17. INTERACTION OF EFFECTS

17.1 Introduction

Chapters 5 to 15 of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity (Flora and Fauna) Ornithology (Birds), Land, Soils and Geology, Water (Hydrology and Hydrogeology), Air, Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage (Archaeological, Architectural and Cultural Heritage) and Material Assets (Roads and Traffic, Telecommunications and Aviation), as a result of the Proposed Development as described in Chapter 4 of this EIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or improve them, or have a neutral effect.

A matrix is presented in Table 17-1 below to identify potential interactions of impacts between the various aspects of the environment already assessed in this EIAR. The matrix highlights the potential for the occurrence of positive, neutral or negative effects during both the construction (C) and operational (O) phases. It is considered that the potential effects during the decommissioning phase will be similar to the construction phase effects but of a lesser magnitude. The matrix is symmetric, with each environmental component addressed in the chapters of this EIAR being placed on both axes of a matrix, and therefore, each potential interaction is identified twice.

Table 17-1 Interaction Matrix: Potential for Interacting Impacts

	Phase	Population and Human Health	Biodiversity, Flora and Fauna	Ornithology	Land, Soils and Geology	Water	Air	Climate	Noise and Vibration	Landscape and Visual	Cultural Heritage	Material Assets
Population and Human Health	C											
	O											
Biodiversity, Flora and Fauna	C											
	O											
Ornithology	C											
	O											
Land, Soils and Geology	C											
	O											
Water	C											
	O											
Air	C											
	O											
Climate	C											
	O											
Noise and Vibration	C											
	O											
Landscape and Visual	C											
	O											
Cultural Heritage	C											
	O											
Material Assets	C											
	O											

Legend: No Interacting Effect: Positive Effect:
Neutral Effect: Negative Effect:

The potential for interaction of impacts has been assessed, throughout this EIAR, as part of the Impact Assessment process. While the work on all parts of the EIAR was not carried out by MKO, the entire project and all the work of all sub-consultants was managed and coordinated by the company. This EIAR was edited and collated by MKO as an integrated report of findings from the impact assessment process, by all relevant experts, and impacts that potentially interact have been assessed in detail in the individual chapters of the EIAR above and summarised in Section 15.2 below.

Where any potential negative impacts have been identified during the assessment process, these impacts have been avoided or reduced by design and the proposed mitigation measures, as presented throughout the EIAR and highlighted in Section 17.2 below.

17.1.1 Statement of Authority

This section of the EIAR has been prepared by Edward Ryan, and reviewed by Eoin McCarthy, of MKO. Edward holds a B.Sc. (Hons) in Environmental Science from the University of Limerick and a M.Sc. (hons) in Environmental Systems from Atlantic Technological University: ATU (formally GMIT). Edward is an Environmental Scientist with over 4 years of consultancy experience. Eoin is a Senior Environmental Scientist with over 12 years experience and holds a B.Sc. (Hons) in Environmental Science from the University of Galway. His project experience includes a significant range of energy infrastructure having managed and co-ordinated the EIAR preparation and planning application process for circa 700MW of wind energy projects.

17.2 Impact Interactions

17.2.1 Population and Human Health

Population and Human Health, and Noise

As identified in Chapter 5 (Population and Human Health) of this EIAR, the construction phase has the potential to create a short-term, negative effect on human health due to the nuisance caused by construction plant and vehicle noise emissions, should the mitigation measures outlined in Chapter 12 (Noise) not be implemented.

During the operational phase the Proposed Development has the potential to generate noise but as identified in Chapter 12, the potential effects on population and human health are not significant.

Population and Human Health and Air

During the construction phase. the Proposed Development has the potential to create a short term, negative effect on human health via exhaust emissions as a result of the use of construction vehicles/machinery and plant on the site and the transport of workers and materials to/from the site. As outlined in Chapter 10 (Air), the potential effects on human health are short-term, slight, negative impacts.

By providing an alternative to electricity derived from coal, oil or gas-fired power stations, the Proposed Development will result in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2). The production of renewable energy from the Proposed Development will have a long-term, significant, positive impact on air quality.

Population and Human Health and Climate

During the construction phase, the Proposed Development has the potenital to create a short term, negative effect on climate via exhaust emissions as a result of the use of construction vehicles/machinery

and plant on the site and the transport of workers and materials to/from the site. This potential impact will be short-term and slight and will be restricted to the duration of the construction phase.

