of influence of the proposed development, as discussed in **Section 7.1.4.1** above.

#### **7.1.4.5 Subtidal Habitats**

The proposed submarine cable route will run from the high-water mark across the estuary in waters with a maximum depth of approx. 60m.



The substrate type between 0m and 30m water depth, towards the southern shore, consists of a mix of sand, slightly gravelly sand, gravelly sand, slightly gravelly muddy sand, gravelly muddy sand and sandy gravel (Aquafact, 2008; 2009). Slightly gravelly sandy mud is present between 0m and 10m water depth towards the northern shore and the 30m to 60m water depth zone consists of a rocky seabed with boulders, cobbles and gravel. The habitats that overlap the cable laying area, based on NPWS Conservation Objective mapping for Lower River Shannon cSAC (Site code 002165), include 'subtidal sand to mixed sediment with *Nucula nucleus* community complex', 'faunal turf dominated subtidal reef community', 'subtidal sand to mixed sediment with *Nephtys* spp. community complex', 'fucoid dominated intertidal reef community complex' and '*Laminaria* dominated community complex'.

Surveys previously carried out in the estuary undertaken by Aquafact (2008; 2009) recorded the following species from the 'subtidal sand to mixed sediment with *Nucula nucleus* community complex' an assemblage that occurs within both Large Shallow Bay and Inlet and Estuary that are QI for the Lower Shannon SAC: the polychaetes *Macrochaeta clavicornis*, *Nephtys hombergii*, *Paradoneis lyra*, *Sphaerosyllis bulbosa*, *Capitella* sp. complex, *Scoloplos armiger* and *Spirobranchus* sp., the bivalves *Nucula nucleus*, *Nucula nitidosa*, *Nucula tenuis* and *Abra alba*, the amphipods *Unicola crenatipalma*, *Abludomelita obtusata*, *Pisidia longicornis* and *Maera othonis*, the mysid shrimp *Gastrosaccus spinifer* and the gooseberry sea-squirt *Dendrodoa grossularia*.

Aquafact (2008) recorded the following species from the 'subtidal sand to mixed sediment with *Nephtys* spp. community complex' an assemblage that occurs within both Large Shallow Bay and Inlet and Estuary that are QIs for the Lower Shannon SAC: the polychaetes *Terebellides stroemi*, *Nephtys hombergii* and *Scoloplos armiger* and the amphipods *Metaphoxus pectinatus* and *Ampelisca brevicornis*.

Within the 'faunal turf dominated subtidal reef community' an assemblage which occurs within Reef habitat that is a QI for the Lower Shannon SAC, Aquafact (2008; 2009) recorded a rocky seabed with boulders up to 0.5m in diameter either in tight clumps or more diffuse with some intervening mud, sands and gravel. Species of note included the queen scallop *Aequipecten opercularis*, the green crab *Carcinus maenas*, harbour crab *Liocarcinus depurator*, spider crab *Maja squinado*, the dahlia anemone *Urticina feline*, the gooseberry seasquirt *Dendrodoa grossularia*, *Sabellaria* sp. and other tubeworms and a variety of sponges and hydroids.

The 'fucoid dominated intertidal reef' which occurs within Reef habitat that is a QI for the Lower Shannon SAC, is characterised by *Fucus spiralis* on the upper shore, *F. vesiculosus* on the mid shore and *F. serratus* on the lower shore (Aquafact, 2008; 2009). The associated fauna included talitrids, limpets *Patella vulgata*, dogwhelks *Nucella lapillus*, periwinkles *Littorina littorea* and *L. obtusata*, hermit crab *Pagurus bernhardus*, barnacles and the polychaetes *Spirobranchus* sp. and spirorbid spp. None of these species are rare in Irish coastal seas.

Of the Annex 1 habitats and QI habitats of the Lower Shannon SAC in the vicinity of the proposed development site boundary, the submarine cable installation area overlaps the reef (1170) and estuary (1130) habitats. The stony bank (1220) habitat is located above the high-water mark and proposed development will not encroach on this.

#### **7.1.4.6 Dolphins**

The Shannon Estuary is the most important site in Ireland for bottlenose dolphins (*Tursiops truncatus*) and was designated as a cSAC for this species in 1999. A study on genetics of bottlenose dolphins in Ireland suggested that the bottlenose dolphins in the Shannon Estuary are genetically discrete and thus of very high conservation value. NPWS reports that this resident population of bottlenose dolphin is the only known resident population of this species in Ireland. The population at the site was estimated in 2006 to be approximately 140 individuals (NPWS, 2013).

The most recent surveys of the species in the estuary were undertaken from June to early October 2018 and estimated the population to be approximately 139. The population size estimated in 2018 was reported to lie within the range of population estimates calculated for the site since 1997 and indicated a stable population size. Bottlenose dolphins in the Shannon Estuary calf between June and September with the peak calving period occurring in August.

#### **7.1.4.7 Sea Lamprey and River Lamprey**

Both sea lamprey (*Petromyzon marinus*) and river lamprey (*Lampetra fluviatilis*) are species present in the Lower River Shannon SAC and have the potential to occur within the project area.

The sea lamprey (*Petromyzon marinus*) is a migratory species which grows to maturity in the sea and migrates to freshwater to spawn. They migrate through the estuary from the sea in April and May and spawn in rivers in late May or June and then return to sea.

The river lamprey (*Lampetra fluviatilis*) is a migratory species which grows to maturity in estuaries and migrates to freshwater to spawn from October to December (Maitland, 2003). Spawning occurs in the rivers in March and April. Between July and September young adults at 3-5 years of age migrate during hours of darkness to the estuary.

#### **7.1.4.8 Atlantic Salmon**

Atlantic salmon (*Salmo salar*) is also a species of the Lower River Shannon SAC. A number of rivers that flow into the Shannon Estuary are fished for salmon. These include the River Fergus, Castle Connell Salmon Fishery, the River Mulchair, the River Mague, the River Deel and the River Feale/Cashen.

Smolts typically head out to sea between March and June and adults return to the river between March and August. There are no spawning sites at the project area. However, adult fish will pass through the site when travelling up the river to spawn or on return to the sea or as smolts on their first migration to the sea.

#### **7.1.4.9 Otters**

Previous studies and investigations revealed that otters (*Lutra lutra*) are present throughout the Shannon Estuary. The sightings reported through the National Biodiversity Data Centre *Lutra lutra* database identify areas where freshwater enters the estuary as being more typical of otter usage e.g., Ballylongford Bay, Tarbert Bay and Kilrush.

No evidence of otter holts or resting sites were observed in the proposed development site. That being said, otters do have the potential to occur within the proposed development area for periods of time.

#### **7.1.4.10 Amphibians and Reptiles**

As no ponds or pools were present at either landfall site location, no amphibians were recorded. No lizards were noted on site.

## **7.2 Potential Impacts**

### **7.2.1 Designated Sites**

A Screening for Appropriate Assessment, the report of which, accompanied the Foreshore consent application, investigated the potential for the proposed development to have significant effects on European Sites. The Screening for Appropriate Assessment identified a source-pathway-receptor link between the proposed development and the Lower River Shannon SAC, and the River Shannon and River Fergus Estuaries SPA. The screening assessment concluded, in light of best available scientific data, that there is potential for significant effects on the qualifying interests and special conservation interests (SCIs) of the SAC and SPA, respectively.

A NIS was prepared, which presented an assessment of the potential for the proposed development to result in an adverse effect on the integrity of European sites. The NIS concluded that, following implementation of mitigation measures, the proposed development either alone or in combination with other plans and projects, would not have adverse effects on the integrity of the SAC or the SPA, in view of the sites' conservation objectives.

It is noted that the NPWS made no observations on the application or the NIS.



## 7.2.2 Offshore Activities During Construction

### 7.2.2.1 Underwater Noise Disturbance

Construction activities such as cable burial, pre-lay grapnel clearance and the mass flow excavation will all generate some level of submarine noise. The cable lay and support vessels will also generate underwater noise.

A published value for cable trenching operations gave a sound source level of 178 dB re 1  $\mu$ Pa m. (Nedwell et al., 2003). Nedwell et al. (2012), in assessing the impact of noise during the installation of export power cables from an offshore wind farm in the UK, concluded that the impact range of such activities is far less than for other activities such as piling operations.

Unpublished information for cable jetting operations indicates a comparable sound source level, concentrated in the frequency range of 1 kHz to 15 kHz. The sounds of cable burial were attributed to cavitation bubbles as the water jets passed through the leading edge of the burial plough. Apart from the cable vessel itself, cables laid on the seabed (mostly water depths more than 1,000m) do not generate any sound (see Hale).

It is expected that a cable laying barge or vessel of approx. 125m in length will be employed to carry out cable laying. Other vessels that will be required include a launch vessel and guard/ support vessel(s). Vessel noise is a combination of tonal sounds at specific frequencies (e.g., propeller blade rotational frequency and its harmonics) and broadband noise (Vella et al., 2001). Propeller cavitation noise is the primary source of sound from underway vessels, while noise from engines originates inside the vessel and reaches the water through the hull of the vessel. Noise from shipping is roughly related to vessel size with larger ships having larger, slower rotating propellers. These produce louder, lower frequency sounds (SMRU, 2001). Overall, vessel noise covers a wide range of frequencies from 10Hz to 10kHz. A typical 12m fishing vessel moving at 7 knots will have a peak frequency of 300 Hz with sound pressure level of 150 dB re 1  $\mu$ Pa at 1 m (DAHG, 2014). For comparison, large commercial ships (tankers, bulk carriers, container ships) at their normal working speed generate sound levels circa 180 dB re 1  $\mu$ Pa m. (Greene et al., 1995).

#### ***Marine Mammals – Bottlenose Dolphin***

The potential impacts of noise on marine mammals have been the subject of considerable research. Reviews were provided by Richardson et al. (1995), Nowacek et al. (2007), Southall et al. (2007), Weilgart (2007) and Wright et al. (2007). If the frequency of anthropogenic noise overlaps with the frequencies used by marine mammals, this may reduce the animal's ability to detect important sounds for navigation, communication and prey detection (Weilgart, 2007). This is termed acoustic masking, which may occur anywhere within an organism's auditory range (Wright et al., 2007; Richardson et al., 1995). Masking of important vocalisations will result in increasing information ambiguity and, in extreme circumstances, may result in cetaceans being unable to orientate themselves or hunt/ evade predation in the marine environment (Wright et al., 2007).

Exposure to high energy noise emissions (piling, drilling, and seismic noise) can result in nonrecoverable auditory injury (termed Permanent Threshold Shift [PTS]). Behavioural reactions to acoustic exposure are generally more variable, context-dependent, and less predictable than the effects of noise exposure on hearing or physiology. This is because behavioural responses to anthropogenic sound are dependent upon operational and environmental variables, and on the physiological, sensory, and psychological characteristics of exposed animals. It is important to note that the variables may differ (greatly in some cases) among individuals, of a species and even within individuals depending on various factors (e.g., sex, age, previous history of exposure, season, and animal activity). NOAA (2013) outline that noise can affect cetacean behavioural patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Potential injury zones around installation vessels range between less than 5m up to 50m for marine mammals, although this is based on a number of conservative assumptions, including the assumption of an animal staying within range of the vessels for 24 hours at a time. As individual bottlenose dolphins are unlikely to remain in the vicinity of sources of injurious noise, prolonged exposure of individuals is unlikely occur. However, given the vulnerability of bottlenose dolphin to noise, significant adverse effects to the species are possible.

### ***Diadromous Fish Species***

Sound is perceived by fish through the ears and the lateral line (the acoustico-lateralis system) which is sensitive to vibration. Some species of fish such as salmon have a structure linking the gas-filled swim bladder to the ear. The swim bladder is sensitive to the pressure component of a sound wave, which resonates as a signal that stimulates the ears. These species, therefore, usually have increased hearing sensitivity. Such species are considered to be more sensitive to anthropogenic underwater noise sources than species, such as lamprey that do not possess a structure linking the swim bladder and inner ear.

It should be noted that the potential impact of noise on juvenile and adult fish in open water are considered to be minimal as they can readily move away from the noise source. Experiments on juvenile fish demonstrated balance problems resulting from exposure to an energy source. However, the effects were temporary with full recovery observed after a few minutes upon cessation of the noise (Kostyuchenko, 1971). Some studies of high energy seismic noise sources have also demonstrated the ability of fish to acclimatise to noise associated with an energy source over time (e.g., Chapman and Hawkins, 1969).

Hearing in salmon is poor, responding only to low frequency tones (below 0.38 kHz). While there are no data available for hearing in lamprey, it is highly unlikely that they detect sound close to 10 kHz (Popper, 2005). The lamprey ear is relatively simple and there is nothing within the structure of the ear or associated structures to suggest any specialisations that would make them into anything but a hearing generalist, with maximum hearing to no more than several hundred Hz.

Prolonged exposure of individual fish to injurious noise from trench excavation and cable laying activities is unlikely occur as fish are unlikely to stay in the vicinity of noise sources. There will be no potential for significant adverse effects.

### ***Marine Invertebrates***

As marine invertebrates have no auditory receptors, they will not be able to perceive any construction noise and therefore will not be impacted. They do however have sensory receptors and for mobile species, they will migrate away from the vibrations caused by construction noises. This represents a displacement impact. For sessile species e.g., sea anemones, tubiculous worms, bivalves such as mussels, they will either retract or close their shells. No significant or indirect impacts on this species from noise construction are predicted.

### ***Birds***

The proposed submarine development boundary overlaps the River Shannon and River Fergus Estuaries SPA. Of the 21 SCIs of the SPA, only two, cormorant and black-headed gull, are open water species that have the potential to occur within the cable laying area. All the other species are either waders, duck or geese and these will be found only on mud flats or wading/dabbling in shallow water, a habitat that is not present at the site. There will be no potential for significant adverse effects on the wader birds, ducks and geese.

Of the two SCI bird species i.e., cormorant and blackheaded gull, that are likely to occur at the site, it is only the cormorant that might be affected by construction noise as it dives under water to forage for fish. Blackheaded gull feeds on the surface of the sea. With regard to the cormorant, if the bird is on the sea surface, it will be disturbed and it will fly away if the construction vessel comes to close to it. If it is underwater, it will swim to the surface and then fly away from the vessel. This represents a displacement impact, the duration, of which is temporary and reversible. No significant direct or indirect impacts from construction noise on either cormorant or blackheaded gull are predicted.

### ***Underwater Noise Potential Cumulative Effects***

#### ***Commercial Shipping***

The level of commercial shipping in the Shannon has remained relatively stable over the last 10 years. Given the ambient level of activity in the area, the temporary presence of the cable laying vessel, launch vessel and guard/ support vessel will not significantly increase the overall level of vessel activity in the area and so it is considered that there is no likelihood of a potential significant in-combination effect.

#### ***Dredging***

No dredging is proposed for the area of the proposed works.

### ***Kilpaddoge Battery Energy Storage Project***

The Shannon Clean Tech Ltd Battery Energy Storage System Facility will be located on land 300m from the boundary of the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA. There is no likelihood of potential significant in combination effect on underwater noise

### ***Moneypoint Synchronous Condenser***

There is a proposal for the development of the Moneypoint Synchronous Condenser (Planning Application Ref: 20/318 Clare County Council) approximately 800m west of the Cross Shannon cable landfall at Moneypoint. The NIS for the Moneypoint Synchronous Condenser noted that piling works during its construction had the potential for underwater noise effects on bottlenose dolphin and that a Marine Mammal Observer would be employed to mitigate the risk. Both the proposed development, and the Moneypoint Synchronous Condenser would, if consented, be supervised by MMOs, who will implement the NPWS guidance on minimising underwater noise effects on marine mammals. If the works to complete the Moneypoint Synchronous Condenser and the proposed development are undertaken simultaneously, there will be potential for adverse in-combination effects on marine mammals.

#### ***7.2.2.2 Habitat Disturbance***

The construction activities such as cable burial, pre-lay grapnel clearance and the mass flow excavator will cause disturbance to the seabed habitats along the route between Moneypoint and Kilpaddoge.

### ***Soft Sediment Habitat***

Cable trenching activities proposed for the current project will impact sediments to a depth of up to circa 2.5m. Clearance of seabed obstructions using the PLG equipment has the potential to scrape the top-most substrate layers removing and dislodging fauna. It should be noted, however, that PLG equipment damage will be of a limited footprint. The PLG activities proposed will be limited spatial and temporally. Consequently, the impact will be temporary. Excavation of the trenches for the cables will result in the elimination of natural seabed topography and the creation of mounds of sediment displaced from the trench. The impacts to the seabed will be temporary. The trenches created will be infilled through natural sediment movement processes due to water currents. The natural sediment movement processes will also flatten and remove the sediment mounds.

