17. INTERACTION OF EFFECTS

17.1 Introduction

The preceding Chapters 5 to 16 of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity (Flora and Fauna), Ornithology (Birds), Land, Soils and Geology, Water (Hydrology & Hydrogeology), Air Quality, Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage (Archaeological, Architectural and Cultural Heritage), Material Assets (Roads and Traffic, Telecommunications, Aviation, Utilities and Waste Management), and Vulnerability to/from Major Accidents and Natural Disasters as a result of the Proposed Project, as described in Chapter 4 (Description of the Proposed Project) of this EIAR. All of the potential significant effects of the Proposed Project and the measures proposed to mitigate them have been outlined in the preceding chapters of this EIAR. Mitigation measures and best practice measures for the construction, operation and decommissioning of the Proposed Project are detailed in the accompanying Construction and Environmental Management Plan (CEMP) (Appendix 4-3). However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them or have a neutral effect.

A matrix is presented in Table 17-1 below to identify potential interactions between the various aspects of the environment already assessed in this EIAR. The matrix highlights the occurrence of potential positive or negative effects during both the construction (C) and operational (O) phases. It is considered that the potential effects during the decommissioning phase will be similar to the construction phase but of a lesser magnitude. The matrix is symmetric, with each environmental component addressed in the chapters of this EIAR being placed on both axes of a matrix, and therefore, each potential interaction is identified twice. In Section 17.2 below, the potential interactions between each environmental component have been discussed in order of the relevant chapters of the EIAR. Once a potential interaction between two environmental components has been discussed, for example, Population & Human Health and Water, the interaction will not be discussed again in the following relevant section, therefore there is no Water and Population & Human Health section.

Table 17-1 Interaction Matrix: Potential for Interacting Impacts

	Phase	Population and Human Health	Biodiversity	Birds	Land, Soils and Geology	Water	Air Quality	Climate	Noise and Vibration	Cultural Heritage	Landscape and Visual	Material Assets	Major Accidents & Vulnerability to Natural Disasters
Population and Human Health	C												
	O												
Biodiversity	C												
	O												
Birds	C												
	O												
Land, Soils and Geology	C												
	O												
Water	C												
	O												
Air Quality	C												
	O												
Climate	C												
	O												
Noise and Vibration	C												
	O												
Cultural Heritage	C												
	O												
Landscape and Visual	C												
	O												
Material Assets	C												
	O												

Major Accidents and Vulnerability to Natural Disasters	C												
	O												

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

The potential for interaction of effects has been assessed, throughout this EIAR, as part of the Impact Assessment process. While the work on all parts of the Environmental Impact Assessment Report (EIAR) were not carried out by MKO, the entire project and all the work of the sub-consultants was managed and coordinated by the company. The EIAR was edited and collated by MKO as an integrated report of findings from the impact assessment process, by all relevant experts, and effects that potentially interact have been assessed in detail in the individual chapters of the EIAR and summarised in Section 17.2 below.

Where any potential negative effects have been identified during the assessment process, these impacts have been avoided or reduced by design and the proposed mitigations measures, as presented throughout the EIAR.

17.1.1 Statement of Authority

This section of the EIAR has been drafted by Joye Atkinson and reviewed by Jonny Fearon.
Joye is a Graduate Environmental Scientist with MKO and holds a BSc (Hons) in Social Science from University College Dublin. Prior to taking a position in MKO she interned at RMLA Planning for one year. Here she assisted a variety of projects within the public and private sectors. Joye's key strengths include drafting EIAR chapters, QGIS and ArcGIS mapping.

Jonny Fearon is a Project Environmental Scientist with MKO having joined the company in March 2022. Jonny holds a BSc (Hons) Environmental Science, a MSc (Hons) in Environmental Leadership and a Specialist Diploma in Corporate Environmental Planning. Jonny's key strengths are GIS, data analysis, fieldwork and report writing. Since joining MKO, Jonny has been involved in a range of wind farm projects. In his role as a Project Environmental Scientist, Jonny works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs.