During the operational phase, the energy generated by the Proposed Development will offset energy and the associated emission of greenhouse gases from electricity-generating stations dependent on fossil fuels, thereby having a positive effect on climate (i.e. slowing the rate of global warming). In doing so, there will be reduced effects from climate change on human health over the 'do-nothing' scenario and continuing reliance on generating energy using fossil fuels.

Population and Human Health and Land, Soils and Geology

The excavation and movement of peat and spoil during the construction phase of the Proposed Development has the potential to create dust emissions which, consequently, have the potential to have a temporary, slight, negative effect on local air quality and human health. Mitigation measures to reduce dust emissions generated during the construction phase of the Proposed Development are presented in Chapter 10.

Population and Human Health and Water

As described in Chapter 9 of this EIAR, the construction phase of the Proposed Development has the potential to give rise to some water pollution as a result of site activities, and any water pollution could have a potential significant negative effect on the health of other users of that water within the same catchment. Mitigation measures are presented in Chapter 9 to minimise the potential of any such issues occurring.

Population and Human Health, and Material Assets

Chapter 15 of this EIAR discusses how the construction phase of the project will give rise to traffic movements of abnormal loads and increased traffic volumes on the local road network and, therefore, is likely to create some short-term inconvenience for other road users. A Traffic Management Plan will be in place to minimise all disruption insofar as possible, as outlined in the Section 15.1 of this EIAR and included as Appendix 15-2.

Population and Human Health, and Landscape and Visual

The construction phase of the Proposed Development will see the temporary introduction of construction machinery and the erection of wind turbines into a natural, but already modified landscape. The erection of the turbines in particular will change the existing landscape. Whether the long-term change in landscape created by the erection of the turbines is deemed to be positive or negative is a subjective matter. What appears to be a positive visual effect to one viewer could be deemed to be a negative effect by another viewer. The landscape and visual impact assessment of the Proposed Development, included as Chapter 14 of this EIAR, concludes that, from 11 viewpoints assessed, the visual effect will be 'Moderate' from one location and ranges from 'Not Significant' to 'Slight' at the remaining locations. Therefore, it is considered, on the basis of the visual assessment undertaken, that the overall visual impact of the Proposed Development will not be significant.

17.2.2 Biodiversity

Biodiversity and Land, Soils and Geology

The removal of forestry, peat and spoil, during construction of the Proposed Development, is likely to result in some disturbance of flora and fauna in the areas surrounding the proposed works area thereby, potentially causing a long term, slight, negative effect on flora and fauna. Excavated peat and spoil will

be used for the restoration of the proposed borrow pits permanently placed within the peat placement areas within the site or used for landscaping.

Biodiversity and Water

Site activities during the construction phase have the potential to give rise to some water pollution, and consequential indirect effects (such as disturbance and deterioration of habitat quality) on flora and fauna that use the water within the same catchment. The site activities during the construction phase, and continuing on for the operational phase, will give rise to additional localised drainage, which has the potential to have a significant, long term, negative effect on flora and their associated habitats should the appropriate measures not be implemented. These potential impacts have been assessed in Chapter 6 and Chapter 9 of this EIAR, and the relevant measures outlined in Chapter 9 will be in place to avoid any water pollution and subsequent effect on flora and fauna.

Biodiversity and Air

During the construction phase of the Proposed Development, increased vehicular and dust emissions within and around the site have the potential to be a nuisance to flora and fauna, thereby having a temporary, slight, negative effect. The mitigation measures outlined in Chapter 10 of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

Biodiversity and Climate

During the construction phase of the Proposed Development, the use of construction vehicles/machinery and plant, the transport of workers and materials to/from the site and the felling of trees will give rise to exhaust emissions. The production of these emissions will result in a short-term, negative impact on biodiversity.

During the operational phase, the Proposed Development will help offset carbon emissions from fossil fuel based electricity generation plants, which will help contribute to a slower increase in the rate of global warming and a reduction in air pollution, consequently, could in combination with other renewable energy projects, have a long term, significant positive effect on flora and fauna.

Biodiversity and Noise and Vibration

Site activity during the construction phase could give rise to noise that could be a nuisance for fauna, thereby having a temporary, slight, negative effect. Best practice mitigation measures are included in Chapter 6 and Chapter 12 to minimise the potential negative effect of noise generated during the construction phase on fauna.