Trenching activities will result in resuspension of sediment. Sediment modelling was undertaken which showed that the sediment plumes generated will lead to deposition of sediment on the Annex I habitats and constituent community types. The deposition of sediment has the potential to smother resident communities.

The sediment modelling exercise predicted sediment deposition depths after completion of the cable installation will be:

- Up to 2mm towards the south of the cable route,
- Generally, less than 1mm, located towards the shoreline where flow speeds are lower than in the central part of the estuary, and
- Up to 20mm inside the small bay to the southeast of the cable route.

Relatively high sediment deposition has been predicted in the intertidal area of the small bay to the southeast of the project. However, the OSPAR Commission (OSPAR 2008, 2009) noted that marine life can survive rapid sediment deposition up to depths of 100mm, five times the depth predicted by the model for the worst-case scenario. Further, OSPAR (2008, 2009) also stated that negative impacts to marine life are only expected when sediment deposition depths exceed 150mm.

NPWS (2012) *Conservation objectives supporting document for marine habitats in the Lower River Shannon SAC* provides guidance on interpretation of the Conservation Objectives which are, in effect, management targets for habitats and species in the SAC. This guidance relates the anticipated sensitivity of habitats and species to disturbance by proposed activities. For the practical purpose of management of sedimentary habitats, a 15% threshold of overlap between a disturbing activity and a habitat is given in the NPWS guidance. Below this threshold disturbance is deemed to be non-significant.

Disturbance is defined as that which leads to a change in the characterizing species of the habitat (which may also indicate change in structure and function). Such disturbance may be temporary or persistent in the sense that change in characterizing species may recover to pre-disturbed state or may persist and accumulate over time. As the disturbance of the proposed project to sedimentary community types will be temporary and well below the threshold of 15%, it can be concluded that there will be no potential for significant adverse effects on soft sediment habitats.

### ***Reef Communities***

If contact is made with an epifaunal community or species during cable laying, then some damage to the community/species could occur. Cables laid across areas of reef will require additional protection provided by rock placement, installation of concrete mattresses or rock filter bags. The clearance of seabed obstructions using the PLG equipment has the potential to remove and dislodge reef fauna. The area overlaid with rock protection or damaged by PLG activity will be re-colonised by either the damaged species itself or from neighbouring specimens of the same species. A study undertaken at Lyme Bay, southwest United Kingdom, showed recovery of reef habitats and assemblages within 3 years following the cessation of chronic towed demersal dredge and trawl fishing (Sheehan et al., 2013). The recovery reported in Sheehan et al (2013) is broadly consistent with other studies which have reported detectable trends towards recovery within a few years (e.g. Beukers-Stewart, 2005). It should be noted that cable laying and seabed clearance activities will be limited to the immediate surroundings of the cable route and will only occur as a once-off event. Therefore, recovery will be considerably more rapid than recovery from bottom fishing impact. Consequently, it can be concluded that any effects will be temporary significant adverse and there will be no permanent significant adverse effects.

#### ***7.2.2.3 Marine Mammals***

Bottle-nosed Dolphins will not be impacted by sediment resuspension caused by cable laying as these species are adapted to living in the highly turbid estuarine waters of the Shannon Estuary. For the impacts on soft sediment communities due to sediment resuspension to **Section 7.2.2.2** above.

#### ***7.2.2.4 Fish Migration***

Inland Fisheries Ireland observed that the timings of the work in the estuary should be cognisant of the migratory window of diadromous species. As the construction works progressed across the channel, it will be important to ensure that there is free passage for fish species along one bank to allow species migrating up and downstream. While some works will take place during the 7am - 7pm period others will be over 24 hours which could interfere with fish migrations.

#### ***7.2.2.5 Pollution and Biohazards***

There are potential pollution risks associated with the construction of the proposed development. The most significant of these would be spills or leaks of oil/diesel or harmful or noxious substances on land or at sea. Depending on the volume, a spill or leak has the potential to have a significant adverse effect on marine biodiversity.

There is a risk that non-native species or pathogens could be introduced into the estuary by vessels, construction plant and personnel during construction activities.

### ***7.2.3 Onshore Activities During the Construction***

#### ***7.2.3.1 Noise Disturbance***

##### ***General***

Noise will be generated during the construction of the landfalls by the plant and machinery used to regrade the ground, excavate trenches and joint bay pits, construct the landfall ramps, place the protective rock cover and install the cable channels. However, as the work at both landfalls will be relatively brief in terms of numbers of days and will affect a relatively small area, the potential impacts are expected to temporary moderate, adverse.

### ***Otters***

Despite the lack of signs of otter or holts at either landfall or along the onshore cable route, it is likely that they occur in the proposed development area. The noise associated with the onshore construction is likely to result in disturbance to otter which may forage or commute in the area. The disturbance of otter will be a temporary effect during the works which has the potential to have a temporary moderate adverse effect on the local otter population.

### ***Birds***

The construction works are likely to temporarily disturb birds within the works area. These birds are likely to move to alternative sites during the works.

### ***Amphibians and Reptiles***

As no ponds or pools were present were observed on site, no amphibians were recorded and, given that only grassland and hedgerows were recorded, no lizards were noted on site. A significant potential impact on amphibians or lizards is not likely.

#### **7.2.3.2      *Terrestrial Habitat Disturbance***

During the construction phase, it is proposed that temporary construction laydown facilities (comprising of dedicated laydown and storage areas) will be provided for construction plant/equipment. These areas will be within the existing red line boundary and on land at the Moneypoint Generation Station and the Kilpaddock substation. These lands currently comprise disturbed bare ground and agricultural grassland.

Areas of agricultural grassland and scrub will be temporarily removed to facilitate the works. Some habitat loss and/or degradation may occur during the construction phase arising from the construction activity itself and from runoff of sediments and the settlement of dust on land, and sediment suspension in the sea. These effects will be spatially small, and the works will be less than one year in duration. The terrestrial habitats were considered as having local low value, as the habitats are common throughout the wider environs and contain a low diversity of species. The habitats will recolonise on completion of the works. The potential impacts on habitats will not be significant at a broad geographical scale.

The temporary loss of habitat, coupled with the availability of alternative suitable habitat within the surrounding habitat, does not have the potential to result in a significant adverse impact on bird species.

#### **7.2.3.3      *Pollution and Biohazards***

During the construction phase there is potential for spills and leaks of oils, fuels and chemicals from storage areas, plant, and equipment to impact on the surrounding habitats. Accidental spills of fuels, oils and construction materials (e.g., concrete), if not appropriately managed can affect habitat quality through deposition of materials in the environment. Excavation activities also have the potential to result in the runoff of sediment into the estuary or local water courses.

Due to the proximity of the works area to the European sites, there is potential that the invasive species may be introduced to the SAC or SPA.

#### **7.2.3.4      *Slope Stability***

The collapse of slopes, created during excavation, has the potential to result in sediment entering the estuary or local water courses. This has the potential to have an adverse effect on water quality and biodiversity.

### **7.2.4          *Operational Phase***

#### **7.2.4.1      *Onshore***

Once the proposed development has been completed, there will be no potential for significant impacts on terrestrial biodiversity arising from the cables at either landfall site or along the cable route.

#### 7.2.4.2 Offshore - EMF

Each cable will give rise to a permanent EMF being generated along its length. Studies on the effect of EMFs from submarine electrical cables, on marine organisms have shown that decapods (*Cancer pagurus*), elasmobranchs e.g., Lesser Spotted Dogfish (*Scyliorhinus canicula*) and agnathans e.g., Sea Lamprey (*Petromyzon marinus*) are attracted to such fields (see Hutchinson et al., 2018 and Scott et al., 2019). Some marine invertebrate and vertebrate taxa are attracted to EMFs, but significant negative impacts have not been recorded on any species.

Reviews of studies on the effects of EMFs in migratory fish species have reported a lack of data on Atlantic salmon (*Salmo salar*) and sea trout (*Salmo trutta*) (e.g. Waterside Ecology, 2017; Gill and Bartlett 2010). To overcome this lack of data, Gill and Bartlett (2010) appraised the likely responses of Atlantic salmon and sea trout to EMF based on documented responses of other salmonid species. Studies undertaken by Lohmann et al. (2008) and Putman et al. (2014) on salmonid species including sockeye salmon (*Oncorhynchus nerka*), chinook salmon (*Oncorhynchus tshawytscha*), chum salmon (*Oncorhynchus keta*) suggested that the earth's magnetic field combined with other directional information, such as stellar cues, are used to identify particular coastal or oceanic regions. If salmonids do use magnetic cues for orientation or navigation it is likely that these cues are used at a large spatial scale and during the oceanic phase of outward and homeward migrations (Lohmann et al., 2008; Putman et al., 2014). Once an appropriate coastal region is identified, migration to home (natal) rivers is likely dependent on olfactory cues, with chemical cues extending from natal rivers strongly implicated in the final phases of salmonids migrations (Stabell, 1984; Johnstone et al., 2012). Thorstad et al. (2011) suggested that once salmon have reached sheltered fjords and sea lochs, olfactory cues are the most important sense for homing. Given that the last phase of the spawning migration in salmonids is primarily governed by olfactory cues, it can be concluded that salmonid species migration will not be significantly affected by the EMF produced by the Cross Shannon cable.

Cross ocean migration in European eel (*Anguilla anguilla*) is likely to be influenced by the species ability to detect the earth's magnetic field (Durif et al., 2013; Naissbett-Jones et al., 2017), when located closer to the coast, olfaction plays a large part in locating river and streams (Waterside Ecology, 2017). Several studies have reported no evidence that EMF presents obstructions to eel migrations. Studies in the Baltic indicated that high voltage cables did not pose a threat to eel migration. Given the above, it can be concluded that European eel migration will not be significantly affected by the proposed development.

The review by Gill and Bartlett (2010) reported that there was no evidence that sea lampreys possess an ability to detect magnetic fields. Furthermore, the review reported no evidence that EMF plays any role the species during their homeward migrations to coasts and estuaries. Given the above, it is expected that sea lamprey migration will not be significantly affected by the proposed development.

No data were found by the Applicant that marine mammals are negatively impacted by EMF.

The Marine Institute, in its observations, noted that in relation to aquatic species, that the lack of evidence of impact is not evidence of no impact. While the Marine Institute accepted that, for some species, magnetic fields as navigational aids may be replaced by olfactory cues in riverine situations, this did not mean that the sensitivity to magnetic fields is disabled. Notwithstanding these observations, and specifically in relation to the Foreshore licencing process, the Marine Institute stated that it was broadly satisfied with the response by the Applicant to its concerns and had no further observation.

Once the proposed development has been completed, it is expected a significant impact on marine biodiversity from the EMF generated by the cables is unlikely.



## 7.3 Mitigation Measures and Monitoring

### 7.3.1 Construction Phase

#### 7.3.1.1 General

A detailed Construction Environmental Management Plan (CEMP) and a Construction Method Statement will be prepared and implemented by the Contractor. Kerry and Clare County Councils, the Department of Housing Local Government and Heritage, the Department of Communications, Climate Action and Environment, the NPWS, Inland Fisheries Ireland and the IWDG will be consulted during the preparation of the CEMP. The CEMP will be reviewed regularly by the Contractor and revised as necessary to ensure that the measures implemented are effective. An Outline CEMP accompanied the application for consent. The outline CEMP sets out the mitigation measures proposed to ensure that there would be no significant effects on the receiving environment from the construction of the proposed development.

All onshore pollution control measures will be designed, installed and maintained in accordance with CIRIA guidance for ‘*Environmental Good Practice on Site*’ (C741), ‘*Control of water pollution from linear construction projects. Technical guidance*’ (C648) and will have regard to IFI guidance *Guidelines on the Protection of Fisheries During Construction Works in and Adjacent to Waters* (2016) to ensure the protection of the Lower Shannon catchment and the fishery habitat and species it supports.

All mitigation will be implemented under the supervision of an Environmental Clerk of Works, who will be appointed by the Contractor, as explained in **Section 4.3.8** above.

#### 7.3.1.2 Offshore Construction Phase Mitigation

The minor disturbances to the seabed during the pre-lay, cable laying and post-lay activities will have a not significant impact on the seabed habitat and no mitigation measures are proposed.

#### ***Marine Mammals and Fish***

ESB will ensure that the cable laying operators will implement the mitigation and monitoring measures in relation to marine mammals as outlined in Department of Arts, Heritage and the Gaeltacht (DAHG) *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*.

The DAHG (2014) provides guidance on the measures required to manage the risk of man-made sound to marine mammals due to certain specified human activities that can introduce sound into the marine environments at levels that may harm and/ or disturb species that are legally protected. While the activities proposed for the installation of sub-seabed cables are not specifically listed in the guidance, ESB and the survey operators will adhere to DAHG (2014) guidance on mitigation measures and monitoring to be implemented for geophysical acoustic surveys and will consult with IWDG.

The measures will include the use of marine mammal observers (MMOs) and operational protocols. The works in the estuary will commence with a ‘soft-start’ procedure to allow lamprey, salmon and marine mammals to vacate the works area. The implementation of these DAHG (2014) guidance measures will minimise potential impacts to marine mammals from the proposed development.

Inland Fisheries Ireland observed that while the reference to the Habitats Annex II species was noted there are other fish species inhabiting the vicinity of the works sites. Inland Fisheries Ireland pointed out that the mitigation measures and guidance of NPWS regarding marine mammals are not transferrable to fish species. The fish remain invisible to any shore or boat-based observer. Mitigation measures should aim to reduce the sound generated, in intensity and duration. The use of soft-start and ramp-up procedures for any sound generating surveys undertaken – both on a day-to-day basis and on re-start after any stoppages within any day should be undertaken. The comments of Inland Fisheries Ireland in this regard relate to fish species of conservation significance and of leisure angling significance, which constitute part of Inland Fisheries Ireland’s brief.



### ***Aquatic Invasive Species***

The biosecurity measures will prevent the transfer of invasive species from the other waterbodies to Shannon Estuary by ensuring that vessels, plant, personnel, and equipment used are appropriately inspected and sterilised before use on site. The biosecurity measures will have regard to Inland Fisheries Ireland biosecurity protocols including:

- Inland Fisheries Ireland *Biosecurity Protocol for Field Survey Work* (December 2010),
- Inland Fisheries Ireland *Invasive Species Biosecurity Guidelines for Anglers* – leaflet (2011),
- Inland Fisheries Ireland *Invasive Species Biosecurity Guidelines for Boaters* – leaflet (2011), and
- Inland Fisheries Ireland *Invasive Species Biosecurity Guidelines for Scuba Diving* (2012).

The Environmental Clerk of Works, appointed by the contractor, will oversee and monitor the implementation of biosecurity protocols. All plant and equipment will be cleaned and disinfected in advance of coming to site and post works in accordance with Inland Fisheries Ireland biosecurity protocols. All operatives will be briefed on Inland Fisheries Ireland biosecurity protocols, and all disinfection / cleaning of plant and equipment must be witnessed by the Environmental Clerk of Works, or the 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.

#### **7.3.1.3 Onshore Construction Phase Mitigation**

##### ***Control of Run-off and Pollution***

All construction work areas will be fenced off prior to the construction works commencing. Except for 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. During the installation of the underground cable connections across drainage ditches, the works area will be completely isolated from the drain and any water present will be over pumped via appropriate sediment control and released to the downstream section of the drainage ditch. Any contaminated water will be removed and disposed in accordance with the waste legislation.

In addition to the above, the contractor will be required to implement measures to control the emission of dust and air-borne pollutants from construction activities. These measures will include:

- Control of vehicle access,
- Vehicle speed restrictions,
- Bed of gravel at site exit points to remove caked on dirt from tyres and tracks,
- Washing of equipment at the end of work each day,
- Prevention of on-site burning of waste,
- Hard surface roads will be wet swept to remove any deposited materials,
- Unsurfaced roads will be restricted to essential site traffic only, and
- Wheel-washing facilities will be located at all exits from the construction site.

All machinery used in proximity to the drainage ditches at Moneypoint will be stored in bunded areas during the works.

Silt fences will be installed along the length of the works for the underground cable connections located adjacent to the Shannon. The silt fences will be set back a minimum of 10m from all watercourses. Silt fences will also be installed around the proposed landfall locations and will be positioned around stockpiles of excavated material to ensure no runoff from the stored material discharges into a watercourse.