17.2 Impact Interactions

17.2.1 Population and Human Health

Population and Human Health and Land, Soils & Geology

The use of plant machinery on site during excavation works and the movement spoil may result in the potential for soil and ground contamination. A wind farm and associated grid infrastructure is not a recognised source of pollution and so the potential for effects during the operational phase are imperceptible. With the implementation of mitigation and monitoring measures detailed in Section 8.6.2 and Section 8.6.3 of Chapter 8 (Lands, Soils & Geology) and the CEMP (Appendix 4-3), the potential for residual effects associated with soil or ground contamination during the construction and operational phases and subsequent health effects are imperceptible.

On this basis, the identified interaction is not significant.

Population and Human Health and Water

Potential health effects arise mainly through the potential for surface and groundwater contamination which may have negative effects on public and private water supplies, see Section 5.10.2.2.2 of Chapter 5 (Population & Human Health).

There are no underground water or sewerage networks at Proposed Wind Farm infrastructure locations. The Proposed Wind Farm site is located in the Templemore Groundwater Body (GWB) which is described as 'poorly productive bedrock' according to WFD mapping. Within the Lackenacoombe Stream catchment there are 5 no. new proposed watercourse crossing locations and 2 no. existing crossings (along forestry tracks) required for the Proposed Wind Farm access roads. Within the Glasheenyreagha Stream catchment and Aughnaglanny River catchment 3 no. and 1 no. are required respectively. The Proposed Project includes the construction of 9 no. new watercourse crossing (clear span bridge design) and 2 no. watercourse crossing upgrades. A search of private well locations (accuracy of 1 – 50m only) was undertaken using the GSI well database (www.gsi.ie). No such wells were identified either within or adjacent to the Proposed Wind Farm site.

A hydrological constraints map for the Proposed Wind Farm site is shown as Error! Reference source not found.. A self-imposed 50m buffer from streams/rivers (natural watercourses) was applied during the constraints mapping and will be maintained during the construction phase – with the exception of watercourse crossing locations. The proposed Wind Farm drainage infrastructure layout will be cognisant of these buffers.

Along the Proposed Grid Connection cable route there are 23 no. watercourse crossing locations at EPA mapped watercourses, all 23 no. crossings are existing culverts and bridges where works are required to accommodate the Proposed Grid Connection cable within or underneath the crossing structure. Construction of the Proposed Grid Connection will have very low potential to effect local wells due to the shallow nature of the works within the carriageway of public roads. A search of private wells was also undertaken along the grid connection route, and no wells were identified within or adjacent to the Proposed Grid Connection. In the absence of mitigation measures, there will be no significant effects on local groundwater well supplies.

The Proposed Project design and mitigation measures detailed in Chapter 9 (Water) and the CEMP (Appendix 4-3) ensures that the potential for effects on the water environment are not significant. A comprehensive suite of surface water mitigation measures and controls are outlined in Chapter 9 (Water) to ensure protection of all downstream receiving waters. Mitigation measures will ensure that surface runoff from the developed areas of the Site will be of a high quality and will therefore not

impact on the quality of downstream surface water bodies, no impact on group water schemes, wells and therefore, no subsequent health effects.

On this basis, the identified interaction is not significant.

Population and Human Health, and Air Quality

The excavation and movement of spoil during the construction phase of the Proposed Project is likely to create dust and result in the emission of air pollutants which will result in a short-term, slight, negative effect on local air quality. Mitigation measures to reduce dust and exhaust emissions generated during the construction phase of the Proposed Project are presented in Chapter 10 (Air Quality).

During the operational phase, the Proposed Project will generate additional traffic to the area in the form of light goods vehicles (LGVs) visiting the Site 1-2 times per day for inspections and maintenance, giving rise to a long-term imperceptible negative impact on air quality. However, wind turbines are not a recognised source of pollution and will instead be providing clean energy into the National Grid. This will have a long-term moderate positive effect on human health.

