MWP

Chapter 17 Interaction of the Forgoing

Ballinla Wind Farm

Ballinla Wind Farm Limited

August 2025

Contents

Tables

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
23882	6019	A	August 2025	WM	GT	GT	Final

MWP, Engineering and Environmental Consultants
Address: Park House, Bessboro Road, Blackrock, Cork, T12 X251, Ireland

www.mwp.ie

17. Interaction of the Foregoing

17.1 Introduction

This EIAR has presented the environmental assessments of the Proposed Development under each required environmental 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.

This chapter of the EIAR evaluates the potential interaction of impacts, which the Proposed Development may have on the receiving environment and sensitive receptors.

17.1.1 Scope and Methodology Assessment

Article 3 of EIA Directive 2011/92/EU, as amended by 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. The potential for interactions between one aspect of the environment and another can result in direct or indirect effects, which may be positive or adverse. 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.

17.2 Identification 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 the construction, operational and decommissioning phases of the Proposed Development.

Where the potential for significant effects has been identified, the impacts have been avoided or reduced by mitigation measures, as outlined throughout the Chapters of the EIAR.

A matrix has been generated to summarise the relevant interactions between specific environmental factors identified for the Proposed Development. The matrix is presented in Table 17-1. It contains each of the environmental factors or aspects, which were considered as part of this environmental impact assessment, on both axes. These interactions have been identified for both the construction, operation and decommissioning phases of the Proposed Development and positive effects are identified.

Full details of the significance of the effects and the relevant interactions of the environmental aspects along with any proposed mitigation are discussed within each of the individual preceding Chapters.

17.2.1 Population and Human Health

During the construction phase there is potential for adverse effects on population and human health in relation to material assets, traffic and transport, water, air quality, noise and vibration and landscape and visual resources.

The utility services in the local area (i.e. built assets) have been studied to ensure that supply to local residents will be protected during all stages of the Proposed Development. Overall, the interaction with Material Assets is considered a positive effect, resulting from the Project's contribution to the electricity supply with the provision of a sustainable, clean energy source.

The construction phase of the Proposed Development 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 CTMP will be implemented to manage traffic coming to and from the Proposed Development and minimise disturbance to local residents.

Plant and machinery used during the construction phase have the potential to cause short term disturbance through noise and dust emissions. This interaction of effects may also occur at the decommissioning phase of the development. The impacts are considered to be temporary and mitigation measures are set out to ensure no significant interaction effects on population and human health arise.

These effects have an insignificant potential to pollute and create temporary disturbance for occupants of nearby dwellings. The interactive effects are likely to be short term and not significant.

During the operational phase, the Proposed Development 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. During the operational phase, however, there is potential for long term adverse effects on population and human health in relation to landscape and visual and noise and vibration effects. At the same time the Proposed Development will have slight positive effects on air quality, climate change and energy security. The interactive effects are likely to be long term and not significant.

During the decommissioning phase there is potential for insignificant adverse effects on population and human health in relation to traffic and transport, and noise and vibration which could create a temporary disturbance for occupants of nearby dwellings. At the same time the removal of the wind turbines will have long term moderate positive effects on the visual landscape and noise (for occupants of nearby dwellings). The interactive effects are likely to be short and long term and not significant.

17.2.2 Biodiversity and Ornithology

Bird species associated with aquatic habitats (e.g. kingfisher, little egret, whooper swan) may be indirectly affected by changes in water quality or hydrological regimes. The ornithological assessment has considered potential hydrological connectivity between the Proposed Development and nearby wetlands, rivers, and designated sites. Mitigation measures to prevent sedimentation and pollution (e.g. silt fencing, buffer zones) are relevant to protecting avian foraging and roosting habitats.

Construction and operational noise may cause disturbance or displacement of sensitive bird species, particularly during the breeding season. The ornithology chapter has considered the spatial and temporal overlap between noise-generating activities and key avian receptors. Where necessary, mitigation measures have been recommended to minimise disturbance.

While primarily focused on human receptors, landscape and visual changes may also influence bird behaviour, particularly for species sensitive to changes in open vistas or those that rely on visual cues for navigation. The

placement of turbines and associated infrastructure has been reviewed in the context of known flight paths and roosting areas to minimise visual intrusion on key avian habitats.

The development of renewable energy infrastructure contributes positively to climate change mitigation, which is a key driver of long-term changes in bird populations and distributions. The ornithological assessment acknowledges the broader ecological benefits of decarbonisation, while also ensuring that localised impacts are appropriately mitigated.

