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# Shannon Technology and Energy Park (STEP) 220kV Grid Connection Environmental Impact Assessment Report

Volume 1
Non-Technical Summary

July 2024

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# Shannon Technology and Energy Park (STEP) 220kV Grid Connection Environmental Impact Assessment Report

## Volume 1
## Non-Technical Summary

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# 1 Non-Technical Summary

## 1.1 Introduction

Shannon LNG Limited are applying to An Bord Pleanala for planning permission for the development of two new substations and a grid connection to an existing line cable interface mast adjacent to the existing Kilpaddoge 220/110kV Electrical Substation in the townland of Kilpaddoge County Kerry., hereafter referred to as the proposed development. The substation and connection will link the proposed Shannon Technology and Energy Park (STEP) Power Plant with the national grid.

Shannon LNG Limited were awarded a capacity contract (in March 2023) to provide additional 400 MW of capacity to the grid by 2026, which will be generated by the STEP Power Plant facility. The main objective of the proposed development is to connect the STEP Power Plant to the national grid. Shannon LNG Limited have submitted a planning application (19th April 2024) to An Bord Pleanála (ABP-PA08.319566) for the Shannon Technology and Energy Park (STEP) Power Plant. The STEP Power Plant will consist of a Combined Cycle Gas Turbine (CCGT) gas-powered power plant capable of 600 MW of electricity generation, 120 MWhr Battery Energy Storage System (BESS), Above Ground Installation (AGI), and associated plant, equipment and infrastructure

The main elements of the proposed development include:

- Two 220 kV cables and fibre optic cables between the proposed STEP Power Plant and a connection point (an existing Line Cable Interface Mast (LCIM)) in the vicinity of the existing ESBN/EirGrid Kilpaddoge 220 kV substation
- Two substations (1No. onsite EirGrid/ESBN Gas Insulated Switchgear (GIS) substation (named Glansillagh) and 1No. SLNG GIS substation (named Knockfinglas)).
- A 50 MVAr reactor will also be installed adjacent to the EirGrid GIS substation..

The cable will be installed on STEP-owned lands, ca. 2.2km will be installed under public roadway (L-1010) with the last section located off road in private lands (the total off road sections are ca. 2.8km).Kerry County Council (KCC), or their subcontractors, will install the ducting and joint bays along the L-1010 (ca. 2.2km) along with the undertaking of a widening scheme of the L-1010 road which will be completed prior to the start of the main construction elements. These works will be fully funded by the Applicant by means of a special development contribution under section 48(2)(c) of the Planning and Development Act 2000 to cover the full cost of the upgrade works including the ducting and joint bay installation.

The last section of cabling will be located off road in private lands and will terminate at the LCIM. Following the installation of ducts, the cables will be pulled through the full length of ducting.

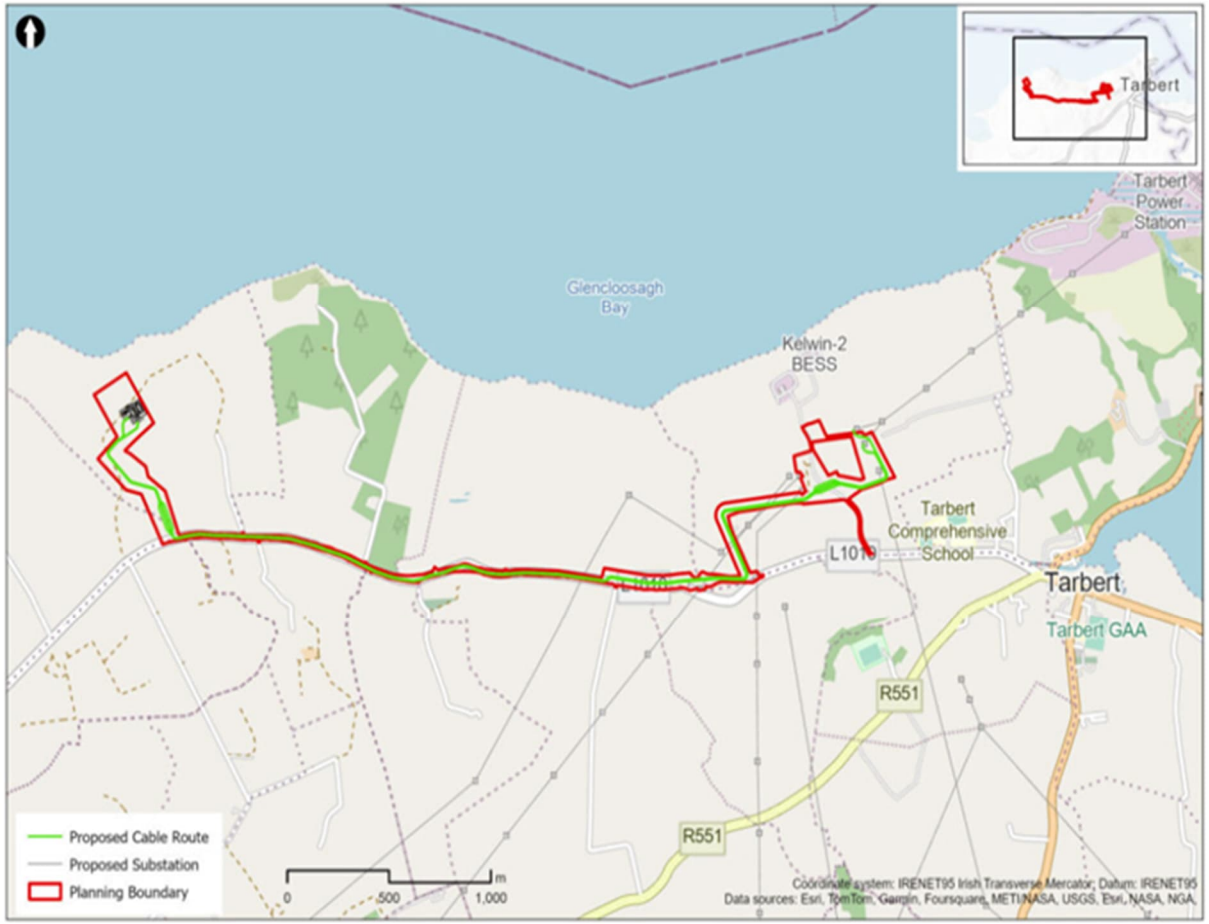
One of the underground cables will be jointed to the existing cable on the LCIM from where it will connect to the Tarbert substation via the existing overhead line. The other underground cable will connect to an existing underground cable route, via a joint bay, to feed into the Kilpaddoge substation.

Once construction is completed, one of the proposed onsite EirGrid/ESBN 220kV GIS Substation and the underground transmission cable will be handed over to EirGrid, who in conjunction with ESB Networks (ESBN), will carry out the final commissioning and energisation of the proposed substation and transmission line connections. Once energised, the proposed

development will from part of the ESBN infrastructure. The SLNG 220kV GIS substation will remain in the ownership of Shannon LNG Limited.

The geographical location off the project is provided in Figure 1.1

**Figure 1.1: Project Location**




Source: Mott MacDonald

### 1.1.1 The STEP Power Plant Facility

The STEP Power Plant facility, incorporating the proposed development, also includes the following:

- A Combined Cycle Gas Turbines (CCGT) Power Plant, Battery Energy Storage System (BESS), Above Ground Installation and associated ancillary works elements (a planning application was lodged with An Bord Pleanála on 19 April 2024 (ABP-PA08.319566);
- Gas Pipeline – The previously consented 26 km Shannon Natural Gas Pipeline (Planning Reference: PL08.GA0003), once constructed, will facilitate transport of the natural gas between the Site and the national gas network at Foynes. Shannon LNG Limited obtained consent in February 2009 for Natural Gas Pipeline under Section 182C (1) of the Planning and Development (Strategic Infrastructure) Act 2006, as amended.

### 1.1.2 EIAR Structure

The structure of the EIAR is as follows and contained within 4 volumes:

- Volume 1: Non-Technical Summary
- Volume 2: Main EIAR
- Volume 3: Appendices
- Volume 4: Photomontages

Volume 2 of the EIAR is set out as follows:

**Table 1.1: EIAR Structure**

| No. | Chapter Title | Description |
|---|---|---|
| | Volume 1 Non-Technical Summary | Provides an overview of the proposed development, the Environmental Impact Assessment (EIA) methodology and the assessment of environmental components. This includes receiving environmental conditions, potential impacts which may arise as a result of the proposed development and proposed mitigation measures for each component. |
| 1 | Introduction | Provides an overview of the purpose, structure and scope of the report |
| 2 | Alternatives considered | Sets out the need for the proposed development. Describes and evaluates the reasonable alternatives studied by the developer. Sets out the justification for the option chosen with consideration of the effects of the proposed development on the environment. |
| 3 | Stakeholder Engagement | Details the informal consultation undertaken with stakeholders and their feedback on the proposed development. |
| 4 | Methodology | Sets out the methodology undertaken in the EIAR. |
| 5 | Description of the Proposed Development | Describes the design, scale and size of the proposed development.<br>Provides an overview of the location and wider setting of the proposed development. |
| 6 | Population and Human Health | Provides an assessment of the receiving environment in terms of population and human health and potential impact on humans as a result of the proposed development. |
| 7 | Land, Soils and Hydrogeology | Provides a review of the land, soils and hydrogeology receiving environment and assesses potential impacts on soil and hydrogeology and impacts in relation to land take. Recommends mitigation measures. |
| 8 | Surface Water and Flooding | Describes the receiving water environment, the potential impact of the proposed development on water quality and flooding; and recommends mitigation measures. |
| 9 | Biodiversity | Describes the receiving environment in terms of existing species and habitats. Assesses potential impacts on biodiversity and proposes relevant mitigation measures. |

| No. | Chapter Title | Description |
|---|---|---|
| 10 | Air | Provides an overview of the receiving air quality environment, describes the impacts on air quality related to the proposed development and recommends appropriate mitigation measures. |
| 11 | Climate Resilience | Describes the receiving climatic environment, the vulnerability of the proposed development to climate change and recommends resilience measures with regard to the proposed development. |
| 12 | Climate - Carbon | This chapter of the EIAR identifies, describes and presents an assessment of the eventual significant effects of the proposed development on climate. The assessment examines the potential impacts during the construction and operational phases of the proposed development. |
| 13 | Noise and Vibration | Provides an assessment of the receiving noise environment and outlines sensitive receptors vulnerable to potential noise impacts that may arise as a result of the proposed development. |
| 14 | The Landscape | Describes the receiving landscape and visual environment, potential impacts to the landscape character and viewpoints and recommends mitigation measures. |
| 15 | Archaeology, Architectural and Cultural Heritage | Provides an assessment of the proposed development, considering potential impacts to cultural heritage assets, such as architectural and archaeological heritage, and proposes mitigation measures. |
| 16 | Material Assets | Describes existing services, waste and infrastructural service requirements by the proposed development. Describes potential impacts to utilities as a result of the proposed development. |
| 17 | Roads and Traffic | Outlines the receiving traffic environment and describes potential impacts on local roads that may arise due to construction and operational traffic. |
| 18 | Major Accidents and Disasters | Identifies and assesses the likelihood and potential impacts to the environment and population arising from the vulnerability of the proposed development to risks of major accidents and / or natural disasters. |
| 19 | Interactions of the foregoing | Provides an overview of potential interactions among environmental factors and their cumulative impact as a result of the proposed development. |
| 20 | Summary of Mitigation and Monitoring | Sets out the mitigation and monitoring measures proposed throughout the various chapters for ease of reference. |

### 1.1.3 Site Location

The proposed development is located in the north of County Kerry ca. 250m from the southern shore of the River Shannon estuary. The proposed development is located in a rural location approximately 50km from the city of Limerick.

The STEP substations will be located within the STEP Power Plant (ABP-PA08.319566) red line boundary located 4.5 km from Tarbert and 3.5 km Ballylongford in Co. Kerry. The lands for the proposed substations are agricultural fields, with hedgerow boundaries, areas of scrubland and small drainage ditches.

### 1.1.4 Project Need

The proposed development will provide a connection from the proposed STEP Power Plant to Ireland's electricity gird and will help to provide security of supply.

The main objectives of the STEP Power Plant are to:

1. Provide 600 MW of fast acting flexible thermal generation capacity to the Irish electricity market;
2. Provide a 120 MWh (1-hr) Battery Energy Storage System (BESS) to participate in the electricity ancillary services market;

3. To ensure that Shannon LNG's award of a capacity contract on 28 March 2023 from EirGrid to deliver 400 MW of electricity generation capacity is delivered at the Site by no later than 1st October 2026, or any subsequent date extension approved by the Regulator; and
4. To support the provisions of recent national policies with respect to security of electricity supply, including the Climate Action Plan 2024, the National Energy Security Framework 2022, the government's Policy Statement on Security of Electricity Supply 2021 and the recently published 'Energy Security in Ireland to 2030' which all point to the need for a significant uplift in the delivery of flexible gas-fired power generation capacity to 2030.

## 1.2 Alternatives considered

The proposed development is a high voltage 220 kV electrical connection to send power from the Applicant's proposed 600 MW power plant to the national electricity grid. The 220 kV connection is a "contestable" connection. This simply means that the Applicant will build the connection for EirGrid, but once it has been built, the cable will be transferred from the Applicant to EirGrid for ongoing operation, and ESB for maintenance. This is a common practice for developer led connections in Ireland as under the law only EirGrid and ESB can operate and maintain power cables in Ireland.

For further context, the STEP Power plant has a capacity of up to 600 MW. Once operational it will be one of the largest power plants in the State. The Grid Operator (EirGrid) has advised the Applicant that it needs the connection route to be very secure and reliable, as any sudden loss of the connection could cause national problems. EirGrid have reviewed the design and proposed route and are satisfied with the proposal.

In September 2020 the Applicant requested a grid connection from EirGrid for its 600 MW power plant. On the 14th of April 2023 the Applicant executed the 600 MW 220 kV grid connection agreement with EirGrid.

To ensure the Applicant's power plant was connected to the grid in a safe and reliable location, EirGrid instructed, within the connection agreement itself, that the connection point on the network be via a loop in connection into the Kilpaddoge – Tarbert 220kV circuit and substation, via an existing 220kV Line Cable Interface Mast (LCIM).

The Applicant has consulted with the local community in relation to the proposed development. The local community has advised the Applicant of its concern about any additional new overhead lines and strongly emphasised its preference for only underground cables.