By providing an alternative to electricity derived from coal, oil or gas-fired power stations during the operational phase, the Proposed Project will result in emission savings of carbon dioxide (CO2), oxides of nitrogen (NOx), and sulphur dioxide (SO2). The production of renewable energy from the Proposed Project will have a long-term, moderate, positive impact on air quality.

On this basis, the identified interaction is not significant.

Population and Human Health, and Climate

The construction of the Proposed Project will have a short-term, imperceptible, negative effect on climate and will be restricted to the duration of the construction phase. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate and therefore population and human health.

The Proposed Project when in operation, will reduce the input of carbon intensive energy into the national grid and reduce the amount of greenhouse gas emissions being released to the atmosphere. Harnessing more energy by means of renewable sources will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. The rated output of 6.2 MW per turbine for the Proposed Project would result in an estimated installed capacity of 86.8 MW, displacing approximately 62,931 tonnes of carbon dioxide per annum or 2,202,588 tonnes over its operational life from traditional carbon-based electricity generation. The operational phase of the Proposed Project will offset the 162,241 tonnes of carbon dioxide associated with the construction and operational phases that will be lost to the atmosphere in approximately 31.5 months of operation. This will have a long-term moderate positive effect on climate and therefore a long-term moderate positive effect on health.

On this basis, there identified interaction is not significant.

Population and Human Health and Noise and Vibration

As identified in Chapter 5 (Population & Human Health) of this EIAR, the construction phase will generate an increase in noise levels in the vicinity of the Site which has the potential to cause a nuisance to sensitive receptors in the area. The contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise* and all mitigation measures, as detail in Chapter 12 (Nosie & Vibration) and the CEMP, will be implemented. The construction phase will likely create a short-term slight to moderate

negative effect on human health due to the nuisance caused by construction plant and vehicle noise emissions.

As detailed in Chapter 12 (Noise & Vibration), the predicted noise emissions during the operational phase, once the appropriate mitigation measures are implemented, will be long-term negative and not significant. Furthermore, as noise emissions from turbines are controllable via inbuilt technologies, the Proposed Project will be able to comply with the *'Wind Energy Development Guidelines for Planning Authorities'* (Department of the Environment, Heritage and Local Government (DoEHLG), 2006) (hereafter referred to as the Guidelines (DoEHLG, 2006)) and future iterations should they come into effect before a decision is made on this application. Likewise, the proposed turbines will be capable of achieving compliance with noise conditions imposed should the Proposed Project receive a grant of planning permission.

On this basis, the identified interaction is not significant.

Population and Human Health, and Landscape and Visual

The construction phase of the Proposed Project will see the temporary introduction of construction machinery and the erection of wind turbines into a natural but already modified landscape. The erection of the proposed turbines in particular will change the existing landscape. Whether the long-term change in landscape created by the erection of the turbines is deemed to be positive or negative is a subjective matter. What appears to be a positive visual effect to one viewer could be deemed to be a negative effect by another viewer.

Chapter 14 (Landscape and Visual) of this EIAR comprises the landscape and visual impact assessment of the Proposed Project. As detailed in Chapter 13 (Landscape and Visual), it is to be anticipated that wind farms inevitably cause 'Significant' visual effects on proximate sensitive visual receptors due to the prominence of turbines within landscape views and the 'Substantial' magnitude of change which will arise in the following highlighted areas.

Within 2km of the VP09 location an assessment found in Appendix 14-3 indicates that from this vantage point, the proposed turbines are visible across the rounded terrain of Knockbane peak, set within forestry tracts on the near side as well as beyond the ridgeline, with full blades visible above the horizon. The proposed turbines are perceived at large scale relative to the landscape and are prominent within the views. In addition, regarding three specific residences in close proximity to VP09 there is potential for "surrounding" effects owing to the presence of the existing Glencarbry 1 turbines located behind the viewpoint on Knockbane peak (see further discussions and Figure 14-18 in Section **Error! Reference source not found.** Cumulative Visual Effects during Operation). Therefore, the magnitude of change is deemed "Substantial," resulting in "Significant" residual visual effects.