In Material Assets, the removal of forestry and changes in land use can affect bird species that rely on woodland or transitional habitats. The ornithological assessment has considered the implications of felling and replanting, particularly in relation to species such as buzzard, kestrel, and woodcock. Coordination with forestry management plans has informed the mitigation strategy.

Increased traffic during construction, particularly along the Proposed TDR, may result in temporary disturbance to birds using roadside habitats. The ornithological assessment has considered the potential for disturbance along the TDR and recommends measures such as timing restrictions and minimising vegetation clearance.

During the construction phase, changes associated with biodiversity such as the removal of habitats, planting of new vegetation and landscaping works have the potential to cause interactions with other aspects of the environment including land and soils, water, air quality and climate, noise and vibration, and traffic and transportation. The effects of water quality, land and soils, air quality and climate, and disturbance from noise/vibrations and traffic effects were taken into consideration in the assessment of biodiversity effects (i.e. there will be some habitat loss and disturbance to fauna and birds during excavation of certain works areas.) With the proposed mitigation measures in place, the interactive effects are considered **short-term** and **not significant.**

The potential associated effects and mitigation measures are described in full in **Chapter 6 Biodiversity** and **Chapter 7 Ornithology**, which includes biodiversity enhancement measures for the site. During the operational phase, with the proposed mitigations, the adverse interactions of biodiversity and ornithology, land and soils, water, air quality and climate, noise and vibration, and traffic and transport are **likely** to result in **effects not significant** on biodiversity.

Overall, the impacts of decommissioning a wind farm are potentially similar to construction impacts and will comprise temporary disturbance such as noise associated with decommissioning of turbines and on-site machinery and increased traffic. The interaction of biodiversity and water quality, and land and soils effects will not occur during the decommissioning phase.

17.2.3 Water

An assessment of the potential impact of the Proposed Development on human health is included in **Chapter 5: Population and Human Health** of this EIAR. Appropriate industry standard and health and safety legislative requirements will be implemented during the Construction Phase of the Proposed Development that will be protective of site workers.

Effects on waterbodies associated with potable water sources will be mitigated using standard pollution control measures ensuring no adverse impacts on potable water sources as a result of the Proposed Development.

The Proposed Development will temporarily increase the amount of people in close proximity to flood-prone areas during the construction phase. This increased population density could heighten the potential for flood-related health impacts, particularly during construction. Residual risk will be mitigated by monitoring weather forecasts to optimize construction planning.

An assessment of the potential impact of the Proposed Development on the Land and Soils is included in Chapter 9 of this EIAR. During the construction earthworks, heavy rainfall events have the potential to mobilise contaminated runoff and impact on the usability of materials stored onsite. This could therefore require the importation of additional material from external sources. Mitigation measures to reduce the risk of damage of construction materials from heavy rainfall and flood events is outlined in Chapter 3: Civil Engineering.

An assessment of the potential impacts of the Proposed Development on the Biodiversity of the site, with emphasis on habitats, flora and fauna which may be impacted as a result of the excavation and importation of materials to the site are included in Chapter 6: Biodiversity of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

An assessment of the potential impact on the Proposed Development on the material assets – utilities including built services and infrastructure has been set out in Chapter 14: Material Assets Built Services of this EIAR.

There is a risk of excess silts from construction runoff accumulating in the existing drainage network, potentially compromising its capacity. To mitigate this, standard pollution control measures will be employed to manage contaminated runoff and preserve the integrity of drainage channels during construction.

During the construction phase there is potential for the effects associated with surface water and ground water to interact with population and human health (due to water quality), land and soils (soil characteristics and contamination), biodiversity (habitat related to water quality) and Material Assets. The interactive effects are likely to be short term and not significant.

These interactive effects are not relevant to the decommissioning phase. The underground turbine hardstands underground cables and access tracks will likely stay in place during the decommissioning process.

The potential effects associated with surface water and ground water due to the construction and operational phases of the Proposed Development are addressed individually and in detail, in particular in relation to suitable mitigation measures to minimise effects, within the preceding individual chapters.

A CEMP and specific wind farm drainage design have been completed as part of the Proposed Development to manage runoff by maintaining natural drainage features and diverting clean water from works areas that might be silt laden, any silt laden sediment from the works area will be routed to settlement ponds prior to controlled diffuse release as a means of protecting water quality and aquatic habitats.

