17 INTERACTIONS OF THE FOREGOING AND A SUMMARY OF MITIGATION MEASURES

17.1 INTERACTIONS OF THE FOREGOING

17.1.1 Introduction

The foregoing topics in earlier chapters do not exist in isolation from each other and consequently, any impact on one element of the environment may also impact on another. The Irish Environmental Protection Agency (EPA) have developed a simple matrix to show the key interactions and interrelationships between the environmental aspects of a Development (**Table 17.1**). The interactions between impacts on different factors have been addressed as relevant throughout the EIAR (**Table 17.2**). The cumulative slight impact on a number of topics may result in a significant impact on another topic.

17.1.2 Impact Interactions

Where any potential negative impacts have been identified during the assessment process, these impacts have been avoided by embedded design mitigation or at a minimum, reduced by the proposed mitigation measures.

17.2 SUMMARY OF MITIGATION MEASURES

This chapter summarises mitigation measures proposed elsewhere in the EIAR. **Chapters 4 to 16** of the EIAR outline the findings of the assessment of the predicted effects of the Project on a topic-by-topic basis. The significance of these effects has been assessed using criteria defined in the topic chapters. In the context of The EPA Guidelines (2022), the significance of effects is categorised from imperceptible through to not significant, significant and profound with varying sub-categories.

17.2.1 Embedded Mitigation

Embedded mitigation includes design changes that were made to reduce or eliminate adverse effects, as well as normal good practice measures; these have avoided the majority of potentially significant effects. **Appendix 17.1** summarises mitigation measures for all technical assessment chapters.

The process of applying the embedded mitigation is set out in **Chapter 2: Project Description**. The key design aspects comprising embedded mitigation include:

- Avoiding inconsistent turbine spacing, outliers and excessive turbine overlapping to minimise visual confusion and ensure a balanced/compact array of key views;
- Achieving an appropriate scale of turbine, taking account of the landscape context;
- Upgrading existing forestry tracks to be used as Site Access Roads at the Site;

- Respecting and understanding the ground conditions and topography of the Site; including avoiding effects on active peat where possible;
- Maximising the separation from residential dwellings, and
- Respecting other environmental constraints and associated buffer separations.

17.2.2 Specific Mitigation Measures

In addition to mitigation proposed to address significant adverse effects (**Appendix 17.1**), certain chapters have also proposed further measures to reduce effects that were assessed as 'Not Significant' before mitigation.

Table 17.2 outlines interactions between environmental aspects. Technical assessments have assessed pathways, both direct and indirect that can magnify effects through the interaction or accumulation of effects. Effects have been cross-referenced between chapter topics. An outline of potential interactions between chapters/topics is presented in **Table 17.1**.

Table 17.1: Summary matrix of Interactions of Impacts during Construction, Operational and Decommissioning Phases (Source: Adapted from EIAR Guidelines, 2022)

	Population & Human Health		Biodiversity		Soils & Geology		Hydrology and Hydrogeology		Noise		Landscape & Visual		Material Assets		Cultural Heritage		Traffic & Transportation		Shadow Flicker		Air and Climate		Major Accidents and Natural Disasters	
	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper
Population & Human Health																								
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	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper
Major Accidents & Natural Disasters																								

Note: Const. = Construction phase; Oper = Operational phase Decom. = Decommissioning

Interaction or inter-relationship

No interaction or inter-relationship

Table 17.2: Interactions & Inter-relationships between Environmental Aspects of the Proposed Development

