FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

# EIAR FOR POWERSTOWN BIOENERGY

## Volume 2- Main Body of the EIAR

## Chapter 17 – Inter-relationships and Interactions

**Prepared for:**

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# 17. INTER-RELATIONSHIPS AND INTERACTIONS

## 17.1 Introduction

This chapter has been developed to identify potential inter-relationships and interactions between environmental aspects addressed in this EIAR (i.e., interactions between one environmental aspect and another environmental aspect which can result in an environmental impact).

The previous chapters have described the potential impact of the proposed development and proposed gas pipeline under a variety of different environmental topic headings. An assessment of impact inter-relationships and interactions is already embedded in these chapters. The purpose of this chapter is to take a more holistic and comprehensive view of the inter-relations and interactions between different aspects of the project and topics discussed in other chapters. This ensures that there is adequate coverage in this EIAR of the potential for the development to cause overall effects and cumulative impacts. This process examines whether interactions between the different effects themselves may cause impacts that are greater than those discussed individually. As such, this chapter responds to the requirement of the legislation governing the EIA process for the inter-relationship or interaction between the various environmental aspects and impacts to be fully considered, described and assessed.

This chapter considers the identified potential impact interactions between the following environmental aspects/EIAR topic chapters:

- Chapter 6 - Traffic and Transportation
- Chapter 7 - Population and Human Health
- Chapter 8 - Air Quality
- Chapter 9 - Climate
- Chapter 10 - Noise and Vibration
- Chapter 11 - Biodiversity
- Chapter 12 - Soils, Geology and Hydrogeology
- Chapter 13 - Surface Water and Hydrology
- Chapter 14 - Material Assets
- Chapter 15 - Archaeological, Architectural and Cultural Heritage
- Chapter 16 - Landscape and Visual Impact

A description of potential impacts associated with the construction, operation, and decommissioning phases of the proposed development and proposed gas pipeline, in the absence of mitigation, is provided in the EIAR chapters listed above.

A description of Residual Impacts associated with the construction, operation, and decommissioning phases of the proposed development and proposed gas pipeline, with the adoption of mitigation considered, is also provided in the EIAR chapters listed above.

For a project of this nature, there is also the potential for interaction amongst these impacts that may not be perceived when examined individually. Therefore, it is necessary to consider the relationships between the impacts.

Impact interactions and inter-relationships have been identified and are discussed in this chapter.

## 17.2 Statement of Authority

This chapter was prepared by Eibhlín Vaughan and reviewed by Tanya Ruddy, both of Fehily Timoney and Company (FT). Their CVs are in Appendix 1.1 of Volume 3 of this EIAR.

Eibhlín is a Project Environmental Scientist in the Circular Economy and Environment Department at FT. She holds a First Class Honours Bachelor's Degree in Environmental Science from Trinity College Dublin and a Master of Engineering Science Degree from University College Dublin. She has three years of experience supporting with Environmental Impact Assessment Reports (EIARs) for infrastructure projects. Eibhlín provides technical support to the EIAR teams for a variety of projects.

Tanya is the EIAR Coordinator for the proposed development. Tanya is a Chartered Scientist (CIWEM) and holds a BA in Environmental Science and a MSc in Environmental Management. She is also a Chartered Environmentalist (CIWEM) and Chartered Waste Manager (MCIWM). Tanya has over 20 years post qualification experience in environmental consultancy. She provides advice on statutory consents including planning applications, licence applications with supporting EIAR and NIS.

## 17.3 Evaluation of Impact Inter-relationships and Interactions

Table 17-1 provides a matrix indicating the key interactions and inter-relationships between the environmental aspects discussed previously in this EIAR.

### 17.3.1 Traffic and Transportation

Potential Traffic and Transportation interactions are summarised under the following sections.