### ***Slope Stability***

At an early stage of the project development, survey data was used to inform and minimise the slope instability risk along the cable alignment. To further reduce the vulnerability of the cable installation in areas with steep slopes, micro routing will be carried out at detailed design stage.

The design of the slopes of the ramps and the excavation side slopes, at the landfalls, has been based on conservative slope angles for the materials observed from the preliminary site surveys. Trench and excavation depths have been minimised where possible to limit excavations and the need for material disposal.

#### **7.3.1.4 Monitoring**

The implementation of the CEMP will be monitored by the Environmental Clerk of Works for the duration of the construction phase.

#### **7.3.2 Operation**

As a significant adverse impact on biodiversity, following completion of the works is not expected, there are no requirements for a monitoring programme.

### **7.4 Residual Impacts**

A Natura Impact Statement (NIS) was prepared to assess the potential for the proposed development to result in an adverse effect on the integrity of European sites. The NIS concluded that, following implementation of mitigation measures, the proposed development, either alone or in combination with other plans and projects, would not have an adverse effect on the integrity of the Lower River Shannon SAC nor on the River Shannon and River Fergus Estuaries SPA, in view of the sites' conservation objectives.

It is expected, that with the implementation of mitigation measures, there will not be a significant adverse impact on marine mammals. There will not be a significant adverse effect on diadromous fish. No significant direct or indirect impacts on marine vertebrates or invertebrates or marine birds are predicted.

It is expected that there will be no potential for significant adverse effects on soft sedimentary habitat communities. Cable laying and seabed clearance activities in reef habitat areas will be limited to the immediate surroundings of the cable route and will only occur as a once-off event. Recovery is expected to be rapid. Consequently, it can be concluded that any effects will be temporary significant adverse and there will be no permanent significant adverse effects on reef communities.

There is not expected to be a significant adverse impact on terrestrial habitats or species.

With the implementation of mitigation measures it is expected that there will not be a significant impact on biodiversity from pollution or biosecurity risk.

The independent environmental consultant Hartley Anderson prepared the following reports:

- *Appropriate Assessment Screening Cross Shannon Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage - updated following RFIs (February 2022)*
- *Appropriate Assessment Cross Shannon 400 kV Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage (May 2022).*
- *Article 12 Risk Assessment - Cross Shannon 400 kV Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage (February 2022).*

The Appropriate Assessment report also agreed with the conclusion of the NIS. The Article 12 Assessment conclude that with implementation of mitigation measures, it is very unlikely that there will be negative residual impacts from the proposed works on Annex IV species in the area and it is also very unlikely that any animals will be injured or killed as a result of the proposed works.

## 8. Marine Aspects

### 8.1 Baseline Environment

Soils and geology, hydrodynamics, coastal processes and bathymetry are addressed in this section.

#### 8.1.1 Marine Deposits

The superficial deposits, along the proposed cable route in the estuary, vary in thickness from 0.2m to 30m. The greatest depths of these superficial deposits are found in the middle of the estuary and the smallest depths are located along the northern section of the route.

The bedrock geology along the cable routes is described in **Section 9.1** below.

Two types of till have been identified in the proposed development area reflecting glacial erosion of different bedrock types:

- A limestone dominated till with a sand and/or silt matrix; and
- A shale dominated till with a clay or silty clay matrix.

Post-glacial Alluvium was identified both onshore and offshore, the composition of which is variable.

No surface faults have been mapped on the Geological Survey of Ireland 1:100,000 scale map for the area. Brittle Variscan deformation features were identified by Sleeman and Pracht, 1999, who also identified that the Navan-Silvermines fault lies beneath the carboniferous bedrock, which may have had a role in the location of the estuary. In general, the area has been described as seismo-tectonically stable.

At the Moneypoint landfall, the foreshore gently slopes into the channel (southwards) before it slopes at a 70° angle for a distance of approximately 25m, to reach a depth of 22m (Mott MacDonald, 2019a). The gently sloping foreshore area is composed of flat, sub-angular, mudstone boulders interspersed with angular rocks and pebbles. From the base of the slope continuing southwards across the estuary bed to the southern shoreline, the mudstone boulders become less prevalent, and pockets of silty clay become more widespread covering approximately 70% of the sub-tidal survey area.

#### 8.1.2 Shoreline, Coastal Erosion and Landslides

The Geological Survey of Ireland, in its observations, recommended that geohazards such as landslides, flooding and coastal erosion be considered. Flooding risk is addressed in **Section 10** below.

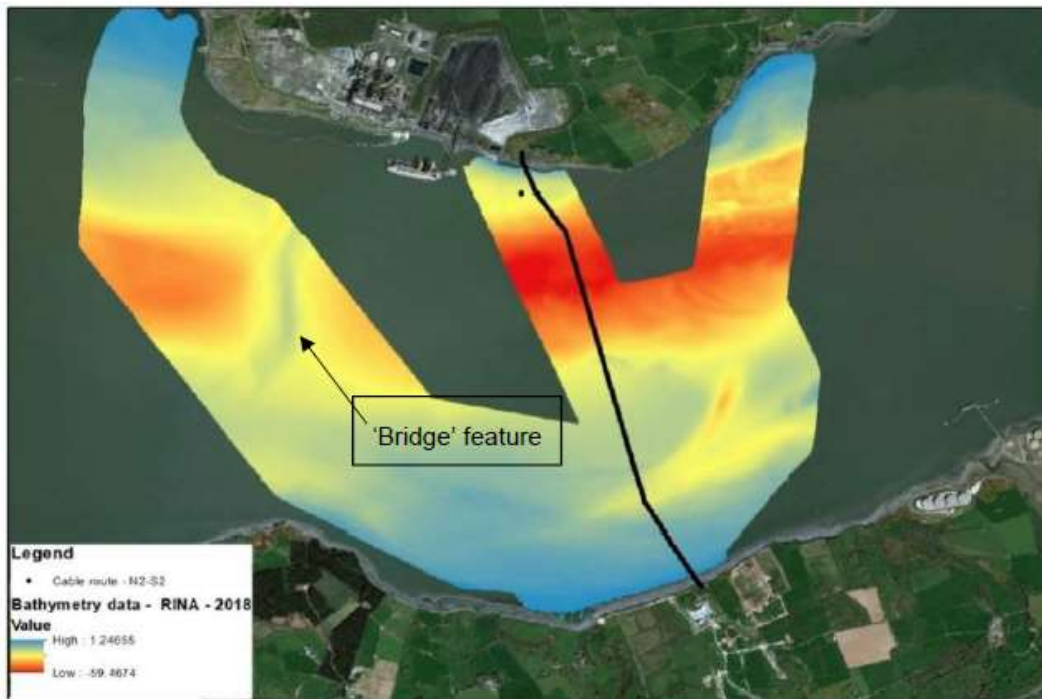
The historical shoreline maps from the Ordnance Survey Ireland (1893- 1913), aerial imagery provided by RINA (2018a) and coastal erosion maps from the Irish Coastal Protection Strategy Study Phase 4 revealed that the coastline is stable with a moderately exposed rocky coast comprising boulders, rocks, stones and pebbles. The assessment of coastal erosion risk completed by the OPW did not identify the study area as being at significant risk of erosion.

The topography of the northern and southern shorelines and cable routes has gently slopes. The Geological Survey of Ireland landslides data base landslides susceptibility mapping <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228> (accessed in January 2022) was reviewed. The mapping does not indicate that the area of the proposed development is susceptible to landslides.

#### 8.1.3 Bathymetry

The evaluation of bathymetry and seabed features was undertaken using the results from the marine survey campaign completed for the proposed development.

Figure 4 and 6 show the seabed levels and seabed features along the proposed cable route. Shallow and deep waters areas are present with maximum water depth reaching 58m relative to chart datum (CD) at the centre of the Shannon Estuary. Maximum slope angles are up to 15 degrees, with the steepest slopes identified at the approach to the northern landfall at Moneypoint.



**Figure 4 Bathymetry data showing the proposed development cable route (Source: Planning and Environmental Considerations Report, submitted with the application)**



**Figure 5 Bathymetry data showing areas of steep slope (Source: Planning and Environmental Considerations Report, submitted with the application)**

Steep seabed slopes are considered a potential hazard for submarine cable installation. Cable installation tools will have a maximum slope angle at which they can operate. The impact of the slope on cable laying is dependent on several factors such as the orientation of the slope relative to the cable alignment, water depth, sediment type and cable installation technique. Installing a cable in an area with a steep slope will result in the cable being more vulnerable to damage as it may be suspended above the seabed.

Therefore, steep slopes will be avoided where possible. If they cannot be avoided, mitigation measures such as pre-installation clearance or seabed flattening will be necessary.



## 8.1.4 Hydrodynamics

### 8.1.4.1 Tidal Height and Current Velocity

The Shannon Estuary is approximately 100km in length and has a tidal range of approximately 5m during spring tides. An increase in tidal range occurs from the mouth of the estuary at Kibaha Bay, where the range is 4.45m towards the upper estuary, at Limerick where the range is 6.25m during spring tides.

Tidal flows in the estuary are influenced by freshwater inputs from the fluvial network. In the estuary, freshwater discharges from the fluvial network are less dense than the saline estuarine water which leads to stratification. During the ebb tide, freshwater and saltwater flow in the same direction. However, during the flood tide, the freshwater will remain above the incoming flow of denser saltwater.

Tidal currents were measured using an Acoustic Doppler Current Profiler in April 2008 (Soil Mechanics, 2009a). The measurements demonstrated that:

- The flood tide propagates up the estuary, mainly flowing through the deeper section of the estuary channel, with faster velocities measured at greater depth; and
- Higher current velocities at the surface are observed during ebb tides.

During the ebb tide the fresh and saline water move in the same direction, and higher current speeds are observed in the upper water column.

The flood and the ebb cause different flow characteristics during the spring tides. The flood tide propagates eastwards up the estuary, with velocities up to 120-150cm/s measured at approximately 30m water depth in the main channel. During the flood tide, current velocities close to the northern shoreline and shallower southern regions are relatively benign.

The most significant tidal velocities during the ebb are observed approximately 1.25km south of the northern shoreline. From the start of the ebb tide, to approximately 1.5 hours after high water, the velocities typically reach speeds of 120-180cm/s. These velocities are predominantly observed as surface currents and do not penetrate to a significant water depth. Velocities at or near the seabed are observed to be relatively benign at this point of the tide. A lack of deeper flow is likely due to bottom friction preventing the water mass initially moving, with the surface water not affected by bottom friction. In addition, the surface flow is likely to be combining with the natural flow of the River Shannon. Between 3.5 and 5 hours after the high water, peak current velocities reach speeds of up to 240-260cm/s, (circa 5 knots).

### 8.1.4.2 Sand waves

Current speed influences sediment particles and, because of gravity, they are lifted/moved in the direction of the flowing current. This sediment movement causes seabed features such as ripples and sand waves. These features are dynamic in nature. Sand waves in the proposed development area are generally 1m in amplitude. However, there are some areas where they exceed 2-3m and localised locations where sand waves of 4-5m amplitude have been identified. Sand wave mobility surveys carried out in 2018 (RINA, 2018a) identified that there is no significant movement of sand in a single tidal cycle of circa 12h. However, in some areas between the spring and neap tides, which is approximately 7 days, a migration of approximately 5m horizontally can occur.

Large sand wave amplitudes and their mobility (migration) have the potential to impact the complexity of the submarine cable installation. Large amplitude sand waves result in steep slopes and rapid changes in slope angle over relatively short distances. Cable installation tools will have a maximum slope angle, in which they can operate, and the submarine cable will have a maximum bending radius. Consequently, areas of large amplitude sand waves and high mobility will be avoided or otherwise mitigation measures such as pre-installation clearance or seabed flattening will be necessary.

Mobile sediment features are considered a constraint due to their potential impact on a cable's rating performance and maintenance. The migration of sand wave features may lead to a change in the cable burial depth during the operational phase of the cable's life. An increase in the burial depth has the potential to impact on the cable rating, as it becomes more difficult for heat to dissipate away from the cable. If the heat reaches a level above that which is allowed for, this could lead to performance issues for the voltage.

A reduction in burial depth increases the risk of cable damage, as the material over the cable provides protection, and increases the risk of impacts by human factors such as anchor strike. If a significant reduction in burial depth occurs this could result in exposure and sections of free spanning of the cable, which would result in additional tension in the cable system above which have been allowed for.

A pre-installation clearance of sand waves is proposed, using a mass flow excavation (MFE) tool. The MFE will be deployed along the cable alignment 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 sand waves, the cable will be buried deeper to avoid future cable damage.

## **8.2 Potential Impacts**

### **8.2.1 Construction Phase**

#### **8.2.1.1 Sand Waves**

Areas of sand waves of large amplitude or high mobility will be avoided in the cable micro-routing, if possible. If they cannot be avoided, mitigation measures such as pre-installation clearance or seabed flattening will be undertaken. Pre-installation clearance or seabed flattening will have a temporary, slight adverse effect on sand waves along the cable alignment.

#### **8.2.1.2 Seabed Slopes**

Steep slopes have been avoided in the cable routing where possible. Seabed slopes between 10 and 25 degrees were observed in marine survey data near to the northern landfall. The steepest slopes angles occur for approximately 25 to 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 to facilitate cable installation. The seabed preparation works, to mitigate the seabed slope over a 25m length, between the 5m and 10m bathymetry contour, will have a permanent slight adverse impact on the seabed along the cable alignment.

#### **8.2.1.3 Geology and Sediments**

At the landfalls the bedrock geology and superficial sediment will be locally disturbed. Excavation works using traditional excavation methods will take place to create the foundation of the landfall structure. Where possible, existing bedrock and sediment will be reused in the construction works. There is a potential for collapse of excavations and unstable construction slopes. The ground will be regraded at the southern landfall. At the northern landfall, the existing cliff will be excavated, and the contours permanently changed. The landfall construction will have a temporary moderate adverse potential impact on the geology and sediments.

Excavation of the cable trenches will have a permanent imperceptible adverse impact on the seabed sediments. For areas of exposed bedrock, the submarine cable is proposed to be installed on the seabed and covered with rock protection. Because area of bedrock impacted will be relatively small, the installation of the cable in seabed areas of exposed bedrock will have a permanent imperceptible adverse impact on the bedrock.

#### **8.2.1.4 Shoreline Erosion and Landslides**

Comparison of the historic mapping with the current shorelines has shown that shoreline erosion is negligible. The submarine cable installation and landfall construction phase are anticipated to be in the order of weeks to a few months. Due to the short-term duration and geology at the landfall locations, the potential impact of shoreline erosion over this timescale is likely to be negligible.

It is considered that there is no potential risk of landslides in the area of the proposed project.

#### **8.2.1.5 Sediment Dispersion**

For areas of exposed bedrock, the submarine cable is proposed to be installed on the seabed and covered with rock protection. Therefore, sediment dispersion is not likely to be impacted.

Where the submarine cable is proposed to be buried below the seabed in superficial sediment, a cable burial technique will be used. This technique is not likely to significantly impact sediment dispersion.

#### **8.2.1.6 Sediment Deposition**

At the end of cable installation there is expected to be sediment deposition along the cable alignment. A model exercise of the behaviour of the sediment released into the water column during cable installation was carried out to assess the extent of sediment deposition. The sediment modelling exercise predicted sediment deposition depths after completion of the cable installation will be:

- Up to 2mm towards the south of the cable route,
- Generally, less than 1mm, located towards the shoreline where flow speeds are lower than in the central part of the estuary, and
- Up to 20mm inside the small bay to the southeast of the cable route.

This sediment deposition is not expected to have a significant adverse impact on the seabed sediments.

### **8.2.2 Operational Phase**

#### **8.2.2.1 Geology and Sediments**

The ground will be regraded at the southern landfall. The southern landfall construction will have a permanent not significant adverse effect on the geology and sediments. At the northern landfall, the existing cliff will be excavated, and the contours permanently changed. The northern landfall construction will have a permanent moderate adverse impact on the geology and sediments.

#### **8.2.2.2 Shoreline Erosion and Landslides**

Comparison of the historic mapping with the current shorelines has shown that shoreline erosion is negligible. The geology at the northern landfall is bedrock and at the southern landfall is glacial till. The construction of the landfalls has the potential to create a risk of erosion at both shorelines.

It is considered that there is no potential risk of landslides in the area of the proposed project.

#### **8.2.2.3 Sediment Mobility**

The installation of the cables is not expected to have a significant effect on sediment mobility.