The potential for "Significant" residual visual effects was predicted for one viewpoint located 750m north-east of the nearest proposed turbine (T06). In in this case, the proposed turbines are spaced such that long-ranging scenic views of the River Suir valley are not fully obscured and are still available looking between and beyond the towers and blades. The viewpoint imagery was captured from the only location in that vicinity with unobstructed views of as many of the proposed turbines as possible, thereby representing the greatest degree of visual effects. The receptors include three residences in close proximity to the viewpoint, and the overall number of receptors likely to experience these effects is very low as the landscape surrounding the Proposed Wind Farm site has a significantly low population density. Other factors such as roadside screening from dense, mature vegetation and undulations in local topography would allow for most receptors in the vicinity to experience visual effects of a lesser degree.

No "Significant" residual visual effects are predicted for any receptors located greater than 1km from the proposed turbines; the predicted visual effects for receptors within 1km were reported previously in this conclusion section in relation to the photomontage viewpoint assessment. The LVIA focussed on assessing the visual impact on local residential receptors (those within 2km of the proposed turbines)

considered high-sensitivity owing to their close proximity and determined that most receptors within 2km—those to the west, north, east, south and southeast of the Proposed Wind Farm site—are predicted to experience "Slight" to "Moderate" visual effects, which are not significant.

The visual effects from the viewpoints of VP02, VP06, VP09 and VP10 are rated of relatively high significance ('Significant' and 'Moderate') due to the close proximity to the proposed turbines where the magnitude of change is greatest, and the sensitivity is relatively high in respect of local residents who live in close proximity. Please see Section 14.7.3.2.10 of Chapter 14 (Landscape and Visual) and Volume 2: Photomontage Booklet for further detail on these viewpoints.

On this basis, the identified interaction is considered to be significant.

Population, and Human Health and Material Assets

During the construction phase the Proposed Project will give rise to traffic movements of abnormal loads and increased traffic volumes on the local road network and, therefore, is likely to create some short-term inconvenience for other road users as well as dust and exhaust emissions. A Traffic Management Plan will be implemented prior to construction to minimise all disruption, as described in Chapter 15 (Material Assets) and the CEMP (Appendix 4-3).

During the operational phase, impacts on the surrounding local road network will be imperceptible. With the implementation of measures detailed in Chapter 5 (Population & Human Health) and the CEMP (Appendix 4-3) dust and exhaust emission will be contained and the potential for impact on health will be imperceptible.

As detailed in Chapter 15 (Material Assets), the Proposed Project will have a no impacts on telecommunications and aviation assets or operations and a short-term, slight, negative effect on utilities during the construction phase.

During the operational phase, there will be no impacts or associated effects on built services or telecommunications associated with the Proposed Project. The Proposed Project will have a long-term imperceptible neutral residual effect on aviation assets during the operational phase.

The Proposed Wind Farm therefore has the potential to produce up to 273,733 MWh (megawatt hours) of electricity per year to the national grid during the operational phase, offsetting the use of fossil fuels within the electricity sector. This has a long-term moderate positive effect on national electricity supply and the offsetting of fossil fuel consumption, thereby resulting in a reduction in harmful emissions that can be damaging to human health.

On this basis, the identified interaction is not significant.

17.2.2 Biodiversity

Biodiversity and Land, Soils & Geology

The removal of forestry and hedgerow and the excavation of spoil during the construction phase of the Proposed Project is likely to result in the disturbance of flora and fauna in and adjacent to the Proposed Project footprint thereby, potentially causing a long term, slight, negative effect on flora and fauna. These potential impacts have been assessed in Chapter 6 (Biodiversity) of this EIAR, and excavated spoil will be contained on site in the designated spoil management areas or used for landscaping.

It is proposed to enhance and manage 30.22ha of wet grassland land for Marsh Fritillary. In addition, 3.3ha of native woodland habitat will be established and managed. Meanwhile, it is also proposed to plant 9.9ha of a riparian woodland buffer throughout the Site which will create approximately 10.3km of woodland edge habitat.

