

RECEIVED: 18/11/2025

15 Interaction Between Effects on Different Factors

15.1 Introduction

In an Environmental Impact Assessment Report (EIAR), the interactions between chapters are crucial for providing a comprehensive understanding of how different environmental factors influence each other.

All environmental factors are interlinked to a degree such that interrelationships exist on numerous levels. Interactions within the study area can be one-way interactions, two-way interactions and multiple-phase interactions which can be influenced by the proposed development. As this EIAR has been prepared by a number of specialist consultants an important aspect of the EIA process is to ensure that interactions between the various disciplines have been taken into consideration.

Chapters 5 to 14 have described the potentially significant effects posed by the proposed development upon a variety of environmental receptors. Given the complexity of the proposed development, there is the potential for interaction amongst these impacts that may not be perceived when examined individually, hence, it is necessary to consider the relationships between the impacts.

Each environmental topic chapter of this EIAR includes a dedicated section on interactions with other relevant factors. This approach is considered to meet with the requirements of applicable EU and Irish law. The likely interactions between one topic and another have been discussed under each topic chapter by the relevant specialist consultant. ORS ensured collaboration among specialist consultants to address the likely interactions between effects predicted from the proposed development. This ensured that appropriate mitigation measures were incorporated into the design process.

This section on interactions identifies the potential of unplanned but potential interactions that could occur during construction and operation of the proposed development. **Table 15.1** overleaf identifies where it is predicated, that interactions could occur.

RECEIVED 18/11/2025

Table 15.1: Matrix summarising potential interactions noted between factors

Interaction	Biodiversity	Pop. & Human Health	Lands, Soils, Geology	Hydrology & Hydrogeology	Air, Odour, Climate	Noise & Vibration	Landscape & Visual	Traffic & Transport	Archaeology & Cultural Heritage	Material Assets
Biodiversity	N/A	✓	✓	✓	✓	✓	✓	X	X	✓
Population & Human Health	✓	N/A	✓	✓	✓	✓	✓	✓	X	✓
Lands, Soils & Geology	✓	✓	N/A	✓	X	X	✓	X	X	✓
Hydrology & Hydrogeology	✓	✓	✓	N/A	X	X	X	X	X	✓
Air, Odour & Climate	✓	✓	X	X	N/A	X	X	✓	X	X
Noise & Vibration	✓	✓	X	X	X	N/A	X	✓	X	X
Landscape & Visual	✓	✓	✓	X	X	X	N/A	X	X	X
Traffic & Transport	X	✓	X	X	✓	✓	X	N/A	X	✓
Archaeology & Cultural Heritage	X	X	X	X	X	X	X	X	N/A	X
Material Assets	✓	✓	✓	✓	X	X	X	✓	X	N/A

✓ Interaction
 X No interaction

15.2 Population & Human Health

As referenced throughout the report, there are numerous inter-related environmental topics described in detail throughout this EIAR document which are of relevance to human health. This chapter of the EIAR has been instructed by updated guidance documents reflecting the changes within the 2014 EIA Directive. These documents include the EU and Irish guidelines for preparation of an EIAR and carrying out an EIA. Therefore, in accordance with the aforementioned guidance documents, this chapter of the EIAR focuses primarily on the potential likely and significant impact on Population & Human Health. Potential effects are presented in relation to health effects/issues and environmental hazards arising as a result of other environmental factors and interactions.

Where there are identified, associated and inter-related potential likely and significant impacts which are more comprehensively addressed elsewhere in this EIAR document, these are referred to.

15.3 Archaeology & Cultural Heritage

No interactions were identified in the Archaeology & Cultural Heritage chapter.

15.4 Biodiversity

There are interactions between this Biodiversity Chapter and those of Land, Soils & Geology (Chapter 7), Hydrology & Hydrogeology (Chapter 8) and Landscape & Visual (Chapter 11).

In terms of Land and Soils, there is overlap with the Biodiversity chapter in that the potential impacts of the construction works, through excavation, construction etc., could have an effect on the receiving environment in terms of changes in land use, soil erosion, contamination, or compaction that leads to degradation of soil quality, leading to habitat loss and decreased biodiversity. The mitigation measures in both chapters overlap somewhat as they address protecting the receiving environment from the construction works e.g., protecting waterbodies from pollution and sedimentation.