### **8.3 Mitigation Measures and Monitoring**

Substantial mitigation by avoidance and reduction has been achieved through the consideration of alternatives in the design phase of the proposed project. These embedded measures resulted in the selection of the optimum route alignment. Micro-routing of one or more cables may be undertaken, at the detailed design stage, to avoid areas of significant risk. Additional mitigation measures in respect to the offshore elements are set out in below.

#### **8.3.1 Construction Phase**

##### **8.3.1.1 Sand waves**

A follow up survey will be carried out at the detailed design phase to locate ripple and sand wave features and micro-route the cable route to avoid those areas, if possible. Prior to cable installation, another survey will be undertaken as these features are dynamic in nature. This will minimise the need to flatten sand waves and, thus, minimise the impact on the seabed.

##### **8.3.1.2 Seabed Slopes**

To reduce the vulnerability of the cable because of the installation in areas with steep slopes, micro routing will be carried out at detailed design stage.



All micro routing will be carried out within the proposed red line boundary. This will minimise the need for rock filled bags to be used in areas where a steep slope cannot be avoided and, thus, minimise the impact on the seabed.

#### **8.3.1.3 *Slope Stability***

The slope of the proposed ramp and the side slopes of excavations at the landfalls are based on conservative slope angles for the type of subsoils observed in the preliminary site surveys. The angle of slopes will be subject to further optimisation at the detailed design stage. Trench and excavation depths have been minimised where possible to limit excavations and the need for material disposal.

#### **8.3.1.4 *Sediment Dispersion and Deposition***

Construction activities such as trenching, and cable installation will release sediment which will be dispersed in the area due to currents. The quantities of sediments being suspended is expected to be small, given the dimensions of the cable trenches and the level of disturbance expected to arise from the cable installation. Best practice guidelines will be adopted by the Contractor to avoid unnecessary sediment dispersion during the submarine cable installation.

The installation of the cable will be programmed to avoid periods of peak spring tidal currents. The submarine cable installation will be undertaken when tidal currents are slackest to minimise sediment dispersion.

### **8.3.2 *Operational Phase***

#### **8.3.2.1 *Shoreline Erosion***

To avoid shoreline erosion, a rock revetment will be installed at the toe of the concrete slipway structure at the northern landfall. This rock revetment will limit the amount of erosion and the potential of instability of the cliff. A rock revetment will be installed on the crushed stone slipway at the southern landfall. A gabion wall will terminate the rock revetment above the high tide line. Monitoring of the landfall structures will be undertaken on a yearly basis to detect any early erosion signs and prevent the potential collapse of the structures.

It is considered that there is no potential risk of landslides in the area of the proposed project and no mitigation is proposed.

#### **8.3.2.2 *Sediment Mobility***

A preliminary cable burial risk assessment has been completed to determine the risk of the cable being exposed or undermined due to sediment mobility over the operation life of the cable. The assessment considered different survey datasets for the study area. However, predicting long term change in the River Shannon is complex even with sediment modelling. Therefore, the mitigation for the proposed development is proposed, which includes:

- Full cable burial risk assessment to be completed at the detailed design stage; and
- Post construction monitoring. A campaign of periodic marine survey inspections of the cables to monitor the movement of sand waves and determine cable burial depth.

### **8.3.3 *Monitoring***

Following completion of construction, monitoring will be undertaken of the landfalls to detect signs of erosion. Periodic marine survey and inspections will be undertaken of the cables to monitor the movement of sand waves and determine cable burial depth.

## **8.4 *Residual Impacts***

Pre-installation clearance or seabed flattening will have a temporary, slight adverse effect on sand waves along the cable alignment.

The seabed preparation works, to mitigate the seabed slope over a 25m length between the 5m and 10m bathymetry contour, and installation of the cable in seabed areas of exposed bedrock, will have a permanent slight to imperceptible adverse impact on the seabed along the cable alignment. The overall construction phase impact on sediment mobility and sediment deposition is not expected to be significant.

The landfall construction will have a temporary moderate adverse impact on the geology and sediments. The northern landfall construction will have a permanent moderate adverse impact on the geology and sediments. With the implementation of mitigation measures, the construction of the landfalls is not expected to create a risk of erosion at both shorelines.

## 9. Land, Sediment and Geology

This chapter examines the baseline environment in terms of land and soils in relation to the onshore elements and assesses the potential impact of the proposed works.

### 9.1 Baseline Environment

#### 9.1.1 Geology and Subsoils

##### 9.1.1.1 Subsoils

The EPA subsoil mapping database indicates the land at the northern extent of the proposed development, adjacent to the proposed northern landfall, as ‘Other deposit type (Bedrock at Surface)’ and ‘Till type’ (shales and sandstone till Namurian). To the west of this area is the Moneypoint Generating Station which is indicated as ‘Made Ground’. The sub-soil at Kilpaddoge is indicated as ‘Till type’ which is described as fine loamy drift with siliceous stones.

##### 9.1.1.2 Bedrock

The bedrock along the shores of the Shannon Estuary adjacent to the proposed cable routes has been mapped as Namurian (Upper Carboniferous) sediments. These comprise two groups, the Central Clare Group to the north and the Shannon Group on the southern shores. These lithologies were described by Sleeman and Pracht (1999) as:

- Central Clare Group – Cyclotherm-controlled prograding deltaic deposits. The sediments usually comprise some or all of the following lithologies; basal marine band overlain by laminated shales, massive grey siltstones and a thick upper unit dominated by laminated sandstone, sometimes capped by coal and rootlets. Syn-sedimentary features are common (e.g., slumping, faulting, flow-folding, ball and pillow structures, sand volcanoes) and channel features/point-bar deposits may also be found.
- Shannon Group (undifferentiated) – unit dominated by turbidite sandstones, i.e., most likely to comprise a mixture of grain sizes in generally fining-upward successions.

#### 9.1.2 Hydrogeology

Geological Survey of Ireland web-mapping has classified the groundwater vulnerability as ranging from ‘High’ to ‘Extreme’ at both the Moneypoint and Kilpaddoge onshore sites. A parcel of land at the northern extent of the proposed development, adjacent to the proposed northern landfall, is noted as ‘Rock near the surface’. ‘Extreme’ groundwater vulnerability means water and contaminants can easily move from the subsurface materials into groundwater.

### 9.1.3 Geological Heritage Areas

A Geological Heritage Area is an area, which contains geological or geomorphological features considered to be of national interest, and which has been recommended for Natural Heritage Area (NHA) designation by the Geological Survey of Ireland under the Wildlife (Amendment) Act 2000.

Desk-based research utilising the Geological Survey of Ireland databases indicated that there are no Geological Heritage Areas, or proposed Geological Heritage Areas, within one kilometre of the proposed development sites. This was confirmed by the Geological Survey of Ireland, in its observations on the application.

## 9.2 Potential Impacts

### 9.2.1 Construction Phase

Overall, construction phase activities could potentially, without the implementation of mitigation measures, result in the following significant effects on the receiving environment.

- Excavations increase the vulnerability of groundwater to exposure to spills/leaks of potentially polluting substances (chemicals, oils, paints, and sanitary waste).
- The potential discharge of cement or uncured concrete would cause water pollution.
- At the landfalls the bedrock geology and superficial sediment will be locally disturbed.
- The 400 kV underground trenches will be approximately 1.65m wide and 1.34m deep with the cables spaced at 500mm centre to centre. Being less than 1.3m deep, significant seepage of ground water into the trench is not anticipated.
- The proposed development will result in the temporary loss of agricultural land to facilitate the construction. It is expected that a construction zone up to 20m wide along the onshore cable route and temporary laydown areas approximately 1,585m<sup>2</sup> and 3,173m<sup>2</sup> in area will be required for the duration of the works.
- There will be a permanent loss of green field land at the proposed extension to the existing Kilpaddoge Substation site.
- The excavations will give rise to a risk of ground instability.
- There is the potential for soil compaction due to trafficking, materials storage and excessively high stockpiles of soil.
- There is the potential for silt laden run off from the site in heavy rain or from wheel-washing activities, and
- Hydrocarbons stored and used on site to refuel earthmoving machinery will give rise to the risk of spills and leaks, and
- There is potential for spills and leakage to occur either through discharge of on-site hydrocarbons or accidental damage to outside bunds with subsequent localised contamination of the soil and groundwater.

### 9.2.2 Operational Phase

During the operational phase of the proposed development there is no potential for site activities to have a significant impact on the geological and hydrogeological environment of the area.

## 9.3 Mitigation Measures and Monitoring

### 9.3.1 Construction Phase

In order to minimise disruption, a Construction Environmental Management Plan (CEMP) will be developed and implemented by the Contractor during the construction phase of development. The CEMP will be reviewed regularly and revised as necessary to ensure that the measures implemented are effective.

A Construction Waste Management Plan (as part of the overall CEMP) will provide for the segregation of all construction wastes into recyclable, biodegradable and residual wastes. All operations at the site will be managed and programmed in such a manner to minimise waste production and maximise recycling in order to prevent potential ground pollution. 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 manner which will not adversely affect the environment.

Other measures will include:

- To minimise the risk of instability, stockpiling of excavated materials will be undertaken only to heights and slope angles which the material can support. 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.
- Excavation depths will be minimised to limit excavations and the need for material disposal.
- Excavated material will be re-used for the backfill material. The backfill material will be compacted adequately, to ensure the stability requirements and overall integrity of the landfall structure are met.
- Imported materials and any site won materials will be tested prior to use to determine their geotechnical and geo-environmental properties 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.
- Bunds for the storage of chemicals will be lined or constructed of materials resistant to damage by the materials stored. The capacity of such bunds will be a minimum of 110% of the volume of the largest container stored. 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).
- Where refuelling is to take place on site, it will be within a designated impermeable, bunded area, away from all drains or the estuary. 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. All relevant personnel will be fully trained in the use of this equipment.
- Drip trays will be used where hydrocarbons are being used for vehicle maintenance/refuelling.
- 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.
- 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, and

The following measures will be implemented for underground cable installation:

- The onshore trench depth will be minimised where possible.
- Compacted concrete material will be placed around the ducts.
- Along the internal access tracks, the trench reinstatement will be carried out in consultation with the landowners.
- For unsurfaced/grass sections, the trench will be backfilled with suitable excavated material placed and compacted above the top row of ducting to ground level, and
- Excavated material and topsoil will be stored and capped for re-use in separate stockpiles alongside the trench. Surplus material will be stored or reused elsewhere inside the 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.

### 9.3.2 Operational Phase

There is no potential for site activities to have a significant impact on the geological and hydrogeological environment of the area in the operational phase. No specific mitigation will be required.

### 9.3.3 Monitoring

The implementation of the CEMP will be monitored by the Environmental Clerk of Works for the duration of the construction phase. Once the proposed development has been completed, there will be no potential for significant impacts on land, sediment and geology and there will be no requirement for monitoring.

## 9.4 Residual Impacts

With the implementation of the mitigation measures, the construction phase will have a temporary not significant adverse effect on land, soils and geology due to local disturbance the bedrock geology and overburden at the landfalls and along the cable route, and the temporary loss of agricultural land to facilitate the construction.

The proposed project will cause a permanent loss of green field land at the proposed extension to the existing Kilpaddoge site. This will be a permanent slight adverse effect on land, soils and geology. During the operational phase, site activities are not expected to have an impact on land, soils and geology.

# 10. Water and Flood Risk

## 10.1 Baseline Environment

### 10.1.1 Water Framework Directive

The main surface water bodies within the study area flow into the Lower Shannon Estuary. The Shannon is Ireland's largest estuary, comprising an area of approximately 150km<sup>2</sup>. The Lower Shannon Estuary is designated as a SAC and a SPA.

The Burane Lower drains into the bay between Kilmer and Moneypoint. The water quality of the Burane Lower was unassigned in the latest Water Framework Directive Status (2013-2018) report by the Environmental Protection Agency (EPA). The Glencorby and Tarbert rivers drain into the estuary near Tarbert. The Glencorby drains into the estuary to the east of Tarbert, and Tarbert stream drains into the estuary at Tarbert Bay. Both rivers are assigned a 'Good' status.

The Lower Shannon Estuary transitional waterbody was reported to have 'Good' status by the EPA (2013-2018). However, the transitional waterbody is noted to be 'At Risk' of a deterioration in water quality.

### 10.1.2 Water Framework Directive Protected Areas

While the overall objective of the Water Framework Directive is to achieve good status for all waterbodies, some waterbodies require extra protection by virtue of their location in a protected area or their function as a drinking water or bathing water. In accordance with the requirements of the Water Framework Directive and the associated national regulations, a register of protected areas has been established for each River Basin Districts in Ireland.

A desktop review of the waterbodies requiring extra protection in the general area of the project was undertaken. There are several private wells in the area. There are no nutrient sensitive waters located in the area. Water dependent habitats and areas of ecological significance in the area including all internationally designated habitats, are described in the **Section 7**, Biodiversity, above.

### 10.1.3 Aquaculture

The estuary is an important area for aquaculture. **Section 6.1.7** above provides more information on aquaculture in the vicinity of the proposed project.

All marine waters in the proposed development site are of high importance and sensitivity.

#### **10.1.4 Industry**

Operations at the Moneypoint Generating Station and the SSE Generating Station at Tarbert are currently regulated by the EPA under the existing Industrial Emissions Directive licences (Ref No. P0605-04 and P607-02, respectively). All emissions from these plants are subject to the conditions set out in the licences.

#### **10.1.5 Flood Risk**

Potential flood risk from the proposed development has been considered in accordance with the *Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government, November 2009).

The Guidelines note that a precautionary approach should be applied to reflect uncertainties in flooding datasets and risk assessment techniques and the ability to predict future climate and performance of existing flood defences. A development should be designed with careful consideration to possible future changes in flood risk, including the effects of climate change, so that future occupants are not subject to unacceptable risks.

Flooding in the general study area was reviewed by accessing the Office of Public Works data portal ([www.floodinfo.ie](http://www.floodinfo.ie)) and the Flood Risk Management Plans for the Shannon Estuary South and the Shannon Estuary North and Mal Bay River Basin (OPW, 2018). On the southern side of the Shannon Estuary, historical flood events and future coastal flood risk indicate that Tarbert Island, the N67 road approaching it from the south, and the Ballylongford catchment are at risk of flooding. On the northern side of the Shannon Estuary, historical flood events have been recorded at Kilrush and Cappagh. The Irish Coastal Protection Strategy Study for the South West Coast, under the most conservative modelling assumptions, have identified areas at potential risk from tidal flooding. These locations are generally in the immediate environs of the shoreline except for Tarbert Island, which is considered to be most vulnerable under the high probability scenario. There is no record of pluvial flooding at the existing Moneypoint Generating Station Complex or the Kilpaddoge substation.

According to the predicative flood maps ([www.CFRAMS.ie](http://www.CFRAMS.ie)) the proposed onshore cable routes are located outside the predicted flood extents associated with the Lower River Shannon Estuary for medium or high probability scenarios. This indicates that the landfalls and onshore cable route are in 'Flood Zone C' as defined in the 2009 Guidelines. Flood zone C is an area where the probability of flooding is low, less than 0.1%, or 1 in 1,000 for both river and coastal flooding.

### **10.2 Potential Impacts**

#### **10.2.1 Construction Phase**

##### **10.2.1.1 Onshore Activities**

The potential construction phase impacts associated with the proposed onshore works mainly relate to the risk of contamination of waterbodies. Except for minor field drain crossings, there will be no instream works carried out as part of the onshore works and substation works. Consequently, there will be no change to the morphology of the existing onshore surface water network. Construction phase activities may result in short term indirect impacts on the waterbodies which, without the implementation of appropriate mitigation measures, could have significant effects on the receiving environment and areas that are hydrologically connected. There is a possibility that uncontained spills or leaks of pollutants from onshore plant and equipment, discharge of grout or uncured concrete or silt in stormwater run-off from the works would have a significant adverse impact on local water quality in watercourses or the estuary.

All onshore construction works will be located outside the predicted flood extents associated with the Lower Shannon estuary and no potential impacts due to flooding are predicted.

##### **10.2.1.2 Offshore Activities**

The pre-lay, cable laying and post-lay activities will disturb sediments and increase sediment suspension in the water column, which would be a potential impact on water quality. Spills or leaks or discharge of pollutants from the vessels engaged in the works have the potential to have significant adverse impacts on water quality in the estuary.