Some of these proposals will disturb local soil and subsoil deposits and increase the likelihood of erosion of soil and subsoils. However, due to the largely non-invasive nature of the works the potential for effects on the soils and geological environment are limited. The works will have a positive effect on the land environment. Please see Chapter 6 (Biodiversity) and Appendix 6-1 Biodiversity Management and Enhancement Plan (BMEP) for details.

On this basis, the identified interaction is not significant.

Biodiversity and Water

Site activities during the construction phase of the Proposed Project may have the potential to give rise to water pollution, and consequential indirect effects (such as disturbance and deterioration of habitat quality) on flora and fauna that use that water within the same catchment. These potential impacts have been assessed in Chapter 6 (Biodiversity) and Chapter 9 (Water) and the relevant mitigation measures outlined in these chapters and the CEMP (Appendix 4-3) will be in place to avoid any water pollution and subsequent effect on flora and fauna.

As part of the Proposed Project, proposed enhancement measures (creation of 30.22ha wet grassland for marsh fritillary, 3.3ha of native woodland habitat and 9.9ha of a riparian woodland buffer) have the potential to impact downstream surface water quality. These works will begin in the pre-construction stage and will have positive effects on water quality, aquatic fauna and aquatic habitats.

On this basis, the identified interaction is not significant.

Biodiversity and Air Quality

During the construction phase of the Proposed Project, increased vehicular and dust emissions within and around the Site have the potential to be a nuisance to flora and fauna, thereby having a short-term, slight, negative effect. The mitigation measures outlined in Chapter 10 (Air Quality) and the CEMP (Appendix 4-3) of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

During the operational phase, the potential for effects on biodiversity from vehicular and dust emissions are imperceptible, however the overall displacement of fossil fuel emissions resulting from the operation of the Proposed Project will have a long-term moderate positive effect on air quality for biodiversity.

On this basis, the identified interaction is not significant.

Biodiversity and Climate

The construction of the Proposed Project will result in greenhouse gas emissions associated with tree felling, production of Proposed Project infrastructure and construction materials, and operation of vehicles and plant. As well, the Proposed Project footprint will result in the loss of carbon fixing vegetation within the Proposed Wind Farm site. The impact on biodiversity will be negative and slight only given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible, negative effect on the climate and therefore biodiversity. This is assessed further in Chapter 11 (Climate) of this EIAR, and mitigation measures are presented to minimise any potential effects.

During operational phase, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year operational lifespan due to the provision of clean renewable energy to the national grid, consequently, in combination with other renewable energy projects, the Proposed Project will have a long term, moderate positive effect on flora and fauna.

On this basis, the identified interaction is not significant.

Biodiversity and Noise & Vibration

Site activity during the construction phase could give rise to noise that could be a nuisance for fauna, which use the Site. Best practice mitigation measures are included in Chapter 6 (Biodiversity) and Chapter 12 (Noise & Vibration) and the CEMP (Appendix 4-3) to minimise the potential negative effect of noise generated during the construction phase on biodiversity.

The limited on-site noise activity generated by the Proposed Project during the operational phase will have an imperceptible effect on biodiversity.

On this basis, the identified interaction is not significant.

17.2.3 Birds

Birds and Land, Soils & Geology

The removal of hedgerows and soil, during construction phase of the Proposed Project is likely to result in some disturbance of flora and fauna, including birds, in the areas surrounding the Proposed Project works area. During the construction and operational phase, there will be a short-term to long-term, slight, negative effect on birds. The relevant mitigation measures outlined in Chapter 7 (Birds), Chapter 8 (Lands, Soils & Geology) and the CEMP (Appendix 4-3) will be in place to avoid any potential significant effect on birds.

On this basis, the identified interaction is not significant.

Birds and Water

Site activities during the construction phase of the Proposed Project may have the potential to give rise to some water pollution, and consequential short term indirect effects on birds and their prey species (such as disturbance and deterioration of habitat quality) that use that water within the same catchment. With the implementation of mitigation and monitoring measures outlined in Chapter 7 (Birds), Chapter 9 (Water) and the CEMP (Appendix 4-3), the effects during the construction and operational phase from site activities will be not significant.