Similarly with respect to Hydrology, potential impacts to ecological receptors downstream of the Proposed Site are addressed. Biodiversity interacts with hydrology & hydrogeology in several crucial ways. Hydrology, which involves the distribution and movement of surface water, and hydrogeology, which deals with groundwater, both play pivotal roles in sustaining diverse and healthy ecosystems. The potential for the Construction Phase to effect receiving waterbodies and ecology in the vicinity of the Site is addressed via the mitigation measures proposed in the respective EIAR chapters.

In terms of Landscape & Visual effects, the proposed landscaping works interact with the biodiversity and ecology of the site; through the changes that will occur to the existing habitats and flora due to landscape modification. The landscaping proposals will entail a number biodiversity improvements in terms of vegetation at the Site, which in turn will affect the ecology of the Site. The Site in its current condition contains species-rich hedgerows and treelines which are of high ecological value at a local scale. The proposed landscaping will retain these features throughout the construction phase and operational phase.

15.5 Landscape & Visual Impact

Interactions with respect to the landscape and visual aspects of the proposed development relate to the architectural design of the proposed development and the landscape proposals for the site, as summarised in the design-related mitigation measures in **Section 11.5** of the EIAR.

The landscape proposals also relate to biodiversity on the site, both existing and proposed, in that they seek to protect and conserve valuable habitat on site, most notably the existing hedgerows and trees, as well as the drainage ditches along the site boundaries and the nearby Ballinure River.

The interaction of the landscape and visual impacts and the geological impacts relate primarily in this instance to the mitigation measures proposed for soils and slope retention. The mitigation measures as outlined in the geological and soil report indicate measures which will increase potential landscape capacity by preserving the soils on site, their variability, fertility and ability to support the landscape masterplan proposals and the proposals to retain the contiguous and proposed development topography. The latter will also ensure the protection of hazel and other screening vegetation along the edge of the esker.

15.6 Land, Soils & Geology

The most significant interactions with land, soils & geology is with the hydrology and hydrogeology chapter. The characteristics and management of Land, Soils & Geology significantly influence both surface water (hydrology) and groundwater (hydrogeology) systems. Due to the inter-relationship between groundwater and surface water the discussed impacts are also considered applicable to Chapter 8 (Hydrology & Hydrogeology).

The EIAR identifies how the proposed development could potentially affect the balance between land, soils and water systems. This understanding is imperative for developing effective mitigation strategies to protect soil health and ecosystems as well as to limit adverse environmental impacts to hydrological and hydrogeological receptors.

The mitigation measures that will be implemented at the proposed development site will ensure that any effects of the proposed development will comply with all surface and groundwater legislative limits.

A significant interaction also occurs with the Landscape and Visual (LVIA) chapter. The interaction of the landscape and visual impacts and the geological impacts relate primarily in this instance to the mitigation measures proposed for soils and slope retention. They are necessarily interrelated. The mutual benefit to geology and landscape of protecting the underlying geology and soils as much as possible will enable the landscape and visual mitigation measures to be as effective as possible.

15.7 Hydrology & Hydrogeology

The most significant interactions with hydrology and hydrogeology are with land, soils & geology and population & human health. Due to the inter-relationship between groundwater and surface water the discussed impacts are also considered applicable to Chapter 7 (Land, Soils & Geology).

The EIAR addresses how the proposed development could potentially affect the balance between land and soils and water systems. This understanding is crucial for developing

effective mitigation strategies to protect water quality, to sustainably manage water resources and to prevent adverse environmental impacts to underlying soils.

Hydrology and Hydrogeology also interacts with Biodiversity (Chapter 5). With the successful implementation of best practice procedures and mitigation measures throughout the construction and operational phases of development, potential hazards will be managed such that the likelihood of adverse environmental incidents occurring is low. Any potential impacts are therefore considered to be resolved or minimised.

The mitigation measures that will be implemented throughout the proposed development will ensure that the impact of the proposed development complies with all surface and groundwater legislative limits.

RECEIVED: 18/11/2025

15.8 Air, Odour & Climate

Air quality does not interact significantly with the majority of other topics examined through the EIAR process. The most significant interactions relate to population & human health. In an EIAR, chapters focusing on various environmental factors must closely interact with those addressing air quality and climate to ensure a thorough evaluation. Air quality is principally influenced by emissions from the proposed development, which can stem from construction activities, transportation, and operational processes.

Adverse effects with respect to air quality in either the demolition, construction or operational phase have the potential to cause health and dust nuisance issues. The mitigation measures that will be implemented at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits.

Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, vehicle emissions increase. 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 an EIAR, the interactions between biodiversity, air quality and climate are crucial considerations for understanding ecosystem health and resilience. Biodiversity, encompassing a variety of plant and animal species, plays a vital role in maintaining air quality by influencing oxygen production, carbon sequestration, and pollutant filtration. Healthy ecosystems help regulate local air quality by absorbing pollutants and releasing oxygen through photosynthesis, thereby mitigating the impacts of human activities on air pollution.

With the implementation of appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land, soils & geology. No other significant interactions with air quality have been identified.

15.9 Noise & Vibration

Noise and vibration interact significantly with other environmental factors to assess potential effects and propose mitigation measures. Noise assessments consider sources such as transportation, industrial activities, and construction activities associated with the proposed development. They evaluate potential impacts on communities, wildlife, and sensitive receptors.

The chapter's most interlinked with noise and vibration assessments include Biodiversity (Chapter 5), Population & Human Health (Chapter 6) and Traffic & Transport (Chapter 12).

15.10 Traffic & Transport

Traffic and transport do not interact significantly with the majority of other topics examined through the EIAR process. The most significant interactions relate to Population & Human Health (Chapter 6), Air, Odour & Climate (Chapter 9) and Noise & Vibration (Chapter 10). Increases in traffic flows to and from the location of the proposed development can have negative implications for carbon emissions and air quality and noise.

Interactions between traffic & transport, air quality and noise can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, vehicle emissions increase. Similarly, noise emissions can increase. 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.

It is not envisaged that there will be queues or delays formed along either road as a result of the Development, thus, no significant interactions with other environmental receptors have been identified.

15.11 Material Assets

Interactions between Material Assets and other environmental topics are outlined throughout this EIAR document. The material assets chapter interacts closely with various other chapters to comprehensively evaluate their impact and propose mitigation measures.

The Material Assets chapter assess how proposed developments may affect the material assets in the vicinity of the site through construction activities, changes in land use, and operational effects. Interaction with chapters on socio-economic factors is crucial to understand the implications on the local economy, employment, and community services.

Material Assets is linked with Biodiversity as discussed in Chapter 5. Implementation of successful surface water mitigation measures onsite will ensure that the likelihood and consequences of environmental incidents that could impact designated sites downstream via the Ballinure River, including the River Suck Callows SPA and the River Shannon Callows SAC.

Material Assets also interact with Population & Human Health (Chapter 6). Links between these chapters mainly relate to onsite resource and waste management. The implementation of rigorous waste management and cleaning protocols onsite will ensure that hygiene is maintained across the site such that waste arisings are appropriately disposed of that the risk of vermin infestation is minimized.

Material Assets interact with Hydrology and Hydrogeology (Chapter 8). The proposed foul, surface water, and public water infrastructure comprising part of the Proposed Development will lead to potential impacts on the surrounding networks.

Material Assets interact with Traffic and Transport (Chapter 12). The Proposed Development will not adversely impact the functionality of the R355 Regional Road and the L8412 Local Road in the vicinity of the site and the junction will function below capacity for future design years. There will be no queues or delays formed along both roads due to the Proposed Development, therefore, it can be concluded that the Proposed Development will not result in a detrimental effect on the existing road network in the vicinity of the site.

15.12 Conclusion

This chapter has reviewed the interactions between the environmental topics assessed in Chapters 5–14 of this EIAR. An interaction matrix has been prepared and key topic inter-relationships have been described.

The assessment confirms that:

- The EIAR topic chapters have already taken account of relevant interactions in their impact assessments and mitigation design.

RECEIVED: 18/11/2025

- No additional significant adverse effects arise solely as a result of interactions between topics, beyond those already identified and assessed in the individual chapters.
- Embedded design measures and mitigation (including the CEMP, drainage and containment design, stack design, traffic management, noise controls and landscape planting) are effective in managing both direct and interactive effects.
- The Proposed Development will deliver significant positive interactions in relation to material assets and climate mitigation, by enabling the production and injection of renewable biomethane and supporting the management of agricultural residues within a circular-economy framework.

Overall, when topic interactions are considered alongside the individual impact assessments, the conclusions of the EIAR remain unchanged: the Proposed Development, with the proposed mitigation measures implemented, will not give rise to significant adverse environmental effects, and will deliver a number of long-term environmental and socio-economic benefits.