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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED COUNNAGAPPUL WIND FARM, CO. WATERFORD

VOLUME 2 – MAIN EIAR

CHAPTER 6 – POPULATION AND HUMAN HEALTH

Prepared for:

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Date: October 2023

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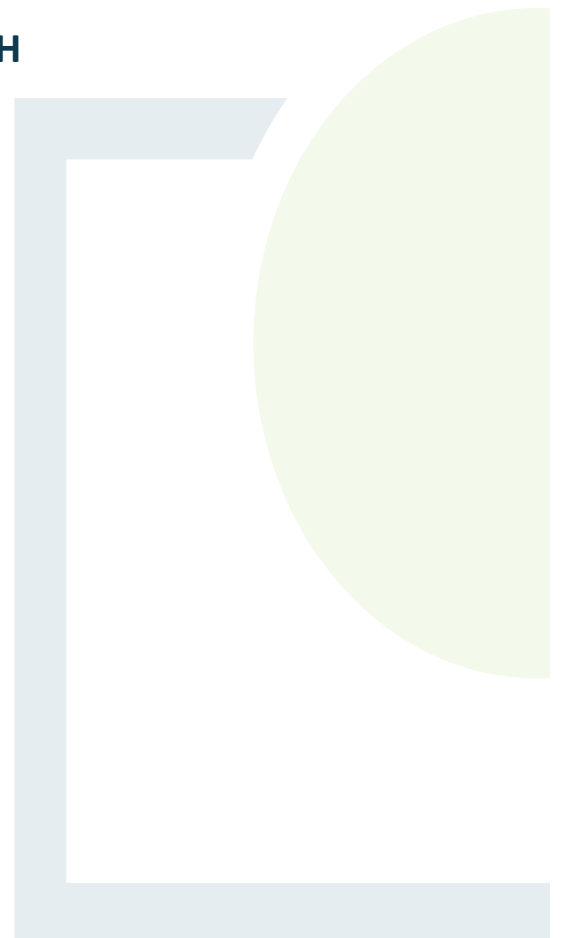


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6. POPULATION AND HUMAN HEALTH

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) examines the potential effects of the proposed Coumragappul Wind Farm on Population and Human Health. The chapter includes a description of the existing environment in respect of population and human health and considers the likely effects arising from the proposed project during construction, operation and decommissioning under the following elements:

- Population and Settlement Patterns;
- Employment and Economic Activity;
- Land Use;
- Recreation, Amenity and Tourism;
- Human Health and Safety including the potential for the project to cause accidents and/or natural disasters and the vulnerability of the project to potential disaster/accidents;

The assessment presented in this chapter draws upon the findings of other EIAR chapters, including Air and Climate (Chapter 7), Noise (Chapter 8), Soils, Geology and Hydrogeology (Chapter 11), Hydrology, Water Quality and Flood Risk Assessment (Chapter 12), Shadow Flicker (Chapter 13), Traffic & Transportation (Chapter 14), Landscape and Visual Impacts (Chapter 16) and Material Assets, Telecommunications & Aviation (Chapter 17). In addition, other assessments are set out including those relating to potential effects on population statistics, socio-economics, changes to land use, facilities, human perception, and human safety.

The proposed Project assessed in this EIAR comprises the following key elements:

- The wind farm site (referred to in this EIAR as the 'Site');
- The grid connection (referred to in this EIAR as the 'GCR');
- The turbine delivery route (referred to in this EIAR as the 'TDR').

The layout of the proposed wind farm site (Site), grid connection (GCR) and turbine delivery route (TDR) are presented in Figures 2.2 to 2.4 in Volume IV.

This assessment considers the Vestas V162 wind turbine model as described in Chapter 1 Introduction and Chapter 2 Development Description. The plans and particulars submitted with this application for consent provide dimensions for the turbine structures. The turbine specifications will have a hub height of 104 m and a rotor diameter of 162 m with a tip height of 185m.

Where potential significant effects have been identified, mitigation measures have been proposed. Residual effects are then considered which details potential effects following implementation of mitigation measures.



A do-nothing scenario (as described in Chapter 3 - Site Selection and Alternatives) is outlined, in line with requirements of the EIA Directive 2014 (As Amended) which states: “*The environmental impact assessment report to be provided by the developer for a project should include a description of an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*”. The assessment details the likely evolution of the receiving environment in the future should the proposed project not be carried out.

6.2 Statement of Authority

This chapter has been prepared by Mr. Killian Whyte and Ms. Rita Mansfield of Fehily Timoney and Company.

