

INTERACTIONS OF THE FOREGOING 16

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Making Sustainability Happen

Acronyms and Abbreviations

AIL	Abnormal Indivisible Load
AM	Amplitude Modulation
CEMP	Construction Environmental Management Plan
CO ₂	Carbon Dioxide
CTMP	Construction Traffic Management Plan
dB LAeq	A-weighted Equivalent Continuous Sound Level
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EU	European Union
GCR	Grid Connection Route
HGV	Heavy Goods Vehicle
IEF	Important Ecological Feature
NSR	Noise-Sensitive Receptor
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
SAC	Special Area of Conservation
SPA	Special Protection Area
SuDS	Sustainable Drainage Systems
TDR	Turbine Delivery Route
ZTV	Zone of Theoretical Visibility

16.0 INTERACTIONS OF THE FOREGOING

INTRODUCTION

- 16.1 Article 3 of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of the Council on 16 April 2014, ('EIA Directive') 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).”

- 16.2 In accordance with the requirements of the EIA Directive, this EIAR assesses the likely significant environmental effects of the Proposed Project on a range of environmental topic areas referred to in points (a) to (d) above. Where relevant, the interaction between various environmental topic areas, are already addressed within each chapter of this EIAR. For example, there are clear overlaps between the land, soils and geology assessment and the hydrological assessment of the Proposed Project.
- 16.3 Section 3.3.4 of the EPA's 2022 Guidelines on the Information to be contained in Environmental Impact Assessment Reports emphasises the role of an assessment of interactions to provide careful consideration of pathways – direct and indirect – that can magnify from a single non-significant effect or mitigation measure to a cumulative effect in combination with other conditions or predicted effects. Within each of the specialist assessments and their respective chapters of this EIAR, topics that relate to more than one environmental consideration are addressed in all assessments to which they relate. For example, hydrogeological conditions and potential impacts are addressed in the biodiversity and land, soil and geology chapters of the EIAR, as well as the main assessment within the overall water chapter. Where there has been interactions of potential impacts there has been close collaboration between specialists and EIA coordinators. For example, the design of the attenuation basin network has evolved in close consultation with the biodiversity team to ensure that any favourable habitat that could result in bird or bat mortalities close to the wind turbines can be avoided.
- 16.4 The EPA's 2003 Advice Notes on Current Practice in the preparation of Environmental Impact Statements acknowledges that all environmental factors are inter-related to some extent and suggests that interaction assessment headings concentrate on significant interaction and interdependencies in the existing environment. The purpose of this chapter is to ensure that the appropriate potential interactions have been examined by the specialist disciplines, as recommended within the Advice Notes.
- 16.5 In reading this chapter, reference should also be made to **Chapter 1** of this EIAR which defines the terms (Capitalised) to be utilised throughout each chapter, **Chapter 2** which provides a detailed description of the Proposed Development and the wider Proposed Project and **Chapter 3**, which provides an evaluation of reasonable alternatives studied by the developer.

Statement of Authority

- 16.6 This chapter of the EIAR was prepared by Eoin Greevy, BSc, MSc. Eoin is a Graduate Planner at SLR Consulting with experience supporting renewable energy and infrastructure projects across Ireland.
- 16.7 This chapter of the EIAR was reviewed by the following individuals in SLR Consulting:
- The chapter was reviewed by Gareth Hughes, BSc, MSc, PISEP who has over 15 years' experience and who specialises in managing multi-disciplinary EIA projects for onshore wind farm projects.
 - The chapter has also been reviewed by Aislinn O'Brien, MSc, MCD, MIPI, MRTPI. Aislinn is a chartered town planner with over 20 years professional planning experience. During this time Aislinn has project managed and coordinated numerous planning applications and EIARs.

Interaction of Environmental Factors

- 16.8 There is potential for interactions between one aspect of the environment and another which can combine to result in cumulative, direct or indirect effects on the environment and human health. **Table 16-1** provides a matrix to present the main interactions and interdependencies between environmental factors given the findings of the preceding chapters of this EIAR. A supporting commentary is also provided below, which explains the main interactions between the environmental topic areas in the context of the Proposed Project.
- 16.9 The matrix contains each of the environmental topics, which were considered as part of this EIAR, on both axes. These interactions have been identified for both the construction [C] operational [O] and decommissioning [D] phases, of the Proposed Project. Although, in general, decommissioning impacts will be similar to those of the construction stage, they will be of a much-reduced scale. There is likely to be less interactions during decommissioning as given that many of the components will be left in-situ, including the turbine foundations, access tracks and underground cabling. It is not therefore considered that interactions potentially arising at the construction stage can be expected to also arise at the decommissioning stage.
- 16.10 Full details of the significance of the effects and the relevant interactions of the environmental aspects along with any proposed mitigation measures which will be implemented are discussed within each of the individual technical chapters, which consisted of:
- Chapter 4 Population and Human Health
 - Chapter 5 Biodiversity
 - Chapter 6 Land, Soils and Geology
 - Chapter 7 Water (Hydrology & Hydrogeology)
 - Chapter 8 Air Quality and Climate
 - Chapter 9 Noise and Vibration
 - Chapter 10 Landscape and Visual