### 1.2.1 Substation type

There are two types of substations on the transmission system: Air Insulated Switchgear (AIS) substations and Gas Insulated Switchgear substations (GIS). AIS substations are insulated by air and GIS substations are insulated using sulphur hexafluoride (SF6).

An AIS substation uses atmospheric air as the phase to ground insulation for the switchgear within the electrical substation. An advantage of AIS substations is that they allow for future expansion. The equipment for an AIS substation is easily sourced and has a short lead-time. The main disadvantage of an AIS substation is the footprint required and they require sensitive locating in a rural environment.

A GIS was selected over an AIS substation at this location due to the following reasons:

- The site is on the west of Ireland and exposed to a marine environment with a saline atmosphere. A GIS substation at this location and with its enclosed equipment, offers more protection to the electrical equipment than an AIS station, thereby increasing operational life and reducing maintenance costs;

- A GIS substation, with its enclosed equipment and reduced footprint is less visually intrusive than an AIS station; and
- The footprint of an GIS is about 50% less than an AIS substation which is more favourable environmentally.

### 1.2.2 Substation Location

The 220 kV grid connection will require two substations at the STEP Power Plant site and a 5 km underground grid connection.

An initial location proposed for the substations, which was originally located on the access road, approximately 250m to the southwest of the proposed STEP Power Plant.

An alternative location was subsequently proposed following a review of visual effects, directly adjacent to the STEP Power Plant. This is the proposed location of the substations.

Both sites are currently areas of grassland fields and scrub land with hedgerows separating the field boundaries.

The original site (Option A) was located to the south west of the power plant and adjacent to the access road. Following a review of the visual effects from the L-1010 it was considered that an alternative site should be considered. The alternative site is directly adjacent to the STEP Power Plant. The location of the substations is at +20 m OD and adjacent to the main turbine halls. This low position was deliberately selected to avail of the screening effect of the elevated terrain (+25 m OD) between the residences along the Coast Road L-1010. This mitigates visual impact of the substations on these residences.

### 1.2.3 Overhead Line and Underground Cables

Overhead line is the conventional technical option for high voltage power transmission. It is a well-established method of transmitting electrical energy over long distances. Overhead lines operate at different voltage levels.

Underground cables are typically installed in plastic ducts within a trench. The cables are delivered to site on large drums. A joint bay is installed periodically underground to allow for the joining of the cables from one drum to another. Two additional ducts, within the same trench, would generally also be installed to facilitate the installation of fibre optic communication wires.

The preferred option was determined as underground cables based on the following:

- Consultation with local community
- Visual amenity
- Public acceptance
- No bird collision risk

### 1.2.4 Location of underground cable within L-1010

The design intent is to avoid overhead line and to route the majority of the grid connection from the proposed on-site substations underground and along the L-1010 to minimise effects on greenfield land and reduce visual impact, thereby limiting the scope of alternative design. Also, due to the relatively short extent of the grid connection, the scope for alternative designs was limited.

In terms of effects on the environment, in-road works are generally preferable as the removal of vegetation and effects on archaeology are limited, noise effects are temporary and can be mitigated, there are no landscape effects. However, in this case, it was not possible to put the

full length of the cable under the L-1010 road as there was existing utility congestion identified by the designers, within the final 0.83km of the road carriageway.

Due to congestion with existing utilities on the final 0.83 km section of the L-1010, the cables will be routed off-road, to the north of the L-1010. The route is proposed to be installed north of the L1010 as there is residential development on the south side of the road.

The offroad section north of the L1010 to the Kilpaddoge access road HDD crossing runs initially in a field parallel to a private roadway, but which has an existing public right of way. This road is sufficient to allow access by all necessary vehicles to the circuits installed in the adjacent field. The route eventually turns east toward the Kilpaddoge access road. The alignment here has been chosen to avoid the zone of notification of ring forts in the area, as well to keep outside of the 10m exclusion zone to overhead line towers. ESB are understood to already have access rights to these fields for the purposes of maintaining the OHL and extending this access is possible.

This section of route is considered to be the most practicable option as it:

- avoids utility congestion in the L1010,
- avoids existing residential development, and
- suitable access is available to the route along its length.

The installation throughout this section would be at the standard depth of burial for farmland

### 1.2.5 Connection Options

On the 14th of April 2023 the Applicant executed the 600 MW 220 kV grid connection agreement with EirGrid. Within the connection agreement, EirGrid explicitly specified to the Applicant the exact connection point on EirGrid's network that it would only allow connection. This is because EirGrid needs to ensure large power plants are connected to the grid in a safe and reliable location.

In summary, EirGrid specified a loop in connection into the Kilpaddoge – Tarbert 220kV circuit and substation, via an existing 220kV Line Cable Interface Mast (LCIM). Put simply, as the Applicant was not free to specify a connection point, no alternative connection options could be assessed

### 1.2.6 Ralappane Stream Crossing Options

As the underground cabling exits the Shannon Technology and Energy Park (STEP) Power Plant and the cable route approaches the L-1010 along the STEP facility access road, there is a requirement to cross the Ralappane Stream. Ralappane Stream is an EPA mapped river waterbody within the red line boundary of the STEP Power Plant and is named Ralappane_010.

The Ralappane_010 Stream has a low summer base flow and flows in a north-west direction towards the coast close to, but beyond, the western boundary of the Site and through a key coastal wetland area, which is part of both the Lower River Shannon SAC and the Ballylongford pNHA, before discharging to the Shannon Estuary on the southwest side of Knockfinglas Point via a modified channel.

Options which have been considered include:

- Open Cut Trench – A dry area is created by damming the stream using the installation of an impermeable barrier blocking the river. Water is removed from the works area and held in settlement tanks to remove sediment prior to discharge back to the watercourse downstream of the dam area. Trenching is then undertaken and the ducting installed, the trench is then backfilled and the dam removed.

- Pre-cast Concrete Bridge Crossing – Cabling can be attached to the new precast concrete bridge that is to be installed on the access track as part of the STEP Power Plant, which will traverse the stream. The cabling would be enclosed within a protective casing and fixed to the side or underneath the bridge.
- HDD Crossing – This method involves the creation of launch and reception pits at the start and the end of the HDD crossing. An initial pilot hole is drilled, prior to the drilling of multiple to allow the cable ducting to be pulled through the holes underneath the stream. Cabling can be fitted following the installation of the ducting.

The preferred method for the crossing of the Ralappane stream is via open cut method due to technical reasons with regard to the suitability of HDD and this is the method assessed in the EIAR – this is also the worst case which is assessed in the EIAR. Provided that the mitigation measures prescribed within the EIAR are implemented, there is a very low risk of pollutants being released during the works. The Ralappane stream has a low summer base flow and the works will be carried out between July and September inclusive and in agreement with Inland Fisheries Ireland.

A HDD crossing will not be suitable at the crossing location and there is uncertainty with regard to the viability of attaching the cables to the bridge in terms of acceptance by the Regulator. Therefore, an open cut method is considered as the preferred option.

### 1.2.7 Surface Water Drainage

Two alternate options were reviewed with regard to the surface water drainage of the proposed development.

- A standard sustainable drainage system (SuDS) which would discharge at the greenfield rate, incorporating a proprietary flow control device. Flows would be attenuated using modular storage tanks. Storm water would flow through silt traps and hydrocarbon interceptors prior to discharge to the Ralappane stream (Option A).
- Interception of stormwater from the substation and compound area which would flow through hydrocarbon interceptors and be conveyed through the STEP Power Plant site to the fire water retention tank from where flows would be discharged via the STEP Power Plant outfall pipe to the Shannon Estuary (Option B).

The storm water drainage system proposed as part of the STEP Power Plant application will intercept flows from a catch basin to the northeast of the substation compound site.

Benefits from the connection of the drainage system to the STEP Power Plant drainage system include:

- Utilising the STEP power plant storm water drainage system eliminates the need to create a new storm water system. This eliminates the need of an additional stormwater discharge location to Ralappane stream and/or the estuary foreshore;
- The storm water will flow into the STEP firewater retention pond which has an automatic shut off system in the event of fire; and
- After the firewater retention pond, the storm water will flow into a sub tidal storm water outfall pipe in the estuary. This subtidal location allows storm water to be discharged to the estuary directly as opposed to Ralappane stream which has much less attenuation.

## 1.3 Stakeholder Engagement

### 1.3.1 Pre-application Consultation with An Bord Pleanála

A pre-application meeting was undertaken with An Bord Pleanála on 1st December 2023. A letter was issued to ABP on 29 April 2024 to close the pre-application process. The Board served notice on 16th May 2024 and concluded that: the proposed development would be strategic infrastructure and that any application for approval must therefore be made directly to ABP under section 182A(1) of the Planning and Development Act 2000, as amended.

The Board's Notice of 16th May 2024, included a list of prescribed bodies which have been notified of the application for the Proposed Development, these prescribed bodies being:

- Department of Planning and Local Government and Heritage (DPLGH).
- Minister of Environment, Climate and Communications.
- Kerry County Council (Kerry Co. Co.).
- Clare County Council (Clare Co. Co.).
- Transport Infrastructure Ireland (TII) / National Transport.
- An Chomhairle Ealaion (Arts Council).
- Heritage Council.
- Failte Ireland.
- An Taisce.
- Southern Regional Assembly (SRA).
- Uisce Éireann.
- Inland Fisheries Ireland (IFI).
- Waterways Ireland.
- Department of Agriculture, Food and Marine (DAFM).
- Department of Tourism, Culture, Arts, Gael, Sports and Media (DTCAGSM).
- Health Service Executive (HSE).
- Health and Safety Authority (HSA).
- Commission for Regulation of Utilities (CRU).
- Office of Public Works (OPW).
- Electricity Supply Board (ESB).
- EirGrid.

Following the submission of the planning application to ABP, a website, containing the application materials will also be available for the duration of the planning process.

Consultation letters were issued to the following consultees:

- An Bord Pleanála
- EPA
- Development Applications Unit
- Kerry County Council
- Health and Safety Authority
- EirGrid
- Department of the Environment, Clmate and Communications
- Commission for the Regulation of Utilities

- Inland Fisheries Ireland
- ESB

Responses received are outlined in the chapter.

## 1.4 Methodology

As per the Environmental Impact Assessment (EIA) Directive on the assessment of the effects of certain public and private projects on the environment, EIA ensures a high level of protection to the environment and human health, through the use of minimum requirements for undertaking an EIA.

The EIA Directive defines EIA as a process that consists of:

- The preparation of an environmental impact assessment report by the developer;
- The carrying out of consultations;
- The examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer, and any relevant information received through the consultations;
- The reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination and, where appropriate, its own supplementary examination; and
- The integration of the competent authority's reasoned conclusion into any of the decisions.

The technical chapters of this EIAR provide further topic specific details of the methodologies applied in the preparation of this EIAR.

### 1.4.1 EIAR Methodology

The receiving environment describes the current state of environmental characteristics, detailing the condition, sensitivity and significance of relevant environmental factors which are likely to be significantly affected by the proposals. The amended EIA Directive also requires consideration of the likely future receiving environment in the absence of the project:

The temporal scope or duration of effects will be described for each technical chapter of this EIAR. Spatial (or geographical) scope refers to the area over which the EIAR considers effects. The environmental sensitivity of the surrounding geographical areas and the establishment of source-pathway-receptor linkages (i.e. the zones of influence) will determine the extent of the area to be assessed as part of the EIAR. This is defined in each of the technical chapters of the EIAR.

Receptors for each chapter are identified within the EIAR. A receptor is defined in the EIAR Guidelines as ‘any element in the environment which is subject to impacts’. The environmental effect will depend on the spatial relationship between the source and the receptor with some receptors being more sensitive than others to particular environmental effects. Topic specific receptors have been identified in each technical chapter.

The effects are described in accordance with the EPA Guidelines 2022. The significance of an impact is defined by the sensitivity of the receiving environment and the description (i.e. magnitude/probability/duration) of the predicted impact and are identified within each chapter. Professional judgement remains the most effective way to identify the significance of an effect. Where this has been necessary, it has been highlighted within the text. Where significant adverse effects are likely, mitigation to reduce those impacts is required.

Mitigation measures that have been defined for each environmental topic are set out in the technical chapters comprising this EIAR. These mitigation measures relate to the construction, operation, maintenance and decommissioning phases of the project. Mitigations, as proposed, are representative of best practice guidance in the respective specialist technical fields. Monitoring provides assurance that proposed systems are operating as intended. This allows adjustments of operations to be made to ensure continued compliance with consent conditions.

Cumulative effects of the proposed development with other developments within the vicinity and the intra-project effects of the overall STEP Facility are highlighted and evaluated to identify significance and discussed within each chapter.

Residual impacts that remain from the predicted impacts of the proposed development once additionalmitigation has been implemented are set out in the technical chapters in this EIAR.

There are no Transboundary effects identified as the proposed development is within the island of Ireland.

## 1.5 Description of the Proposed Development

The proposed development consists of two 220kV substations and two 220 kV underground cable circuits between the Shannon Technology and Energy Park (STEP) Power Plant and the existing line cable interface mast adjacent to the existing Kilpaddoge Substation, which in turn feeds into the electricity network. The proposed development will be known as the Shannon Technology and Energy Park 220kV Grid Connection.

The proposed development will include:

- Approximately 5km of two 220kV underground cables (ca. 2.2km within the L-1010 and ca. 2.8km off road in greenfield land);
- Two 220kV Gas Insulated Switchgear (GIS) substations, including two-storey GIS buildings and associated transmission infrastructure.
- A 50MVAr shunt reactor including all ancillary equipment
- Buried optical fibre within the cable ducts from the proposed Glansillagh GIS substation to the Line Cable Interface Mast at Kilpaddoge

The cable route originating at the substations, will then be routed adjacent to the STEP facility access road, public road and private lands. The cable will be installed on STEP-owned lands, ca. 2.2 km will be installed under public roadway (L-1010) with the last section located off road in private lands (the total off road sections are ca. 2.8km).

The cable route terminates at a Line Cable Interface Mast (LCIM) in proximity to Kilpaddoge substation. One of the underground cables will be jointed into an existing cable on the existing LCIM and the other underground cable will connect to an existing underground cable route, via a joint bay, to feed into the Kilpaddoge substation.