Mr. Killian Whyte is a Project Planner with a MSc in Planning and Development from Queens University Belfast (2018), Higher Diploma in Social Policy from University College Cork (2014) and BSc Government and Public Policy from University College Cork (2013). He is also a Licentiate member of the Royal Town Planning Institute. Killian has prepared several Population and Human Health EIAR chapters for wind farm development in Ireland including a Population and Human Health chapter for the Fahy Beg Wind Farm Co. Clare and a Population and Human Health chapter for the Regeneration of the South Docklands in Cork City.

Ms. Rita Mansfield has worked in environmental consultancy for 19 years and has obtained a Bachelor (Hons) Degree in Applied Ecology from University College Cork and a Higher Diploma in Environmental Protection and Pollution Control from the Sligo Institute of Technology. She has managed the preparation of EISs/ EIARs for large-scale infrastructure development throughout Ireland.

6.3 Study Area

The Study Area for the Population and Human Health Chapter of this EIAR focuses on the local receiving human environment and is described in terms of the Electoral Divisions (EDs) in which the proposed Project is located, as well as adjacent EDs which have the potential be affected by the Project.

- The Site is located within the EDs of Knockaunbrandaun and Seskinan in County Waterford. The Site is located 15.8 km north of Dungarvan and 14.5 km southeast of Clonmel town center. The nearest settlement is Ballymacarbry, located 5.5 km to the northwest of the Site.
- The GCR will be from Dungarvan Substation to the Site and will pass through the EDs of Colligan, Modelligo, Coumaraglin and Seskinan.
- The TDR will be from Waterford Port along the N25 where it passes through the EDs of Rathpatrick, Dunkitt and Aglish, Co. Kilkenny (for ca. 10.5 km) before entering Co. Waterford where the route continues along the N25 and passes through the EDs of Gracedieu, Killoteran, Reisk, Kilmeaden, Newcastle, Newtown, Kilmacthomas, Ballylaneen, Fox’s Castle, Comeragh, Mountkennedy, and Clonlea, following which it diverts to the N72 within the ED of Dungarvan Rural, and further diverts to the R672 within the Colligan Modelligo, Coumaraglin EDs and diverts to the local roads within the Seskinan ED, where it enters the Site.

Electoral Divisions are the smallest legally defined administrative areas in the state. EDs encompass Small Areas (which typically contain between 10 and 120 dwellings) which in turn comprise Townlands.

The extent of the EDs considered for the purposes of this assessment are shown in Figure 6.1, Volume IV.



Cumulative Effects

In relation to cumulative effects for Population and Human Health, the cumulation of effects with other existing and/or approved projects has been assessed. The cumulative impact assessment provides a baseline from which a full environmental assessment of the potential effects arising from the Project in combination with other plans and projects can be considered comprehensively. A search for proposed, consented and existing projects was conducted within 20km of the proposed project to identify development in proximity to the Site, GCR and TDR.

The geographic extent of the cumulative assessment is considered on a case-by-case basis, in line with the Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission, 1999). However, 20km distance from the Site was considered a reasonable zone of influence for the purpose of assessing potential cumulative effects on population and human health considering the size and extent of the project, the nature of the impacts and the receiving environment of the wider area.

The 20km radius from the proposed turbines is considered relevant in line with the recommended study area for the zone of theoretical visibility of proposed wind farm projects as set out in the Wind Energy Development Guidelines (2006) which cites the use of a 20 km radius for blade tips greater than 100m. This represents a visual study area for potential cumulative projects but also represents an appropriate study area for other potential cumulative effects including traffic, noise, water quality and air quality. It is considered that potential impacts beyond this distance are imperceptible.

Regular planning searches from June 2022 to October 2023 were carried out to identify proposed development in proximity to the Site, GCR and TDR. This included a search for major infrastructure projects; large residential, renewable energy or commercial developments; proposed or consented development; as well as an examination of relevant plans and policies for the area as detailed in Chapter 4: Policy. Cumulative impact is further detailed in Section 6.11.

6.4 Consultation

Consultation with relevant organizations was initiated during the initial stage of the EIAR to identify any potential effects of the Project on Population and Human Health.

No response was received from the Health Service Executive.

An Garda Síochána issued a letter in response to the Coumragappul Wind Farm Scoping consultation on 21st September 2020 which highlighted the potential for safety implications when using local roads for turbine deliveries, noting sharp bends and narrow stretches on the L1014.

The Applicant conducted community consultation in relation to the Project between 2019 and 2023. Community feedback included:

- Queries in relation to effects on traffic;
- Requests for information on turbine proximity to property, wind farm layout and visual effects including turbine cut in and cut out data;
- Concerns about effects on livestock, including sheep and sheepdogs.