On this basis, the identified interaction is not significant.

Birds and Air Quality

During the construction phase of the Proposed Project, increased vehicular and dust emissions within and around the Site have the potential to be a nuisance to birds, thereby having a short-term, slight, negative effect. The mitigation measures outlined in Chapter 10 (Air Quality) and the CEMP (Appendix 4-3) of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

During the operational phase, the potential for effects on birds from vehicular and dust emissions are imperceptible, however the overall displacement of fossil fuel emissions resulting from the operation of the Proposed Project will have a long-term moderate positive effect on air quality for biodiversity.

On this basis, the identified interaction is not significant.

Birds and Climate

The construction of the Proposed Project will result in greenhouse gas emissions associated with tree felling, production of Proposed Project infrastructure and construction materials, and operation of vehicles and plant. As well, the Proposed Project footprint will result in the loss of carbon fixing

vegetation within the Proposed Wind Farm site. This impact on birds' ranges from a negative slight to imperceptible effect, given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. As discussed above in Section 17.2.1, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate.

During operational phase, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year operational lifespan due to the provision of clean renewable energy to the national grid, consequently, in combination with other renewable energy projects, the Proposed Project will have a long term, moderate positive effect on flora and fauna.

On this basis, the identified interaction is not significant.

Birds and Noise & Vibration

Site activity during the construction phase could give rise to noise that could be a nuisance for birds, which use the Site. Best practice mitigation measures are included in Chapter 7 (Birds) and Chapter 12 (Noise & Vibration) and the CEMP (Appendix 4-3) to minimise the potential negative effect of noise generated during the construction phase.

The limited onsite noise activity generated by the Proposed Project during the operational phase will have an imperceptible effect on birds.

On this basis, the identified interaction is not significant.

17.2.4 Land, Soils and Geology

Land, Soils & Geology, and Water

As identified in Chapter 8 (Lands, Soils & Geology) of this EIAR, the erosion of soil/subsoil can have the effect of reducing the overall volume of soil/subsoil at the Site, with the potential for some eroded subsoils to reach watercourses, leading to water quality issues such as high turbidity. This has the potential to have a slight short term negative effect on water quality. Mitigation measures to ensure there are not significant, negative effects on water quality are presented in Chapter 8 (Lands, Soils & Geology), Chapter 9 (Water), and the CEMP (Appendix 4-3).

On this basis, the identified interaction is not significant.

Land, Soils & Geology and Air Quality

The excavation works and transportation of vehicles to/from and around the Site will give rise to dust, which is considered a short-term, slight, negative impact on air quality. Mitigation measures outlined in Chapter 10 (Air Quality) will reduce the potential for negative effects on land, soils, and geology, including includes dust suppression measures which is further outlined in the CEMP (Appendix 4-3).

On this basis, the identified interaction is not significant.

Land, Soils & Geology and Climate

The construction of the Proposed Project will result in greenhouse gas emissions associated with production of construction materials and operation of vehicles and plant. This impact will be negative and imperceptible only, given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. As discussed above in Section 17.2.1,

once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate.

On this basis, the identified interaction is significant.

Land, Soils & Geology and Landscape & Visual

The removal of spoil and the subsequent replacement with crushed stone for the construction of the site roads and hardstanding areas within the Proposed Wind Farm site has the potential to alter the local landscape. The visual effect of this change is expected to be short-term, negative and slight.

On this basis, the identified interaction is not significant.

Land, Soils & Geology and Cultural Heritage

The construction of the Proposed Wind Farm will not result in any direct, negative effects on the recorded archaeological, architectural or cultural heritage resource as none of these sites are located within the footprint of the development that requires excavations and ground works.

However, the removal of spoil during the construction phase is likely to have a permanent, slight, negative effect on any previously unrecorded sub-surface archaeological site and/or artefacts after mitigation is applied. Mitigation measures outlined in Chapter 13 (Archaeology, Architectural & Cultural Heritage) will reduce the potential for negative effects on unrecorded sites and artefacts during excavations.

