

16 INTERACTION OF THE FOREGOING

16.1 INTRODUCTION

This EIAR supports an application for the development of a wind farm of up to twelve turbines, a grid connection and all associated development south of Ballylongford, Co. Kerry. In accordance with the requirements of the 2014 EIA Directive, this EIAR has presented the environmental assessments of the entire project under each required factor. Where relevant, the interaction between the factors, which is the interactions between specific environmental aspects and effects, are already addressed within each of the individual assessment topic areas or chapters of this EIAR.

16.2 SCOPE

Article 3 of EIA Directive 2014/52/EU stipulates that 'The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: (a) population and human health; (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; (c) land, soil, water, air and climate; (d) material assets, cultural heritage and the landscape; (e) the interaction between the factors referred to in points (a) to (d)'.

The purpose of this Chapter is to draw attention to important interactions and interdependencies between one factor or topic and another. Consequently, this chapter now highlights those interactions of the environmental aspects and topics previously detailed and assessed throughout this EIAR (Chapters 4 to 15). The potential for interactions between one aspect of the environment and another can result in direct or indirect effects, which may be positive or negative. This chapter is completed based on a desktop review and by provision of a matrix to present the main interactions. The assessments and results have previously been presented in the preceding chapters of this EIAR.

16.3 INTERACTION OF ENVIRONMENTAL IMPACTS

While all environmental aspects can be inter-related to some extent, the following outlines the key interactions identified between each of the various environmental subject areas considered in this EIAR for both the construction and operational phases of the proposed Shronowen wind farm project.

Human Environment Interactions:

- Air Quality and Climate
- Civil Engineering and Roads/Traffic
- Noise
- Landscape and Visual Resources
- Material Assets

Civil Engineering and Roads/Traffic Interactions

- Human Environment
- Biodiversity
- Ornithology
- Land and Soils

Biodiversity/Ornithology Interactions:

- Water Quality
- Land and Soils
- Air Quality and Climate
- Noise

Water Interactions:

- Biodiversity
- Human Environment

Land and Soils Interactions:

- Water Quality
- Biodiversity
- Archaeology and Cultural Heritage
- Air Quality and Climate

Air Quality and Climate Interactions:

- Human Environment
- Biodiversity
- Material Assets

Noise and Vibration Interactions:

- Human Environment
- Biodiversity
- Ornithology

Landscape and Visual Resource Interactions:

- Material Assets
- Human Environment

Archaeology and Cultural Heritage Interactions:

- Material Assets

Traffic and Transport Interactions:

- Human Environment
- Noise
- Air Quality and Climate
- Material Assets

Material Assets Interactions:

- Human Environment
- Archaeology and Cultural Heritage
- Civil Engineering and Roads/Traffic

A matrix has been generated to summarise the relevant interactions and interdependencies between specific environmental aspects and a significance rating has been given. The matrix is presented in

Table 16-1. It contains each of the environmental topics, which were considered as part of this environmental impact assessment, on both axes. These interactions have been identified for both the construction [C] and operation [O] phases of the proposed development and have been classified as minor or major based on the impacts previously identified. The significance rating is made in accordance with EPA significance rating criteria. Full details of the significance of the impacts and the relevant interactions of the environmental aspects along with any proposed mitigation are discussed within each of the individual preceding Chapters;

Chapter 5	Population and Human Health
Chapter 6	Biodiversity
Chapter 7	Ornithology
Chapter 8	Water
Chapter 9	Land and Soils
Chapter 10	Air and Climate
Chapter 11	Noise
Chapter 12	Shadow Flicker
Chapter 13	Landscape and Visual Impact
Chapter 14	Cultural Heritage
Chapter 15	Material Assets

A number of interactions have been identified in the EIAR. These are set out below and have been addressed in the relevant chapter.

16.3.1 Major Interactions

Biodiversity and Ornithology *and* Civil Engineering and Roads/Traffic

The interaction between biodiversity and ornithology *and* civil engineering and roads/traffic is expected to be greatest during the construction phase. These impacts have been assessed in the Biodiversity and Ornithology Chapters 6 and 7. Construction scheduling and the recommended mitigation measures set out in the project Construction Environmental Management Plan (CEMP) and Construction-Phase Traffic Management Plan will reduce any impacts.

Land and Soils *and* Water *and* Civil Engineering and Roads/Traffic

Soil (peat and subsoil) and rock will be excavated to accommodate the foundations, hardstandings and the access roads. These construction works also have the potential to negatively impact on surface water. The wind farm will be developed in line with the drainage proposal for surface water management (sediment and erosion control) detailed in the Chapter 2 of this EIAR and the CEMP as part of the civil works to ensure adequate protection of water courses during the construction phase.

16.3.2 Minor Interactions

Population and Human Health *and* Air and Climate *and* Noise

As identified in Chapter 4 of this EIAR, the construction phase has the potential to generate noise and dust, which could create a temporary nuisance for occupants of nearby dwellings during the construction phase. A CEMP will be implemented to mitigate any impact. Best practice in the form of BS5228 –1&2:2009 + A1 2014, *Code of Practice for the Control of Noise and Vibration on Construction and Open Sites* will be adopted during the construction phase in order to minimise the noise generated by construction activities and nuisance to neighbours.

Any noise emissions generated during the operational phase are predicted to meet the noise limits established for both day and night-time periods.

During the operational phase, the proposed wind farm will contribute towards eventual national decarbonisation which will have beneficial effects on air quality and climate change and a resultant positive effect on the human environment. This is outlined in Chapter 10 Air and Climate.