Further details on Scoping Consultation and Community Engagement are provided in Chapter 5.



6.5 Methodology

This chapter of the EIAR has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA), in particular, the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, May 2022), The Government of Ireland's Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August, 2018) and the European Commission's guidance document: Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report as per Directive 2011/92/EU as amended by 2014/52/EU. The determination of significance of impact is in line with the EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, May 2022).

6.5.1 Population and Settlement Patterns

Demographic data has been sourced from the Central Statistics Office (CSO)'s Census of Ireland (2006 to 2016, along with available preliminary data from 2022) records. At the time of submission of this EIAR Chapter the CSO Census of Population 2022 was not available, only preliminary data relating to County population was published.

Demographic information relating to the State, County Waterford and the Study Area has been assessed to establish the trends in population demographics and settlement patterns.

Eircode data (2020), Geodirectory data which provides locations (geographic coordinates) for registered addresses along with planning application lists (including any exempted developments) sourced from Waterford County Council, An Bord Pleanála and the Department of Housing and Local Government's EIA Portal have been assessed to identify any commercial or residential receptors in proximity to the Project. These sources were assessed throughout the EIAR process and most recently in October 2023. The planning search was conducted to identify permitted unbuilt dwellings and planned dwellings which do not appear on Eircode or Geodirectory Databases.

A house survey was carried out as part of a general walkover in September 2022 where locations of all dwellings in proximity to the Site were confirmed to be as per the Geodirectory and any derelict buildings were similarly confirmed.

A desktop house survey was carried out for the Grid Connection Route and TDR where temporary works are proposed.

The data gathered has informed the consideration of impacts on the existing population within the immediate environs of the proposed development and allows for a comprehensive assessment of the potential effects on population trends which may occur during the construction, operational, and decommissioning phase of the Project.

Additionally, a review of local and regional development plans and planning policy was carried out in order to identify future development within the study area.



6.5.2 Employment and Economic Activity

A socio-economic profile of the existing environment was established using live register data (2019 to 2023) and Census (2016) data to outline an employment profile of the study area. Peer reviewed research from the Institute for Sustainable Futures and the European Wind Energy Association was referred to in order to estimate the employment which the proposed development has the potential to create through the construction, operation and decommissioning phases of the proposed development, and the impact this employment will have on the study area.

6.5.3 Land Use

Land use in the study area was examined to determine potential impacts on existing land use patterns which may arise because of the proposed Project. Corine Land Cover data (2018) was studied, and observations were carried out throughout the ground-proofing survey to determine land uses in the study area. The impact of the Project was then considered with regard to these land uses.

6.5.4 Recreation, Amenity and Tourism

Fáilte Ireland's 'Guidelines on the Treatment of Tourism in an Environmental Impact Statement' (2011) informed the methodology used in assessing potential impacts on Recreation, Amenity and Tourism. A profile of tourism in the region was established through examination of Fáilte Ireland Statistics in order to indicate the strength of Recreation, Amenity and Tourism in the surrounding region. Recreation and amenity facilities and attractions in the area were identified through a desktop study (including <https://visitwaterford.com/> accessed in September 2023) and the location of amenities relative to the Project were established. Potential impacts as a result of the Project were then considered in relation to the tourism profile, amenity and recreation facilities and attractions of the area.

A review of planning policy and strategies was carried out to identify core walking trails and cycling routes and other rights of ways within the study area.

6.5.5 Human Health & Safety

The assessment on human health and safety has regard to the Environmental Protection Agency's (EPA US) Human Health Risk Assessment process¹ which is a procedure for identifying the nature and magnitude of risks to human health over the lifetime of a project. The risk assessment for The Project includes a review of published literature on the effects of wind energy developments and construction activities on human health. CSO data (2016) and reports published by the Department of Health were examined to establish a baseline health profile of the study area. A desktop examination of potential hazardous land uses in the study area was carried out and vulnerability of the project to natural disaster was assessed through a desktop geographical study and literature review. The assessment was further informed by field surveys and slope stability assessment which were completed as part of the EIA process. Potential impacts to human health as described throughout this EIAR are detailed in this Chapter, including potential impacts on air quality, noise and traffic and potential impacts on human safety including potential for flood risk and slope failure.

¹ <https://www.epa.gov/risk/conducting-human-health-risk-assessment>



6.6 Existing Environment

6.6.1 Population

This section provides an overview of the population profile for the Study Area, County Waterford and the State between the Census years of 2006 and 2016 to create a baseline demographic profile of the receiving environment.

The Preliminary Results of Census 2022 are used in this assessment where relevant. However, it is noted that not all Census data from 2022 was available at the time of undertaking this assessment and that available data pertained to analysis of geographical changes of the population, components of population change and housing.