The proposed substations will comprise an EirGrid/ESBN 220 kV substation, named Glansillagh 220 kV substation and one SLNG 220 kV GIS substation, named Knockfinglas 220kV substation, located adjacent to each other and adjacent to the Shannon Technology and Energy Park (STEP) Power Plant. The proposed 220kV substations are approximately 50m by 18.5m.

The proposed substations and reactor will be located directly to the west of the proposed STEP Power Plant, approximately 250 m south of Shannon Estuary and approximately 400m north of the nearest public road, the L-1010. The proposed substations are located within the planning application boundary of the STEP Power Plant project.

Kerry County Council has obtained Part 8 planning for the widening of the L-1010. The road widening works will include the ducting and joint bay installation for the 220kV cables under the L-1010 and will be undertaken by Kerry County Council, or their subcontractors, in advance of the proposed development. These works will be fully funded by the Applicant by means of a special development contribution under section 48(2)(c) of the Planning and Development Act 2000 to cover the full cost of the upgrade works including the ducting and joint bay installation.

### 1.5.1 Proposed Works

Proposed works for the construction and installation of the substations, equipment and grid connection will take approximately 27 months.

The works for the construction of the substations include:

- Foundation Works – starting after the completion of STEP Power Plant site clearance and grading. Foundation works will involve excavation, form work, steel reinforcement, and concrete placement. Excavated material will either be reused on-site or disposed of off-site in accordance with applicable requirements under the Waste Management Act 1996, as amended and associated regulations.
- Structural steelwork erection - following the installation of the foundations, structural steelwork will be erected. The GIS Building will be a two storey building with partial basement. The ground floor level will include service rooms, loading bay, generator room, relay room, battery room and access to the cable basement area. The first-floor area of the building will accommodate the 220kV switchgear assembly.
- Cladding and building finishing works including building services, drainage and internal roadway.
- A fire detection and alarm system will also be installed.
- Miscellaneous civil works: paving, landscaping, permanent fencing and completion of works.
- Electrical Installation of GIS plant will then be delivered to the substation compound and unloaded within the GIS building loading bay. Following the installation of plant within the GIS building, wiring and cabling of GIS plant and associated protection and control cabinets will be undertaken.

The grid connection works include:

- Trenching and Ducting – A twin trench will be dug in agricultural lands with a width of 1.7m and depth of approximately 1.5m with a centre-to-centre spacing of 5.5m. Trenching and ducting will be undertaken within the L-1010 by Kerry county council, during the road widening scheme.
  - Joint bays are installed, generally as pre-cast installations, approximately 8m length x 2.5m width x 2.3m depth to allow cables to be pulled through the ducting.
  - Bedding material is added to the trench, followed by Cement Bound Granular Material (CBGM) and the ducts put in place, protection strips laid on top and the trench will be backfilled.
  - Ducting will take place on the two trenches, will progress sequentially, moving from joint bay to joint bay. A temporary construction access track alongside the cable trench will be required to allow for the movement of construction equipment and materials along the section of the route on the farmland.
  - Approximately 30-50 m of trenching and ducting is completed in a day, dependent on conditions and location.
- Cable Installation and Jointing - The cables will be brought to site on cable drums which will then be placed into position and a winch system set up from joint bay to joint bay to pull the cable through the ducting.

- Cable Crossing - Underground cabling crossings on the Kilpaddoge substation access road are proposed to be crossed by Horizontal directional drilling (HDD).
- Water crossings - There will be a crossing at the Ralappane Stream which will be crossed by open cut method. This involves the damming of the stream and the installation of an impermeable barrier to allow a dry working area. Water from the upper section of the stream will be either pumped or a temporary diversion installed to maintain flow downstream. Once works are completed site restoration will be employed with agreement with Inland Fisheries Ireland (IFI) to minimise disruption or pollution incidents.
- Connection to Kilpaddoge and Tarbert substations - The two underground cables will connect to the national transmission network via two separate connections.
  - The connection to the Tarbert substation is via a LCIM (Line Cable Interface Mast).
  - The second underground cable will connect to an existing underground cable at the LCIM, via a joint bay, to feed into the Kilpaddoge substation.

### 1.5.2 Construction Requirements

- Temporary Construction Compounds - A main temporary laydown area will be located adjacent to the proposed substations, beside the main STEP Power Plant. Three smaller temporary laydown areas are also proposed, one south of the main temporary compound and adjacent to the access road and two to the east of the proposed development in proximity to the LCIM.
- Construction Traffic –
  - It is expected that an average of approximately 16 Heavy Goods Vehicle (HGV) movements per day will be required during the site preparation and civil construction phase of the proposed substation construction. This is expected to reduce during the electrical installation and commissioning phase of the substation.
  - For the cable route installation, an average of approximately 48 HGV movements per day will be required during the civil construction of the cable route. Once the civil works are completed, the electrical installation is expected to require a maximum of 12 HGV movements per day.
  - The number of construction workers required during the construction phase is expected to peak at approximately 60 persons for the substation construction, and 5 – 8 persons per crew working on the cable route. It is expected that up to three crews may be working on the cable route at a time.
- Construction working hours - Construction phase works will take place between the hours of 07:30 to 18:00 (Monday to Friday) and 08:00 to 14:00 (Saturday). No works will take place on Sundays or Bank Holidays.
- A Construction Environmental Management Plan (CEMP) will be prepared and implemented during the construction phase in consultation with the Kerry County Council. 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 is 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.
- Construction Traffic Management Plan (CTMP) - Prior to commencement of the development, the Contractor appointed by the Developer will prepare a CTMP which will be developed and implemented to mitigate any potential construction traffic impacts on the local road network and will be agreed with Kerry County Council.
- Construction Resource Waste Management Plan (CWRMP) - Prior to commencement of the development, the Contractor appointed by the Developer to undertake the works will further develop the CWRMP 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.

### 1.5.3 Operation and Maintenance Phase

During the operation and maintenance phases of the proposed development, a potable water supply will be sourced from the existing public watermain system via a new connection to the STEP Power Plant.

Wastewater will be discharged to a holding tank which will be emptied approximately every six months.

A new storm water drainage system is required. Storm water will be collected via a catch basin in the northeastern corner of the compound and will be conveyed to the fire water retention tank. All storm water will pass through an attenuation system including a silt trap and a hydrocarbon interceptor prior to discharge. The storm water will be discharged from the fire water retention tank to the Shannon Estuary via an outfall pipe (constructed as part of the STEP Power Plant project) located 5m beyond the low water mark and in a water depth of ca. 2.4m.

Upon completion of the works, the proposed onsite EirGrid/ESBN 220kV GIS Substation and the underground transmission cable will be handed over to EirGrid, who in conjunction with ESB Networks (ESBN), will carry out the final commissioning and energisation of the proposed substation and transmission line connections.

Once energised, the EirGrid/ESBN substation and 220kV grid connection will from part of the ESBN infrastructure (in their role as Transmission Asset Owner (TAO)), and EirGrid will be responsible for operating the system (in their role as Transmission System Operator (TSO)). The SLNG 220kV GIS substation will continue to be owned and operated by Shannon LNG Limited.

### 1.5.4 Decommissioning Phase

Subject to the granting of statutory approval, the EirGrid/ESBN substation and grid connections will form part of the national electrical grid infrastructure. The design life of the substation is approximately 40 years. It is expected that the substation site will remain a permanent part of the national electricity transmission network and will be refurbished and / or redeveloped as required rather than be decommissioned.

The SLNG substation is expected to have a design life of 25 years. Where decommissioning takes place, all above-ground components associated with the substation will be disassembled and removed from the site and effects are likely to be similar or of a lesser magnitude than the construction effects.

## 1.6 Population and Human Health

The chapter assess the likely significant effects on population and human health and includes consideration of the potential for both adverse and beneficial effects during the construction phase and the operational phase, with regards to residential properties, community resources, local businesses, employment, tourism, and human health.

The study area for residential properties, community facilities, businesses and agricultural landholdings is 500m from the red line boundary of the proposed development. As of the 2022 Census data, there are 757 within the local impact area, which is a decline of 1% since the 2016 Census. There are 412 residential properties identified within the local impact area, with 50 residential properties within 500m of the proposed development, primarily along the L-1010. There are several community facilities within Tarbert to the east of the proposed development,

with only one located within 500m. within the local impact area there are 43 agricultural land holdings and the proposed development spans five of these.

There are five tourist attractions noted within the local impact area, including a woodland walk, the Shannon Estuary Way and the Wild Atlantic Way. The closest attraction is Kilnaughtin Church and Graveyard approximately 90m to the south of the proposed development. Health indicators from the 2022 Census show that 83% of the population within the local impact area are reported as having 'good' or 'very good' health. This is in line with the County Kerry, South West Ireland and Ireland figures.

As per the Guidelines provided by the Environmental Protection Agency, Likely Significant Effects are assessed against the following:

### 1.6.1 Construction Effects

This chapter assessed effects on population, land use and social considerations, economic activity and human health.

With regard to population no effects on population are likely as no change in residential population anticipated.

In terms of land use and social considerations:

- Temporary land requirements – not significant as temporary land requirements are for the construction phase only and land will be reinstated to its current use.
- Permanent land requirements – substation land is owned by the applicant and the effect is considered imperceptible.
- Delay in journey times – slight adverse effect during the construction period as access to receptors along the L-1010 will be maintained throughout the construction phase, with the effect considered not significant.

There will be temporary changes in employment as a result of employment from across the county during construction and the effect is considered to be not significant.

In terms of human Health within the study area, no effect on health and well-being is anticipated. No significant effects are likely with regard to electromagnetic fields. With regards to social cohesion, effects will be temporary and not significant. There will be temporary disruption due to construction traffic but this will not be significant.

### 1.6.2 Operation and Maintenance Effects

The following summaries effects during the operation and maintenance phases:

- Population – there are no effects anticipated
- Land use and social considerations – effects are not anticipated
- Economic Activity – effects considered imperceptible.
- Human Health – no significant effects anticipated

### 1.6.3 Cumulative effects

- Population - no significant negative effects
- Land use
  - Land Requirements - there is the potential to lead to a further loss of agricultural land within the study area with the STEP Power Plant which could result in a negative cumulative impact on land use, although it is considered unlikely to be significant as majority of the land required is currently owned by the Applicant

  - Reduction in access - The delivery of cumulative schemes is likely to increase volumes of traffic on the local road network, however as set out in Chapter 17 (Roads and Traffic), the combined impact on driver delays as a result of the proposed development and cumulative schemes is assessed as not significant.
- Economic Activity – Employment - The proposed development and the associated STEP Power Plant during both the construction (temporary) and operation (permanent) is expected to generate employment with a slight beneficial long term effect.
- Human Health
  - Neighbourhood amenity – potential for dust and noise effects cumulatively could cause negative cumulative effects on amenity, however these are not likely to be significant.
  - EMF – The proposed development will operate in accordance with limits set by the EU Directive 2013/35/EU Electromagnetic Fields (EMF) and International Commission on Non-Ionising Radiation Protection (ICNIRP) and as such, it is assumed that there will be no significant cumulative health effects associated with EMF.
  - Traffic Disruption - in the study area, the cumulative effect on severance will be relatively low given the notable level of residual road capacity and construction traffic generated by the proposed development and cumulative developments.

### 1.6.4 Residual Effects

There are no significant residual population and human health effects predicted during the construction and operational and maintenance phases. It is acknowledged that inconvenience will be caused in some areas due to the increase in construction traffic, however, as the construction periods have been phased, effects will be temporary and negligible.

## 1.7 Land, Soils and Hydrogeology

This chapter presents an assessment of the likely significant environmental effects on land, soils and hydrogeology.

The predominant land use type identified within the study area is pastures, which is present across the whole of the proposed substation site and the majority of the underground cable route, apart from the section along the L-1010. Land of this type is considered to have a low sensitivity. There is an area classified as sea and ocean, located within the buffer zone, 100m north of the proposed substation site, which is considered to a Medium sensitivity. The predominant soil type within the study area is Kilrush, which is described as fine, well-drained, loamy drift with siliceous stones. Bed rock geology main comprises of mudstones, siltstones and rippled sandstones. The landslide susceptibility classification is Low across most of the study area, however, small areas of Moderately Low to Moderately High susceptibility are present, associated with the coastline and river/stream channels to the north of the proposed substations. The closest private ground water supply is located approximately 60m west of the red line boundary.

### 1.7.1 Construction Phase

The construction phase activities associated with the proposed development, which could pose risks to land, soils and hydrogeology, have a significance of effect of imperceptible or slight, apart from the risk of landslides which is assessed as moderate to significant. Also, exposure to radon is assessed as being of profound significance in the absence of mitigation.

### 1.7.2 Operation and Maintenance Phase

Operational effects were assessed in terms of:

- Land and land-use
- Soils and geology
- Hydrogeology

With the exception of exposure to radon, the effects were assessed as imperceptible to slight during the operation and maintenance phase. Exposure to radon was assessed as being of profound significance in the absence of mitigation.

### 1.7.3 Cumulative Effects

Cumulative effects with the STEP Power plant and associated master plan are considered to have an imperceptible significance of effect. Other projects are considered to have at worst slight adverse cumulative effect, due to irreversible quantitative loss of soils and bedrock due to excavations. Other cumulative impacts are considered minimal.

### 1.7.4 Residual Effects

Residual effects following mitigation are considered imperceptible.

## 1.8 Surface Water and Flooding

Surface water and flooding chapter considers the potential impacts during construction, operation (including maintenance) associated with:

- Surface waters;
- Water supply and wastewater discharge (including drinking water supply network, foul water and the drainage network);
- Water Framework Directive (WFD) surface water objectives; and
- Flood risk.

The study area assessed includes surface waters adjacent to the proposed development and surface waters which are crossed by the proposed development. The surface waters within the assessment are the Ralappane Stream and Farranawana Stream which discharge into the Lower Shannon estuary. The proposed development crosses the Ralappane Stream. Kerry County Council will construct crossings along the L-1010 (Ralappane and Farranawana streams) during the road widening works under an already approved Part 8 Consent.

The latest WFD status for the River Shannon Estuary is ‘Good’ with the water quality status (2018 – 2020) classified as ‘unpolluted’.

Both the Ralappane Stream and Farranawana Stream are classified by the EPA as having a ‘moderate’ WFD status (WFD Status 2018-2021). Biologically the Farranawana Stream moderate status and the Ralappane stream was assessed at the two crossing locations as having a poor biological status.