- Chapter 11 Shadow Flicker
- Chapter 12 Cultural Heritage
- Chapter 13 Material Assets, including Telecommunications and Aviation
- Chapter 14 Traffic and Transport
- Chapter 15 Major Accidents and Disasters

16.11 The most dynamic interaction and interdependencies relate to the connection between humans and biodiversity receptors, and their potential exposure to receptor pathways such as soils, water / hydrology, air and noise. Removal of soil cover can result in effects or changes on hydrology, both in terms of water quality and hydraulic regime, which may result in secondary ecological effects on vegetation patterns and habitats and species. The relationship and effects of these aspects have been fully considered in **Chapter 5** of this EIAR. Similarly, there is potential for impacts to human health through interactions / follow on effects of changes that may occur as a direct result of the Proposed Project, and these are specifically addressed in **Chapter 4** of this EIAR. The following is an overview of these and other possible interactions which acts as a check to ensure that none have been inadvertently missed in the EIA process.

Table 16-1: Interactions of the Foregoing

	Population & Human Health	Biodiversity	Land, Soils and Geology	Water (Hydrology and Hydrogeology)	Air Quality and Climate	Noise and Vibration	Landscape and Visual	Shadow Flicker	Cultural Heritage	Material Assets	Traffic and Transport	Major Accidents and Disasters
Population & Human Health		C/O	C	C	C/O	C/O	C/O	O	C/O	C	C	C/O
Biodiversity			C/O	C	C/D	C/O/D	C/O	-	-	C/O	C	-
Land, Soils and Geology				C/O	C	-	C	-	C	C	-	C
Water (Hydrology and Hydrogeology)					-	-	-	-		C	-	-
Air Quality and Climate						-	-	-	-		C	C/O
Noise and Vibration							-	-	-	-	C	-
Landscape and Visual									C/O	-	-	-
Shadow Flicker									-	-	-	-
Cultural Heritage										C	-	-
Material Assets											C	-
Traffic and Transport												C

	Population & Human Health	Biodiversity	Land, Soils and Geology	Water (Hydrology and Hydrogeology)	Air Quality and Climate	Noise and Vibration	Landscape and Visual	Shadow Flicker	Cultural Heritage	Material Assets	Traffic and Transport	Major Accidents and Disasters
Major Accidents and Disasters												

C (Construction Phase), O (Operational Phase), D (Decommissioning Phase)
 Grey shading is used for blocking out part of the table to avoid duplication.

Population and Human Health

Interactions of Population and Human Health, Noise & Vibration and Air Quality & Climate

- 16.12 The potential impacts from noise on residential amenity during the construction of the Over-run Areas, is assessed to be a moderate significant effect. This is due to a single sensitive receptor near Over-run Area 1. Prior to mitigation, short-term construction noise levels at this receptor exceed 75 dB LAeq, resulting in a temporary moderate significant effect in EIA terms. With mitigation, specifically the provision of a 2.5 m high close-boarded wooden temporary noise barrier to the north of Over-run Area 1, any likely significant effects will be eliminated with no significant residual effects expected.
- 16.13 The nearest noise-sensitive locations are sufficiently distant from the Main Wind Farm Development Site, at least 740m, such that vibration will not be perceivable by residents at their dwellings and building damage will not occur from construction incurred vibration. **Chapter 9** sets out mitigation measures that will be implemented to maintain appropriate noise levels and avoid potential impact to human health at nearby receptors.
- 16.14 During the operational phase of the Proposed Project, with mitigation in the form of noise-reduced modes, both the daytime and night-time wind turbine noise limits will not be exceeded at any of the NSRs across all wind speeds.
- 16.15 The construction phase of the Proposed Project could lead to minor short term or indirect emissions, including vehicular and fugitive dust emissions. The impact on air quality due to emissions from construction works (construction machinery) has been classified as a slight residual effect which will be temporary. Given the distance between the Proposed Project and the nearest receptor, the impact on air quality at nearby dwellings will be low.
- 16.16 The carbon resources required for the construction of the Proposed Project and the savings achieved by displacing fossil fuel-generated electricity indicate a net positive impact on air quality in the long term. During the operational phase, the Proposed Project will contribute towards national decarbonisation which will have beneficial effects on air quality and climate and a resultant positive effect on the human environment and health. This is outlined in **Chapter 8**.