#### *Population and Human Health*

During construction, temporary increases in traffic, noise, and associated disturbances (e.g. dust and vibration) may give rise to short-term, localised effects on nearby residents and users of community facilities. These effects will be limited in extent due to the use of designated haul routes and implementation of a Construction Traffic Management Plan, ensuring continued access to services and amenities. While sensitive receptors may experience minor disruptions (e.g. at the Arboretum Inspirational Gardens), these will be slight, temporary, and reversible, with access maintained at all times. The relatively low age dependency rate in the study area indicates a more resilient population, reducing susceptibility to construction-related disturbance. Overall, no significant effects on population or human health are anticipated.

In operation, traffic-related noise increases are predicted to be localised, with a moderate negative long-term effect at one road link only. Elsewhere, traffic increases are low and result in neutral, imperceptible effects. Consequently, operational impacts on population and human health from traffic and transport are limited and not significant overall.

Standard mitigation measures, including traffic management, controlled working hours, and noise and dust suppression, will minimise temporary construction impacts. Community engagement and clear communication will further reduce disruption. These measures ensure that traffic-related effects on population and human health remain minor and not significant.

### *Air Quality*

There are interactions between Air Quality and Traffic and Transportation during construction. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality. The effects are considered to be direct, short-term, neutral and not significant during the construction phase.

The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality. The impact of the interactions between Traffic and Air Quality are considered to be long-term, direct, neutral and not significant during the operational phase.

There are interactions between Air Quality and Traffic and Transportation during decommissioning. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality. The effects are considered to be direct, short-term, neutral and not significant during the decommissioning phase.

### *Climate*

Based on the information available in Chapter 6 – Traffic and Transportation it was determined by the traffic consultant that construction traffic will not meet the PE-ENV-01106 TII criteria for assessment. The construction traffic volumes were also reviewed as part of Chapter 8– Air Quality and it was determined that the criteria of changes in overall traffic volumes of 1,000 AADT and changes in HDV flows of 200 AADT would not be met, therefore further assessment of construction traffic is scoped out of this assessment. The climate assessment did include for fuel use by construction and operational traffic to and from the proposed development and during construction of the proposed gas pipeline in the GHGA.

### *Noise and Vibration*

During the construction phase, traffic associated with the proposed development would consist of a mix of construction staff vehicles, LGVs and HGVs travelling to and from the site.

Construction-related traffic will cause a slight, short-term increase in noise levels, with a worst-case increase of 1.7 dB at road link 8 L3045, resulting in a negative but not significant effect. Traffic increases on all other links are minimal (below 25% AADT) and will give rise to neutral, imperceptible impacts. These conclusions are based on a cumulative traffic scenario and indicate no significant noise effects overall.

Operational traffic will result in a localised increase in noise, with a worst-case rise of 4.3 dB at road link 8, giving rise to a negative, moderate, long-term effect. Traffic increases on all other links are low (below 25% AADT) and will result in neutral, imperceptible long-term impacts. These findings are based on a cumulative traffic scenario and indicate that significant noise effects are limited to a single location.

The noise and vibration impacts for construction works traffic will be mitigated by restricting movements along access routes to the standard working hours, unless specifically agreed otherwise. Consultation with the local community is important in minimising noise and vibration impacts, and therefore any out of hours working would be agreed in advance with the planning authority. In addition, residents will be informed of construction activities through the Community Liaison Officer.

### *Biodiversity*

Operational traffic increases along the L3045 will result in a slight rise in noise levels (+4.3 dB). However, effects on biodiversity are expected to be negligible. Mammals and birds in the area are likely to habituate to these minor changes, given existing baseline noise (40–51 dB) and the already disturbed, low-value habitats present. No notable mammal activity has been recorded, and the marginal traffic increase is not expected to affect mortality rates or population levels. Similarly, bird species, including waterbirds, are unlikely to respond to these low noise levels.

Overall, the interaction between traffic and biodiversity is assessed as unlikely to result in impacts, with effects characterised as temporary, imperceptible, and negative.

## 17.3.2 Population and Human Health

Potential Population and Human Health interactions are summarised under the following sections.

### *Traffic and Transportation*

A description of the interactions between Population and Human Health and Traffic and Transportation is discussed in Section 17.3.1.

### *Air Quality*

An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the Proposed Development. Best practice mitigation measures will be implemented during the construction phase to ensure that the impact of the Proposed Development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, short-term, negative and not significant with respect to Population and Human Health during the construction phase.