Diffuse agricultural sources continue to be the main threat to the quality of water of these areas. Agriculture is the largest land use in the country and is the largest pressure on water quality which can be affected by diffuse nitrogen, phosphorus, sediment release, point source losses, pesticides and ammonium losses.

Neither the Ralappane Stream nor Farranawana Stream are designated as proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Special Areas of Conservation (SACs) or Special Protection Areas (SPAs), however the Shannon estuary is designated as a SAC (Lower River Shannon SAC) and SPA (River Shannon and River Fergus Estuaries SPA) and both streams discharge into the Shannon estuary.

The proposed development is not at risk from fluvial flooding from Ralappane and Farranawana stream.

The proposed development is outside OPW tidal flood risk areas, so is not at risk from coastal and tidal flooding and is not at risk from coastal flooding from Ralappane and Farranawana stream as the development is at a higher level to the tide levels.

Rainfall could affect the proposed development, but the pluvial flooding risk has been considered as minimal and addressed by the drainage design.

OPW Groundwater flood risk maps (www.floodinfo.ie) indicate no risk of groundwater flooding on the development route. The proposed development is not in the area with potential for groundwater flooding.

The proposed development is considered to not be at risk of flooding from artificial drainage systems or infrastructure failure.

### 1.8.1 Construction Phase

- Surface water - Construction works, such as vegetation clearance and excavation, have the potential to cause surface water run-off and sediment release to water courses. Accidental release of pollutants from construction works/vehicles could also impact. Without mitigation there is a moderate effect.
- Water supply, wastewater and drainage – During construction there will be welfare facilities at construction compounds and any effects are considered temporary and imperceptible.
- Flood risk –
  - Cable Construction Open Cut - The majority of the cable route will be installed by open cut method, the route is along the public road L-1010 and private agricultural lands, therefore the volume of water affected by the proposed development is small and manageable. The significance of this temporary effect is assessed as slight to significant and temporary.
  - Watercourse Crossings - The proposed watercourse crossing for the Ralappane Stream is open cut, which puts a constraint on a watercourse and could affect the flood extent, which could result in a Significant effect. Duration of the effect is assessed as being temporary during construction.
  - Construction Compounds and Laydown Areas - Construction compounds/Laydown areas will be located within the red line boundary of the site and will be a minimum of 50m from watercourses and not within flood zones but could influence surface water flow paths. The temporary, significance of the effect is assessed as Slight to Significant depending on the location of the compounds, which is considered a negligible impact.

### 1.8.2 Operation and Maintenance Phase

- Water Supply - a potable water supply is required for substations from the existing public watermain via a new connection to the watermain which is proposed to supply the STEP Power Plant facility. Fire hydrants will also be installed and foul drainage will be held in a holding tank and emptied once filled. Significance of effect is considered to be imperceptible.
- Storm Water Drainage - will be collected via a catch basin in the north eastern corner of the compound and will be transferred to the fire water retention tank proposed as part of the STEP Power Plant application. All storm water will pass through an attenuation system including interceptors prior to discharge to the Shannon Estuary via an outfall pipe. As the stormwater will pass through hydrocarbon interceptors as per standard design, the effect will be imperceptible.

- Flood Risk - A desk-based assessment of the cable route was undertaken which concludes that the impact on flood risk is negligible at operation stage due to the cables being buried, no new obstruction to watercourses and so not influencing flood waters.

### 1.8.3 Cumulative effects

Following the implementation of mitigation measures, no significant cumulative effects are likely with the other elements of the STEP facility or with any other project.

### 1.8.4 Residual effects

Following the implementation of mitigation measures during construction and the embedded mitigation built into the design for the operational phase, residual effects in terms of water quality will be imperceptible in the Ralappane stream and downstream in the Lower Shannon estuary. The residual effect on water supply, wastewater and drainage will be imperceptible. In terms of flood risk, the residual effect is imperceptible.

### 1.8.5 Water Framework Directive Assessment

The EU Water Framework Directive (WFD) (Directive 2000/60/EC) establishes a framework for the protection of inland surface waters, transitional waters, coastal waters, and groundwater. It aims to prevent and reduce pollution, promote sustainable water use, protect and improve the aquatic environment and mitigate the effects of floods and droughts. A WFD assessment was undertaken as part of the Surface Water and Flooding chapter and concluded the following:

- With the implementation of the mitigation measures proposed, the proposed development will not result in a change in status of any WFD quality elements or prevent any waterbodies from reaching good status in the future.
- The assessment has shown that the proposed development upon completion will have no permanent impact on the hydromorphological (i.e. flow, continuity, morphology) and physicochemical (i.e. thermal, nutrient, oxygenation, acidification) elements of the Ralappane stream and the ability of these elements to provide a supporting environment for the river's ecology. As such the assessment has demonstrated that the potential impacts associated with the proposed development are unlikely to cause a deterioration at the water body scale.

In summary the proposed development would not result in status deterioration of the Ralappane river waterbody or directly prevent the future attainment of good water status or indirectly impact measures that may be put in place by the relevant competent authorities to achieve the environmental objectives of the WFD.

## 1.9 Biodiversity

A desktop assessment and field surveys were undertaken to assess the likely potential effects on biodiversity as a result of the proposed development.

European sites identified as present in the study area and potentially within the 500m Zone of Influence of the proposed development, include:

- Lower River Shannon SAC (Site Code: 002165) approximately 86.7m north of the proposed development area at its closest point.
- River Shannon and River Fergus Estuaries SPA (Site Code: 004077) approximately 86.7m north of the proposed development area at its closest point.

No sites of national designation occur within or in proximity to the proposed development site. The closest NHA to the proposed development is the Bunnaruddee Bog NHA (001352), located approximately 5.5km to the south of the proposed development.

Four pNHAs were identified outside of the proposed development boundaries, but with connectivity to the proposed development: Ballylongford Bay, Tarbert Bay, Scattery Island, and Poulnasherry Bay.

### 1.9.1 Construction Phase

- Off-road Cable - The construction of the cable route has potential to cause direct impacts to habitats, noise and disturbance effects and surface water run-off.
- HDD Crossing - A HDD crossing under the Kilpaddoge substation access road is required. The launch and reception pits (approximately 3m x 5m) for the drilling rig requires the temporary installation of a level hardstanding area on a geotextile base. There is potential for direct impacts to habitats during the installation of the HDD crossing.
- Construction Compounds - A site construction compound is proposed for the north western end of the proposed development. Three temporary laydown areas are required, one to the south of the main site compound and two in proximity to the LCIM connection point. There is potential for direct impacts to habitats, along with surface water run-off associated with these compounds and laydown areas.
- Open Cut Trenching - Open cut trenching methodology is proposed as a crossing option for the Ralappane stream adjacent to the access track to the STEP Power Plant. In the absence of mitigation, there is potential to result in degradation to the watercourse, damage to habitats and species therein, and downstream mobilisation of surface water pollutants.
- Substations – The construction of these substations will result in a permanent loss of habitats within the footprint of the works and has potential to result in surface-water and noise emissions.
- Air emissions – Effects of construction traffic emissions on local air quality are considered to be low and not significant. On This basis, no further consideration has been given to the effects of construction road traffic on ambient air quality and ecological receptors.
- Assessment of Effects on European Designated Sites (Special Areas of Conservation and Special Protection Areas) – A NIS was undertaken and concluded that, based on the assessment of the proposed development alone and in combination with other projects and plans, including the implementation of mitigation measures, it can be concluded that no adverse effects on the integrity of any European sites will arise, in view of the site's conservation objectives.
- Assessment of Effects on Nationally Designated Sites – No NHAs were identified with potential connectivity to the proposed development. Given the lack of connectivity to any NHAs, there is no potential for impact on same.
- Proposed Natural Heritage Areas (pNHAs) – four pNHAs were identified with potential connectivity to the proposed development. The site boundaries for these pNHAs is contiguous with that of the Lower River Shannon SAC and the River Shannon and Fergus Estuaries SPA. These sites are therefore assessed under the relevant European designated site.

  Potential for Effect to Habitat KERs – The proposed development involves the construction of a cable route, access routes, grid connection and GIS substations all of which will result in direct, both temporary and permanent, effects on the habitats present at those locations, as identified in Table 1.2.

  Due to the nature of the proposed development and the need for a flexible approach to works, all habitats located within the RLB are considered to experience some temporary loss during the construction phase within the RLB. The total area of KER habitats identified within the RLB equals 10.64ha, of this it is expected that due to the nature of the proposed development and need for works along both sides of the proposed cable route all 10.64ha will experience a loss. Of this loss, however, only 0.89ha (8.37%) will be a permanent loss

while 9.75ha (91.64%) of the total habitat area will be only temporarily lost during the construction phase.

- Potential for Effect to Species KERs - The potential for effects on all other KERs are detailed in Table 1.2.

**Table 1.2: Potential for Effect to Key Receptors**

| Feature | | Importance | Potential for Effect in the Absence of Mitigation | Effect Magnitude in the Absence of Mitigation |
|---|---|---|---|---|
| Birds | Wintering birds | International | Vegetation clearance has the potential to result in a loss of foraging and roosting habitat for wintering bird species in the local area. In addition, the disturbance of these species during the construction phase has potential to result in temporary movement out of the ZoI and is assessed to be a temporary moderate negative effect at an international scale as the wintering bird species of concern are SCI's of the nearby River Shannon and Fergus Estuaries SPA.<br>The loss of potential foraging habitat has potential to result in a permanent slight negative effect on local bird populations. | Permanent slight negative effect at a local scale. |
| | Breeding | Local Importance (Higher Value) | Vegetation clearance has potential to result in a loss of nesting habitat for breeding bird species in the local area. In addition, should clearance be carried out during the nesting season (1st March-31st August) there is potential for direct impact to nesting birds within scrub, treeline, and hedgerow habitats within the study area. The disturbance of these species during the construction phase has potential to result in temporary movement out of the ZoI and is assessed to be a temporary moderate negative effect at local scale.<br>The loss of potential nesting habitat has potential to result in a permanent slight negative effect on local bird populations. | Permanent slight negative effect at a local scale. |
| Non-Volant Mammals | Badger | Local Importance (Higher Value) | Badger have been historically recorded on site particularly towards the western end of the proposed development route as well as more recent badger evidence identified towards the eastern end of the route in 2024. While most of the badger activity has been observed both within and outside of the proposed development area and RLB it has been determined that only one badger sett is at immediate risk of impact from the proposed development.<br>In addition, there is potential for additional direct impacts and disturbance effects should additional badger setts become established within the ZoI in the time period following the survey and prior to construction.<br>In the absence of mitigation, these impacts are assessed as permanent significant negative effect at a local scale, in the absence of mitigation. | Permanent significant negative effect at a local scale. |
| | Otter | International Importance | No otter holts or couches were recorded within the ZoI during the field surveys. There is potential, however, for otter holts and couches to become established prior to the commencement of construction. There is also potential for degradation of water quality to cause a reduction in prey species for otter. Potential for impact to aquatic species is discussed in the context of aquatic habitats and below in the context of aquatic species.<br>Loss of holts, and associated injuries to otter therein would result in a permanent significant negative effect on otter populations at a local scale, in the absence of mitigation. | Short-term moderate negative effect at a local geographic scale |
| Bats | Foraging habitat | Local Importance (Higher Value) | There is potential for a loss of 2.67ha of foraging habitat associated with the proposed development. Loss of treeline, hedgerow, and scrub habitat has the potential to result in loss and/or degradation of foraging habitat | Permanent slight negative effect at a local scale |

| Feature | | Importance | Potential for Effect in the Absence of Mitigation | Effect Magnitude in the Absence of Mitigation |
|---|---|---|---|---|
| | | | for bat species in the wider landscape. The loss of foraging habitat, has the potential to result in a permanent slight negative effect at a local scale due to the potential loss of linear woodland type forage habitat. | |
| | Roosts | Local Importance (Higher Value) | No roosts were identified within the ZoI of the proposed development. There is potential, however, for potential roost features to become established in trees within the ZoI in the time between survey and construction. The loss of trees with potential roost features therein has the potential to result in a permanent slight negative effect at a local scale due to the potential loss of linear woodland type forage habitat. | Permanent slight negative effect at a local scale |
| Other Terrestrial Mammals | Hedgehog | Local Importance | Hedgehog are presumed to be present within the ZoI of the proposed development. There is, therefore, the potential for hedgehog territories to be present within the proposed development site.<br>There is potential for direct habitat loss impacts on hedgehog. This is assessed as a temporary slight negative effect on hedgehog populations at a local scale. | Temporary slight negative effect at a local scale |
| | Irish hare forms | Local Importance (Higher Value) | There is potential for hares to make forms within ZoI of the proposed development. Irish Hare which are impacted will readily move to another location during construction. There is therefore potential for a short-term slight effects at a local scale. | Short-term slight effects at a local scale |
| Amphibians | Common frog | Local Importance (Higher Value) | There is potential for a permanent loss of habitat for amphibians in the footprint of the works. The habitat available within the site is generally ephemeral and not significant long-term habitat for frogs. As such, there is potential for a permanent slight negative effect on local population of amphibians, in the absence of mitigation. | Permanent slight negative effect on local scale |
| Aquatic Species | European eel | Local Importance (Higher Value) | There is potential for direct impact to European eels within the footprint of the watercourse crossing. There is potential, therefore for a short-term moderate negative effect on eel populations at a local scale. | Short-term moderate effects at a local scale |

### 1.9.2 Operation and Maintenance Phase

Given the proposal's design has taken certain impacts such as the storm water discharge and lighting into consideration and incorporated mitigation as part of the design; the only potential operational or maintenance impact is in relation to repairs to the cable, should they be required. Given the infrequent nature of this requirement, mainly restricted to if a failure occurs, the impacts are considered to be temporary slight effects at a local scale but will persist throughout the lifetime of the proposed development.

### 1.9.3 Cumulative Effects

With regards to the proposed STEP Power Plant, there is a potential risk for cumulative effects from increased traffic movements, during the construction phase, causing air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby designated sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the impact from air emissions will be significant and will be imperceptible.

There is potential for in-combination effects with other projects in the vicinity. However, with suitable mitigation measures employed, it is considered that the cumulative impact will not be significant.

### 1.9.4 Residual Effects

It is considered that due to the permanent nature of the proposed development scheme, the residual effects will likely remain the same as those outlined for the operational phase. Correct adherence to the CEMP and mitigation measures will result in non-significant effects. Continued monitoring and maintenance of the project (specifically in the early stages of the operational phase) will help to assess the effectiveness of the mitigation measures that were in place and will help ensure potential impacts are minimised/avoided. Residual effects range from imperceptible to moderate.