Interactions of Population and Human Health, Land, Soils & Geology and Hydrology and Hydrogeology

- 16.17 There are potential effects on human health associated with disturbance of soils during the construction phase of the Proposed Project. If displaced soils are not appropriately managed, they can cause mud / unsafe surfaces and can create pathways to contamination of ground and surface water bodies. **Chapters 6 and 7** have assessed these potential interactions to ensure that soil and peat disturbance are appropriately managed. These

measures will be implemented through both mitigation and construction stage controls set out in the CEMP (**Technical Appendix 2-1**), such as careful soil and peat handling, pollution prevention, sediment and surface water control, management of mud and debris, and emergency response procedures. With the implementation of these measures, potential risks to human health arising from interactions with land, soils, geology and water will be minimised and no significant residual effects in the context of the EIA Regulations are predicted.

Interactions of Population and Human Health, Landscape and Visual and Cultural Heritage

- 16.18 In designing the Proposed Project, careful consideration was given to the potential impact the proposed turbines may have on the value of the landscape. The most visually dominant infrastructure of the Proposed Project will be the wind turbines, and the erection of the wind turbines will change the landscape to observers. This will apply to construction and operational stages of the Proposed Project. **Chapter 10** of this EIAR considers the magnitude of landscape change and assesses the landscape and visual effects of the Proposed Project. Whilst the Proposed Project will have some notable impacts on the character of this landscape, it is well offset from the most sensitive coastal areas and is influenced by more robust and complementary land uses. Overall, the significance of operational landscape effects during the operational phase is considered not significant in the context of the EIA Regulations.
- 16.19 Features of Cultural Heritage interest can also be important landscape / visual resources and valuable tourist assets. There is a crannog located within the Main Wind Farm Development Site approximately 230 metres from proposed turbine 11, as well as two others within 1 km of the Main Wind Farm Development Site. The presence of crannogs (previous settlements) are well documented in the region's archaeological records. There is also a penal mass station c.1.8 km east and a megalithic tomb c. 1.5 km east of the Main Wind Farm Development Site. **Chapter 12** concluded that no potential significant effects were predicted upon the crannog or its potential associated remains, the penal mass station or the megalithic tomb.
- 16.20 Setback from the proposed turbines to residential receptors was employed as a means of embedded mitigation, with this setback greater than the standard of four times tip height as set out in the 2019 Wind Energy Development Guidelines (WEDG). The residual effects to recreation, amenity and tourism in the surrounding area as a result of the Proposed Project are assessed as moderate (not significant in the context of the EIA Regulations).

Interactions of Population and Human Health and Biodiversity

- 16.21 **Chapter 5 and Chapter 17** of this EIAR specify a range of mitigation measures that are to be implemented through all stages of the Proposed Project to provide for protection of the natural environment, which will ensure the intrinsic and recognised value of the natural environment on the human population. The specific Peat Restoration Plan and Habitat Management Plan presented in **Technical Appendix 5-5** of this EIAR provides details on how the Proposed Project will deliver long-term restoration of peatland with the intention of providing a carbon store. This, in combination with the aim of the operation of the Proposed Project to provide a non-fossil fuel energy source for the national grid, is intended to represent a material contribution to climate change mitigation, which is one of the key threats to populations and human health at the current time. Therefore, the interaction between biodiversity and population / human health is considered positive.

Interactions of Population and Human Health and Material Assets and Traffic and Transport

- 16.22 The construction phase of the Proposed Project has the potential to create health and safety hazards for both construction workers and the general public. This is as a result of construction activities and associated impacts, including increased traffic, transport of heavy or bulky materials, and construction on public roads. Road safety due to increased traffic numbers and the transport of abnormal indivisible loads (AILs) to the Main Wind Farm Development Site along the TDR and proposed haul routes is a key consideration.
- 16.23 All proposed works and deliveries along the TDR route will be controlled by a CEMP (**Technical Appendix 2-1**). Prior to the Grid Connection Route (GCR) installation works, all access points (domestic, business, farm) will be considered when finalising temporary road closures and diversions, to maintain local access. Construction traffic, including turbine delivery and abnormal load movements, will be managed in accordance with a Construction Traffic Management Plan (CTMP) (**Technical Appendix 14-4**), which sets out measures for routing, timing of deliveries, temporary traffic management, maintenance of local access and liaison with the relevant local authorities. With the implementation of the CTMP and the mitigation outlined in **Chapter 14**, no significant residual effects on population and human health are predicted.
- 16.24 **Chapter 13** includes a range of measures which will be delivered through the CEMP to ensure that there will be no disturbance to the local population as a result of potential interruption to utilities.