Vehicles accessing the site will emit pollutants which may impact Air Quality and Human Health. However, the increased number of vehicles associated with the Proposed Development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health. The likely effect will be long-term, direct, negative and imperceptible.

An adverse air quality impact during the decommissioning phase can cause health and dust nuisance issues. Dust impacts during the decommissioning phase are expected to be of similar type and similar or lesser in magnitude to those anticipated during the construction phase, but generally of a shorter duration. The same mitigation measures implemented during the construction phase will be applied during the decommissioning works and are also considered appropriate for the decommissioning demolition works. Therefore, the predicted impact is direct, short-term, negative and not significant with respect to Population and Human Health during the decommissioning phase.

### *Climate*

The effects of the proposed development on climate change may result in indirect effects on people due to an increase in climate-related events such as storms, droughts, floods etc.

The effects of greenhouse gas emissions from the construction phase were found to have a direct, long-term, negative and minor impact that is considered to be not significant due to the levels of mitigation proposed.

Similarly, the operation of the facility was found to be a source of emissions, however the primary function of the proposed development is the production of biogas to replace the use of fossil gas. Therefore, the operational impact of the proposed development was found to be positive due to the production of biogas and levels of mitigation proposed in terms of the measures.

### *Noise and Vibration*

Noise generation during the construction and operational phases of the proposed development has the potential to negatively impact upon sensitive human receptors in the vicinity of the proposed development site.

With the adoption of the mitigation measures, no significant residual impacts will arise as a result of the decommissioning phase of the proposed development. Overall, noise-related interactions with population and human health are limited in magnitude and not significant.

### *Biodiversity*

Impacts upon biodiversity elements (i.e., eco-systems, habitats and species), may, in turn, affect recreational value attained by humans experiencing nature. It has been concluded that the proposed development will not have any significant adverse impact on biodiversity.

### *Soils, Geology and Hydrogeology*

No public health issues associated with the land, soil, geology and hydrogeology conditions at the site have been identified for the Construction, or Operational Phases of the proposed development.

### *Surface Water and Hydrology*

Due to the design of the proposed drainage system for construction, operation and decommissioning phase which includes a multi-stage drainage system, oil interceptors, water-quality monitoring, automatic isolation (penstocks), and sporadic controlled discharge only under certain circumstances—these are no risks to surface water quality or hydrology. Measures also ensure containment of accidental spillages, treatment of runoff, and maintenance of system performance over time.

As a result, no deterioration in water quality, no increase in flood risk, and no impact on water resources used by the local population are expected. Therefore, residual effects on population and human health are negligible and not significant.

### *Material Assets*

Impacts on utilities may indirectly affect human receptors. For example, overloading an electrical supply system or wastewater treatment plant may result in a diminution of these assets, which in turn may affect other human receptors reliant on them.

The residual negative effects of the proposed development on utilities are not significant. The proposed development will not have any significant effect on material assets which people depend on. The significance of potential positive effects on renewable energy generation due to facility operations is characterised as significant beneficial - effects which will be transmitted to people.

### *Archaeological, Architectural and Cultural Heritage*

Due to previous quarrying and associated archaeological monitoring, the proposed development site has no remaining potential to contain unrecorded archaeological features, and therefore no impacts on cultural heritage assets that could affect population or human health are anticipated.

For the gas pipeline route, archaeological supervision during groundworks will ensure any potential subsurface features are identified and protected. As such, there will be no significant effects on cultural heritage that could influence community wellbeing or amenity. Overall, interactions between archaeology and population and human health are negligible and not significant.

#### *Landscape and Visual Impact*

Visual receptors in the study area are of medium sensitivity; however, construction and operational visual effects are assessed as not significant due to the site's location within a quarry and effective screening. As a result, there is no meaningful interaction with population or human health arising from visual impacts.

During construction, adherence to defined working hours and good practice construction methods will minimise visual and noise disturbance, further reducing any potential effects on residential amenity and wellbeing. Overall, interactions between landscape/visual impacts and population and human health are negligible and not significant.