## 1.10 Air

The Air chapter provides an assessment of the potential effects and likely significance of the proposed development on local air quality.

For the construction phase, the study area covers human health receptors and ecologically designated sites within 250m of the construction site boundary and within 50m of the routes used by construction vehicles on the public highway, up to 250m from the site entrances.

Given the frequency of maintenance, the effects of operation road traffic contributions from the proposed development are considered low and not significant. On this basis, no further consideration has been given to the effects of construction road traffic on ambient air quality.

Given the frequency of maintenance, the effects of operation road traffic contributions from the proposed development are considered low and not significant. On this basis, no further consideration has been given to the effects of construction road traffic on ambient air quality.

### 1.10.1 Construction Phase

- Construction Dust Emissions

**The overall risk of receptors to dust soiling effects and $PM_{10}$ effects are presented in Table 1.3.Table 1.3: Summary of the risk of construction effects**

| Activity | Dust soiling effects | $PM_{10}$ effects |
|---|---|---|
| Earthworks | Medium | Low |
| Construction | Low | Negligible |
| Trackout | High | Low |

Dust soiling effects are 'Low' to 'High' and $PM_{10}$ (particulate matter) effects are 'Negligible to Low' without mitigation.

- Construction road traffic emissions
  - Following consultation with the proposed development engineering team, the construction of substations and underground cables phase will increase the number of Heavy duty Vehicle (HDV) traffic movements to the area. It is expected that construction traffic movement during other construction phases (such as electrical works) would be insignificant.
  - During the 10-week site preparation and civil construction of the substation phase, the average daily flow is predicted to be approximately 16 HDV vehicles. Whereas during the 20-week underground cabling phase, the average daily flow is predicted to be approximately 48 HDV vehicle movements.
  - These phases are not expected to overlap, however if this were to occur, the traffic movements would still be well below the 100 HDV movement threshold for the proposed development. Given the construction traffic generated is well below the EPUK/IAQM criteria, effects of construction traffic emissions on local air quality are considered to be low and not significant. On this basis, no further consideration has been given to the effects of construction road traffic on ambient air quality

### 1.10.2 Operation and Maintenance Phase

During the operation and maintenance phase, access may be required on rare occasion to facilitate cable replacement if failure occurs. Given the frequency of maintenance, the effects of operation road traffic contributions from the proposed development are considered of low and not significant.

A qualitative assessment of construction dust effects has been undertaken for the different construction activities associated with the proposed development. The assessment is precautionary and likely over-estimates the level of mitigation required. Across the construction activities, the level of risk of dust creating nuisance and/or loss of amenity and $PM_{10}$ leading to adverse health effects (without mitigation) is predicted to range from 'negligible' to 'high risk'. Following the implementation of the mitigation measures, the air quality impacts associated with dust are predicted to be not significant.

As the air quality impacts associated with the proposed development are not significant and ambient pollutant concentrations are well below the relevant air quality standards, no exceedances of air quality standards are anticipated.

### 1.10.3 Cumulative effects

A cumulative assessment was conducted for air emissions from traffic, and found that the cumulative effects on the worst-case human health receptors with regard to $NO_2$, $PM_{10}$ and $PM_{2.5}$ are not significant. With regard to ecological receptors, potentially significant effects are predicted with regard to nitrogen deposition. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences

within the Shannon Estuary on sensitive habitats, it is not considered that the impact from air emissions will be significant and will be imperceptible.

### 1.10.4 Residual Effects

With the successful incorporation of best practice mitigation, the residual impacts on dust emissions from construction activities will be negligible.

**Table 1.4: Residual effects**

| | Construction effect | Residual effect |
|---|---|---|
| Construction dust emission | Dust soiling effects: 'Low' to 'High' risk<br>PM10 effects: 'Negligible to Low' risk | Not significant with mitigation |

Source: IAQM (2024)[1]

There are no significant impacts predicted during the construction and operational phases for air quality with the successful incorporation of best practice mitigation.

## 1.11 Climate Resilience

A climate change impact assessment has been undertaken to assess the climate resilience of the proposed development. The impact assessment methodology takes a qualitative approach informed by the future climate baseline. The approach considers the magnitude of climate change risks and the sensitivity of receptors, along with consideration of embedded mitigation measures within the design, to determine whether identified climate change risks to the proposed development should be considered significant.

### 1.11.1 Construction Phase

As the construction is expected to start in October 2026 and take place over 27 months, it will be undertaken within a time period where the climate will not have notably changed from present day and, as such, the construction phase is not considered as part of this assessment. Extreme weather events will be managed through the Construction Environmental Management Plan (CEMP), such as:

- inaccessible construction site due to severe weather event (flooding, snow and ice, storms) restricting working hours and delaying construction;
- health and safety risks to the workforce during severe weather events;
- unsuitable conditions (due to very hot weather or very wet weather, for example) for certain construction activities;
- damage to construction materials, plant and equipment, including damage to temporary buildings/ facilities within the Site boundary, such as offices, compounds, material storage areas and worksites, for example as a result of stormy weather; and potential pollution incidents due to severe rainfall events or storms.

### 1.11.2 Operational Phase

This section outlines the potential impacts that the proposed development may face due to climate change throughout its operational lifetime. The impact assessment has been conducted to determine likely significance of potential impacts.

[1] Institute of Air Quality Management (2024) Guidance on the assessment of dust from demolition and construction

Table 1.5 presents the findings of the impact assessment and considers embedded mitigation as part of the assessment to assess the significance of the effect.

Mitigations can take one of two forms:

1) Embedded – Some measures are embedded into the design of the proposed development. For example, inclusion of climate change allowances within flood modelling and the application of climate change uplifts to drainage design.
2) Operational – These are secondary mitigation measures such as asset management planning and asset maintenance that should be carried out throughout the lifetime of the proposed development to continue to provide protection against evolving climate hazards. Such mitigations may also include future refurbishments, upgrades or changes to assets and processes at the appropriate time in the future, based on how significantly the climate continues to change and the evolving resilience needs of the proposed development.

It is proposed that a full review of the mitigation embedded within the proposed development design will be carried out at the detailed design stage, including consideration of all additional mitigation recommended to be embedded within the detailed design.

**Table 1.5: Climate change risk assessment for the proposed development**

| Change in climate variable | Climate hazard | Description of potential climate impact | Affected asset | Embedded mitigation measures | Magnitude | Sensitivity | Significance of effect |
|---|---|---|---|---|---|---|---|
| Increased heavy rainfall events | Flooding | Heavy precipitation and flooding events may result in exceeding drainage capacity and thus damaging assets located within the sub-station, affecting operations and leading to reduced output or time lost.<br>Flooding could cause access and egress issues, endangering operational workforce and waterlogging of pavement surface due to increased percolation of water into its porous upper layers, leading to weakened asphalt and formation of faults and potholes and increased maintenance requirements. | Sub-station | N/A | Moderate | Medium | Moderate, significant |
| | Flooding | Rainwater can lead to surface erosion and deterioration of concrete of the concrete post and rail fencing, reducing its overall lifespan. | Sub-station – concrete post fencing | N/A | Moderate | Medium | Moderate, significant |
| Increased heavy rainfall events<br>Changing temperature variability | Freeze thaw cycles | Penetration of rainwater to the concrete, followed by cold periods causing rainwater to freeze, expand and crack the surrounding concrete, and potentially compromising the fence's stability. While freeze events may become fewer, this risk may increase due to increased winter rainfall and waterlogging of the ground. | Sub-station – concrete post fencing | N/A | Minor | High | Moderate, significant |
| Reduced rainfall | Increased drought risk | Shrinkage and desiccation of ground leading to cracks, strength loss and instability. Substation foundations may be affected. | Sub-station – structural foundation | N/A | Moderate | High | Moderate, significant |
| | Increased drought risk | Drought conditions can cause asphalt and concrete surfaces to become brittle and potentially lead to cracking, increasing requirement for maintenance. | Sub-station – asphalt surface of internal roadways | N/A | Moderate | Medium | Moderate, significant |

| Change in climate variable | Climate hazard | Description of potential climate impact | Affected asset | Embedded mitigation measures | Magnitude | Sensitivity | Significance of effect |
|---|---|---|---|---|---|---|---|
| | Increased drought risk | Reduced availability of potable water for operational staff when present on site which is proposed to be sourced from the existing public watermain system via a new connection. | Sub-station – water supply | The potable water demand is estimated to be low as the sub-station will normally be unmanned and operated remotely.<br>Taps incorporate automatic shut-off mechanism, automatic flushing mechanism in place for WC which operates only twice per day. | Moderate | Low | Minor, not significant |
| | Increased drought risk | Prolonged drought can cause soil drying around underground cables, leading to reduced heat dissipation from the cables and affecting their current-carrying capacity (ampacity) | Underground cables | Underground cables will be surrounded by Cement Bound Granular Mixture (CBGM) and then backfilled with soil. CBGM will insulate the underground cables, thus preventing impacts on their ampacity from prolonged droughts. | Moderate | Low | Minor, not significant |
| | Increased drought risk | Increasing temperatures combined with reduced rainfall can lead to increased stress upon landscape vegetation, and even dieback. | Landscaping - vegetation | N/A | Moderate | Medium | Moderate, significant |
| Increasing temperatures (including average temperatures and temperature extremes) | Increased risk of extreme high temperatures /heatwaves | Increased temperature extremes and/or sustained high temperatures may inhibit power infrastructure (e.g. transformers, circuit breakers) performance due to the changes in operating temperature ranges of generators and electrical equipment, leading to accelerated deterioration, insulation breakdown and electrical failure. | Sub-station – generators, power infrastructure, transformers, circuit breakers | Generators are proposed to be located in a dedicated room within each substation building with appropriate ventilation to ensure cooling. | Minor | Medium | Minor, not significant |
| | | Cracking, reduced strength and increased rate of deterioration of metallic components. | Sub-station – generators, power infrastructure, electric components | N/A | Minor | Medium | Minor, not significant |
| | | Extreme temperatures may lead to melting and deformation of asphalt surface course, leading to uneven road surface and early replacement. | Sub-station – asphalt surface of internal roadways | N/A | Minor | Medium | Minor, not significant |

| Change in climate variable | Climate hazard | Description of potential climate impact | Affected asset | Embedded mitigation measures | Magnitude | Sensitivity | Significance of effect |
|---|---|---|---|---|---|---|---|
| | | Increased temperatures leading to reduced current-carrying capacity (ampacity) of underground cables. | Underground cables | Cables are proposed to be buried underground. Soil acts as an insulator thus providing resilience to high temperatures. | Minor | Negligible | Negligible, not significant |
| Increase in extreme weather | High wind speeds | Structural damage resulting from high winds, particularly a risk to lighting poles due to their height, standing at 18.5m tall. | Sub-station - lighting poles | N/A | Negligible | High | Minor, not significant |
| | | Increased risk of physical damage to transmission infrastructure affecting the ability to transfer power to the grid | Sub-station | N/A | Negligible | High | Minor, not significant |
| | Lightning | Electrical faults leading to power outages, due to storms and lightning strikes | Sub-station | The current design incorporates lightning protection masts on each of the substations to protect the current design from lightning strike.<br>An emergency diesel generator (less than 400 KVA) will also be provided to supply back up power for the ancillary electrical services in each substation, and will be used in rare cases, such as the loss of main power. The generator will be located in a dedicated room within each GIS building with appropriate fire rating and ventilation.<br>A below ground earth grid will be installed in a grid arrangement approximately 600 – 750 mm below the finished surface. The earth grid will consist of bare stranded copper conductor with an outside diameter of approximately 95mm2. The purpose of the earth grid is to ensure personnel and public safety during electrical faults that may occur on the transmission grid. | Minor | Low | Negligible, not significant |

### 1.11.3 Cumulative Effects

Cumulative effects in relation to climate resilience typically consider risks such as urban heat island massing or significant cumulative loss of local flood storage.. It is unlikely the proposed development would result in any negative cumulative effects with other projects in the local area due to their distance, the rural nature of the area and the project's coastal location. It is also not anticipated that the project will affect the climate resilience of other projects.

### 1.11.4 Residual effects

Due to potential significant effects identified on climate resilience, further mitigation measures are required beyond what is currently included in the design and presented in Table 1.6.

**Table 1.6: Recommended embedded mitigation measures for consideration during detailed design**

| Climate hazard | | Additional embedded mitigation measures |
|---|---|---|
| Flooding | Heavy precipitation and flooding events may result in exceeding drainage capacity and thus damaging assets located within the sub-station, affecting operations and leading to reduced output or time lost.<br>Flooding could cause access and egress issues, endangering operational workforce and waterlogging of pavement surface due to increased percolation of water into its porous upper layers, leading to weakened asphalt and formation of faults and potholes and increased maintenance requirements. | In order to ensure that there is no internal property flooding for a storm with a 1 in 100 year return period, a +20% allowance for climate change to be included in the detailed drainage design. |
| Flooding / freeze thaw cycles | Rainwater can lead to surface erosion and deterioration of concrete of the concrete post and rail fencing, reducing its overall lifespan.<br>Penetration of rainwater to the concrete, followed by cold periods causing rainwater to freeze, expand and crack the surrounding concrete, and potentially compromising the fence's stability. | Application of a concrete sealer to be incorporated as required as part of the detailed design in order to protect the concrete surfaces from water penetration and reduce the risk of erosion. |
| Increased drought risk | Shrinkage and desiccation of ground leading to cracks, strength loss and instability. Substation foundations may be affected. | Ground stability under future climate conditions to be addressed during detailed design to avoid effects on foundations. |
| Increased drought risk | Increasing temperatures combined with reduced rainfall can lead to increased stress upon landscape vegetation, and even dieback. | The planting specification within detailed design to consider choosing native plant species that can withstand increasing temperatures and reduced rainfall conditions, so as to prevent species failure and enhance resilience. |
| Increased risk of extreme high temperatures/heatwaves | Increased temperature extremes and/or sustained high temperatures may inhibit power infrastructure (e.g. transformers, circuit breakers) performance due to the changes in operating temperature ranges of generators and electrical equipment, leading to accelerated deterioration, insulation breakdown and electrical failure. | Detailed design to consider utilisation of materials with higher temperature thresholds for key or critical assets. |
| Increased risk of extreme high temperatures/heatwaves | Cracking, reduced strength and increased rate of deterioration of metallic components. | Detailed design to consider utilisation of materials with higher temperature thresholds for key or critical assets. |

| Climate hazard | | Additional embedded mitigation measures |
|---|---|---|
| High wind speeds | Structural damage resulting from high winds, particularly a risk to lighting poles due to their height, standing at 18.5m tall. | Detailed design to include consideration of wind speeds to design structures resilient to wind loads that account for future climate change. |
| | Increased risk of physical damage to transmission infrastructure affecting the ability to transfer power to the grid | Detailed design to include consideration of wind speeds to design structures resilient to wind loads that account for future climate change. |

## 1.12 Climate – Carbon

This chapter identified the impacts on climate change likely to be caused by the proposed development. The assessment is qualitative in nature and considers the potential Green House Gas emissions arising from the construction and operation of the proposed development.