Interactions of Population and Human Health and Shadow Flicker

- 16.25 The operation of wind turbines has the potential for shadow flicker, which can cause disturbance to the local population. The effect of shadow flicker has been assessed using relevant guidance and best practice. Following the implementation of the Shadow Flicker Shutdown Protocol outlined in **Chapter 11**, potential residual shadow flicker effects due to the Proposed Project are considered not significant in the context of the EIA Regulations. The full shadow flicker assessment is described in **Chapter 11** of this EIAR. The inter-related effects are not significant and no significant negative effects on human health are predicted from this interaction.

Interactions of Population and Human Health and Major Accidents and Disasters

- 16.26 During the construction, operational, and decommissioning phases, the Proposed Project carries no likely significant effect with respect to major accidents or disasters, nor is it vulnerable to potential disasters or accidents, including both natural and man-made incidents. Potential risks identified, such as traffic accidents, forest fires, or extreme weather events (e.g., high winds and flooding), are managed through the implementation of the CEMP and an Environmental Management System that will be developed for the Proposed Development should planning permission be granted. These provide for rigorous statutory and engineering safety checks to ensure the protection of the onsite workforce and the public.
- 16.27 The risk of a major accident or disaster occurring is considered 'Low' based on the 'Classification of Likelihood', and the subsequent impact on population and human health is classified as 'Minor' or 'Limited'. Following the implementation of these safety protocols and mitigation measures, no significant negative effects are predicted from the interaction between Population and Human Health and Major Accidents and Disasters.

Biodiversity

Interactions of Biodiversity and Land, Soil and Geology

- 16.28 During the construction phase, the Proposed Project will require the clearance of vegetation, soil, and rock to facilitate infrastructure including access roads, hardstands, and turbine bases. This physical disturbance of land and soils results in the direct loss of biodiversity habitats, specifically conifer plantation and peatland habitats. Alternative compensatory afforestation will be provided in consultation with the Department of Agriculture, Food & the Marine under the Forestry Act 2014 and a management plan for peatland restoration is provided in **Technical Appendix 5-5**. As the blanket bog on which the Main Wind Farm Development Site is located is mostly drained, the Proposed Project has the potential to enhance the widely accepted biodiversity value of this unique habitat.
- 16.29 All proposed construction activities will be controlled by the CEMP as detailed in **Technical Appendix 2-1**. For example, the CEMP has identified management measures to ensure the stockpiling of excavated materials and potential resultant dust generation will not cause indirect effects on biodiversity, such as the smothering of adjacent Annex I blanket bog, hedgerows, and treelines.
- 16.30 During the operational phase, the interaction is managed through the continued management of the land for bat mitigation buffers and habitat enhancement. This is addressed in further detail in the Peatland Restoration and Draft Habitat Management Plan in **Technical Appendix 5-5**.

Interactions of Biodiversity and Hydrology and Hydrogeology

- 16.31 Potential interactions between biodiversity and the hydrological/hydrogeological environment during construction include the release of suspended solids, hydrocarbons, or cement leachate, which could reach downstream receptors via hydrological connections. The release of suspended solids is primarily a consequence of the physical disturbance of the ground, including soil stripping and excavations for turbine foundations and access tracks. High levels of suspended solids can increase turbidity, which inhibits respiration in salmonids, and lead to siltation that affects riverbed substrate composition, reducing spawning and fry survival. Furthermore, the release of hydrocarbons from fuel spills or leaks could lead to eutrophication and reduced oxygen levels, which are causes of death for all salmonid and lamprey life stages. The interactions between biodiversity and hydrology/hydrogeology is mitigated by measures identified in **Chapter 7** and the CEMP included as **Technical Appendix 2-1**.
- 16.32 Indirect effects could also include hydrological or hydrogeological alterations leading to changes in wetland condition. While the Natura Impact Statement (NIS) confirmed potential hydrological and hydrogeological connectivity to designated sites such as the Mullet/Blacksod Bay Complex SAC, it determined that with mitigation, there will be no significant stand-alone or cumulative effects on water quality or the integrity of these sites. During the operational phase, interactions are limited to the collection and drainage of surface water runoff from the site infrastructure, which will be managed through SuDS-based drainage systems to prevent sediment release or altered hydrological pathways that could impact aquatic habitats and peatland vegetation.

Interactions of Biodiversity, Noise & Vibration, Air & Climate and Traffic and Transport

- 16.33 Some operational stage effects are predicted to be similar to the effects described for the construction and decommissioning stages e.g. disturbance or displacement to Important

Ecological Feature (IEF) birds, bats and mammals via increased dust/noise levels/light levels/presence of construction workers. These effects are intrinsically linked to the movement of construction traffic, which includes up to 311 HGV movements and 51 light vehicle movements per day during the peak construction month. The delivery of turbine components via AILs further contributes to the potential for temporary noise and vibration disturbance along the delivery route.