### 10.2.2 Operational Phase

The proposed development boundary is located in 'Flood Zone C' as defined by '*The Planning System and Flood Risk Management Guidelines for Planning Authorities*'. The stormwater drainage collection system of the proposed extension at the existing Kilpaddock substation will discharge to ground. The operation of the proposed project will not increase the level of flood risk at the project site or elsewhere in the catchment.

There is a possibility of uncontained spills or leaks associated with equipment malfunctions, i.e., fuel spillage giving rise to hydrocarbons outside the substation compounds.

These pollution events, in the absence of mitigating controls, have the potential to impact the water quality in the estuary via natural drainage pathways.

## 10.3 Mitigation Measures and Monitoring

### 10.3.1 Construction Phase - Onshore

The appointed Contractor will be required to develop a Construction Environmental Management Plan (CEMP) which will include a comprehensive and integrated plan for erosion and sediment control measures. These will include:

- No construction works will be undertaken within 10m of any drainage ditch, with the exception of the crossing points.
- Temporary construction surface drainage and sediment control measures will be in place before earthworks commence. A preventative maintenance programme for all wastewater, stormwater, fuel and chemical management systems will be implemented on site.
- Topsoil and subsoil will be excavated to facilitate the construction of the proposed onshore development. Unless re-used as backfill or in local landscaping works all soil/stones (topsoil and subsoil) arising on the site will be removed from the site for reused as a by-product, where appropriate, or disposed of as a waste, if reuse cannot be identified, by an appropriately permitted Contractor subject to the relevant permissions by consenting authorities.
- During the installation of the cables across drainage ditches, the works area will be completely isolated from the watercourse and any water present will over pumped to percolate to ground, or a diversion will be created in accordance with Inland Fisheries Ireland Guidelines.

Refer also to the mitigation measures specified in **Section 9.3.1** above to control impacts on land, sediment and geology.

### 10.3.2 Construction Phase – Offshore

No mitigation measures were identified in the PECR to minimise the risk of spills or leaks or the discharge of pollutants from vessels engaged in the works having an impact on water quality in the estuary.

The Arup proposes that the following conditions be imposed, should a licence be issued:

- Refuelling of vessels engaged in the works shall take place in port at the quayside using suitable hoses and equipment to avoid any spillages.
- No waste materials, bilge water or wastewater shall be deposited into the sea from the vessels engaged in the works at any time. All waste materials, bilge water and wastewater from the vessels engaged in the works shall be brought onshore for proper removal and disposal by a licensed waste contractor.

Arup notes that it is a legal requirement that all vessels engaged in the works operate within the regulations of the International Convention for the Prevention of Pollution from Ships (MARPOL). In this respect Annexes I, IV and V of the MARPOL convention, which contains the regulations for the prevention of pollution by oil, the prevention of pollution by sewage from ships and the prevention of pollution by garbage from ships, must be implemented by the vessel operators.



The Irish Coast Guard noted the provisions of the National Maritime Oil/Hazardous Noxious Substances Spill Contingency Plan (and its suite of standard operation procedures), June 2021, and the associated national legislation referenced in the Plan. The Irish Coast Guard noted, specifically, the requirement for contingency preparedness and planning for emergency response and environmental protection for offshore/at sea operations by the vessels, to which the relevant national legislation applies.

### **10.3.3 Operational Phase**

The increase in runoff resulting from the replacement of a permeable greenfield area with impermeable surfaces in the Kilpaddoge substation extension will be mitigated by the proposed site drainage and the use of sustainable urban drainage features.

All collected storm water runoff in the Kilpaddoge substation extension will be directed through a silt trap and a full retention oil interceptor which will remove any silt or hydrocarbons which may have become entrained in runoff from hardstanding surfaces within the compound. The drainage design includes an emergency shut-off valve in a manhole chamber just upstream of the infiltration areas which can be closed in the event of a major spill to prevent runoff discharging to ground.

### **10.3.4 Monitoring**

The implementation of the CEMP will be monitored by the Environmental Clerk of Works for the duration of the construction phase. Once the proposed development has been completed, there will be no potential for significant impacts on water quality or flood risk and there will be no requirement for monitoring.

## **10.4 Residual Impacts**

With the implementation of the proposed mitigation measures, neither the construction nor the operational phases are likely to have a significant impact on water quality. The proposed works will not impact on the overall objective of the Water Framework Directive that all waterbodies should achieve or maintain good status. The construction and operation of the proposed project will not increase the level of flood risk at the project site or elsewhere in the catchment.

Inland Fisheries Ireland observed that if all mitigations measures are put in place this should reduce the risk of any incident affecting the estuarine environment.

# **11. Archaeology and Cultural Heritage**

## **11.1 Methodology**

Known archaeological sources and site investigations conducted for the project were reviewed. The site inspections and surveys undertaken included walkover surveys of the intertidal and upper foreshore and comprehensive archaeological interpretation of the findings of a marine geophysical survey, which comprised multibeam bathymetry, side-scan sonar, magnetometry and sub-bottom profile data sets, and which extended over a wider study area.

The existing 220kV cable installation (Foreshore Licence Ref: FS005791) was the subject of archaeological assessment and the study of current project drew on that work to provide background insight.

## **11.2 Baseline Environment**

### **11.2.1 Archaeological Overview**

The Shannon Estuary is the largest inlet located along the Irish coastline and constitutes an exposed intertidal zone around 200km in length (combined length of both sides of the river). The estuary is part of a dynamic landscape that includes raised bogland, freshwater fens, salt marshes and intertidal mudflats.

Research conducted in the 1990s highlighted the archaeological importance of the Shannon estuary since earliest times. The work conducted by the Discovery Programme focused attention on the economic role that the estuary played in terms of coastal exploitation for fishing and communications since the later Mesolithic period, before people exploited the landscape directly for agrarian production. The Discovery Programme study area was concentrated on the intertidal mudflats on the Fergus and Meelick rivers and around Carrigdirty, County Limerick, upriver from the present survey area. The work brought attention to the archaeological potential of the larger estuary area.

Estuarine environments are sensitive to sea-level change and large areas of prehistoric foreshore have been submerged by relatively small fluctuations in sea level. The inter-tidal environment provides for an extremely rich archaeological holding-content and archaeological / palaeoenvironmental evidence of Mesolithic, Neolithic, Bronze Age and post-medieval date has been recovered. Large sections of the estuary provide suitable environmental conditions for the preservation of archaeological material in its intertidal zone, where deep deposits of estuarine mud provide an anaerobic environment within which archaeological material is preserved. Areas of submerged Neolithic forest have been identified, buried deep in the estuarine clays. The distribution of known medieval and early modern/nineteenth-century fortifications along the estuary was well known, but the new work highlighted the previously undocumented foreshore areas with relict fish weirs and old piers as features that can retain significant and early phases of use.

In the area between Moneypoint and Kilpaddoge, the Shannon Estuary is approximately 2.5km wide, and begins to broaden gently on its west side as it starts its approach to the Atlantic Ocean. The waters run swiftly across the deep parts of the main channel. The estuarine topography differs from that further east and, in the most part, does not provide for the form of preservation seen to the east of Kilkerrin Point. The upper foreshore and inter-tidal zones on the north side, around Moneypoint, are predominantly composed of shelving bedrock, shingle, and rock deposits, with small areas of sand and silt in natural inlets, while Glencoosagh Bay, on the south side, provides a narrow band of sand and silt deposits inshore.

The Underwater Archaeology Unit reiterated the observations of the National Monument Service and Kerry County Council's Archaeologist, as issued to An Bord Pleanála, that study area is an area of extremely high archaeological potential.

## **11.2.2 Outputs of Desktop Studies**

### **11.2.2.1 Record of Monuments and Places**

The Record of Monuments and Places (RMP) is a list of archaeological sites based on the Sites and Monuments Record (SMR) files, maintained by the National Monuments Service at the Department of Housing, Local Government and Heritage. Thirty-nine sites are listed in the RMP in the vicinity of the foreshore areas under assessment. Remote from the shoreline, but within 1.5km radius of the coastline, is a series of other archaeological sites that provide clear evidence of the early medieval settlement of the townlands located on either side of the estuary. Several souterrains and a ringfort in Kilpaddoge townland, County Kerry, attest to this occupation. The picture is mirrored on the north side of the estuary with ringforts and associated structures located in the townlands of Carrowdotia North and Carrowdotia South.

### **11.2.2.2 National Inventory of Architectural Heritage**

The National Inventory of Architectural Heritage is a county-by-county database that identifies, records, and evaluates the post-1700 architectural heritage of Ireland. There are no entries listed in the National Inventory of Architectural Heritage for the townlands in the vicinity of the project.

### **11.2.2.3 Topographical Files**

The topographical files held at the National Museum of Ireland record objects that have been reported to the Museum or form part of its national collections. The records have been catalogued according to county and townland. There are currently no entries in the Topographic Archive relating to the area under assessment.

#### **11.2.2.4 Historic Shipwreck Inventory**

The Historic Shipwreck Inventory at the Department of Housing, Local Government and Heritage is a national archive that seeks to include all shipwreck events recorded in Ireland since records began to be made systematically in approximately 1750 AD. It does not claim to represent a systematic record of wrecking prior to this date. The Inventory is made up principally of recorded incidents of wrecking. The locations of these wrecking incidents are not absolute and refer to the nearest headland or other known topographic feature. There are far fewer known locations of shipwreck, where wreckage has been identified on the seabed from sources such as marine geophysical survey, diver-truthing, fishermen's records or combinations of these and related sources.

In relation to the survey area, the headlands considered for the assessment include Moneypoint, Burrane Point, Clonderalaw Bay, Kilkerin Point, Bolands Rocks and Colman's Point on the Clare side, and Ballydonohue Point, Tarbert, Carrigaduaun, and Ardmore Point on the Limerick / Kerry side. The Inventory records only ten wrecking events, and none of these have been confirmed in terms of specific coordinates for actual wreckage surviving in situ. It should also be noted that, despite the comprehensive marine geophysical survey conducted in 2008 for a previous cable lay between Tarbert and Moneypoint, there were no observations made of shipwreck material. There are significantly more events of historic wrecking recorded downriver at Scatterry Island and upriver at Foynes. Tarbert is a difficult anchorage and suffers from a strong ebb-tide. This may explain the absence of shipwrecking incidents noted in the Tarbert and Moneypoint area.

#### **11.2.2.5 Excavations Bulletin**

The excavations bulletin provides an annual published and online summary of accounts of archaeological excavations undertaken throughout Ireland. Summaries may also be submitted for inter-tidal surveys, underwater assessments, and the archaeological monitoring of marine/ riverine dredging works. Archaeological monitoring for the previous cable-lay between Tarbert and Moneypoint did observe two series of timber posts or stakes in the nearshore sands off Kilpaddoge, County Kerry. Four stakes were considered to be associated with a previously unrecorded nineteenth-century salmon weir, and three other stakes may have been associated with a weir, and part of a rope fragment recovered from excavations associated with this second set of stakes was dated to the Bronze Age.

#### **11.2.2.6 Summary of the Desktop Studies**

The archaeological potential within the study area, based on existing data, highlights the two shorelines as locations that retain historic structures such as simple quays and former fish traps. There are no known archaeological or historic features within the corridor of the proposed development.

However, intertidal archaeology is still a young discipline and much of the material remains tends to belong to the recent past, which has not been the focus of more traditional archaeological approaches. Moreover, as demonstrated during the archaeological monitoring of the previous cable-lay across the estuary in 2012, the potential to observe new material during construction is high. The inshore environment retains expanses of soft sediment, and features such as buried fish traps remain invisible to marine geophysical prospection.

### **11.2.3 Outputs of the Field Studies**

#### **11.2.3.1 Field Surveys**

Field walkover surveys were undertaken in 2018 and 2019 of the intertidal areas of the landfalls and along the cable routes. No surface features or deposits of archaeological / historic interest were encountered within the footprint of the proposed landfall works corridor. The landfall locations avoid all known and recently discovered archaeological features recorded within the various foreshore areas and their adjoining littoral zones.

At the northern landfall, no features of archaeological or historic interest were encountered as part of the field-walking. However, an area of archaeological potential (Area AP1) was identified where a mound of quarried stone overspills onto the foreshore from an abandoned nineteenth century quarry (Moneypoint Quarry). This area is 80m northeast of the landfall location. The debris occupies the position of a cartographic feature recorded on the OS 25-inch map; a structure that comprised a masonry quay that once facilitated the shipment of flagstones from the quarry. The potential for remains of the quay structure to lie buried beneath the area of quarry debris is likely and an area of potential, AP1, is assigned to this location.

The development boundary of the proposed southern landfall site will avoid any archaeological features previously identified as part of the survey undertaken in 2018. The nearest features are situated 520m and 486m to the west. In addition, archaeological inspection of the pastureland adjoining the upper foreshore did not reveal any surface features of archaeological or historic interest. Moreover, the paucity of the topsoil present and shallow nature of the underlying strata (glacial till and bedrock) do not provide conditions particularly suitable for the retention of archaeological material, features, or deposits. As such, a relatively poor holding-content can be ascribed to the intertidal foreshore and adjacent pasturelands that are located within the proposed landfall corridor.

#### **11.2.3.2 Marine Geophysical Survey**

As part of the assessment undertaken to date, a marine geophysical survey was undertaken. The main findings from the marine geophysical survey are summarised below.

There were no clearly defined features associated with shipwreck, and while most of the anomalies identified may be either natural items such as rocks or modern debris, the data do highlight two areas that could be of further interest. Side scan sonar anomaly ss18 in the southern sector of the survey area, off Carhoonakineely townland in Glencoosagh Bay, is a stone alignment that lies close to a former fish trap and may be related to it. Secondly, the magnetometer data highlights the inshore area at the north side of the survey area in the vicinity of the alternative landfall locations (east and west of Moneypoint) as a busy sea area that can be expected with the presence of the former quarry sites and quays to the east of the existing Moneypoint Electricity Generating Station.

Three recorded side scan sonar anomalies (namely ss4, ss12 and ss24) were noted within the proposed route corridor. None of these features correspond with detections in the magnetometry survey. The proposed submarine cable route corridor sought to avoid all impacts with recorded marine geophysical survey anomalies. The findings from the geophysical data however, highlighted the need for the project development process to be mindful of the archaeological risk associated with the Shannon Estuary.

#### **11.2.3.3 Marine Site Investigation**

A programme of vibrocoring and cone penetration testing was carried out to inform the design and route selection process. No archaeological deposits or inclusions were encountered as part of the marine site investigation works that would suggest the presence of buried in situ archaeological material.

#### **11.2.4 Baseline Conclusion**

The 2019 archaeological assessment, combined with the 2018 intertidal survey, provided a detailed account of the foreshore and wider coastal environment at the two landfall sites for the proposed development. No surface features or deposits of archaeological / historic interest were encountered within the footprint of the proposed landfall works corridor. The landfall locations are considered optimal from a cultural heritage perspective. The chosen sites avoid all known and recently discovered archaeological features recorded within the various foreshore areas and their adjoining littoral zones.

### **11.3 Potential Impacts**

The proposed development will avoid impact with any recorded marine anomalies and known archaeological features. Direct impacts to the intertidal and seabed areas within the proposed route corridor will however occur. These have the potential to expose new sub-surface material of archaeological interest. The proposed construction activities which have the potential to give rise to new material of archaeological interest will be as follows:

- Landfall preparatory works including foreshore trenching, topsoil stripping, construction of cable transition joint bays, construction of concrete slipway at the northern landfall,
- Seabed disturbance along the submarine cable route corridor including pre-lay grapnel runs across seabed,
- Seabed preparation works including installation of rock filter bags or similar on seabed slopes,
- Submarine works along the proposed cable alignments including use of the MFE tool to remove sand waves/ripples above 0.5m height,

- Trenching for burial of cables using plough/jetting machine along approximately 600m section from kilometre point (KP) 2.2 to KP2.8,
- Installation of rock filter bags or similar,
- Post construction surveys.