### 17.3.3 Air Quality

Potential Air Quality interactions are summarised under the following sections.

#### *Traffic and Transportation*

A description of the interactions between Air Quality and Traffic and Transportation is discussed in Section 17.3.1.

#### *Population and Human Health*

A description of the interactions between Air Quality and Population and Human Health is discussed in Section 17.3.2.

#### *Climate*

Interactions between air quality and climate arise through shared emission sources, particularly greenhouse gases (GHGs) and air pollutants generated during construction and operation. Emissions contributing to reduced air quality (e.g. from traffic and plant) also contribute to climate change, while climate conditions can influence pollutant dispersion and concentration.

In this case, construction-phase emissions are temporary, minor, and not significant. During operation, although emissions occur, the primary function of the development (biogas production) will reduce reliance on fossil fuels, resulting in a positive climate effect. This also contributes indirectly to improved long-term air quality by reducing overall GHG and pollutant emissions at a broader scale.

#### *Biodiversity*

Dust generation can occur during extended dry weather periods due to construction traffic. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. The River Nore and River Barrow SAC is within 20m of the Proposed Development site area. Dust mitigation measures will be implemented on site as set out in Section 8.11.1. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be direct, short-term, negative and not significant with respect to biodiversity.

There are no potentially significant interactions identified between Air Quality, and Biodiversity during the operational phase.

Dust impacts on ecology during the decommissioning phase are expected to be of similar type and similar or lesser in magnitude to those anticipated during the construction phase, but generally of a shorter duration. The same mitigation measures implemented during the construction phase will be applied during the decommissioning works and are also considered appropriate for the decommissioning demolition works. Therefore, the predicted impact is direct, short-term, negative and not significant with respect to Biodiversity during the decommissioning phase.

#### *Soils, Geology and Hydrogeology*

Construction phase activities such as construction and movement of materials by construction vehicles have the potential for interactions between Air Quality and Land & Soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and Land & Soils during the construction phase.

There are no potentially significant interactions identified between Air Quality, and Land & Soils during the operational phase.

Dust impacts during the decommissioning phase are expected to be of similar type and similar or lesser in magnitude to those anticipated during the construction phase, but generally of a shorter duration. The same mitigation measures implemented during the construction phase will be applied during the decommissioning works and are also considered appropriate for the decommissioning demolition works. Therefore, the predicted impact is direct, short-term, negative and not significant with respect to Land & Soils during the decommissioning phase.

### 17.3.4 Climate

Potential Climate interactions are summarised under the following sections.

#### *Traffic and Transportation*

A description of the interactions between Climate and Traffic and Transportation is discussed in Section 17.3.1.

#### *Population and Human Health*

A description of the interactions between Climate and Population and Human Health is discussed in Section 17.3.2.

#### *Air Quality*

A description of the interactions between Climate and Air Quality is discussed in Section 17.3.3.

#### *Biodiversity*

There is limited interaction between climate and biodiversity arising from the proposed development. Construction-related greenhouse gas emissions will be minor and not significant, resulting in negligible indirect effects on biodiversity.

During operation, the development will have a positive climate impact through biogas production, reducing reliance on fossil fuels. This contributes beneficially to climate mitigation, which indirectly supports biodiversity by reducing long-term climate-related pressures.

### *Surface Water and Hydrology*

Interactions between climate and surface water and hydrology arise primarily through potential changes in rainfall patterns and extreme weather events. During construction, minor greenhouse gas emissions are not significant and will not materially influence hydrological conditions.

During operation, the proposed development will have a positive climate effect through biogas production, contributing to reduced greenhouse gas emissions. This indirect benefit supports long-term climate stability, which in turn helps to reduce pressures on hydrological systems such as increased runoff, flooding, or water quality deterioration associated with climate change.

In addition, the design incorporates robust surface water management measures (e.g. attenuation, controlled discharge, and treatment systems), ensuring resilience to potential future climate variability.