- 16.34 As outlined in the CEMP (**Technical Appendix 2-1** found in Volume 3 of the EIAR), works will follow best practice to minimise unnecessary noise and avoid lighting spill. Construction activity will be constrained where necessary to avoid sensitive periods for birds (breeding, overwintering) and bats. The Ecological Clerk of Works (ECOW) will advise on timing to minimise disturbance to mammals, birds and aquatic fauna. A Construction Traffic Management Plan (CTMP) will be implemented to manage the volume and timing of vehicle movements to further reduce disturbance to sensitive ecological receptors.
- 16.35 As set out in **Chapters 8** (Noise & Vibration), **9** (Air Quality & Climate), and **14** (Traffic & Transport), predicted operational noise levels, air quality effects, and traffic volumes associated with the Proposed Project are low and remain within recognised thresholds of acceptability. Operational traffic volumes are negligible and are not anticipated to result in any meaningful changes to baseline air quality or disturbance levels.
- 16.36 On this basis, no significant interaction effects between biodiversity, noise and vibration, air and climate, and traffic and transport are predicted during the operational phase. While minor interactions may theoretically occur (for example, low-level operational noise or infrequent vehicle movements), these are not of sufficient magnitude, duration, or spatial extent to result in significant effects on ecological receptors in the context of the EIA Regulations.
- 16.37 Accordingly, no significant adverse effects arising from the interaction of these factors are predicted during the operational phase of the Proposed Project.

Interactions of Biodiversity and Landscape & Visual

- 16.38 The Proposed Project will introduce new development to the Main Wind Farm Development Site; therefore it will result in a change to landscape for construction and operational stages. A Peatland Restoration and Habitat Management Plan (**Technical Appendix 5-5**) has been developed to ensure the improvement of the condition of the cutover blanket bog landscape within the Main Wind Farm Development Site. The peatland restoration plan will remain in place until the landscape demonstrably returns to baseline condition or shows positive ecological trends.

Interactions of Biodiversity and Material Assets

- 16.39 The Proposed Project includes tall, rotating equipment from which biodiversity such as bat and birds need to be protected. **Chapter 5** provides information on how the likely significant effects arising have been assessed and mitigated through design, for example through the establishment of bat buffer zones, limiting foraging habitat immediately surrounding wind turbines and proposing a system of adaptive management if there is evidence of bat/bird collisions through carcass finds. Following the implementation of these mitigation measures and the commitment to adaptive management, the residual inter-related effects are considered not significant in the context of the EIA Regulations. No significant negative effects are predicted from the interaction between biodiversity and the physical material assets of the Proposed Project.
- 16.40 The implementation of bat buffers identified as mitigation in **Chapter 5** has been assessed for likely significant effects on forestry in **Chapter 13**. Tree felling of between 27.17 and

31.37 hectares of commercial forestry will be required as a result of the Proposed Project. By way of mitigation, all forestry felled will need to be replaced through the compensatory afforestation of an equivalent area of alternative land. Replanting of forestry on an equivalent area of alternative land will be undertaken.

- 16.41 In order to mitigate potential impacts during the construction phase, best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. Good practice measures will be applied in relation to pollution risk, sediment management and management of surface runoff rates and volumes.
- 16.42 A CEMP (**Technical Appendix 2-1** found in Volume 3 of the EIAR) has been developed for the Proposed Project to ensure adequate protection of the water environment. All personnel working on the Proposed Project will be responsible for the environmental control of their work and will perform their duties in accordance with the requirements and procedures of the CEMP.
- 16.43 During the construction phase, all works associated with the construction of the Proposed Project will be undertaken in accordance with the guidance contained within CIRIA Document C741 'Environmental Good Practice on Site' (CIRIA, 2015). Any groundwater encountered will be managed and treated in accordance with CIRIA C750, 'Groundwater control: design and practice' (CIRIA, 2016).
- 16.44 At decommissioning stage, the risk of a pollution incident occurring will be managed using good practice measures. These practices are concerned with undertaking activities away from watercourses and identifying safe areas for stockpiling or storage of potential pollutants that could otherwise lead to the pollution of watercourses. Potential pollution events occurring during the decommissioning of the turbines or any hardstanding will be controlled by good practice measures and will be subject to some attenuation in the soils before reaching groundwater. Adherence to these measures will ensure that any material generated is not transported into nearby watercourses