### 1.12.1 Construction Phase

Construction-related GHG emissions include the use of materials (which have embodied carbon associated with their production), transport of these construction materials to site, use of construction equipment and disposal of waste. There will be earthworks, new cables, new buildings and equipment for the substations. Emissions sources are set out in Table 1.7.

**Table 1.7: Construction Impacts**

| Activity | Emission source | Likely impact |
|---|---|---|
| Grid connection underground cables (two underground circuits) between the proposed Shannon Technology and Energy Park (STEP) Power Plant and the existing grid network. | Embodied emissions from production of construction materials, and transport of those materials and workers to site. Materials are mainly the ~5km of underground cabling required.<br>Vehicle and machinery usage (electricity, fuel, and water consumption), including for site clearance and temporary construction compounds.<br>Waste and excavated material management.<br>Land use change along the cable route. | Based on previous project experience, construction material manufacture (embodied carbon) is likely to be the most significant source of GHG emissions on this project.<br><br>Fuel consumption in vehicle and machinery use will also be a large source, although not as significant.as construction material use |
| Two substations (EirGrid Glansillagh GIS substation and customer Knockfinglas GIS substation). | Embodied emissions from production of construction materials, transporting these materials and workers to site. Materials will include structural steel, metallic cladding and roofing for the substation buildings, as well as lightning protection masts, and equipment such as circuit breakers and transformers.<br>Vehicle and machinery usage (electricity, fuel, and water consumption), including earthworks for preparing the site.<br>Waste and excavated material management.<br>Land use change associated with site development and proposed landscaping. | |

Construction emissions are considered to be adverse and significant, as all new GHG emissions, regardless of quantity, are known to contribute to a negative environmental impact on climate change.

### 1.12.2 Operation and Maintenance Phase

The proposed development is part of STEP Power Plant that aims to provide 600 MW of fast-acting flexible thermal generation capacity to the Irish electricity market, through three blocks of combined cycle gas turbines (CCGT) with 200 MW capacity and provide a 120 MWh battery

energy storage system (BESS). The overall project will include underground cables which will run from the two new substations to the connection point at the existing LCIM near Kilpaddoge substation.

The operation of substations and maintenance of the infrastructure will require energy use over the project's lifespan, although overall operational energy use is not anticipated to be significant. Sulphur hexafluoride ($SF_6$) is a greenhouse gas is used by the GIS substation as an insulator, and it is estimated a leak rate lower than 1% per year. $SF_6$ has a very high global warming potential, therefore small leaks can lead to large GHG emissions over the operational lifetime.

**Table 1.8: Operation impacts**

| Activity | Emission source | Likely Impact |
|---|---|---|
| Two substations (onsite EirGrid GIS substation and customer GIS substation). | $SF_6$ leaks<br>Energy and fuel consumption (emergency diesel generator) | Significant $SF_6$ emissions without leak monitoring and management in place.<br>Energy consumption expected to be minor. |

It is noted that no significant effects are expected to occur from the cables or connection point infrastructure. The cables will not require specific or routine maintenance activities along the cable trench or joint bay locations. Therefore, the GHG emissions generated by this proposed development will be mainly related with its construction phase and operational $SF_6$ leaks. Without leak management measures, operational impacts would likely be adverse and significant.

### 1.12.3 Cumulative Effects

The nature of GHG emissions means that the ultimate receptor is the global climate system. The GHG assessment does not consider cumulative effects, as GHG emissions do not result in a regional or local effects on climate and, therefore, the effects of the project's emissions on climate will not differ when combined with other developments. This is in line with the IEMA Guidance (2022) which states that "e*ffects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other.*

### 1.12.4 Residual Effects

There would be unavoidable GHG emissions resulting from the construction and operational phases of the proposed development as materials, energy and fuel use, and transport would be required. In line with IEMA Guidance, "the goal of the EIA process should be to reduce the project's residual emissions at all stages" and therefore mitigation and monitoring measures (such as those detailed above) are recommended. The residual effect of minor adverse with mitigation is anticipated with no significant effects expected. In line with the IEMA Guidance, minor adverse means that the project's emissions are in-line with good practice design standards and are also in-line with national net zero pathways.

## 1.13 Noise and Vibration

This section presents an assessment of the likely and significant effects arising due to noise and vibration from the proposed development.

The main sources of noise and vibration associated with the proposed development are:

- Noise and vibration due to activities (such as earthworks) and the use of mobile plant during construction

- Noise due to additional road traffic during the construction phase
- Noise due to operation of fixed plant associated with the GIS substation

This chapter presents an assessment of the impacts on the closest Noise Sensitive Locations (NSLs) due to the above sources of noise and vibration.

The volume of vehicle movements generated by the proposed development during the operational phase is considered to be negligible and the assessment of environmental effects have been scoped out. Therefore, the operational phase noise impacts due to road traffic are not assessed.

The assessment chapter references the results of noise monitoring undertaken between February 2020 and October 2020 to describe baseline conditions affecting the closest NSLs considered by the operational noise assessment.

Vibration due to the operation of the proposed development is considered to be negligible given that the proposed development is not expected to be a significant source of ground-borne vibration and the long separation distance to the nearest NSLs and is not considered further.

### 1.13.1 Construction Phase

Following the assessment, it is concluded that no significant effects are identified due to construction activity with regards to construction noise. With regards to construction vibration, due to the large distance from the activities to the nearest properties, all activities are assessed as not having a significant impact in terms of both human perception or cosmetic damage to buildings. Effects due to construction traffic noise, given the predicted absolute noise levels are relatively low and that the impacts are temporary, the noise impacts due to the changes in road traffic noise due to additional construction traffic are not significant.

### 1.13.2 Operation and Maintenance Phase

The predicted operational noise levels of the proposed development are significantly below the night-time criterion at all Noise Sensitive Locations. Therefore, it is concluded that the impact due to operational noise of the proposed development is not significant.

### 1.13.3 Cumulative Effects

A cumulative assessment was conducted to assess the cumulative effect of the STEP Power Plant and the proposed development. The noise levels at all noise sensitive locations (NSL) comply with the night-time noise limit, apart from NSL1. However there a number of contextual factors which have been taken into account and the assessment found that no significant effects due to operational noise are expected.

- The 26km Gas Pipeline is not considered to be a significant source of operational noise. The Data Centre Campus and Strategic Gas Reserve will be subject to their own impact assessments, meaning that noise and vibration emissions will be considered in combination with the proposed development. Any potential impacts can be identified and mitigated at this stage.
- All current and future applications at the development site are on behalf of the same Applicant. A commitment has been made to ensure that noise and vibration emissions from all developments are considered cumulatively such that construction and / or operational noise emissions do not combine in such a way that relevant noise limits are breached.
- No significant noise impacts are expected from works associated with other projects.

### 1.13.4 Residual Effects

The proposed development is expected to generate noise during both the construction and operational stages, and vibration during construction.

The assessment has considered the likelihood of significant effects based on predictions of noise where the noise emissions of construction and operational plant have been assumed.

The assessment of construction phases impacts due to noise and vibration indicates that significant adverse effects are not predicted to arise. Short-term noise levels during Phase 4 may exceed the daytime threshold value at a small number of dwellings adjacent to the works for around three days. However, this is expected to be tolerated given the short duration of exposure and with prior notification to the occupants on the duration and timing of the works.

The assessment of operational noise has indicated that predicted noise levels are not expected to be significant due to the proposed development alone or cumulatively.

## 1.14 The Landscape

The Landscape and Visual Impact Assessment (LVIA) describes the landscape context of the proposed development and assesses the likely landscape and visual impacts of the proposed development on the receiving environment.

Landscape Impact Assessment (LIA) relates to assessing effects of the proposed development on the landscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.

Visual Impact Assessment (VIA) relates to assessing effects of a development on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements. Visual impacts may occur from; visual obstruction (blocking of a view, be it full, partial or intermittent) or; visual intrusion (interruption of a view without blocking). 14 viewpoints were identified and assessed within the EIAR.

It is anticipated that the proposed works at the proposed GIS Substations are likely to be difficult to discern beyond approximately 3km and are not likely to give rise to significant landscape or visual impacts beyond 1km distance. However, in the interests of a comprehensive appraisal, a 5km radius study area (from the proposed GIS Substations) was selected.

A 500m radius area of interest was applied to the proposed Underground Cable because significant landscape or visual effects are highly unlikely beyond this 1km wide swathe due to the subterranean nature of the proposed infrastructure and the transient nature of the proposed construction works. The entirety of this area of interest occurs within the study area generated by the 5km radius buffer from the proposed GIS Substations.

The proposed development is located within County Kerry. Portions of the study area occur within County Kerry and County Clare as it is based on a 5km buffer from the location of the proposed GIS Substations and County Clare is located less than 5km to the north.

### 1.14.1 Construction Phase

#### 1.14.1.1 Underground cable

Trenches will be excavated so the ducting and joint bays can be installed below the ground. There will be associated and ancillary development, including temporary construction

compounds and laydown areas, tracks, site development, landscaping works, fencing and vegetation removal. During the construction phase, the proposed underground cable pulling will result in a low magnitude of impact along the sections of the route that follow the existing road network, but the magnitude of impact will be medium-low along the off-road (cross-country) sections of the proposed Underground Cable.

#### 1.14.1.2 GIS Substations

Physical landscape impacts will occur during the construction phase at the site of the proposed GIS Substations. This will result from disturbance to the landform and land cover for the various structures, buildings and associated access and egress roads. The construction stage works required at the site will be relatively modest in scale and short term in duration. Construction phase activities are considered to be slight for the underground cable and moderate for the substations.

### 1.14.2 Operation and Maintenance Phase

As the proposed underground cable will largely occur within existing ducting in the road network and cross-country sections they will not be visible and as such it is deemed not to have any notable adverse impacts on the physical landscape or on landscape character within the receiving landscape and deemed to have a slight-imperceptible significance of effect on the landscape.

The substations have the potential to generate an effect on the landscape due to their relative height and bulk compared to other surface level features within the site. The main effect will be an increased sense of industrialisation within the predominantly rural setting of the site, particularly in relation to the open coastal pastoral landscape context and are deemed to have a moderate effect. Analysis of the viewpoints assess the significance of effect to range from imperceptible to slight and are considered not significant.

### 1.14.3 Cumulative Effects

The addition of the construction phase of the proposed development within the same timeframe as that of the STEP Power Plant will not be significant. It is anticipated they will be no greater than the maximum determined for the proposed development in isolation; negative, moderate-slight and permanent.

During operation it is anticipated that the significance of the cumulative landscape effect would be no greater than the significance determined for the proposed development in isolation with a moderate significance of effect. Visually, the proposed development would represent an increase in industrial structures within views where the larger industrial development of the STEP Power Plant would be visible. The proposed development would be seen as a modest addition to a much larger industrial facility. It is not considered that the proposed GIS Substations represent a noticeably greater cumulative impact than what would occur due to the STEP Power Plant in isolation and it is considered that the significance of effect is moderate-slight.

### 1.14.4 Residual Effects

Following mitigation measures the significance of residual effect is considered slight-imperceptible for the underground cable, moderate for the substations and moderate-slight for the viewpoints.

In summary, significant landscape and visual effects are not anticipated for the construction, operational or decommissioning phases, and no significant cumulative or residual landscape and visual effects are expected as a result of the proposed development.

## 1.15 Archaeology, Architectural and Cultural Heritage

The likely significant effects on archaeology, architectural and cultural heritage are assessed with regards to the construction, operation, maintenance and decommissioning of the proposed development.

### 1.15.1 Construction Phase

Table 1.9 summarises the effects of the proposed development on recorded monuments, protected structure, undesignated archaeology and undesignated built heritage.

**Table 1.9: Summary Impact Assessment**

| Significance of Effect | Recorded Monument | RPS | Undesignated Archaeology | Undesignated Built Heritage |
|---|---|---|---|---|
| Significant (Indirect) | Souterrains CH106, CH109 | None | None | None |
| Moderate (Direct) | None | None | CH82 curvilinear feature<br>CH138, CH139 possible enclosure/ringfort<br>CH52, CH54 lime kilns | None |
| Slight (Indirect) | Church CH110, Graveyard CH111 | None | CH132 boundary/path | CH23 farm complex |
| Not Significant (Direct) | None | None | CH48, CH49 townland boundary; CH72 laneway<br>CH51 field boundaries;<br>CH01, CH02 buildings (site of); CH53 laneway;<br>CH55 quarry. | None |
| Not Significant Indirect | Ringforts CH105, CH107, CH108 | Ralappane House CH76 | None | None |

### 1.15.2 Operation and Maintenance Phase

The predicted impacts arising from the proposed development are predicted to relate to the construction phase and there are no further impacts predicted during the operation and maintenance phase.

### 1.15.3 Cumulative Effects

Direct and indirect cumulative effects are assessed with regard to the overall STEP project. There are common receptors for the proposed development and the other elements of the STEP project. The mitigation proposed for the other STEP projects and for this proposed development will minimise effects on archaeology, architectural and cultural heritage.

### 1.15.4 Residual Effects

Table 1.10 detials the residual effects on cultural heritage associated with the proposed development.