Pluvial or surface water flood mapping shows no identified flood vulnerability at the site of the proposed development for the assessed rainfall events. While the proposed development will introduce new buildings and infrastructure, a surface water drainage system incorporating a lagoon has been designed to manage runoff from the site. The system is designed to accommodate a 1 in 30-year storm event with an additional allowance for climate change, and it is not anticipated to increase flood risk on site or at the downstream discharge location.

## 17.3.5 Noise and Vibration

Potential Noise and Vibration interactions are summarised under the following sections.

### *Traffic and Transportation*

A description of the interactions between Noise and Vibration and Traffic and Transportation is discussed in Section 17.3.1.

### *Population and Human Health*

A description of the interactions between Noise and Vibration and Population and Human Health is discussed in Section 17.3.2.

### *Biodiversity*

Construction and operational noise associated with the proposed development and gas pipeline has the potential to cause disturbance to fauna. However, all effects are assessed as unlikely and imperceptible. Mammals (including hedgehog, badger, red squirrel, hare and stoat), bats, and birds may experience brief or short-term disturbance, but are expected to tolerate or habituate to these low-level changes.

During operation, noise effects are similarly minimal, with imperceptible impacts on mammals and neutral to imperceptible effects on birds.

Overall, noise-related interactions with biodiversity are temporary, negligible in magnitude, and not significant, and no specific mitigation measures are required.

## 17.3.6 Biodiversity

Potential Biodiversity interactions are summarised under the following sections.

### *Traffic and Transportation*

A description of the interactions between Biodiversity and Traffic and Transportation is discussed in Section 17.3.1.

### *Population and Human Health*

A description of the interactions between Biodiversity and Population and Human Health is discussed in Section 17.3.2.

### *Air Quality*

A description of the interactions between Biodiversity and Air Quality is discussed in Section 17.3.3.

### *Climate*

A description of the interactions between Biodiversity and Climate is discussed in Section 17.3.4.

### *Noise and Vibration*

A description of the interactions between Biodiversity and Noise and Vibration is discussed in Section 17.3.4.

### *Soils, Geology and Hydrogeology*

Interactions between biodiversity and soils, geology, and hydrogeology arise where ground conditions influence habitat availability, water regimes, and species distribution, and where construction activities could alter these conditions.

In this case, the site is already significantly disturbed due to quarrying, limiting ecological sensitivity and the dependency of habitats on underlying soils or groundwater. Potential impacts (e.g. contamination, soil disturbance, or changes in groundwater conditions) are controlled through standard construction methods and mitigation measures, ensuring stability of these environmental media.

Residual effects on soils and hydrogeology are neutral to slight and not significant, and therefore any indirect effects on habitats or species are minimal.

### *Surface Water and Hydrology*

Interactions between surface water and hydrology and biodiversity include potential effects on water quality, flow, and aquatic habitats that may support sensitive ecological receptors, including designated sites such as the River Barrow SAC.

In this case, all pathways for impact (e.g. sedimentation, contamination, runoff, and accidental releases) are effectively controlled through design, including drainage design, pollution prevention, monitoring, and containment systems. These measures ensure that there are no adverse effects on downstream receptors, including the SAC.

Residual biodiversity effects are limited to minor, localised habitat changes within the site, with no impact on designated conservation sites.

### *Archaeological, Architectural and Cultural Heritage*

Interactions between biodiversity and archaeology can arise where archaeological features (e.g. undisturbed soils, earthworks, or historic structures) provide habitats for flora and fauna, or where construction activities affecting one receptor also influence the other.

In this case, the proposed development site has been previously disturbed through quarrying and does not retain archaeological potential. Therefore, it does not function as a habitat resource linked to archaeological features. Along the gas pipeline route, archaeological monitoring will ensure protection of any subsurface remains, but these are not expected to support significant ecological receptors.

There is no overlap between sensitive ecological habitats and known or potential archaeological features, and mitigation measures for each topic operate independently without conflict.

#### *Landscape and Visual Impact*

There can be interaction between biodiversity and landscape and visual where landscape changes (e.g. vegetation clearance, landform alteration, visual screening) influence habitats, species distribution, or ecological connectivity. Similarly, landscape mitigation measures (e.g. planting) can provide biodiversity benefits.