Interaction	Description
Population and Human Health & Hydrology and Hydrogeology	**Chapter 8: Hydrology and Hydrogeology** provides an assessment of the hydrological impacts of the Proposed Development, including the potential for water contamination. Water contamination could potentially occur during the construction and the Decommissioning phases from the release of suspended solids, accidental spillages of cement, hydrocarbons, or HDD fluid. Once mitigation measures are implemented the risk of water contamination will be significantly reduced. However, there remains a level of risk and therefore both precautionary measures and emergency response protocols have been established and specified in Management Plans 1 and 2 of the CEMP, **Appendix 2.1**.
Population and Human Health & Noise	There is likely to be some noise and vibration from traffic within the vicinity of the Haul Route which may cause disturbance to residents. However, the effects are not predicted to be significant. Operational noise, designed to meet the limits in the 2006 Wind Energy Development Guidelines (WEDG) will have a residual effect within the guideline limits and can be described as Not Significant. Noise effects during Decommissioning of the Proposed Development are likely to be of a similar nature to that during construction but of shorter duration. Existing roadways and turbine bases (excluding plinths) will be left in place and naturally vegetated over. Any legislation, guidance, or best practice relevant at the time of Decommissioning will be complied with.
Population and Human Health & Landscape and Visual	The Project is located approximately 10 km from the Múscraí Gaeltacht area. While the construction phase will see the arrival of construction workers in the vicinity of the area, this will be a short-term occurrence and will not result in permanent settlement of the area by non-Irish speakers. The Project is, therefore, predicted to result in a negligible, indirect, not significant impact on the Irish language during the construction phase. Please see **Chapter 14: Cultural Heritage** for more details. Based on the findings of the collective assessments, it was considered that the Proposed Development will not give rise to any significant effects on tourism. Overall effects of the Proposed Development with regards to tourism are considered to be short-term, slight, negative during both construction and Decommissioning phases due to temporary closures and diversions of walking and cycling routes. There will be a long-term, slight positive impact during operation due to improved tracks, information boards and waymarking.
Population and Human Health & Shadow Flicker	The assessment has identified that by installing a blade shadow control system on the proposed turbines, there will be no significant direct or indirect effects. Given that only effects of significant impact or greater are considered "significant" in terms of the EIA Directive the potential effects of the Project as a result of shadow flicker, when mitigated, are considered to be not significant. The Project has been assessed as having the potential to result in negative, imperceptible, long-term effects overall with regards to shadow flicker. There are no predicted cumulative effects.
Population and Human Health & Air and Climate	The effect of the Proposed Development on air quality will be imperceptible over the short-term period in which there will be an increase in traffic movements during construction and Decommissioning. There will be slight, long term, positive effects on air quality because of the wind farm during operation.

Interaction	Description
Population and Human Health & Major Accidents and Natural Disasters	The design of the Project has considered the susceptibility to natural disasters. The proposed site drainage will mitigate against any potential flooding risk due to run off with the use of Sustainable Drainage Systems (SuDS). Construction drainage will be left in-situ for the lifespan of the Project through to Decommissioning. The Contractor's fire plans are reviewed and updated on a regular basis. A nominated competent person shall carry out checks and routine maintenance work to ensure the reliability and safe operation of firefighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be kept on site at all times. **Chapter 16: Major Accidents** provides an assessment of the vulnerability of the Project to major accidents and natural disasters. Possible risks associated with the Project during the construction, operation and Decommissioning phases are outlined and assessed. These risks have the potential to directly or indirectly impact Population and Human Health. The consequence ratings assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster. All scenarios when assessed were considered "low risk".
Soil and Geology & Biodiversity	Ecology - there is a close association and interaction between soils and the habitats that the various soil types support. The removal of soils has resulted in a loss of habitat within the Proposed Development footprint for these flora and fauna that depend on them for food and shelter. This will be reversed in those parts of the Proposed Development that are to be restored. For blanket bogs, there is an important interaction between flora, fauna, soil and hydrology.
Soils and Geology & Hydrology and Hydrogeology	Water (Hydrology & Hydrogeology) - management of soil (excavation and storage) will interact with surface water quality in terms of potential soil erosion and siltation of the receiving surface water environment. The risk of soil contamination from hydrocarbons also presents a risk to the groundwater and surface water environments.
Soils and Geology & Noise	Noise – construction works at the Site using large plant will increase noise levels. Much of this work will be completed with excavators and rock breaker. This increase will be of short duration.
Soils and Geology, & Archaeology and Cultural Heritage	The Project is located approximately 10km from the Múscraí Gaeltacht area. While the construction phase will see the arrival of construction workers in the vicinity of the area, this will be a short-term occurrence and will not result in permanent settlement of the area by non-Irish speakers. The Project is, therefore, predicted to result in a negligible, indirect, not significant impact on the Irish language during the construction phase. Please see **Chapter 14: Cultural Heritage** for more details. Based on the findings of the collective assessments, it was considered that the Proposed Development will not give rise to any significant effects on tourism. Overall effects of the Proposed Development with regards to tourism are considered to be short-term, slight, negative during both construction and Decommissioning phases due to temporary closures and diversions of walking and cycling routes. There will be a long-term, slight positive impact during operation due to improved tracks, information boards and waymarking.
Soils and Geology & Traffic and Transportation	Traffic - the transport of turbine components to site and the importation of concrete and aggregate will increase HGV traffic and noise locally. This increase will be of short duration. For example, the concrete needed to complete one foundation will require approximately 42 loads, but this will be completed in one day. Use of site-won stone will reduce the volume of HGV traffic but increase noise levels on site in their excavation.