17.2.4 Land and Soils

The excavation, stockpiling and movement of soil for the Proposed Development has the potential to effect air quality from increased dust emissions associated. There is also potential for related effects on surface and ground water, biodiversity, heritage, landscape, noise and vibration and traffic and transportation. The associated effects and interactions for each aspect are addressed individually in the preceding chapters.

Excavation of soil and rock is required to accommodate the footprint of the turbines, substation and the grid connection. This will lead to habitat loss and create potential pathways to surface and groundwater. There is also the potential for previously unrecorded sites of archaeological interest to be disturbed during excavation works. The potential for all these interactions and the resultant effects are assessed in detail in the relevant chapters in this EIAR. The likely impacts will be avoided or minimised through specific mitigation measures. The Proposed Development will be developed in line with the drainage proposals for surface water management

detailed in the CEMP as part of the civil works to ensure adequate protection of water courses during the construction phase.

These adverse interactions of biodiversity and ornithology, water, landscape, noise and vibration, and traffic and transport effects are likely to result in effects that are not significant during the construction phase only.

17.2.5 Noise and Vibration

Noise effects will occur during the construction phase of the project as a result of increased levels of site associated traffic and excavations during the construction phase. Noise and vibration has the potential to effect population and human health, land and soils, biodiversity and traffic and transportation which are addressed individually and in detail within the preceding chapters. Appropriate noise mitigation measures and best practice methodologies provided in the CEMP will be implemented during the construction phase.

These adverse interactions of biodiversity and ornithology, land and soil, water, air quality and climate, noise, and traffic and transport effects are likely to result in not significant effects. Due to the distance of the proposed works from sensitive locations vibration effects are not likely to arise.

During the operational phase, the only minor noise effects will be associated with the turbine operations and maintenance traffic. This noise will have long-term, not significant effects on population and human health (for nearby residents) and biodiversity.

During the decommissioning phase, there will be some slight noise effects associated with the deconstruction and removal of the turbines. This will have interactive effects with population and human health and biodiversity. The interactive effects are likely to be short term and not significant.

17.2.6 Landscape and Visual Effect

During the construction phase, there is potential for short term insignificant adverse effects on population and human health in relation to landscape and visual effects related to the construction works, machinery and traffic. The interactive effects are likely to be short term and moderate.

During the operational phase, the proposed turbines will be prominent in some views from very close to the site and will be visible from certain long-distance viewpoints. Overall, the Proposed Development will be visible from a number of different viewpoints, the sensitivity was generally assessed as Medium-low for these receptors, this reflecting typical views influenced by a combination of the surrounding working landscape and wind energy development, the significance of effects will range from imperceptible to substantial-moderate. They would have a long-term effect that is likely to be not significant on population and human health.

During the decommissioning phase there is potential for moderate, positive, long-term effects on population and human health in relation to landscape and visual effects due to the removal of the turbines for all those able to see the turbines in the landscape. At the same time there is potential for short term, adverse effects on population and human health from the visual effects associated with increased traffic during the removal of the turbines. The interactive effects are likely to be short and long term and moderate.

17.2.7 Cultural Heritage

The excavation of soils during the construction of the Proposed Development has the potential to have an effect on archaeology and cultural heritage, as well as land and soils. As cultural heritage is an integral component of landscape character, any alteration to the setting or visibility of heritage assets may result in indirect impacts on

the perceived landscape during the operational phase. These interactions extend to land and soils, where changes in land use and soil structure may influence the integrity of heritage features embedded in the terrain. Additional interactions may occur with water, where changes in drainage or sedimentation could affect waterlogged archaeological sites, and with noise and vibration, which may pose risks to built heritage during construction. Given that cultural heritage is a component of landscape character, the indirect effects on cultural heritage also have potential to affect the landscape character during the operational phase. These effects are not significant, and the interaction of these effects is **likely** to result in interactive effects that are **short term and not significant**.

During the decommissioning phase there will be a **long term, moderate, positive** interactive effect with landscape character due to the removal of the wind turbines.

17.2.8 Air Quality and Climate

During the construction phase, there is the potential for short term, adverse effects on human health for residents of nearby dwellings and biodiversity in terms of dust emissions. Dust generated during the construction phase is not likely to significantly affect the local air quality. however, there is the possibility of disturbance occurring from dust generated in the vicinity of the site entrances and along the local public road which could affect road users. Dust mitigation measures are presented in **Chapter 13 Air and Climate** to minimise the risk of any such effects. The interaction of adverse construction air quality effects and biodiversity and population and human health are **likely** to be **not significant**.