In this case, the site is already disturbed (quarry setting) and visually well screened, with limited ecological value. Any overlap between landscape/visual and biodiversity (e.g. vegetation removal or reinstatement planting) is already captured within the biodiversity assessment and mitigation (e.g. habitat replacement).

### 17.3.7 Soils, Geology and Hydrogeology

Potential Soils, Geology, and Hydrogeology interactions are summarised under the following sections.

#### *Air Quality*

A description of the interactions between Soils, Geology, and Hydrogeology and Air Quality is discussed in Section 17.3.3.

#### *Biodiversity*

A description of the interactions between Soils, Geology, and Hydrogeology and Biodiversity is discussed in Section 17.3.6.

#### *Surface Water and Hydrology*

Potential interactions between soils, geology and hydrogeology and surface water and hydrology arise primarily during construction through pathways such as sediment runoff, accidental spillages, or localised changes to drainage patterns. However, with the design of the construction phase drainage system, the implementation of a site-specific CEMP, including standard pollution prevention and drainage control measures, these risks will be avoided. There is no discharge from the enclosed basin of the proposed development during the construction phase.

Potential interactions arise through pathways linking ground conditions with surface water systems, particularly via runoff, drainage, and pollutant transport. During operation, activities such as trafficked areas, plant operations, and accidental spills could introduce sediments, hydrocarbons, or contaminants into surface water. In addition, altered ground conditions may influence runoff rates, overland flow pathways, and sediment mobilisation.

However, these pathways are comprehensively controlled through an integrated drainage and water management system, including sumps, catchpits, oil interceptors, lagoon storage, grassed swales, and controlled discharge mechanisms. Measures such as continuous water-quality monitoring, automatic penstock closure, and spillage containment break the link between potential ground contamination and surface water receptors.

Hydrological interactions such as increased runoff volumes and exceedance flows are also managed through attenuation and controlled discharge at greenfield runoff rates, ensuring no increase in flood risk or downstream effects. Long-term maintenance of the lagoon further ensures continued treatment efficiency.

Given the neutral to slight and largely imperceptible effects predicted for soils and hydrogeology, and the robust mitigation measures in place, any indirect effects on surface water quality, flow, or WFD status are avoided.

#### *Archaeological, Architectural and Cultural Heritage*

Interactions between soils, geology, and hydrogeology and archaeological, architectural, and cultural heritage primarily relate to the potential presence, preservation, and disturbance of subsurface archaeological remains. Ground conditions can influence both the survival and detectability of archaeological material, while excavation works may result in direct impacts where such remains exist.

In this case, the proposed development site has been subject to extensive quarrying, removing overburden and archaeological horizons; therefore, no potential for subsurface archaeological remains exists within the site. Along the gas pipeline route, there remains some potential for undiscovered features; however, archaeological monitoring during groundworks will ensure that any features encountered are recorded and protected.

Hydrogeological conditions are not expected to change in a way that would affect the preservation of archaeological materials, and no indirect effects are anticipated.

### 17.3.8 Surface Water and Hydrology

Potential Surface Water and Hydrology interactions are summarised under the following sections.

#### *Population and Human Health*

A description of the interactions between Surface Water and Hydrology and Population and Human Health is discussed in Section 17.3.2.

#### *Climate*

A description of the interactions between Surface Water and Hydrology and Climate is discussed in Section 17.3.4.

#### *Biodiversity*

A description of the interactions between Surface Water and Hydrology and Biodiversity is discussed in Section 17.3.617.3.4.

#### *Soils, Geology and Hydrogeology*

A description of the interactions between Surface Water and Hydrology and Soils, Geology, and Hydrogeology is discussed in Section 17.3.717.3.4.

### 17.3.9 Material Assets

Potential Material Assets interactions are summarised under the following sections.

#### *Traffic and Transport*

Construction of the proposed gas pipeline will interact with existing utilities and road infrastructure, primarily through trenching works, road crossings, and associated temporary traffic disruption. This results in a moderate adverse interaction during construction which are not significant. .