Interaction	Description
Soils and Geology & Air Quality	Air Quality - fugitive dust emissions from the management of soils (excavations and storage) could affect air quality locally. Removal of excess soils and importation of quarry products will increase emissions from HGVs, affecting air quality locally.
Soil and Geology & Major Accidents and Natural Disasters	Peat and/or subsoil on sloping ground can become unstable when the gravity forces acting on the soil mass exceed the shear strength of the material. This failure can occur as landslides or flows. Slides are distinguished from flows in that slides are the movement of large continuous masses of soil/peat along a slip surface. Flows are the movement of material softened and lubricated by water, such as bog bursts. Slip planes are less evident in the latter. The ground conditions of the Site consist of a thin peat cover on steep slopes with slightly thicker peat deposits on shallower slopes. The Wind Farm Planning Guidelines (**Appendix 4** – Best Practice for Wind Energy Development in Peatlands) requires that a geotechnical and landslide risk assessment '*is be carried out where depth of peat is in excess of 50cm*'. As the Site is largely developed and no works are required in areas with peat, a peat landslide risk assessment is therefore not required. One was completed by MEL for the original EIA. It concluded that there was low risk of peat instability during the construction phase and so, adopting the precautionary principle, site-specific mitigation measures were proposed. Mitigation by design (i.e., the avoidance of areas with steep gradient and deeper peat) was used to minimise risk of peat landslide. The construction of the wind farm roads and hardstands was largely completed in 2017 / 2018 with no incidents of peat / soil / rock landslide.
Noise & Traffic and Transportation	The delivery of turbines to the Site will generate low level traffic noise as the vehicles carrying the turbines will move slowly along the local roads where impact is expected to be greatest. The main (maximum) construction noise generated by traffic to the Site will be due to ready-mix trucks delivering concrete pour for foundation of the 3 turbines. The concrete pour for each individual turbine will be required to be completed in a short a period as possible (usually within 10 hours). During this 10-hour period other trucking to the Site will be curtailed on the local road delivery routes as best practice. For three turbines the concrete pour will be of duration of three days (one day for each Turbine Foundation). The predicted construction noise levels are within the NRA guidelines for daytime for all development works and are therefore considered not significant.
Traffic and Transport & Population and Human Health	HGVs leaving the Site have the potential to transport mud, stones or other debris from the Site to the surrounding road network on wheels of the vehicles. This could cause nuisance to local road users or damage to vehicles from loose debris. This effect can be predicted to be direct, negative, minor and short-term in nature confined to the initial Decommissioning and construction phases only and will be subject to mitigation measures.
Traffic and Transport & Air and Climate	Good local air quality is essential for the health and quality of life of residents along the Haul Route. Transport accounts for a significant proportion of pollutants in the atmosphere namely, CO2 emissions, nitrogen dioxide (NO2) and particulate matter (PM10). NO2 emissions can also be harmful to vegetation and ecosystems in the vicinity of the Haul Route. The increase in traffic movements on the local road network of an average of approximately 40 (average 15 HGV's + 25 cars and vans) trips per day over a short-term period is low relative to the Baseline and therefore the effect of the Proposed Development on air quality will be imperceptible.
Traffic and Transport & Noise	There is likely to be some noise and vibration from HGV movements along the Haul Route on the regional roads, particularly on the L8767, R8765 and R586 which can cause disturbance to residents living along these roads. Due to the relatively low number of trips generated per day, (apart from the six days when concrete pours are taking place) the restrictions on working hours and the short-term nature of the construction phase, the effects of noise and vibration are not predicted to be significant. Mitigation measures are discussed in **Section 10.13** and in **Chapter 10: Noise**.

Interaction	Description
Shadow Flicker & Population and Human Health	This assessment has identified the potential for shadow flicker to affect 10 no. out of 21 no. receptors within the shadow flicker Study Area. It is proposed that a shadow control system be installed to eliminate the potential for shadow flicker from the Project. This assessment has identified that by installing a blade shadow control system on the proposed turbines, there will be no significant direct or indirect effects. Given that only effects of significant impact or greater are considered "significant" in terms of the EIA Directive the potential effects of the Project as a result of shadow flicker, when mitigated, are considered to be not significant. The Project has been assessed as having the potential to result in negative, imperceptible, long-term effects overall with regards to shadow flicker. There are no predicted cumulative effects.