**Table 1.10: Residual Effects**

| CH Receptor No. | Site Type | Mitigation Type | Significance of Effect pre-mitigation | Potential Residual Impact post-mitigation |
|---|---|---|---|---|
| CH01 | 2 Buildings - including 1 ruin (site of) | Preservation by record | Not Significant | Imperceptible |
| CH02 | Building | Preservation by record | Not Significant | Imperceptible |
| CH048 | Townland boundary | Preservation by record | Not Significant | Imperceptible |
| CH049 | Townland boundary | Preservation by record | Not Significant | Imperceptible |
| CH051 | Parallel field boundaries | Preservation by record | Not Significant | Imperceptible |
| CH052 | Limekiln disused | Preservation by record | Moderate | Slight |
| CH053 | Laneway entrance to limekiln | Preservation by record | Not Significant | Imperceptible |
| CH054 | Lime kiln disused | Preservation by record | Moderate | Slight |
| CH055 | Quarry | Preservation by record | Not Significant | Imperceptible |
| CH072 | Laneway | Preservation by record | Not Significant | Imperceptible |
| CH076 | House | Offsetting | Not Significant | Not Significant |
| CH105 | Ringfort - rath | Avoidance and offsetting | Not Significant | Not Significant |
| CH106 | Souterrain | Avoidance | SIgnificant | Imperceptible |
| CH107 | Ringfort - rath | Avoidance and Offsetting | Not Significant | Not Significant |
| CH108 | Ringfort - rath | Avoidance and Offsetting | Not Significant | Not Significant |
| CH109 | Souterrain | Avoidance | Significant | Imperceptible |
| CH138 | LiDAR anomaly | Preservation by record | Significant | Moderate |
| CH139 | LiDAR anomaly | Preservation by record | Significant | Moderate |

## 1.16 Material Assets including Waste

Likely significant effects associated with material assets including waste have been assessed. The assessment included built services, infrastructure and waste management.

- Built services include existing underground cabling, overhead transmission lines, water mains, sewers and storm water drains, telecommunication lines.

- Existing infrastructure is present along the main carriageway of the L-1010. The road will be upgraded and widened by KCC prior to the proposed development, with cable ducting installation undertaken at the same time as the road widening/upgrade works. To the east of the proposed development site, the access road to Kilpaddoge Substation will be crossed using HDD.
- Waste Materials from the construction phase that can't be recycled, limited during the operational phase.

### 1.16.1 Construction Phase

- Built Services - The proposed substations will require new services including a water supply, energy supply and new drainage. During construction of the cable route, disruption to existing services will be avoided where possible. Impacts are considered to be localised and temporary in duration and the effects will be imperceptible.
- Infrastructure – A temporary construction compound will be required, adjacent to the proposed development. Welfare facilities will be provided, and any waste 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. Water will be tankered onto site as required. Consequently, adverse effects on utility services during the construction phase are considered not significant.
- Waste Management
  - Waste will be managed in accordance with the Waste Management Hierarchy (EPA, 2021) and Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities (EPA. 2020) and the Waste Management Act 1996, as amended and associated Regulations.
  - For substation construction, the approximate volume of excavated material which will not be reinstated for the proposed is ca. 4,600m$^3$. For the off-road sections of the cable route being installed, the existing soil will be reinstated with the exception of the volume required for the duct banks.
  - In total, the approximate volume of excavated material which will not be reinstated for the cable route is ca. 9355m$^3$. Topsoil and subsoil excess will remain within the agricultural properties, as required by the individual landowners. Any surplus material will be removed off-site by a licenced contractor and in compliance with the Waste Management Act 1996, as amended.

### 1.16.2 Operation and Maintenance Phase

- Built Services – no significant adverse effects are anticipated during operations or maintenance.
- Infrastructure – the operation of the grid infrastructure will have a long-term positive effect as the works will strengthen the electrical grid.
- Utility use – effects on utilities are expected to be imperceptible.
- Waste Management – effects of waste management during the operation and maintenance phase will be imperceptible.

### 1.16.3 Cumulative Effects

Considering that other permitted projects will comply with relevant Irish policy and legislation, it is considered that cumulative impacts on waste management infrastructure capacity will be slight during construction.

During operations, the proposed development will not generate large quantities of waste and cumulative impacts with other projects on waste management infrastructure capacity are considered not significant during the operational phase.

### 1.16.4 Residual Effects

Once construction is complete significant adverse residual impacts associated with the proposed development on built services, waste management and natural assets are unlikely and not significant.

The implementation of the mitigation measures detailed above, including the CEMP, will reduce the environmental impact of the proposed development during construction. Certain brief and temporary slight impacts such as diversion/relocation of utilities may be unavoidable, but the effects are considered not significant provided the mitigation described herein is implemented.

## 1.17 Roads and Traffic

This chapter of the EIAR undertook an assessment of the likely Roads and Traffic effects on public roads impacted by the construction of the proposed development. The assessment looked at the effect upon the local, regional and national road network.

The following effect classifications are considered;

- Driver delay;
- Road safety; and
- Community effects (pedestrian delay, severance, non-motorised user (NMU) amenity, fear and intimidation).

### 1.17.1 Construction Phase

#### 1.17.1.1 Driver Delay

The road sections in the study area where the significance threshold has been met or to be exceeded are;

- L-1010 between Kilcolgan Upper and Ballylongford boundary
- L-1010 between Tarbert Comprehensive School and Kilcolgan Upper boundary
- L-1010 between K551 and Tarbert Comprehensive School

As the L-1010 will be widened in advance of construction of both the STEP Power Plant and the proposed development, the affected L-1010 road sections will operate notably below their theoretical capacity. These road sections all feature low existing traffic volumes and as such show a relatively large proportional increase which would represent a significant effect. However, the significance of effect of driver delay for all road users on these road sections is considered to be minor based on professional judgement and accordingly considered to be not significant..

#### 1.17.1.2 Road Safety

Based on professional judgement and experience in the assessment of Road and Traffic impacts relation the impact to road safety is considered to be not significant. Historic evidence has not revealed any evidence of a poor safety record for the study area road network and, considering the volume of additional traffic expected to be generated during the construction of the proposed development, it is unlikely that an associated road safety problem will manifest.

#### 1.17.1.3 Community Effects (Severance, Pedestrian Dela, NMU Amenity, Fear and Intimidation)

**Severance**

The IEMA Guidelines define severance as 'the perceived division that can occur within a community when it becomes separated by major transport infrastructure'. Severance may result from a road carrying large traffic flows or a physical barrier created by the road itself, and the IEMA Guidelines suggest that consideration is given to the severity of existing severance and how this might be exacerbated by proposed construction traffic generated by a development.

Although the study area does feature routes which could be considered as 'major traffic arteries', the roads within the study area will continue to operate notably below theoretical capacity, even with the addition of traffic generated during construction of the proposed development. Severance should not occur when there is such a notable level of residual road capacity.

**Pedestrian Delay**

For similar reasoning, pedestrian delay is not considered to be an existing problem on any of the route sections within proposed development study area, nor one that shall be created by the addition of proposed construction traffic to these routes.

**NMU Amenity**

Non-motorised user (NMU) amenity is broadly defined by the IEMA Guidelines as the 'relative pleasantness of a journey'. Guidelines suggest that 'a tentative threshold for judging the significance of changes in pedestrian amenity would be where traffic flows (or its HGV component) are halved or doubled.

The construction of the proposed development is predicted to generate increased HGV flows on the roads within the study area, with up to 16 HGV movements per day occurring during the peak construction period (an increase of up to c.90% for HGVs on the L-1010 in year 2027).

On this basis, the significance of the effect on NMU amenity, is considered to be at worst minor and accordingly considered to be not significant in terms of the EPA Guidelines (2022).

**Fear and Intimidation**

Fear and intimidation have been assessed for the peak level of construction traffic in year 2027 and with a negligible impact.

### 1.17.2 Cumulative Effects

Cumulative effects were considered with other projects and driver delay effects are not significant. Road safety effects are considered not significant and community effect are considered moderate.

### 1.17.3 Residual Effects

The assessment of post-mitigation effects has been undertaken on the assumption that key measures set out in the Construction Traffic Management Plan (Appendix to the CEMP) will be developed as appropriate by the appointed contractor and be implemented during the proposed development construction phase.

In the context of the IEMA Guidelines and EPA Guidelines (2022) there are no significant residual Roads and Traffic impacts predicted during the construction phase following incorporation of measures described within the Construction Traffic Management Plan included within the EIAR.

A summary of the residual effects are shown in the following table.

**Table 1.11: Summary of Residual Effects**

| | Significance | |
|---|---|---|
| **Effect** | **Before Mitigation** | **Post Mitigation** |
| **Proposed Development** | | |
| Driver Delay | Minor (Not Significant) | Minor (Not Significant) |
| Road Safety | Minor (Not Significant) | Minor (Not Significant) |
| Community Effects | Minor (Not Significant) | Minor (Not Significant) |
| **Proposed Development + Cumulative Development** | | |
| Driver Delay | Minor (Not Significant) | Minor (Not Significant) |
| Road Safety | Minor (Not Significant) | Minor (Not Significant) |
| Community Effects | Moderate (Significant) | Minor (Not Significant) |

Source: Mott MacDonald, IEMA Guidelines, EPA Guidelines(2022)

## 1.18 Major Accidents and Disasters

The potential for significant adverse effects of the proposed development on the environment deriving from its vulnerability to risks of relevant major accidents and / or disasters at the substation, access road and underground cable route are assessed in this Chapter.

### 1.18.1 Construction and Operational phase

This chapter assessed the potential for significant effects as a result of flooding, fire, extreme temperature, electro-magnetic fields, electricity failure, exposure to high voltage, ground collapse/instability, major road traffic accident, industrial accidents, biological hazards, malicious attaches/cyber-attacks and spillage or seepage of pollutants. In all cases it was concluded that the reasonable worst consequences are managed to an acceptable level with existing mitigation in place. No significant effects are expected with regards to Major Accidents and/or Disasters during the construction or operational phases.

### 1.18.2 Cumulative impacts

The most relevant cumulative impact is that which could arise at the STEP Power Plant site, adjacent to the 220kV substations. Potential disaster or major accidents which could act cumulatively include fire/explosion and the release of pollutants to the environment.

An Environment Management System will be in place for the STEP Power Plant and will set out procedures such as:

- Hazardous and polluting liquids such as transformer oils will be stored in tanks located in bunds.
- The surface water drainage system will route to the STEP Power Plant firewater retention pond.
- Distillate oil unloading bays will be designed to contain spillages.
- Storage tank level indicators and oil detection sensors in bunds will be provided with alarms.
- Class 1 hydrocarbon interceptors will be provided in the surface water drainage system.
- Measures to isolate the surface water drainage system will be provided to prevent discharge of contaminated water.

An emergency shutdown system can be initiated by a number of systems, including automatic fire and gas detection and manual activation. Major electrical equipment has been designed to incorporate a separation distance to prevent major accidents such as fires and explosions

originating in one area from spreading to another area or escalating via domino effects. Substations will be designed to follow all safety specifications and standards. Mitigation measures include fire protection systems such as passive and active fire suppression systems.

The potential for significant cumulative effects is therefore low and detailed safety studies will be prepared as the detailed design of the proposed development progresses to identify where risks can be further reduced.

### 1.18.3 Residual Effects

Following the implementation of mitigation measures, no significant adverse environmental effects are likely to occur.

## 1.19 Interactions of the foregoing

The nature of the environment is such that interactions between all environmental topics are potentially possible and / or may occur to a certain extent for most projects. Key environmental interactions that have been identified are discussed in the Table 1.12.

## Table 1.12: Interactions between disciplines

| Interaction | Description |
|---|---|
| **Population and Human Health** interactions with:<br>Land, Soils and Hydrogeology, Surface Water and Flooding, Air, Climate Resilience, Climate - Carbon, Noise and Vibration, The Landscape, Archaeology, Architectural and Cultural Heritage, Material Assets, Roads and Traffic, Major Accidents and Disasters. | **Land, Soils and Hydrogeology.** The main interaction between Population and Human Health and Land, Soils and Hydrogeology relates to the potential impact of loss of agricultural land, landslide susceptibility and presence of radon risk areas. There will be a loss of agricultural land around the substation from the L-1010 to the LCIM. A moderately high landslide susceptibility risk is identified to the north of the substation compound, however suitable mitigation reduces the significance of effect to imperceptible. Areas of high radon risk are located within the study area, however suitable mitigation reduces the significance of effect to imperceptible during construction and operational phases. In some areas where the underground cabling goes off road, through agricultural lands the significance of land use effects is imperceptible, as detailed within Chapter 7 Land, Soils & Hydrogeology. |
| | **Surface Water and Flooding.** The main interaction between Population & Human Health and Surface Water and Flooding relates to the potential impact of the proposed development on the surface water quality (from sediment runoff, spillages and dischargers to receiving surface waters) and flooding. During construction, stormwater from the substation area will pass through silt traps and hydrocarbon interceptors, as a result, the effect of any discharge will be imperceptible. An open cut crossing of the Ralappane Stream is proposed as part of the construction works which is expected to result in moderate-significant impacts on the stream prior to mitigation. The residual effect will be imperceptible following appropriate mitigation as ouitlined in Chapter 8 and the CEMP. Along the access track to the substation area, following the implementation of mitigation measures and embedded mitigation built into the design for the operational phase, residual effects in terms of water quality will be imperceptible in the Lower Shannon estuary. During operation, the significance of effect on water supply is assessed as imperceptible due to low demand of water. There will be no discharge of wastewater during operation, and the stormwater will pass through hydrocarbon interceptors as per standard design. Therefore, the significance of effect is assessed as imperceptible.<br>The proposed development is considered not at risk of flooding and will not increase flood risk elsewhere. |
| | **Air**. There are interactions between Population and Human Health and air quality impacts associated with proposed development. As discussed in Chapter 10 Air, the dust soiling effects will be low to high and $PM_{10}$ effects will be negligible to low during the construction phase. Dust soiling effects due to trackout are high, due to earthworks are medium, and due to construction works are low. When appropriate mitigation is implemented, the air quality impacts associated with dust and particulates are predicted to be not significant.<br>No exceedances of the AQS for the protection of human health are predicted as a result of the proposed development. The background concentrations for $NO_2$, $PM_{10}$ and $PM_{2.5}$ are all well below their relevant objectives. The predicted additional road contributions for all pollutants are also small. Therefore, the cumulative effects on the worst-case human health receptors are considered not significant. |
| | **Climate Resilience.** The assessment of the resilience of the proposed development to present-day and future extreme weather, and climate change have interactions with Population and Human Health. As discussed in Chapter 11 Climate Resilience, construction phase is not considered as part of the assessment as the climate will not have notably changed from present day to the anticipated construction period in 2026-2028.<br>During operation, effects are considered to be negligible to moderate (as per IEMA guidance, 2020) without mitigation. Heavy rainfall and rising temperatures may affect the substation area, however appropriate mitigation and drainage design during the detailed design stage will reduce the effects to minor and not significant. The effects to the underground cabling are negligible and not significant as the cable has a certain degree of protection as it is buried. |
| | **Climate - Carbon**. There are interactions between Population and Human Health and carbon emissions due to proposed development. As discussed in Chapter 12 Climate Carbon, there will be embodied emissions from the production of construction materials associated with the underground cabling and the substation and the transport of these materials and workers to site. There will be vehicle and machinery usage (electricity, fuel, and water consumption), including for site clearance and temporary construction compounds. There is also waste material generation and excavated |