Land, Soils and Geology

Interactions of Land, Soils and Geology and Hydrology and Hydrogeology

- 16.45 During the construction phase, activities will require earthworks resulting in the removal of vegetation cover and excavation of subsoils and cut peat. Exposed and disturbed ground, particularly peat, may increase the risk of erosion and subsequent sediment-laden surface water runoff. The release of suspended solids is primarily a consequence of the physical disturbance of the ground during the construction phase. Potential sources of sediment-laden water include soil stripping to construct access tracks, site compounds, turbine foundations, hardstands, and the substation; run-off and erosion from soil stockpiles prior to reinstatement; and drainage and seepage water resulting from infrastructure excavation. These activities can result in the release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality of downstream water bodies.
- 16.46 During the operational phase, the presence of access tracks and hardstanding, as opposed to their construction, may affect the potential infiltration and groundwater conditions as well as the sub-surface flow paths around the infrastructure. Newly excavated drains and track dressings may be prone to erosion immediately post-construction as vegetation would not have matured. Potential effects from sedimentation or erosion during the operational phase are considered to come from linear features on steeper slopes, where velocities in drainage channels are higher. Routine maintenance of infrastructure and tracks will be required, which may include work such as maintaining access tracks and drainage. While it is

not anticipated that there will be any excavation or stockpiled material during operation, any maintenance involving construction-type activities will follow mitigation measures to avoid potential effects.

- 16.47 Excavations associated with construction works, such as tracks, turbine bases foundations, and cable trenches, can result in a local lowering of the water table. Dewatering associated with the construction of wind turbine foundations will be temporary. The potential to lower groundwater in the underlying bedrock is limited by the localised and short-term nature of any dewatering required. There is a low to negligible potential to affect groundwater quality in the underlying bedrock through vertical migration of sediment or accidental spillages.
- 16.48 There is also a potential for pollution events to affect surface water and local groundwater bodies impacting on their water quality, particularly water bodies which flow through the Main Wind Farm Development Site. Contamination of surface water runoff from machinery, leakage and spills of chemicals from vehicle use, and the construction of hardstanding have the potential to affect surface water bodies through potential pollutants such as oil, fuels, and cement. This would have a negative effect on the receptor and the resulting degradation of water quality, potentially impacting the Doolough stream or the Mhoing Mhor stream. Additionally, fuel and oil spills and leaks to soils and subsoils during construction within the Main Wind Farm Development Site, along the GCR, or in exposed areas within the TDR Over-run Areas may occur.

Interactions of Land, Soils and Geology and Landscape and Visual

- 16.49 During the construction phase, the requirement for earthworks, including soil stripping and excavations will result in a physical change to the topography and landform. The landscape of the Main Wind Farm Development Site is generally flat and low-lying, and the physical presence of construction plant, temporary material stockpiles, and the creation of bare ground will alter the land cover. The clearing of vegetation and the felling of forestry to implement buffers around turbines represents a land use change from peatland and forestry. These construction activities will result in a temporary change to the landscape character as the natural surface is replaced by the appearance of construction works.
- 16.50 To mitigate these effects, the area of bare or exposed soils and rock will be kept to a minimum. All excavated soils will be reused within the Main Wind Farm Development Site for backfilling, reinstatement, peatland restoration and habitat management as set out in **Technical Appendix 5-5**. Stockpiled soils or exposed surfaces will be temporarily covered or vegetated to reduce the risk of localised erosion and manage the visual appearance of the works until progressive peatland restoration and habitat management proposals are complete. Following the completion of construction, the disturbed areas around the infrastructure will be reinstated using the original soil and vegetation, which will facilitate the re-establishment of the land cover.
- 16.51 During the operational phase, there will be physical impacts on the land cover of the Main Wind Farm Development Site as a result of the Proposed Development, but these will be relatively minor in the context of this transitional working landscape. The lifespan of the Proposed Development is 35 years, after which time it will be substantially dismantled and the landscape reinstated to prevailing conditions. Therefore, the Proposed Development represents a long term, but not permanent impact on the landscape and is reversible.
- 16.52 As noted in **Chapter 6**, the potential impact to soils and subsoils through excavation is considered to be low adverse and the significance of the effect is Slight, while Chapter 10 concludes that the scale of the Proposed Development will be assimilated within its landscape context without undue conflicts of scale with underlying land form and land use patterns.

Interactions of Land, Soils and Geology and Cultural Heritage

- 16.53 All ground intrusive activities during the construction phase including soil stripping, track laying, installation of hardstanding areas and cable laying, and material excavation (soils, subsoils and bedrock) can result in direct impacts upon archaeological remains.
- 16.54 The Main Wind Farm Development Site has been modified due to cultivation, land improvement, drainage, peat extraction and forestry plantations, and although bog/peatland often lends itself to good preservation of archaeological assets, any remains are likely to have been destroyed or truncated. No direct impacts are predicted upon archaeological remains.

Interactions of Land, Soils and Geology and Air Quality & Climate, Material Assets and Major Accidents and Disasters

- 16.55 The CEMP contains details of management measures to ensure that the handling of land and soils will be carried out so as to reduce potential release of dust particulates and to ensure the stability of underlying ground conditions, particularly in peat areas. The ultimate restoration of peatlands to be provided through the peat restoration proposals and the provision of compensatory forestry plantation will ensure the protection of established land use patterns which are a component of material assets.