Population and Human Health *and* Civil Engineering and Roads/Traffic *and* Noise

Appendix 3-1 of this E I A R discusses how the construction phase of the project will give rise to increased traffic including abnormal loads for delivery of turbine components, and is likely to create some short-term inconvenience for other road users. A Construction-phase Traffic Management Plan, included as Appendix 15-3, will be implemented to manage traffic coming to and from the site.

The movement of construction vehicles both within and to and from the site has the potential to give rise to noise and dust nuisance effects during the construction phase. This is assessed further in Chapter 11 of this E I A R, and mitigation measures are presented to minimise any potential effects.

Population and Human Health *and* Material Assets

In general, the interaction with Material Assets is considered based on a positive impact, resulting from its contribution to electricity supply and the provision of a clean energy source.

Population and Human Health *and* Landscape and Visual Resources

The most visually dominant infrastructure will be the wind turbines and these will change the landscape to observers. The proposed wind farm would be located in an area cited in the Kerry Renewable Energy Strategy as being suitable for wind energy ('Open to Consideration') and of Low to Medium landscape sensitivity, as concluded in Chapter 13 Landscape and Visual. The area is already characterised by a number of existing wind farms, including Tullahennel and Curraderrig to the west, with Leanamore to the east.

Chapter 13 of this E I A R considers the magnitude of landscape change and assesses the landscape and visual impact of the project. The potential impact on landscape and visual resources during the construction phase will be temporary e.g. use of construction machinery. The operation of the wind farm will introduce wind turbines into a natural environment, but one that is already modified by the presence of wind turbines.

Biodiversity *and* Water Quality

There is the potential for water pollution from different sources during the construction works which may cause effects on the quality of aquatic habitats and thereby adversely impact the fauna that depend on the habitat. These impacts and any others including drainage are fully assessed in Chapter 6 and the mitigation measures are also described. A surface water management plan (refer to Chapter 2 and Chapter 8) has been completed as part of the project to manage run-off, particularly of sediment laden water, as a means of protecting water quality and aquatic habitats. Specific measures are also outlined in the project Construction Environmental Management Plan (CEMP) to reduce any potential impacts.

The site drainage system that will remain in operation for the operational phase has been designed to minimise significant effects on flora and their associated habitats.

Biodiversity *and* Land and Soils

The removal of soils/peat within the development footprint is likely to result in habitat loss and some disturbance of fauna. Any displaced peat/soil will be re-used on site in road and berm construction and placed in the engineered peat deposition areas.

Land and Soils *and* Water

As identified in Chapter 9 of this EIAR, the movement and removal of soils and overburden during the construction phase has the potential to have an adverse impact on water quality. The excavation of roads and other works areas has the potential to intercept larger volumes of drainage water that will require management. However, with the implementation of the mitigation measures outlined in Chapter 8 Water and Chapter 9 Land and Soils and a CEMP, the impacts will be mitigated or avoided.

Land and Soils *and* Air and Climate *and* Noise

The movement and removal of soils and overburden during the construction phase has the potential to give rise to dust effects (as described in Chapter 10 Air and Climate), which could in turn reduce the local air quality.

Shadow Flicker *and* Population and Human Health

There is the potential for interaction between the nearest receptors and shadow flicker from the wind turbines during the operational phase. The installation of programmable shadow flicker modules on turbines will allow the control of turbines in order to eliminate shadow flicker. The correct operation of the installed shadow flicker control modules will ensure that there will be no impact from shadow flicker.

Table 16-1 Matrix of Impacts

	Population and Human Health	Civil Engineering and Roads	Biodiversity	Ornithology	Water	Land and Soils	Air and Climate	Noise and Vibration	Landscape and Visual	Shadow Flicker	Cultural Heritage	Material Assets
Population and Human Health		C			C	C	C/O	C/O	C	O		O
Civil Engineering and Roads	C		C	C	C	C	C	C			C	C
Biodiversity		C		C	C	C		C/O				
Ornithology		C	C			C		C/O				
Water	C	C	C			C						
Land and Soils		C	C	C	C						C	
Air and Climate	C/O	C										C
Noise and Vibration	C/O	C	C/O	C/O								
Landscape and Visual	O	C									O	
Shadow Flicker	O											
Archaeology and Cultural Heritage		C				C			O			
Material Assets	O	C					O					

	Major Interaction
	Minor Interaction
	No Interaction

C	Construction Phase Impact
O	Operation Phase Impact

16.4 MITIGATION AND RESIDUAL EFFECTS

Where any potential interactive negative effects have been identified in the above, a full schedule of appropriate mitigation measures have already been included in the relevant sections (Sections 4-15) of the EiAR; summarised in Chapter 17. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual effects, and their significance, is also given in each chapter.

16.5 CONCLUSION

While all environmental aspects can be inter-related to some extent, this final chapter highlighted the prominent interactions. The significance of the impacts and the relevant interactions of the environmental aspects are previously discussed within each of the individual chapters. There are a small number of major interactions and a greater number of minor interactions indicated. During the construction phase, the proposed wind farm development may impact on the local environment; however mitigation measures, good site management and best construction practices will mitigate and reduce identified impacts.

The overall wind farm design philosophy of avoiding deep peat and integrating the existing roads and drainage where possible and buffers to sensitive areas and watercourses all underpin the sustainable design philosophy applied to this wind farm.

Overall, the wind farm will be beneficial at a local, national and wider level. The avoidance of fossil fuels and the associated avoidance of emissions of air pollutants and greenhouse gases will have a positive impact. During the operation phase, the development will assist in meeting both domestic and European energy targets and is in line with sustainable development principles in its use of indigenous renewable energy.