These effects will be managed through GNI-led construction standards, service protection measures, and traffic management plans, ensuring no disruption to the gas network and maintaining functionality of existing infrastructure.

### *Population and Human Health*

A description of the interactions between Material Assets and Population and Human Health is discussed in Section 17.3.2.

### *Climate*

Potential interactions between climate and material assets have been considered. Climate-related extreme weather events (e.g. storms, flooding, or drought) may indirectly influence the operation and resilience of key utilities such as electricity.

The project is not predicted to result in any significant direct or indirect effects on climate. Similarly, climate change is not expected to have a significant effect on the integrity or operation of the Proposed Development.

The facility will contribute positively to the advancement of the circular economy. These outcomes are anticipated to deliver beneficial effects in terms of reduced greenhouse gas emissions and overall climate benefit.

## 17.3.10 Archaeological, Architectural and Cultural Heritage

Potential Archaeological, Architectural and Cultural Heritage interactions are summarised under the following sections.

### *Population and Human Health*

A description of the interactions between Archaeology, Architectural and Cultural Heritage and Population and Human Health is discussed in Section 17.3.2.

### *Biodiversity*

A description of the interactions between Archaeology, Architectural and Cultural Heritage and Biodiversity is discussed in Section 17.3.6.

### *Soils, Geology and Hydrogeology*

A description of the interactions between Archaeology, Architectural and Cultural Heritage and Soils, Geology and Hydrogeology is discussed in Section 17.3.7.

### *Material Assets*

There is no anticipated conflict between the protection of archaeology and the provision or operation of material assets.

### *Landscape and Visual Impact*

Interactions between landscape/visual impacts and archaeological, architectural, and cultural heritage arise where changes to the landscape affect the setting, character, or visual appreciation of heritage assets. This can influence how such assets are experienced or understood within their surroundings.

In this case, visual receptors are of medium sensitivity, but the proposed development is located within a quarry and benefits from effective screening, resulting in not significant visual effects. As such, there is no meaningful change to the setting or visual context of any archaeological or cultural heritage assets.

Mitigation measures, including sensitive design and adherence to good construction practices, further reduce potential visual disturbance.

### 17.3.11 Landscape and Visual Impact

Potential Landscape and Visual Impact interactions are summarised under the following sections.

#### *Population and Human Health*

A description of the interactions between Landscape and Visual Impact and Population and Human Health is discussed in Section 17.3.2.

#### *Biodiversity*

A description of the interactions between Landscape and Visual Impact and Biodiversity is discussed in Section 17.3.6.

#### *Archaeological, Architectural and Cultural Heritage*

A description of the interactions between Landscape and Visual Impact and Archaeological, Architectural and Cultural Heritage is discussed in Section 17.3.10.

**Table 17-1: Summary of the Key Interactions and Inter-relationships between the Environmental Aspects of the Proposed Development**

| | Population and Human Health | Biodiversity | Soils, Geology and Hydrogeology | Surface Water and Hydrology | Air Quality | Climate | Noise and Vibration | Traffic and Transportation | Archaeological, Architectural and Cultural Heritage | Landscape and Visual Impact | Material Assets - Utilities and Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Population and Human Health** | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Biodiversity** | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | |
| **Soils, Geology and Hydrogeology** | | ✓ | | ✓ | ✓ | | | | ✓ | | |
| **Surface Water and Hydrology** | ✓ | ✓ | ✓ | | | ✓ | | | | | |
| **Air Quality** | ✓ | ✓ | ✓ | | | ✓ | | ✓ | | | |
| **Climate** | ✓ | | | ✓ | ✓ | | | | | | |
| **Noise and Vibration** | ✓ | ✓ | | | | | | ✓ | | | |
| **Traffic and Transportation** | ✓ | | | | ✓ | | ✓ | | | | ✓ |
| **Archaeological, Architectural and Cultural Heritage** | ✓ | ✓ | ✓ | | | | | | | | |
| **Landscape and Visual** | ✓ | | | | | | | | | | |
| **Material Assets - Utilities and Waste** | ✓ | | | | | | | ✓ | | | |

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