| Interaction | Description |
|---|---|
| | material management. There is a land use change associated with the substation location. The residual effect of minor adverse with mitigation is anticipated with no significant effects expected. In line with the IEMA Guidance, minor adverse means that the project's emissions are in-line with good practice design standards and are also in-line with national net zero pathways. |
| | **Noise and Vibration**. It is considered that there will be a minor increase in noise and vibration levels with the effects on sensitive receptors and the local community from construction activities. As discussed in Chapter 13 Noise and Vibration, these impacts are considered not significant. The predicted operational noise levels of the proposed development are significantly below the night-time criterion at all Noise Sensetive Locations (NSLs). Therefore, the impact due to operational noise of the proposed development is also not significant. |
| | **The Landscape**. The significance of landscape effect due to underground cable works and proposed GIS substations is anticipated to be slight to moderate during construction phase and slight-imperceptible to moderate during operation phase. The location of the GIS Substations is at +18 m OD and adjacent to the main turbine halls of the adjacent STEP Power Plant. This low position was deliberately selected during the design phase to avail of the screening effect of the elevated terrain (+25 m OD) between the residences along Coast Road L-1010. This mitigates the visual impact of the GIS Substations on these residences. Additionally, the proposed colour scheme of the façade of the GIS Substations has been selected to match that of the adjacent STEP Power Plant so that the two developments are visually coherent. The visual impacts during operational phase will range from imperceptible to moderate-slight. |
| | **Archaeology, Architectural and Cultural Heritage**. There are interactions between Population and Human Health and Cultural Heritage due to the importance of archaeology, architectural and cultural heritage in communities. In the off-road sections, during construction, there is the potential for impacts on previously unrecorded archaeology to be uncovered during excavation works. Any disturbance of ground and drainage patterns can also impact unrecorded archaeology and cultural heritage. Where the construction works are undertaken in roadways, no impacts are envisaged. Mitigation measures are detailed within Chapter 15 of this EIAR and the Construction Environmental Management Plan which will ensure that such impacts are minimised. The residual impacts range from imperceptible to slight significance. |
| | **Material Assets.** The main interaction between Population & Human Health and Material Assets relates to the potential impact of the generation and removal of C&D waste from site during construction activities, and potential for services disruptions. As outlined in Chapter 16 Material Assets, there will be imperceptible effects on built services during construction phase and no significant effects on built services during operational phase. The waste management during construction phase will result in slight significance of effects. Following the implementation of mitigation measures these effects will be not significant. |
| | **Roads and Traffic.** Driver delay, road safety and community effects (such as pedestrian delay, severance, Non-motorised user amenity, fear and intimidation) due to proposed development works are considered to be non-significant. For cumulative impacts, the community effects are considered to be moderate significant. These effects have potential to be caused due to an increased volume of traffic on the construction vehicle routes, however as these vehicle movements will occur during construction operations only, they are categorised to be short term effects. Following the implementation of mitigation measures these effects will be not significant. |
| | **Major Accidents and Disasters.** Chapter 18 Major Accidents and Disasters presents an assessment of whether or not embedded design measures, or legal requirements, codes and standards adequately control the potential major accident and / or disaster like flooding, fire, extreme temperature, EMF, electricity failure, exposure to high voltage, subsidence, road traffic accident, industrial accident, biological hazard, cyber attack and watercourse/ground spillage. Potential disaster or major accidents which could act cumulatively at the STEP Power Plant site, adjacent to the 220kV substations, include fire/explosion and the release of pollutants to the environment. Following the implementation of mitigation measures, no likely significant adverse environmental effects are likely to occur. |

| Interaction | Description |
|---|---|
| **Land, Soils and Hydrogeology** interactions with:<br>Population and Human Health (discussed above), Surface Water and Flooding, Biodiversity, The Landscape, and Archaeology, Architectural and Cultural Heritage. | **Surface Water and Flooding.** The excavation of soils (at the substation compound and along the cable route) and bedrock (at the substation compound) for the proposed development, poses a potential risk to nearby watercourses as a result of sediment run off. There is potential for small amounts of groundwater intercepted in trenches to be discharged to local streams or watercourses. An open cut crossing of the Ralappane Stream is proposed as part of the construction works. Open cut crossings have the potential to generate slit and suspended solids which could discharge to surface water bodies and/or leach into groundwater. Best practice techniques, mitigation measures and guidelines have been outlined in Chapter 7 Land, Soils and Hydrogeology and Chapter 8 Surface Water and Flooding and within the Construction Environmental Management Plan of this EIAR and reduce the effects to imperceptible. |
| | **Biodiversity.** The construction works at water crossings have the potential to impact on downstream protected areas, should an accidental release of sediment may occur. There is potential for deposition of spoil on hedgerows, trees and scrub/woodland vegetation, during site works like excavation and site preparation. Elevated levels of sediment could impact on spawning fish, through issues including the sedimentation of spawning gravels, clogging of fish gills and reduction in dissolved oxygen. A suite of best practice techniques, mitigation measures and guidelines have been outlined in Chapter 8 Land, Soils & Hydrogeology and Chapter 9 Biodiversity to reduce significance of effects on biodiversity to imperceptible to moderate. |
| | **The Landscape.** Views of the construction area of the substations and associated earthworks will be partly restricted due to the undulating nature of the topography within County Kerry and the study area. There will be areas of the site dedicated to the storage of excavated earth and building materials. The significance of landscape effect due to underground cable works and proposed GIS substations is anticipated to be slight to moderate during construction phase. |
| | **Archaeology, Architectural and Cultural Heritage.** As with any civil construction works of this nature, there is potential for previously unrecorded archaeology to be encountered during excavation works. The disturbance of soil during the construction phase of the proposed development across the agricultural lands, has the potential to undercover archaeological finds. Mitigation measures are detailed within Chapter 15 of this EIAR and the Construction Environmental Management Plan which will ensure that such impacts are minimised.. |
| **Surface Water and Flooding** interactions with:<br>Population and Human Health (discussed above), Land, Soils and Hydrogeology (discussed above), Biodiversity, Climate Resilience and Roads and Traffic. | **Biodiversity.** During the construction phase of the substations and underground cabling, there is the risk that contaminants could be accidentally released into watercourses which could potentially have impacts for local communities in terms of poor water quality, especially with the linkage to sensitive areas located downstream in the Lower Shannon SAC and the River Shannon and River Fergus SPA, appropriate mitigation measures reduce the significance of effects to imperceptible. Chapter 9 Biodiversity and the Construction Environmental Management Plan set out measures to prevent the runoff of contaminants during construction. |
| | **Climate Resilience.** Key climate trends across Ireland show rising temperatures, with wetter winters and drier summers and more frequent extreme weather events. These trends during the operational lifespan of substation area and underground cabling, have the potential to lead to risks including exceedance of flooding, surface erosion, ground shrinkage and asphalt/concrete cracking. During the operational phase, the impact on flood risk is negligible due to the cables being buried, no new obstruction to watercourses and so not influencing flood waters. Therefore, an imperceptible effect is assessed on flood risk during operational phase. During operational phase, increased heavy rainfall events causing flooding may result in exceeding drainage capacity and thus damaging assets located within the substation. A moderate (significant) effect as per the IEMA (2020) Guidance is assessed. To further mitigate against the potential significant residual effects, Chapter 11 Climate Resilience provides a list of further embedded mitigation measures which will be investigated and implemented as necessary during detailed design. |
| | **Roads and Traffic.** There is a chance that construction traffic could accidentally release fuel/oil which could cause a pollution incident if it reaches a watercourse. The magnitude of adverse surface water quality impacts in the absence of additional mitigation is expected to be moderate resulting in moderate to significant adverse impacts of temporary duration on the Ralappane Stream and potentially downstream in the Lower Shannon estuary. Appropriate mitigation as outlined within Chapter 8 Surface Water and Flooding and within the Construction Environmental Management Plan would |

| Interaction | Description |
|---|---|
| | reduce the significance of effect on surface water quality to imperceptible. |
| **Biodiversity** interactions with:<br>Land, Soils and Hydrogeology (discussed above), Surface Water and Flooding (discussed above), Air and Noise and Vibration, Landscape and Visual | **Air.** There is potential for interactions between biodiversity and air quality. There are no ecological designated sites within 50m of potential dust sources of the proposed development or from roads to be used by construction traffic, therefore ecological designations are not considered in the construction dust assessment in Chapter 10 Air. Air quality changes such as dust during construction may affect flora and fauna in vicinity of proposed development. Across the different construction activities, the level of risk of dust creating nuisance (without mitigation) is predicted to range from 'negligible' to 'high risk' as per the IAQM (2024) Guidance. Following the appropriate implementation of the mitigation measures, the air quality impacts associated with dust are predicted to be not significant. The NOx concentrations at the worst-case receptor, Lower River Shannon SAC / E1, is within the standard of 30µg/$m^3$, and therefore not significant. Similarly, the ammonia concentrations at E1 are below the critical level of 3µg/$m^3$, and therefore not significant. |
| | **Noise and Vibration**. Noise and vibration can cause disturbance of protected species from noise and vibration generated from construction activities. There is potential for noise disturbance to otter and ex situ curlew during construction. Disturbance to protected species could occur from noise associated with human use of the operational site. There is potential for cumulative effects on the Lower River Shannon SAC and the River Shannon and Fergus Estuaries SPA through noise effects. Mitigation is included in Chapter 9 Biodiversity and the Construction Environmental Management Plan. The residual effects due to noise disturbance impacts on designated sites are assessed as imperceptible. |
| | **Landscape and Visual.** The proposed planting reinstatement for the proposed development will consist of native species, which is a positive effect on biodiversity. The planting of native hedgerows to the north and south of the substations will provide visual screening in addition to the positive biodiversity effect. The temporary compound will be reseeded with native species post construction. |
| **Air** interactions with:<br>Population and Human Health (discussed above), Biodiversity (discussed above), Climate - Carbon, Archaeology, Architectural and Cultural Heritage, and Roads and Traffic. | **Climate - Carbon.** The proposed development has the potential for negative impacts on climate. However, air impacts associated with the proposed development are not considered to be significant and ambient pollutant concentrations are well below the relevant air quality standards, no exceedances of air quality standards are anticipated. |
| | **Archaeology, Architectural and Cultural Heritage.** Dust arising during construction phase may temporarily and indirectly impact monuments within ca. 50m of the works, resulting in slight effects and effects. There is also potential for dust to affect built heritage (Ralappane House) – this effect would be not significant. |
| | **Roads and Traffic.** Air quality impacts associated with road vehicle traffic and construction plant during construction and operation of the proposed development are anticipated to be not significant, as discussed in Chapter 10 Air. |
| **Climate Resilience** interactions with:<br>Population and Human Health (discussed above), Surface Water and Flooding (discussed above), and Climate - Carbon | **Climate - Carbon.** Carbon emissions are associated with embodied emissions from the production of construction materials, and transport of those materials and workers to site. Vehicle and machinery usage (electricity, fuel, and water consumption), including for site clearance and temporary construction compounds will result in carbon emissions. The residual effect of minor adverse with mitigation is anticipated with no significant effects expected. In line with the IEMA Guidance, minor adverse means that the project's emissions are in-line with good practice design standards and are also in-line with national net zero pathways. |
| **Climate - Carbon** interactions with:<br>Population and Human Health (discussed above), Air | **Roads and Traffic.** There exists a link between construction traffic and carbon assessment. Transport of construction materials to site is one of the sources for construction-related GHG emissions. |

| Interaction | Description |
|---|---|
| (discussed above), Climate Resilience (discussed above), and Roads and Traffic | |
| **Noise and Vibration** interactions with:<br>Population and Human Health (discussed above), Biodiversity (discussed above), and Roads and Traffic | **Roads and Traffic.** Traffic noise is likely to arise from movement of construction traffic during the substation construction and the underground cabling works, along with the delivery of materials to construction compounds. As concluded in Chapter 13 Noise & Vibration, given the predicted absolute noise levels are relatively low and that the impacts are temporary, the noise impacts due to the changes in road traffic noise due to additional construction traffic are not significant. Chapter 13 Noise and Vibration and the Construction Environmental Management Plan of this EIAR set out measures to reduce the effect of noise from HGV movements on sensitive noise receptors. |
| **Archaeology, Architectural and Cultural Heritage** interactions with:<br>Population and Human Health (discussed above), Land, Soils and Hydrogeology (discussed above), Air (discussed above), and Material Assets | **Material Assets.** As with any works of this nature, there is potential for previously unrecorded archaeology to be encountered during excavation works and waste generation. Disturbance of ground within newly acquired lands may impact unrecorded archaeology and cultural heritage. The implementation of the measures described in Chapter 15 Archaeology Architectural and Cultural Heritage and the CEMP will ensure that such impacts are minimised. All physical archaeological, architectural and cultural heritage effect issues will be resolved at the pre-construction and construction stage of the development and the residual effects range from impereptible to moderate. There are no potential residual effects envisioned at the operational stage and maintenance stage of the proposed development. |
| **Material Assets** interactions with:<br>Population and Human Health (discussed above), Archaeology, Architectural and Cultural Heritage (discussed above), and Roads and Traffic | **Roads and traffic.** There is an interaction between resource and waste management and traffic and transport effects during the construction phase of the proposed development. The transportation of resources and waste to and from the substation and the cable route has the potential to affect local traffic and transport patterns during the construction phase. Materials will be transported from the construction compound areas, to the various sections of the proposed development and there will also be material requiring transport for disposal, following the excavation of the trenches. A Construction Traffic Management Plan has been produced and will be updated by the appointed contractor. The residual effects on roads and traffic are assessed as minor (not significant). |