Once operational, it is generally accepted that the Proposed Development will make a **slight, indirect, positive** contribution to air quality and climate and population and human health. These interactive effects are l**ikely** to be **long term** and **slightly positive**.

The decommissioning phase will have a low risk of dust effecting air quality and climate or interactions of effects. The interaction of adverse construction air quality effects and biodiversity and population and human health are **likely** to be **not significant**.

The adverse interactions of air quality/climate, population and human health, traffic/transport and land and soils effects are likely to result in **not significant, adverse** effects during the construction. The same interactions during the decommissioning phase will be lower as no significant earth works are envisaged. The only air quality effects during the decommissioning phase will be associated with the use of vehicles and machinery in the short term, and a reduction in renewable energy production and associated greenhouse gas reductions in the long term.

17.2.9 Material Assets – Built Services

The existing or future use of forest resources are not expected to have significant adverse effects during the operational phase of the Proposed Development. The forestry loss from the Proposed Development will be replaced under the felling license. It is likely that the improvements to the onsite forest tracks would provide opportunities for further development and use of some of the forest areas for recreation, during the operational phase. This will likely have a **positive, slight** and **long-term** effect on the existing use of forest resources and the associated health benefits for users.

Energy production during the operation phase of the Proposed Development will **likely** have a **positive**, **slight** and **long-term** effect on the existing grid capacity and electrical infrastructure. This will likely have **positive**, **slight** and **long-term** interactive effects on population and human health, as well as climate change adaptation.

During the decommissioning phase, energy production lost during the decommissioning phase of the Proposed Development will likely have a negative, slight and long-term effect on the existing grid capacity and electrical infrastructure.

17.2.10 Material Assets - Traffic and Transport

During the construction phase there is potential for adverse interactive effects between traffic and transport and population and human health, air quality, material assets, landscape and visual, and noise and vibration. These effects have an insignificant potential to pollute and create temporary disturbance for occupants of nearby dwellings. The interactive effects are likely to be short term and not significant.

During the operational phase there is potential for long term imperceptible adverse interactive effects on population and human health, landscape and visual, and noise and vibration effects. The interactive effects are likely to be long term and imperceptible.

During the decommissioning phase there is potential for adverse effects that are not significant on population and human health and noise and vibration which could create a temporary disturbance for occupants of nearby dwellings. The interactive effects are likely to be short term and not significant.

17.2.11 Shadow Flicker

The Proposed Development has the potential to give rise to long term shadow flicker and visual effects on the health of residents of surrounding dwelling during the operational phase only. Wind turbines will, however, be equipped with a shadow flicker module to prevent shadow effects at critical times so that there will be no shadow flicker at sensitive receptors/nearby dwellings during the wind farm operational phase. Therefore, the Proposed Development will not have significant adverse interactive visual, and population and human health effects on residents of nearby dwellings as a result of shadow flicker (Refer to Chapter 16 Shadow Flicker for further details).

17.3 Summary

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 17-1. 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], operation [O] and decommissioning [D] phases of the Proposed Development. Full details of the significance of the effects and the relevant interactions of the environmental aspects along with any proposed mitigation are discussed within each of the individual preceding Chapters.

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

Table 17-1: Matrix of Interactions

	Population and Human Health	Biodiversity and Ornithology	Water	Land and Soils	Noise and Vibration	Shadow Flicker	Landscape & Visual	Cultural Heritage	Air Quality and Climate	Material Assets Built Services	Material Assets Traffic and Transport
Population and Human Health			C	C	C/O/D	O	C/O/D		C/O	C	C/D
Biodiversity and Ornithology			C	C	C/O/D				C		
Water	C	C/O		C						C	
Land and Soils		C/O	C		C		C	C	C		
Noise and Vibration	C/O/D	C/O/D		C							C/D
Shadow Flicker	O						0				
Landscape	C/O	O						C/O			C
Cultural Heritage				C			0				
Air Quality and Climate	C/O	C/O/D		C							
Material Assets Built services	C/O	C/O									C
Material Assets Traffic and Transport	C/D	C/O/D			C/O/D		C/D		C/D	C/D	

C	Construction Phase Effect
O	Operation Phase Effect
D	Decommissioning Phase Effect

	Interaction Occurs
	No Interaction