## 11.4 Mitigation Measures and Monitoring

### 11.4.1 Construction Phase

**Table 11.1** below summaries the proposed construction activities and the proposed mitigation measures.

**Table 11.1 Proposed construction activities and proposed archaeological mitigation**

Installation process	Mitigation
Landfall preparatory works including foreshore trenching, topsoil stripping, construction of cable transition joint bay, construction of concrete slipway at the northern landfall	Pre-construction archaeological investigations (test trenches) across foreshore impact area at each landfall location and adjacent lands at the Kilpaddocke substation, Archaeological monitoring during the construction phase
Seabed disturbance along the submarine cable route corridor including pre-lay grapnel runs across seabed	Archaeological monitoring
Seabed preparation works including installation of rock filter bags or similar on seabed slopes	None required
Submarine works along the proposed cable alignments including use of MFE tool to remove sand waves/ripples above 0.5m height	Archaeological monitoring during the use of the MFE and cable jetting works
Installation of cables: Burial of cables using plough/jetting machine along approximately 600m section from KP 2.2 to KP 2.8	Archaeological monitoring during the cable burial process
Additional cable protection (as required): Installation of rock filter bags or similar	None required
Post construction surveys	Marine geophysical survey data to be subject to archaeological review

The Underwater Archaeology Unit of the National Monuments Service, in its observation, advised that archaeological dive survey and archaeological testing should be carried out in advance of the works contractor being engaged, to ensure that results inform final details for cable placement/completion, particularly if significant archaeological remains are identified, and thus prevent any risk of delays to works when plant and machinery are on site. Should significant archaeological remains be identified, further archaeological mitigation may be required by way of preservation in situ/avoidance or full archaeological excavation.

### 11.4.2 Operational Phase

Once construction has been completed, there will be no potential for impact on archaeology or cultural heritage and no mitigation measures are proposed.

### 11.4.3 Monitoring

Archaeological monitoring is proposed for the construction phase as indicated in **Table 11.1** above.

## 11.5 Residual Impacts

The proposed development will avoid impact on any recorded marine anomalies and known archaeological features.



Direct impacts to the intertidal and seabed areas along the proposed route corridor will occur during the construction phase and unknown archaeological features may be impacted. The implementation of the mitigation measures will ensure that significant adverse impacts on unknown archaeological features will not be likely. Once construction has been completed there will be no potential for impact on archaeology or cultural heritage and no mitigation measures are proposed.

It is noted that the Underwater Archaeology Unit had no objections to the foreshore licence being granted provided that the conditions it proposed were attached to any grant of permission.

## 12. Noise, Air and Climate

### 12.1 Baseline Environment

#### 12.1.1 Study area

The wider environs predominantly comprise the villages of Killimer in County Clare and Tarbert in County Kerry, pasturelands and industrial sites. The ESB Moneypoint Electricity Generating Station and the SSE Tarbert Electricity Generating Station are licensed by the Environmental Protection Agency under Industrial Emissions Directive Licences register references P0605-04 and P0607-02, respectively. There are several agricultural holdings and associated residential dwellings in the area. In addition, there are dwellings in the general area, particularly along the N67 road between the Moneypoint Electricity Generating Station and Killimer, in County Clare, and along the L1010 road, south of the Kilpaddoge 220 / 110 kV substation, on the approaches to Tarbert in County Kerry.

There are two schools, Tarbert National School and Tarbert Comprehensive School, in Tarbert. There are no schools in the study area in County Clare. According to the Health Service Executive website, the closest medical centre is located in Tarbert village. None are indicated in proximity to the study area in County Clare.

There are no sensitive receptors within 200m of the proposed landfalls or the proposed Kilpaddoge substation location. The closest sensitive receptor on the northern side is circa 120m from the cable route between the northern landfall and the Moneypoint substation. There are several one-off residential properties between 200m and 250m from this cable route.

#### 12.1.2 Noise Environment

Currently there are two power transformers operating at the Kilpaddoge Substation. These will continue to operate when the substation is extended. The proposed extension of the Kilpaddoge substation includes the installation of a new power transformer and a new instrument transformer. These transformers will be located outdoors.

A baseline noise survey was carried out in 2019 in the area surrounding the existing Kilpaddoge Substation. Local weather was monitored and reported throughout the noise survey.

Typical noise sources that were noted during the survey were local and distant road traffic, high altitude passenger aircraft flyovers, domestic dogs barking and noise from livestock. From the results of the noise survey, the noise levels are typical of a rural environment. At the monitoring point located adjacent to the Kilpaddoge substation, noise sources included birdsong and distant traffic, and transformer noise was audible. Except for the survey location adjacent to the Kilpaddoge substation, the minimum  $L_{Aeq}$  levels were below 55 dB during the day, 50 dB during the evening and 40 dB at night. The minimum  $L_{A90}$  at each of the monitoring locations, representative of sensitive receptors, was well below 50 dB during the evening and 40 dB during the night-time. At the monitoring point located adjacent to the Kilpaddoge substation, the  $L_{Aeq}$  was 55-57dB in daytime, 56 – 57dB in the evening and 53dB at night time. The  $L_{A90}$  at this location was 52-54dB in daytime and 52-53dB in the evening. The nearest residence to this location is more than 500m away.

Weather data was captured and logged at 10min intervals throughout the noise survey for both attended and unattended measurements. The measurements indicated that winds were elevated in the initial part of the survey.

### **12.1.3 Air Quality**

In relation to Air Quality, EPA classifies the area of the proposed development as Zone D, 'rural Ireland' where typically concentrations of particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and NO<sub>x</sub> are well below the World Health Organisation annual guideline values.

## **12.2 Potential Impacts**

### **12.2.1 Construction Noise**

The footprint of the proposed extension at the Kilpaddoge substation will require site clearing and levelling. Reprofiting works will be required at the proposed landfall locations. Site clearance will be carried out at the commencement of the project. It is proposed that the excavation and site clearance will be carried out by using excavators only. Piling or blasting is not proposed. Typical construction equipment to be used in the civil works will include tracked and wheeled excavators, dozer, excavator mounted rock breaker, articulated dump trucks, concrete mixer trucks, concrete pumps, telescopic crane, vibrating rammers and diesel generators. The estimated daytime construction noise level at the closest receptor to the northern landfall and cable route is 63dB L<sub>Aeq</sub> for three months of the construction phase and no more than 59dB L<sub>Aeq</sub> for the remainder. The estimated daytime construction noise level at the closest receptor to the southern landfall and the Kilpaddoge substation is 55dB L<sub>Aeq</sub>. The National Roads Authority *Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes* (NRA 2014) suggests that the maximum permissible noise levels at the façade of dwellings during construction for the hours 07.00 to 19.00 Monday to Friday is generally 70 L<sub>Aeq</sub>(1-hour). However, for areas where the pre-existing noise levels are low, the guidance level is 60 L<sub>Aeq</sub>(1-hour). The suggested maximum permissible noise levels on Saturdays from 08.00 to 16.30 is 65 L<sub>Aeq</sub>(1-hour). Given the proximity of the N76 road and the Moneypoint Generating Station, coal yard and coal import jetty, 70 L<sub>Aeq</sub>(1-hour) is considered the appropriate level for the northern landfall and cable route. The impact of construction noise on the nearest sensitive receptor is considered to be temporary, moderate adverse.

The electrical assembly work will be undertaken in several stages and will result in temporary minor noise impacts on the local environment.

The construction phase is expected to generate 30 extra HGV movements per day on the road network and the peak workforce is expected to be 45. All construction traffic will access the construction compounds and the works areas using the existing entrances to the Kilpaddoge site from the L1010 Coast Road / N69 road in County Kerry and to the Moneypoint site from the N67 road in County Clare. It is considered that the construction phase will result in a temporary increase of traffic along the local road L1010 Tarbert Coast Road and regional road network. However, this increase in traffic is not anticipated to result in a discernible increase in road traffic noise as an increase of at least 20% in traffic volumes is required for there to be a 1dB increase in traffic noise.

The construction operations on land will be carried out during normal working hours. During certain stages of the construction phase, it may be the case that some work will have to be carried out outside of normal working hours. The cable installation in the estuary will be a 24-hour, 7-day activity.

### **12.2.2 Construction Air Quality**

The potential impacts on air quality from the construction will arise due to emissions of dust and the exhaust emissions from plant and machinery used for the proposed works.

#### **12.2.2.1 Dust**

The dust-generating activities will be earthworks, construction of new structures and trackout. Trackout is the transport of dust and dirt from the construction areas onto the public road network where the dust may be deposited and then re-suspended by vehicles using the network.



This would arise when vehicles leave the construction sites transporting dusty materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and mud onto the road network.

For each of these dust-generating activities, there are three separate potential effects. These are annoyance due to dust soiling, harm to ecological receptors, and the risk of health effects due to a significant increased exposure to particulate matter less than 10 microns in size (PM<sub>10</sub>). The receptors can be human or ecological, based on their sensitivity to dust soiling and PM<sub>10</sub> exposure.

Given the distance of the construction works to the nearest residential receptors, it is considered that the concentration of PM<sub>10</sub> at the nearest receptor would not be likely to cause significant adverse health effects. The lands surrounding the works are farmland, which would be expected have a low sensitivity to dust soiling, and the Kilpaddoge substation and Moneypoint Generating Station. The qualifying interest habitats of the Lower Shannon Estuary SAC, in the vicinity of the proposed construction works, are on the seabed. Consequently, there are no nearby ecological receptors sensitive to dust or PM<sub>10</sub>. The likely potential dust impact would be due to trackout onto the public road network. The impact has the potential to be temporary, moderate adverse.

#### **12.2.2.2 Vehicle Exhausts**

The plant, machinery, vehicles and vessels engaged in the construction activities will emit exhaust gases, which contain air pollutants. However, the construction operations will not be on a large scale and a significant impact on air quality from these emissions is unlikely. Mitigation measures have been proposed, which will help to minimise exhaust emissions.

#### **12.2.3 Construction Climate Impacts**

The plant, machinery, vehicles and vessels engaged in the construction activities will use fossil fuels and will emit greenhouse gases. However, the construction operations will not be on a large scale and a significant impact on climate from the greenhouse gas emissions is unlikely. Mitigation measures have been proposed, which will help to minimise exhaust greenhouse gas emission.

#### **12.2.4 Operational Noise**

The transformers, which will be located outdoors, in the extension to the Kilpaddoge substation are the only element of the proposed project with the potential to have a noise impact when operational.

A three-dimensional acoustic model was developed within DataKustik GmbH CadnaA software which implements the procedures of the International Standard ISO 9613 'Acoustics Attenuation of Sound during Propagation Outdoors Part 2 General Method of Calculation' (1996). As the actual equipment to be used will be selected at the detailed design stage of the project development, typical sound power levels for the noise emitting items of plant were used in the model. The model took a precautionary approach and considered a reasonable worst case. The worst case predicted level at the nearest sensitive receptor exceeds the background level by 1dB during the night-time only. However, the absolute noise level at the receptor was relatively low. Consequently, operational noise from the Kilpaddoge substation is not expected to result in a significant adverse impact on the receptor.

#### **12.2.5 Operational Air Quality**

The operation of the proposed project does not have the potential to have a significant impact on air quality.

#### **12.2.6 Operational Climate Impacts**

The proposed project is part of the 'regional solution', a suite of transmission network reinforcement projects designed to maximise the capabilities of the existing high voltage transmission network, as explained in **Section 4.7.1** above. The regional solution grid reinforcement projects will facilitate high levels of renewable generation in the southwest of Ireland and the export of the excess power generated to areas where it is needed, typically on the east coast. When operational, the cumulative impact of the proposed project and the other regional solution grid reinforcement projects will be to facilitate Ireland achieving 70% renewable generation by 2030. This will have a permanent significant positive cumulative impact on climate.

## 12.3 Mitigation Measures and Monitoring

### 12.3.1 Construction Phase

The contractor will be required to give due regard to BS5228 *Code of Practice for Noise and Vibration on Construction and Open Sites – Part 1: Noise and Part 2* (2009+A1:2014), which gives detailed guidance on the control of noise and vibration from construction activities. The proposed development will implement best practice means as defined by BS5228 for all on-site activities.

The construction operations on land will be carried out during normal working hours. During certain stages of the construction phase, it may be the case that some work will have to be carried out outside of normal working hours. However, work outside of normal hours will be kept to a minimum. Construction works with a significant noise impact will be avoided outside of normal working hours.

A Dust Management Plan will be prepared as part of the CEMP. 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. The dust management plan and measures to minimise exhaust emissions have been formulated by drawing on best practice guidance. The measures will include:

- Communication
  - Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary.
  - Display the head or regional office contact information.
  - It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents.
- Site Management
  - 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.
  - Make a complaint log available to the local authority, when asked.
  - 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 logbook.
- Preparing and maintaining the site
  - Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible.
  - Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles.
  - Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
  - Avoid site runoff of water or mud.
  - Keep site fencing, barriers and scaffolding clean using wet methods.
  - 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.
  - Cover seed or fence stockpiles to prevent wind whipping.
- Operating vehicles/ machinery and sustainable travel.
  - Ensure all vehicles switch off engines when stationary – no idling vehicles.

- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed limit of 15mph on surfaced and 10mph on unpaved surface haul roads and work areas.
- Construction Operations
  - Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction.
  - Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation using non-potable water where possible and appropriate.
  - Use enclosed chutes and conveyors and covered skips.
  - Minimise drop heights from conveyors loading shovels hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever available.
  - 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.
- Storage of Materials.
  - Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process in which case ensure that appropriate additional controls measures are in place
- Measures specific to trackout.
  - Use water-assisted dust sweepers on the access and local roads, to remove as necessary any material tracked out of site.
  - Avoid dry sweeping of large areas.
  - Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
  - Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
  - Record all inspections of haul routes.
  - Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
  - Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit and layout permits.

### **12.3.2 Operational Phase**

There will be no impacts from dust during operation and no mitigation has been proposed in relation to potential operational effects on air quality. Noise emissions during operations will not result in a significant adverse impact on the nearest sensitive receptor.

### **12.3.3 Monitoring**

The implementation of the CEMP will be monitored by the Environmental Clerk of Works for the duration of the construction phase. Once the proposed development has been completed, there will be no potential for significant adverse impacts on air, climate or noise and there will be no requirement for monitoring.

## 12.4 Residual Impact

The implementation of proposed mitigation measures during the construction phase will ensure that noise, dust and construction equipment exhaust emissions will be minimised. The resultant noise, air quality and climate impacts will be temporary, adverse and not significant.

The operational phase is not likely to have a significant impact on noise levels at the nearest sensitive receptors, or on air quality. When operational, the cumulative impact of the proposed project, together with the other regional solution grid reinforcement projects, will be to facilitate Ireland achieving 70% renewable generation by 2030. This will have a permanent significant positive cumulative impact on climate.

# 13. Landscape, Seascape and Visual Impact

## 13.1 Landscape and Seascape Baseline

The River Shannon is very broad, approx. 2.6km wide, at the point of the proposed development. The Kilimer – Tarbert car ferry route is approximately 3km to the east of the proposed development boundary and forms part of the Wild Atlantic Way tourist driving route. The ferry runs every half hour.

Establishing the visual baseline requires an analysis to determine if there are any particularly sensitive visual receptors. Visual receptors are people or groups of people at particular locations or engaged in particular activities that may have a view of the proposed development. Views of recognised scenic value are indicated in the County Development Plans and are designated as scenic views or scenic routes designation. Scenic views might also be indicated on touring maps, guidebooks, roadside rest stops or on post cards that represent the area.

In the study area there are no views or prospects designated in the County Development Plans for either County Clare or County Kerry. The Wild Atlantic Way tourist route crosses the estuary via the Kilimer - Tarbert ferry and passes to the north of the Moneypoint 400 kV GIS Station, on an east – west orientation, on the N67 national secondary road.

There is reasonable landscape integrity in the riverine farmland that slopes down to the shores of the Shannon, on the northern side of the estuary, and there is also some scenic quality relating to broad views across the Shannon Estuary. However, the area of the site is strongly dominated by the industrial imprint of Moneypoint Generating Station and its attendant land uses. The study area is contained within Landscape Character Area 18 – Shannon Estuary Farmland, in the Clare County Development Plan. The section between the N67 National secondary road and the Shannon at Moneypoint is zoned as a ‘Working Landscape’. This acknowledges its distinction from most of the remainder of this Landscape Character Area, which is zoned as a more sensitive ‘Settled Landscape’. Overall, it is considered that the northern land-based section of the study area is of low landscape sensitivity.

Although the land-based southern portion of the study area is centred around the Kilpaddoge 220 kV GIS substation and there is also a considerable number of 220 kV overhead power lines traversing the landscape, it is also a lightly populated gently sloping area of riverine farmland. There is some scenic quality associated with broad northerly views across the Shannon as well as some naturalistic value, also associated with the river corridor. On balance it is considered that the section of the Shannon Estuary contained within the study area is of medium to low landscape sensitivity.

## 13.2 Potential Impacts

Given the scale and nature of the proposed development, it is highly unlikely that any significant landscape or visual impacts could occur beyond approximately 1km of any aspect of it.