Hydrology and Hydrogeology

Interactions of Hydrology and Hydrogeology and Material Assets

- 16.56 An interaction occurs with forestry assets, which are categorised as a material asset. The felling of forestry for infrastructure is required and involves specific water-related mitigation measures which are set out in **Chapter 13**.
- 16.57 In the Operational phase, the presence of access tracks and hardstanding may affect potential infiltration and groundwater conditions as well as sub-surface flow paths. Routine maintenance as described in **Chapter 2** and the CEMP will include the upkeep of the site drainage system to ensure its continued effectiveness.

Air Quality and Climate

Interactions of Air Quality and Climate and Traffic and Transport

- 16.58 During the construction phase, the interaction between Air Quality and Climate and Traffic and Transport is associated with exhaust emissions from construction-related vehicles and the potential for dust generation and generation of CO₂ emissions from construction-related vehicle movements. It is stated in **Chapter 8** that road-traffic impacts on air quality during construction are considered to result in a Not Significant effect in the context of the EIA Regulations and that plant machinery emissions will be imperceptible. It further concludes that the Proposed Project's greenhouse gas emissions will be offset within approximately 4 years and that over a 35-year operational life the project will deliver total emissions savings of between 1,785,538 – 2,206,043tCO₂e, resulting in an overall effect that is Significantly Beneficial.
- 16.59 As detailed in **Chapter 14**, the construction phase is anticipated to last 24 months, with peak construction expected to generate a worst-case scenario of approximately 362 daily two-way vehicle trips. The principal sources of potential dust emissions include on-site haulage by heavy vehicles on unpaved or compacted aggregate surfaces and potential trackout of materials onto the public road network. Exhaust emissions from

the anticipated number of construction vehicles are assessed in **Chapter 8** and will not exceed relevant air quality limit values.

- 16.60 During the operational phase, the development will only generate infrequent maintenance traffic, such as small vans or 4x4s, which is within the normal variation of rural traffic patterns. Consequently, traffic-related interactions during the operational phase are considered negligible.
- 16.61 The decommissioning phase will involve significantly fewer vehicle trips than the construction phase. Turbine components will be transported off-site on normal HGVs and leaving turbine foundations and internal access tracks in situ is proposed to limit the amount of material transported off-site and avoid environmental effects such as dust. With standard construction phase mitigation measures as set out in **Technical Appendix 14-4: Construction Traffic Management Plan (CTMP)** and routine dust suppression measures in place, these interactions will remain temporary and localised.

Interactions of Climate and Major Accidents and Disasters

- 16.62 The interaction between Climate and Major Accidents and Disasters will relate to extreme weather events (e.g. high winds, storms, intense rainfall) which may increase risks during construction or maintenance activities, including traffic movements or lifting operations.
- 16.63 **Chapter 15** of the EIAR provides details of how inbuilt mitigation measures have been incorporated into the design of the Proposed Project to ensure resilience against potential climate/ weather impacts. As also referred to in **Chapter 2**, inherent design features are incorporated to protect against severe weather, such as the yaw mechanism to control wind turbine orientation, lightning protection mast, earthing cable and anti-vibration sensors to cope with any imbalances from ice formation.
- 16.64 The CEMP presented in **Technical Appendix 2-1** identifies a range of measures through which health and safety will be safeguarded through the construction of the Proposed Project, and the risks of major accidents and disasters minimised.

Noise and Vibration

Interactions of Noise and Vibration and Traffic and Transport

- 16.65 Noise is generated from the delivery of the turbine components and construction materials, notably aggregates, concrete and steel reinforcement, and noise from vehicles on local roads and access tracks is also generated from construction traffic associated with the Proposed Project. Road traffic flow data have been provided as part of the traffic and transport assessment for roads used by construction vehicles, and the change in road traffic noise along the majority of the construction route has been determined by calculating the Basic Noise Level with corrections for heavy vehicles. The two local roads (L5252 and L1206) along the construction traffic route do not have enough traffic flow to enable a reliable calculation using the CRTN method, and construction traffic noise impacts have been calculated using the haul route method set out in BS 5228-1 which provides an absolute noise level. Passing heavy goods vehicles may generate vibration, and vibration may be perceived by some residents of dwellings situated close to the cable route during trenching activities; however, this will be for a brief period of less than one day while work is at a minimal distance and will be comparable to that experienced during other highway road works.
- 16.66 The Proposed Project will include the transportation of a range of construction materials to the Main Wind Farm Development Site, with the peak construction month expected to generate up to 311 HGV movements and 51 light vehicle movements per day. Construction

works along the GCR will be transient as works move along the GCR, and construction noise will be greatest when plant passes closest to the NSR. The construction phase working hours for the Proposed Project would be 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 at weekends, and noise generated through construction activities will be of negligible significant effect. The operational and decommissioning phases are predicted to have negligible effects and are therefore scoped out of detailed assessment, and operational traffic will only generate infrequent maintenance traffic such as small vans or 4x4s, which are well within the normal variation of rural traffic patterns. Overall, the interaction between Noise & Vibration and Traffic & Transport is considered negligible.