During the operational phase, there is no potential for impacts on cultural heritage from a land soils and geology perspective as there will be no groundworks ae excavations associated with this phase.

On this basis, the identified interaction is not significant.

17.2.5 Air Quality

Air Quality and Material Assets

The transportation of vehicles to/from and around the Proposed Project will give rise to dust emissions which is considered a short-term, slight, negative impact on air quality. Following implementation of mitigation measures as outlined in Chapter 10 (Air Quality), Chapter 15 (Material Assets) and the CEMP (Appendix 4-3) there will be a short-term, imperceptible, negative effect on air quality due to transportation movements. Dust and exhaust emissions generated through the transportation of vehicles to/from and around the Site during the operational phase (1-2 LGVs per day) are imperceptible.

On this basis, the identified interaction is not significant.

17.2.6 Climate

Climate and Material Assets

The construction of the Proposed Project will result in greenhouse gas emissions associated with tree felling, production of Proposed Project infrastructure and construction materials, and operation of vehicles and plant. As well, the Proposed Project footprint will result in the loss of carbon fixing vegetation within the Proposed Wind Farm site. This negative impact will be imperceptible, given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. However, once emitted to the atmosphere, the greenhouse gas

emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate and therefore material assets. This is assessed further in Chapter 11 (Climate) of this EIAR, and mitigation measures are presented to minimise any potential effects.

During the operational phase, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Project. Therefore, while there will be greenhouse gas emissions associated with the operation of the Proposed Project, this will be offset by the operation of the Proposed Project which will offset 62,931 tonnes of carbon dioxide per annum or 2,202,931 tonnes over its operational life from traditional carbon-based electricity generation. Subsequently, this will cause a long-term moderate positive effect on Climate as a result of reduced greenhouse gas emissions.

On this basis, the identified interaction is not significant.

17.2.7 Landscape and Visual

Landscape & Visual and Cultural Heritage

As described in Chapter 13 (Landscape & Visual) of this EIAR, the proposed turbines have the potential to change the landscape setting of recorded sites and monuments in the wider area. However, it is concluded in Chapter 13 that any potential, indirect, visual effect of the proposed turbines on sites and monuments range from imperceptible to moderate. In reality the effect will be less severe due to natural screening, boundaries, buildings and vegetation, which will alleviate if not remove the impact on setting altogether. Furthermore, some monuments may not be readily visible in the landscape which further ameliorates potential effects on setting. Additionally, many of these monuments are located on private land which are not formally accessible to the public.

17.2.8 Vulnerability to Natural Disasters

As described in Chapter 16 (Major Accidents and Natural Disasters), major accidents or natural disasters are hazards which have the potential to affect the Proposed Project and lead to environmental effects both directly and indirectly. These include accidents during construction, operation and decommissioning of the Proposed Project caused by operational failure and/or natural hazards. The assessment of the potential for significant accidents or disasters is conducted in connection with the information that must be included in the EIAR. This includes aspects such as population and human health, biodiversity, land and soil, hydrology and hydrogeology, air quality, climate, material assets, cultural heritage, and the landscape. The risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low' in accordance with the '*Guide to Risk Assessment in Major Emergency Management*' (DoEHLG, 2010).

When the above mitigation is implemented, and all mitigation detailed in the EIAR is implemented, the residual effect(s) associated with the construction, operation and decommissioning of the Proposed Project are not significant.

17.3 Mitigation and Residual Effects

Where any potential interactive negative effects have been identified in the above, a full suite of appropriate mitigation measures has already been included in the relevant sections (Chapters 5 – 16) of the EIAR and are detailed in the CEMP (Appendix 4-3). The implementation of these mitigation measures will reduce or remove the potential for there to be effects. Information on potential residual effects and the significance of effects, is also presented in each relevant chapter. On this basis the effects arising from the identified interactions are not significant.