There are three elements to the proposed development:

- Connection at Moneypoint 400 kV GIS Station (County Clare);

- Connection at Kilpaddoge 220 kV GIS Station (County Kerry); and
- Submarine/ Shannon Estuary Crossing.

### **13.2.1 Landscape and Seascape Impacts**

At the Kilpaddoge substation a small patch of modified grassland between existing compounds in the substation will be cleared for the substation extension. The extension will be an infill development. There will be trenching required for the land-based sections of the cable route on the northern side of the estuary. Thereafter, it follows the line of the existing track the remainder of the way to the Moneypoint GIS substation. Immediately prior to its convergence with the existing access track, the cable trenching will pass through a narrow band of woodland scrub. For the submarine sections of the cable route across the estuary, the cable duct will be laid on the seabed.

The physical landscape impacts described above will be at their greatest during the construction phase and there will be some permanent new features such as the substation extension, and sections of access track. However, these will be very minor in the context of this already highly modified landscape setting. For the reasons outlined above it is considered that the landscape impact of the proposed development will be temporary, adverse, not significant during construction and permanent adverse not significant, once construction is completed.

### **13.2.2 Visual Impacts**

The visual impacts of the proposed Cross Shannon Cable are closely related to the impacts on landscape character. There will be some slight adverse visual impacts associated with the movement of machinery and materials on land, and the movement of vessels in the estuary during the construction stage, but these will be modest in scale and extent, and temporary in duration. Permanent visual changes will be difficult to discern within the industrial context of Moneypoint Power station, particularly from surrounding receptor locations, and there will be no operation stage visual effects associated with the submarine section of cable. For these sections of the proposed project the visual impact will be permanent adverse and imperceptible.

The only aspect of the proposed development with any potential for noticeable visual effects is the substation extension at Kilpaddoge. This will present as a modest increase in the intensity of the electrical infrastructure at this existing substation facility rather than an increase in the overall visual envelope. In terms of receptors, there are almost no rural dwellings within the southern land-based portion of the study area where the proposed visual change could have a material impact on visual amenity. Only in relatively close proximity from the estuary itself, which represents a very small number of recreational users in this area, is the substation extension likely to be discernible amongst the existing substation facilities. In such a context, the visual impact will be permanent, not significant to imperceptible adverse.

### **13.3 Mitigation Measures and Monitoring**

Given the very low magnitude of landscape and visual impacts arising for the proposed development it is not considered that any specific mitigation measures or monitoring are required in this instance.

### **13.4 Residual Impacts**

The physical landscape impacts will be at their greatest during the construction phase and there will be some permanent new features such as the substation extension, and sections of access track. However, these will be very minor in the context of this already highly modified landscape setting. Consequently, it is considered that the impact of the proposed development on landscape and seascape will be temporary, adverse, not significant during construction and permanent, adverse, not significant, once construction is completed. The visual impact will be temporary, adverse, not significant during construction and permanent adverse not significant to imperceptible once construction is completed.

## 14. Material Assets, including Traffic

### 14.1 Baseline Environment

#### 14.1.1 Utility Services

A desk study was undertaken of services and utilities in the area of the proposed project. The desk study identified foul sewer and storm water networks, water mains and electricity cables in the Moneypoint Generating station complex. These are all located on ESB lands. There was no evidence of gas pipes found in the survey area and GNI service record drawings did not indicate any connections in this site.

The only utilities which were recorded along the cable route are the cable circuits associated with the existing Moneypoint to Kilpaddoge submarine 220 kV cables crossing the estuary. The proposed new cables will cross the Moneypoint to Kilpaddoge 220 kV circuit cables immediately south of the Moneypoint substation. There are minimal services in the access road within the Moneypoint Generating Station Complex.

#### 14.1.2 Traffic and Transport

The general area surrounding the proposed development is not served by a motorway. The closest national road to the proposed development is the N67 which links Tarbert to Galway, via the Tarbert to Killimer ferry. The N67 is a national secondary road. It runs westward from Killimer towards the west coast of County Clare and passes approximately 225m north of the Moneypoint Generating Station. The N67 road provides the main access to Moneypoint.

The Kilpaddoge substation is located off the L1010 Tarbert to Ballylongford coast road, and is located approximately 1.2km north-west of Tarbert Village in County Kerry. The L1010 road links to the regional road network via a priority junction with the R551 regional road in Tarbert village. The R551 road in-turn connects to the national road network via a priority junction with the N67 road in Tarbert village. The N67 road joins with the N69 road in Tarbert at a priority junction in Tarbert village. The speed limit on this section of road is 50 kph. Most of the L1010 road west of the Tarbert towards Ballylongford is narrow and is a two-lane single carriageway. The existing substation site entrance, which will be used for construction, is well established and provides adequate visibility in both directions for both construction and existing road users.

The current daily traffic level on the road network in the vicinity of the site access roads on both sides of the estuary is low.

#### 14.1.3 High Voltage Transmission Network

Refer to **Section 4.7.1** above for a description of the high voltage transmission network.

### 14.2 Potential Impacts

#### 14.2.1 Construction Phase

##### 14.2.1.1 Construction Traffic

Construction of the proposed development will result in an increase in traffic in the surrounding area. The construction phase is estimated to take approximately 12 months. Construction traffic associated with the proposed works at Moneypoint will utilise the N67 and existing Moneypoint Generating Station main entrance to access the construction works area. Construction traffic associated with works at Kilpaddoge will access the site via the L1010 Tarbert to Ballylongford road.

During the construction phase it is expected that there will be approximately 30 HGV movements per day. Apart from the transformers, to be transported to the Kilpaddoge substation extension, no abnormally large loads will be transported to the construction areas. The number of construction workers during the construction phase is expected to peak at approximately 45. Parking will be provided in the construction compounds.



#### **14.2.1.2 Services and Utilities**

During the construction phase, power supplies will be temporarily disrupted. Disruption to the power supply to the surrounding residential and other properties may occur. Such disruption will be minimised. Activities associated with the connection to the Moneypoint 400kV and Kilpaddock 220kV substations will be scheduled to fit into ESB's scheduled outage programme. No significant impacts are expected to power users.

Water will be brought by tanker to the site compounds as required during the construction phase and portable chemical toilets will be provided. All waste material will be removed from site and disposed of to an appropriately licensed facility. No construction phase impacts on water mains or waste water services in the area are likely.

### **14.2.2 Operational Phase**

#### **14.2.2.1 Traffic**

When in operation, infrequent routine maintenance visits will be made by ESB personnel to the Moneypoint GIS substation and Kilpaddock 220kV substation. Operational vehicular access will be required to the joint bays along the cable route. However, these will be extremely infrequent. The number of traffic movements will be very low and there will be no impact on the road network during the operational phase.

#### **14.2.2.2 Utilities and Services**

There will not be a significant impact on local services and utilities in the operational phase of the proposed project.

#### **14.2.2.3 High Voltage Transmission Network**

The proposed project will facilitate the transmission of large power flows from the west and southwest of Ireland to the east coast. This will also help to make better use of the existing 400 kV network better. This will be a permanent significant positive impact on the high voltage transmission network.

### **14.2.3 Potential Cumulative Effects and Interactions**

ESB received permission from Clare County Council (Planning file reference 20/318) for the development of 400 MVA (electrical rating) synchronous condenser which shares the existing 400 KV/17 kV transformer and 400kV underground cable belonging to the existing coal fired Generating Station unit 2.

Whilst part of the proposed ESB synchronous condenser site boundary is adjacent the red line boundary of the proposed project, it will not interface with Cross Shannon Cable Project. The ESB synchronous condenser is expected to connect into an existing cable circuit and will not impact on the proposed project outlined in the present application.

In addition to the ESB synchronous condenser, the other related projects, which are components of the regional solution, are:

- Series Compensation Oldstreet 400 kV Station,
- Series Compensation Dunstown 400 kV Station,
- Wexford 110 kV Station Upgrade,
- Great Island-Wexford 110 kV OHL Upgrade, and
- Great Island-Kilkenny 110 kV OHL Upgrade.

The cumulative impact of the regional solution projects will be a major upgrade of the high voltage transmission system to facilitate the transition of Ireland's electricity sector to low carbon-renewable energy. This will ensure that renewable energy accounts for 70% of all electricity in Ireland by 2030. This will be a permanent significant positive impact high voltage transmission system and renewable generation in Ireland.

## 14.3 Mitigation Measures and Monitoring

### 14.3.1 Construction Phase

#### 14.3.1.1 Traffic

Prior to commencement of the development, a Construction Traffic Management Plan (CTMP) will be prepared in consultation with Clare County Council and Kerry County Council. The CTMP will identify the safety measures required at access and egress locations and will take into consideration the following guidelines, as appropriate:

- Department of Transport “*Guidance for the Control and Management of Traffic at Road Works*”, (2010), and
- Department of Transport “*Chapter 8: Temporary Traffic Measures and Signs for Roadworks*”, (November 2010).

Parking during the construction phase will be provided within existing ESB compounds at both Moneypoint and Kilpaddock Substations.

#### 14.3.1.2 Utility Services

All reasonable measures will be taken to avoid unplanned disruptions to any services during the proposed works. This will include thorough investigations to identify the location of all utility infrastructure in the construction areas, and the implementation of robust procedures when undertaking works around known services. Most of the construction activities are not dependant on outages on the existing transmission system. However, activities associated with connecting to the existing 220 kV network will be planned in line with EirGrid’s scheduled outage programme.

ESB services will be temporarily disrupted during the construction phase by the proposed onshore works. Service disruptions impacting the surrounding residential, social and commercial properties shall be kept to a minimum and will only occur where unavoidable. Prior notification of disruptions shall 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 shall be undertaken prior to any proposed disruptions.

#### 14.3.1.3 Waste Management

A Construction Waste Management Plan will form part of the CEMP and 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 reuse, recovery, and recycling operations.

Where technically and economically feasible, all construction activities will be managed and programmed in such a manner as to prevent/minimise waste production and maximise waste management options (i.e., re-use, recycle, and recovery) which are in the upper tiers of the waste hierarchy. The Plan will also deal with any litter arising during the construction phase of the development.

### 14.3.2 Operational Phase

No specific mitigation measures are required for the operational phase.

### 14.3.3 Monitoring

The implementation of the CEMP will be monitored by the Environmental Clerk of Works for the duration of the construction phase. Once the proposed development has been completed, there will be no potential for significant adverse impacts on traffic, local services and utilities and waste management, and there will be no requirement for monitoring.

## 14.4 Residual Impact

The proposed mitigation measures will reduce the environmental impact of the proposed development. However, certain impacts cannot be avoided in the short-term such as relocation of utilities and disruption to traffic. Residents may experience temporary inconvenience during the construction phase due to a minor increase in traffic. The adverse impacts are not likely to be significant, provided the mitigation proposed are implemented.

Once construction is complete it is considered that significant adverse impacts on traffic or local services and utilities are not likely.

The proposed project will facilitate the transmission of large power flows from the renewable generation in the west and southwest of Ireland to the east coast. This will also help to make better use of the existing 400 kV network better. This will be a permanent significant positive impact on the high voltage transmission network.

The cumulative impact of the regional solution projects will be a major upgrade of the high voltage transmission system to facilitate the transition of Ireland's electricity sector to low carbon-renewable energy. This will ensure that renewable energy accounts for 70% of all electricity in Ireland by 2030. This will be a permanent significant positive impact high voltage transmission system and renewable generation in Ireland.

# 15. Non-Statutory Environmental Appraisal

This section presents an appraisal of the likely significant effects of the proposed development. The residual impacts of the proposed development on the relevant environmental aspects are summaries in this section.

## 15.1 Population and Human Beings

With the implementation of the mitigation measures, a significant effect on human health, residential amenity, recreation and tourism, commercial fishing, aquaculture, and shipping and navigation is not likely.

## 15.2 Biodiversity

A Natura Impact Statement (NIS) was prepared to assess the potential for the proposed development to result in an adverse effect on the integrity of European sites. The NIS concluded that, following implementation of mitigation measures, the proposed development either alone or in combination with other plans and projects, would not have an adverse effect on the integrity of the Lower River Shannon SAC nor on the River Shannon and River Fergus Estuaries SPA, in view of the sites' conservation objectives.

It is expected, that with the implementation of mitigation measures, there will not be a significant adverse impact on marine mammals. There will not be a significant adverse effect on diadromous fish. No significant or indirect impacts on marine invertebrates or marine birds are predicted.

It is expected that there will be no potential for significant adverse effects on soft sedimentary habitat communities. Cable laying and seabed clearance activities in reef habitat areas will be limited to the immediate surroundings of the cable route and will only occur as a once-off event. Recovery is expected to be rapid. Consequently, it can be concluded that any effects will be temporary significant adverse and there will be no permanent significant adverse effects on reef communities.

There is not expected to be a significant adverse impact on terrestrial habitats or species.

With the implementation of mitigation measures it is expected that there will not be a significant impact on biodiversity from pollution or biosecurity risk.

The independent environmental consultant Hartley Anderson prepared the following reports:

- *Appropriate Assessment Screening Cross Shannon Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage - updated following RFIs (February 2022)*
- *Appropriate Assessment Cross Shannon 400 kV Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage (May 2022).*
- *Article 12 Risk Assessment - Cross Shannon 400 kV Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage (February 2022).*

The Appropriate Assessment report also agreed with the conclusion of the NIS. The Article 12 Assessment conclude that with implementation of mitigation measures, it is very unlikely that there will be negative residual impacts from the proposed works on Annex IV species in the area and it is also very unlikely that any animals will be injured or killed as a result of the proposed works.

### **15.3 Marine Aspects**

Pre-installation clearance or seabed flattening will have a temporary, slight adverse effect on sand waves along the cable alignment. The seabed preparation works, to mitigate the seabed slope over a 25m length between the 5m and 10m bathymetry contour, and installation of the cable in seabed areas of exposed bedrock, will have a permanent slight to imperceptible adverse impact on the seabed along the cable alignment. The overall construction phase impact on sediment mobility and sediment deposition is not expected to be significant.

The landfall construction will have a temporary moderate adverse impact on the geology and sediments. The northern landfall construction will have a permanent moderate adverse impact on geology and sediments. With the implementation of mitigation measures, the construction of the landfalls is not expected to create a risk of erosion at both shorelines and there is no risk of landslides.

### **15.4 Land, Sediment and Geology**

With the implementation of the mitigation measures, the construction phase will have a temporary not significant adverse effect on land, soils and geology due to local disturbance the bedrock geology and superficial sediment at the landfalls and along the cable route, and the temporary loss of agricultural land to facilitate the construction.

With the implementation of the mitigation measures, the proposed project will cause a permanent loss of green field land at the proposed extension at the existing Kilpaddoge site. This will be a permanent slight adverse effect on land, soils and geology. During the operational phase, there is not expected to be an impact on land, soils and geology.

### **15.5 Water and Flood Risk**

With the implementation of the proposed mitigation measures, neither the construction nor the operational phases are likely to have a significant impact on water quality. The proposed works will not impact on the overall objective of the Water Framework Directive that all waterbodies should achieve or maintain good status.

The construction and operation of the proposed project will not increase the level of flood risk at the project site or elsewhere in the catchment.

### **15.6 Archaeology and Cultural Heritage**

The proposed development will avoid impact on any recorded marine anomalies and known archaeological features. Direct impacts to the intertidal and seabed areas within the proposed route corridor will occur during the construction phase and unknown archaeological features may be impacted. The implementation of the mitigation measures will ensure that significant adverse impacts on unknown archaeological features will not be likely. Once construction has been completed there will be no potential for impact on archaeology or cultural heritage and no mitigation measures are proposed.

## 15.7 Noise, Air and Climate

The implementation of proposed mitigation measures during the construction phase will ensure that noise, dust, and construction equipment exhaust emissions will be minimised. The resultant noise, air quality and climate impacts will be temporary, adverse and not significant.

The operational phase is not likely to have a significant impact on noise or air quality. When operational, the cumulative impact of the proposed project, together with the other regional solution grid reinforcement projects, will be to facilitate Ireland achieving 70% renewable generation by 2030. This will have a permanent significant positive cumulative impact on climate.

## 15.8 Landscape, Seascape and Visual Impact

The physical landscape impacts will be at their greatest during the construction phase and there will be some permanent new features such as the substation extension, and sections of access track. However, these will be very minor in the context of this already highly modified landscape setting.

Consequently, it is considered that the impact of the proposed development on landscape and seascape will be temporary, adverse, not significant during construction and permanent, adverse, not significant, once construction is completed. The visual impact will be temporary, adverse, not significant during construction and permanent adverse not significant to imperceptible once construction is completed.