Landscape & Visual

Interactions of Landscape & Visual and Cultural Heritage

- 16.67 The Proposed Project has the potential to alter the landscape setting of recorded sites and monuments in the area. The potential impact on these cultural assets is assessed using a ZTV model. A settings assessment was carried out in **Chapter 12** which assessed the indirect effects of the Proposed Project upon cultural heritage assets within the study area as a result of change to setting.
- 16.68 **Chapter 12** concluded that the Proposed Project would have no significant direct or indirect effect to heritage assets within or outside the Main Wind Farm Development Site.
- 16.69 The potential impacts on landscape / scenic designations are described in detail in **Chapter 10** of this EIAR which concludes that whilst the Proposed Project will generate some residual high ranging landscape and visual effects, these have been assessed as not significant in the context of the EIA Regulations.

Material Assets

Interactions of Material Assets and Cultural Heritage

- 16.70 Cultural heritage features form part of the wider material assets baseline and may interact with development through land take, ground disturbance, and associated construction activities.
- 16.71 The Proposed Development has been designed to avoid direct physical impacts on known archaeological assets with a protective buffer zone has been incorporated around the Crannog (MA025-004), located approximately 0.23 km northeast of proposed Turbine 11. This design measure prevents direct interaction between the proposed infrastructure and the recorded monument, ensuring its physical integrity is maintained.
- 16.72 During construction, interactions between material assets and cultural heritage may occur where ground disturbance is required for turbine foundations, access tracks, and ancillary infrastructure. Such interactions present a potential for the discovery of previously unrecorded archaeological remains. Any such discoveries will be managed through archaeological monitoring and recording, in accordance with standard best practice. The recording of finds would contribute positively to the understanding of the cultural heritage resource within the study area.
- 16.73 With the implementation of these design and mitigation measures, interactions between material assets and cultural heritage are assessed as not resulting in significant adverse effects.

Interactions of Material Assets and Traffic and Transport

- 16.74 During the construction phase, the primary interaction relates to the delivery of materials and components for built services and infrastructure. As detailed in **Chapter 14** this will involve 311 conventional HGVs and AIL movements for large turbine components. Any potential diversions or temporary disruption to utility services during construction would be for very short periods of time, no more than a number of hours and are assessed as not significant in the context of the EIA Regulations.
- 16.75 An interaction also exists with existing underground and overhead utility infrastructure. There is a potential, though unlikely, risk that unknown telecommunications services located along the road network may require diversion or experience temporary disruption during the construction of the wind farm or the installation of the grid connection cable trench. To mitigate this, cable detection tools and slit trenches will be used prior to groundworks to confirm the exact location of existing services within public roads and verges.

Traffic and Transport

Interactions of Traffic and Transport and Major Accidents and Disasters

- 16.76 **Chapter 15** of the EIAR provides considers the potential implications of any traffic collisions in the safety management of the Proposed Project.
- 16.77 Traffic and transport effects during construction are addressed through a combination of embedded design measures and a comprehensive Construction Traffic Management Plan (CTMP), which forms a key mitigation measure which will be implemented during the construction phase of the Proposed Project.
- 16.78 Access to the site has been designed to safely accommodate construction traffic, with adequate sightlines, vehicle tracking for HGVs and abnormal loads, and 6 m-wide access tracks allowing two-way HGV movements. These design measures reduce the likelihood of collisions at access points within the Main Wind Farm Site.
- 16.79 The CTMP will implement embedded mitigation throughout the construction phase and has been considered in the assessment of effects, resulting in reduced overall significance in line with EPA (2022) EIAR guidance.
- 16.80 Together, these measures ensure that construction traffic is carefully managed to minimise the risk of collisions, avoid disruption to other road users, and prevent traffic incidents from contributing to wider safety risks or accident scenarios associated with the Proposed Project.

Mitigation and Residual Effects

- 16.81 The review of interactions has confirmed that likely significant effects are appropriately addressed within the relevant environmental topic assessments contained in **Chapters 4 – 15** of this EIAR.
- 16.82 Embedded design measures and additional mitigation measures have been incorporated where necessary and are collectively presented in **Chapter 17**. These measures ensure that interaction effects are avoided, reduced, or managed in accordance with best practice. Any residual effects following mitigation, together with their assessed significance, are reported within the individual topic chapters. Following the implementation of embedded design measures and topic-specific mitigation, no significant adverse interaction effects are predicted to arise from the Proposed Project.