Biodiversity and Landscape

The removal of some vegetation within the Proposed Development footprint and surrounding areas is likely to result in a change to the visual landscape during the construction phase, which will become part of the normal landscape of the wider area for the duration of the operational phase. The visual effect of this change is considered to be long-term, localised and slight.

17.2.3 Ornithology

Ornithology and Land, Soils and Geology

The removal of forestry, peat and spoil, during construction of the Proposed Development, is likely to result in some disturbance of flora and fauna, including birds, in the areas surrounding the proposed works area thereby, potentially causing an indirect long term, slight, negative effect on birds.

Ornithology and Water

Site activities during the construction phase have the potential to give rise to some water pollution, and consequential indirect effects on birds and their prey species (such as disturbance and deterioration of habitat quality) that use that water within the same catchment. The site activities during the construction phase, and continuing on for the operational phase, are likely to give rise to additional localised drainage, which has the potential to have a significant, negative effect on the habitats of particular bird species and subsequently a long, term, negative effect on ornithology, however, this will be mitigated against by the implementation of the measures outlined in Chapter 9 of this EIAR.

Ornithology and Air

During the construction phase of the Proposed Development, increased vehicular and dust emissions within and around the site have the potential to be a nuisance for birds, thereby having a temporary, slight, negative effect. The mitigation measures outlined in Chapter 10 of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

Ornithology and Climate

During the operational phase, the Proposed Development will help offset carbon emissions from fossil fuel based electricity generation plants, which will help contribute to a slower increase in the rate of global warming and, consequently, could in combination with other renewable energy projects, contribute to preventing the loss of bird species from Ireland as a result of climate change.

Ornithology and Noise and Vibration

Site activity during the construction phase could give rise to noise that could be a nuisance for birds that use the site, therefore, causing a temporary, slight, negative effect on ornithology. Best practice mitigation measures are included in Appendix 7-1 and Chapter 12 to minimise the potential negative effect of noise generated during the construction phase on ornithology.

17.2.4 Land, Soils and Geology

Land, Soils and Geology and Water

As identified in Chapter 9 of this EIAR, the movement and removal of peat and spoil during the construction phase has the potential to have a significant, negative effect on water quality through potentially silt-laden runoff from the proposed works areas. Mitigation measures to ensure there are no significant, negative effects on water quality are presented in Chapter 9.

Land, Soils and Geology and Archaeological, Architectural and Cultural Heritage

The removal of peat and spoil during the construction phase has the potential to have a permanent, significant, negative effect on previously unrecorded sub-surface archaeological site and artefacts.

Mitigation measures outlined in Chapter 13 will reduce the potential for negative effects on unrecorded sites and artefacts during excavations.

Land, Soils and Geology and Landscape and Visual

The removal of peat and spoil and the subsequent replacement with crushed stone for the construction of site roads and hardstanding areas within the Proposed Development site has the potential to alter the local landscape. The visual effect of this change is expected to be long term, localised in nature and slight.

17.2.5 Air

Air and Material Assets

The movement of construction vehicles both within and to and from the Proposed Development site has the potential to give rise to dust nuisance effects during the construction phase. This is assessed further in Chapter 10 of this EIAR, and mitigation measures are presented to minimise any potential effects.

17.2.6 Climate

Air and Material Assets

There will be greenhouse gas emissions arising from production of construction materials (such as cement), and the operation of construction vehicles and plant. These will be restricted to the duration of the construction phase, and as such will give rise to emissions over a short-term duration. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate. This is assessed in detail in Chapter 11 of this EIAR, and mitigation measures are presented to minimise any potential effects.

17.2.7 Landscape and Visual

Landscape and Visual and Cultural Heritage

As described in Chapter 14 of this EIAR, the Proposed Development has the potential to change the landscape setting of recorded sites and monuments in the wider area. However, it is concluded in Chapter 13 that any potential, indirect, visual effect of the Proposed Development on national and recorded monuments would not be significant.

17.3 Mitigation and Residual Impacts

Where any potential interactive negative impacts have been identified in the above, a full suite of appropriate mitigation measures has already been included in the relevant sections (Chapters 5-15) of the EIAR. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual impacts and the significance of effects, is also presented in each relevant chapter.