## 15.9 Material Assets

The proposed mitigation measures will reduce the environmental impact of the proposed development, but certain impacts cannot be avoided in the short-term such as relocation of utilities and disruption to traffic. Residents may experience temporary inconvenience during the construction phase due to a minor increase in traffic. The adverse impacts are not likely to be significant, provided the mitigation proposed are implemented.

Once construction is complete it is considered that significant adverse impacts on traffic or local services and utilities are not likely.

The proposed project will facilitate the transmission of large power flows from the renewable generation in the west and southwest of Ireland to the east coast. This will also help to make better use of the existing 400 kV network better. This will be a permanent significant positive impact on the high voltage transmission network.

The cumulative impact of the regional solution projects will be a major upgrade of the high voltage transmission system to facilitate the transition of Ireland's electricity sector to low carbon-renewable energy. This will ensure that renewable energy accounts for 70% of all electricity in Ireland by 2030. This will be a permanent significant positive impact high voltage transmission system and renewable generation in Ireland.

## 15.10 Potential Cumulative Effects and Interactions

Cumulative impacts and interactions are addressed, where relevant, for the individual environmental topics in **Sections 6 to 14** above.

No significant adverse cumulative effects or interactions were identified.

The proposed Cross Shannon 400 kV cable circuit forms part of EirGrid's 'regional solution' suite of transmission network reinforcement projects. The cumulative impact of the regional solution projects will be a major upgrade of the high voltage transmission system to facilitate the transition of Ireland's electricity sector to low carbon-renewable energy. This will ensure that renewable energy accounts for 70% of all electricity in Ireland by 2030. This will be a permanent significant positive impact high voltage transmission system and renewable generation in Ireland.

## 15.11 Conclusion of Non-Statutory Environmental Appraisal

The nature, scale and location of the proposed development is such that there is no real likelihood of significant adverse effects on the environment arising from the proposed development.

The proposed Cross Shannon 400 kV cable circuit forms part of EirGrid’s ‘regional solution’ suite of transmission network reinforcement projects. The cumulative impact of the regional solution projects will be a major upgrade of the high voltage transmission system to facilitate the transition of Ireland’s electricity sector to low carbon-renewable energy. This will ensure that renewable energy accounts for 70% of all electricity in Ireland by 2030. This will be a permanent significant positive impact high voltage transmission system and renewable generation in Ireland.

## 16. Preliminary Examination to Establish Requirement for EIA Screening

### 16.1 Environmental Impact Assessment Directive Requirements

Article 4 of Environmental Impact Assessment (EIA) Directive (Council Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU), imposes the requirement for an EIA for the projects, to which the Article applies. These projects are listed in Annex I and II of the Directive. For Annex I projects, an EIA is mandatory. Member States must determine if an EIA is mandatory for Annex II projects. Member States must make the determination through (a) a case-by-case assessment or (b) thresholds or criteria set by the member state.

The Foreshore Acts, nos. 12 of 1933, 17 of 1992, 54 of 1998 and 11 of 2011 (“Foreshore Acts”), transpose this requirement into Irish law. The Foreshore Acts section 13A, as inserted by the European Union Foreshore Regulations 2009, SI 404 of 2009 is as follows:

**“13A.—** (1)(a) *The appropriate Minister shall, as part of his consideration of a relevant application, in accordance with paragraph (b), ensure that, before a decision on the application is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to an environmental impact assessment.*

(b)(i) *An environmental impact assessment shall be carried out by the appropriate Minister in respect of a relevant application for consent where the proposed development would be of a class specified in—*

(I) *Part 1 of Schedule 5 of the Planning and Development Regulations 2001, and either—*

(A) *such development would exceed any relevant quantity, area or other limit specified in that Part, or*

(B) *no quantity, area or other limit is specified in that Part in respect of the development concerned,*

*or*

(II) *Part 2 of Schedule 5 of the Planning and Development Regulations 2001 and either—*

(A) *such development would exceed any relevant quantity, area or other limit specified in that Part, or*

(B) *no quantity, area or other limit is specified in that Part in respect of the development concerned.*

(ii) *An environmental impact assessment shall be carried out by the appropriate Minister in respect of a proposed development where such development—*

(I) *would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but does not exceed the relevant quantity, area or other limit specified in that Part, and*



*(II) the appropriate Minister determines that the proposed development would be likely to have significant effects on the environment.”*

Annex I projects, for which an EIA is mandatory, are listed in Part 1 of Schedule 5 of the Planning and Development Regulations, SI 600 of 2001, as amended. Annex II projects are addressed in Part 2 of Schedule 5. For most project classes, a threshold is specified in Parts 1 and 2. There are a number of classes which require a case-by-case assessment. An EIA is also required for projects, which do not exceed the threshold, but where the Minister determines that the proposed development would be likely to have significant effects on the environment.

## **16.2 Approach to EIA Screening**

The Office of the Planning Regulator issued a practice note on *Environmental Impact Assessment (EIA) screening for development proposals* (Office of the Planning Regulator, 2021). While the Practice Note is written to provide guidance for compliance with the planning legislation, it provides useful guidance for EIA screening for other consent legislation.

The Practice Note advocates a step-by-step approach. The first step considers:

- Is the proposed development a project as per the EIA Directive? If not, then the proposed development does not require an EIA.
- Is the project listed in Part 1 of Schedule 5 or does it meet or exceed a threshold in part 2 of Schedule 5 of the Planning and Development Regulations, SI 600 of 2001, as amended? If it does, an EIA is mandatory.
- Is the project sub threshold? If it is, preliminary examination is required.

Step 2 is a preliminary examination of the nature, size, and location of the development, including proximity to ecologically sensitive sites, and the potential to affect other environmental sensitivities in the area. Step 2 would have one of three outcomes:

- There is no real likelihood of a significant effect on the environment and an EIA is not required. The reasons and conclusions should be recorded.
- There is significant doubt as to the effects on the environment and a formal screening determination is required.
- There is a real likelihood of a significant effect on the environment and an EIA is required.

Step 3 is a formal screening determination.

## **16.3 Screening for Mandatory EIA**

The only class of electrical transmission lines or cables listed in Part 1 of Schedule 5 of the Regulations is Class 20, which is as follows:

*“20. Construction of overhead electrical power lines with a voltage of 220 kilovolts or more and a length of more than 15 kilometres.”*

The only class of electrical transmission lines or cables listed in Part 2 of Schedule 5 of the Regulations is Class 3(b), which is as follows:

*“(b) Industrial installations for carrying gas, steam and hot water with a potential heat output of 300 megawatts or more, or transmission of electrical energy by overhead cables not included in Part 1 of this Schedule, where the voltage would be 200 kilovolts or more.”*

The proposed development is not an overhead electrical power line, and it will not transmit electrical energy by overhead cables. Underground and underwater power lines or cables are not a class of project listed in Parts 1 or 2 of Schedule 5 of the Regulations. The proposed development is not a project as per Article 4 of the EIA Directive. Consequently, the proposed development does not require an EIA.

## 16.4 Adequacy of Information

Arup considered that there was sufficient information in the licence application and supporting documents to determine whether the proposed development is of a class to which Article 4 of the EIA Directive applies.

## 16.5 Conclusion of the Preliminary Examination

The conclusion of the EIA screening is that, based on the information provided in the licence application and supporting documents, the proposed development is not a project as per Article 4 of the EIA Directive. Consequently, the proposed development does not require an EIA.

# 17. Recommended Conditions

Should the Department decide to consent to the application, Arup recommends the conditions, listed below, be attached to the consent. The recommended conditions are based on the conditions proposed by the Prescribed Bodies in their observations, the mitigation measures proposed in the AA Screening and NIS Report, the Project Environmental Considerations Report, the commitments given by the Applicant in the response to the observations of the Prescribed Bodies, and considerations arising from the non-statutory environmental appraisal.

1. The Licensee shall use that part of the foreshore, the subject matter of this licence for the purposes as outlined in the application and for no other purposes whatsoever.
2. The works shall be undertaken on the foreshore as outlined in the drawing titled “Foreshore Licence Map”, Drawing No: 379408-MMD-XX-00-GIS-N-1009 Rev. 2 Dated: 01/07/2020.
3. The Department of Housing, Local Government and Heritage shall be notified two weeks prior to any works proceeding.
4. The Inland Fisheries Ireland office in Limerick shall be notified one week in advance of the commencement of works.
5. Inland Fisheries Ireland shall be consulted on the final Construction Environmental Management Plan and on specific works method statements prior to construction commencing.
6. The Licensee shall engage with Shannon Foynes Port Company throughout the construction phase of the subsea cables to ensure the safety of navigation is maintained for all mariners within the sea area covered by the application.
7. The Licensee shall consult with Shannon Foynes Port Company as the Local Lighthouse Authority specifically on any requirements for the installation of aids to navigation which will require Statutory Sanction from the Commissioners for Irish Lights.
8. The Licensee shall ensure that contractors, and their subcontractors, are made aware of all licence conditions and project specific requirements and that they are required to have briefings on these to ensure all parties are fully aware of these requirements.
9. The Licensee shall ensure that the mitigation measures specified in Section 3.6 of the NIS (Aquafact 2020), in the Outline Construction Environmental Management Plan and Chapters 6 to 15 of the Planning and Environmental Considerations Report (Mott McDonald 2020) are implemented in full.
10. The Licensee shall ensure that the commitments, made in response to the observations of the prescribed bodies in the consultation undertaken as part of the licence consideration process, and the commitments, made in response to the request for information by An Bord Pleanála by letter dated 23 October 2020, An Bord Pleanála file reference ABP 307798-20, are implemented in full.
11. The Licensee shall ensure that soft-start and ramp-up procedures are used, both on a day-to-day basis and on re-start after any stoppages within any day, for any sound generating surveys undertaken.

12. To protect surface waters

- a. All discharges to and through the surface water collection and disposal system to groundwater and thence to surface water shall not be of environmental significance.
- b. There shall be no permitted discharges to surface water resources of contaminated water or surface water run-off from the development.
- c. Servicing including refuelling of plant and equipment shall only be undertaken on impermeable hard standing areas.
- d. All plant and equipment used within the subject site shall carry spill clean-up kits and not be used or operated if there is evidence of leakage or damaged oil seals.
- e. There shall be no discharge during the construction period of cementitious materials or residues thereof to the surface water or drainage network.
- f. When cast-in-place concrete is required, all works shall be undertaken in the dry and effectively isolated from entering any receiving surface or foul sewers for a period sufficient to cure the concrete.
- g. Concrete delivery vehicles shall be precluded from washing out at locations that could result in a discharge to the surface or foul sewers.
- h. Where cement or lime is stored on site, it shall be held in a dry secure area.
- i. All oils and fuels used on or within the site shall be stored in secure bunded areas and servicing including refuelling of plant and equipment shall only be undertaken on impermeable hard standing areas.
- j. Where temporary diesel or petrol driven pumps are used within the site, they shall be positioned within portable bunded units.
- k. Any silt curtains to be deployed should comply with the relevant European Standard CE 1137-CPR-0613/29.

13. The timings of the work shall be cognisant of the migratory window of diadromous species.

14. The Licensee shall ensure that the submarine cable pre-lay, cable installation and post-lay activities provide a free passage for fish species along one bank of the estuary to allow species migrating up and downstream.

15. With reference to the Emergency Response Plan, the licensee shall ensure that all staff working in the vicinity of watercourses are aware of procedures to prevent silt or other pollutants from reaching watercourses. Sufficient materials to aid in diversion/containment on any such spillage shall be readily available and stored nearby.

16. The contact details for local Inland Fisheries Ireland staff shall be provided to the contractor and shall be added to the Emergency Response Manual.

17. Refuelling of vessels engaged in the works shall take place in port at the quayside using suitable hoses and equipment to avoid any spillages.

18. No waste materials, bilge water or wastewater shall be deposited into the sea from the vessels engaged in the works at any time. All waste materials, bilge water and wastewater from the vessels engaged in the works shall be brought onshore for proper removal and disposal by a licensed waste contractor.

19. All spillages and pollution events at the development sites which may cause potential contamination of seafood shall be immediately reported to the Dingle Sea Fishery Protection Agency office

20. Dive Survey and Archaeological Testing: SS12:

- a. A 100m exclusion zone shall remain in place until such time as anomaly SS12 (identified in the PECR) has been fully and more closely assessed. Based on the results and consideration by the National Monument Service of the results, the exclusion zone may remain in place (i.e., 100m), may be reduced (to 60m) or indeed prove to be unnecessary should the anomaly not be of cultural significance.
- b. If, on safety grounds, there cannot be an archaeological dive survey, then an remotely operated underwater vehicle (ROV) survey shall be undertaken to ensure the anomaly is visualised and can be fully assessed in real time by the archaeologist engaged for the project. The ROV survey shall assess the wider area around SS12 to ensure there is no associated material in the immediate area.

- c. The archaeologist shall be on board the vessel when the ROV survey is being undertaken to ensure he/she can assess the results in real time.
21. Dive Survey and Archaeological Testing: M10 and S1:
- a. Archaeological testing shall be undertaken in the area of the southern landfall S1 (identified in the PECR) shall be prepared and shall follow the route of the cables to the existing Kilpaddocke substation.
  - b. The area where the localised magnetometer anomalies M10 are located on the nearshore/onshore area at Moneypoint for the northern landfall N2 (identified in the PECR) shall be the subject to archaeological testing.
  - c. The location, nature and extent of all test trenches shall be provided to the National Monuments Service.  
Sufficient trenches shall be put in place to assess fully the area from the foreshore (at low water) and inshore for N2 to identify what the magnetometer anomalies are on the foreshore (at low water) to the green field areas and from the foreshore (at low water) and onshore to the substation for S2 to ensure the line of the cables are fully archaeologically tested.
  - d. The methodology submitted should include a detailed finds retrieval strategy.
22. Archaeological Dive and Testing Report: Once all surveys and testing have been completed, the full information shall be compiled into a Report submitted to the Underwater Archaeology Unit, National Monuments Service for review and further comment in advance of any works taking place. The applicant shall be prepared to be advised by the Department in this regard.
23. An appropriate Marine Notice detailing the works and vessels engaged in said works shall be published for the information of all marine users in the Shannon Estuary.
24. Following burial of the cables on the foreshore at the southern landfall the foreshore shall be back filled with native beach material at the pre works beach grade level and foreshore shall be restored to natural like condition so as to not impede public access along the foreshore and to reduce the visual impact of the works.
25. The Licensee shall ensure that the works at the southern landfall, when completed, do not impede access along the shore or foreshore and the foreshore is restored to a natural like condition.
26. A Marine Notice shall be issued once the work is completed clearly indicating the cables location on the river bed to indicate that vessels should not anchor in the location of the cable.
27. The applicant shall ensure the information regarding the final location, depth and shore markings of submarine cables is submitted to the United Kingdom Hydrographic Office for inclusion on relevant navigation charts.

## 18. References

- Department of Housing, Local Government and Heritage Foreshore consents website:  
<https://www.gov.ie/en/collection/f2196-foreshore-applications-and-determinations/> accessed November 2021
- Environmental Protection Agency *Revised Guidelines on the Information to be contained in Environmental Impact Statements* (Draft August 2017)
- EPA website <https://epawebapp.epa.ie/terminalfour/DaS/index.jsp?disclaimer=yes&Submit=Continue>  
 (accessed in January 2022)
- European Commission *Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment* (2014)

Hartley Anderson Ltd (2022) *Appropriate Assessment Screening Cross Shannon Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage - updated following RFIs (February 2022)*

Hartley Anderson Ltd (2022) *Appropriate Assessment Cross Shannon 400 kV Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage (May 2022).*

Hartley Anderson Ltd (2022) *Article 12 Risk Assessment - Cross Shannon 400 kV Cable Project Foreshore Licence Application Report to Department of Housing, Local Government and Heritage (February 2022).*

Geological Survey of Ireland Landslide Susceptibility Map

<https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228>

(accessed January 2022)

Office of the Planning Regulator *Practice Note PN02 Environmental Impact Assessment Screening* (June 2021)

*Planning and Development Regulations SI 600 of 2001, as amended by SI 404 of 2018 European Union (Planning and Development) (Environmental Impact Assessment) (no 2) Regulations of 2018*

NPWS 2013 Site Synopsis. Lower River Shannon SAC Site Code: 002165.

NPWS 2015 Site Synopsis. River Shannon and River Fergus Estuaries Special Protection Area Site Code

National Roads Authority *Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes* (NRA 2014)