Population Trends

Population statistics for the State, Waterford County and the EDs associated with the Study Area (refer to Section 6.3) for the period of 2006 to 2022 are set out in Table 6-1, noting that 2022 figures are from the Preliminary Results of Census 2022. In the six years between the 2016 Census and the 2022 Census, Ireland has seen a national increase in population of 7.6%. This is a continuation of the upward trend in national population observed since 2006, which is similarly reflected at County level. Locally, within the EDs associated with the Wind Farm Site, a slow growth in population is observed since the 2006 Census.

Of the EDs associated with the Wind Farm Site, Seskinan had the larger population in 2022 of 464 persons with Knockaunbrandaun having a population of 209. Similarly in the 2016 Census, Seskinan had the larger population of 414 persons with Knockaunbrandaun having a population of 210. In the 2011 Census Seskinan had a population of 455 and Knockaunbrandaun had a population of 211. The local population trend at Knockaunbrandaun shows little change over time, whereas the population within the Seskinan ED has fluctuated slightly over time but in the recent census is showing a slow upward trend overall.

Table 6-1: Population of Study Area

Area	Population				% Population Change		
	2006	2011	2016	2022	2006-2011	2011-2016	2016-2022
State	4,239,848	4,588,252	4,761,865	5,123,536	+8.2%	+3.8%	+7.6%
Waterford County	107,961	113,795	116,176	127,085	+5.4%	+2.1%	+9.4%
Wind Farm Site	589	666	624	677	+13.1%	-6.3%	+8.5%
GCR	1549	1681	1696	1731	-7.9%	+0.9%	+2.1%
TDR	14426	16458	16917	18431	+14.1%	+2.8%	+8.9%



Population Density

The population density recorded within the State, County Waterford and the Wind farm Site for the 2006, 2011 and 2016 Census are set out hereunder in **Table 6-2**. Population density data from Census 2022 was not available at the time of writing this chapter.

In 2016, the average population density within the State was 70 persons per km², with urban areas having higher densities of 2,008 persons per km² compared to 27 persons per km² in rural areas.

The EDs of Knockaunbrandaun (which has an area of 29 km²) and Seskinan (which has an area of 26 km²) which contain the proposed Wind Farm Site are rural areas with generally stable population densities between 2006 and 2016. Seskinan has the greater population density than Knockaunbrandaun, which is a reflection of the difficult terrain associated with the Comeragh Mountains which sits partially within the Knockaunbrandaun ED. The 2016 population density for Seskinan was 16.1 persons per km² and Knockaunbrandaun was 7.3 persons per km². The population densities of the EDs at the Wind Farm Site are significantly lower than the 2016 national population density of rural areas.

The nearest settlements of Dungarvan and Clonmel are located approximately 16.7 km and 14 km respectively away from the Wind Farm Site.

Table 6-2: Population Density between 2006 – 2016 (Persons per square kilometre)

Area	Population Density (Persons per square kilometre) 2006	Population Density (Persons per square kilometre) 2011	Population Density (Persons per square kilometre) 2016
State	61.9	67	70
Waterford County	58.8	62	63.3
Wind Farm Site	9.1	10.1	9.6
GCR	15.8	17.1	17.3
TDR	35.8	41	42.3

The EDs encompassing the Site are rural in character consisting of one-off houses focused around the local road network and have significantly low population densities. There are no buildings within 4 times the tip height of the proposed wind turbines. According to Eircode data (2022) there are 40 properties within 2 km of the turbine array. The closest property to a turbine is located ca. 820 m distance and is roughly equidistant from south between Turbines T10 and 1.2km south from T12. There is one consented permission which has not yet been developed within 2 km of the Site. This is for a change of use from agricultural to domestic (including a rear extension) at a property located within the Townland of Reanadampaun Commons, 1.97 km west of turbine T12.

Figure 2.5, Volume IV illustrates the properties within 2km of the Site according to Eircode (2022) data. This information is supported by the ground proofing survey (carried out September 2022) and planning application search.



6.6.2 Socio-Economics, Employment and Economic Activity

This section provides a comprehensive overview of the socio-economic, employment and economic activity associated with the Study Area. This provides an understanding of the overall socio-economic profile of the receiving environment and the potential effects arising from the proposed Site, GCR and TDR.

Employment and Economic Status

Live register data accessed in April 2023 (available through <https://data.cso.ie/>) provides information relating to the number of people registering for Jobseekers Benefit, Jobseekers Allowance, or for various other statutory entitlements. In order to obtain the percentage of those unemployed in each month, a percentage of those on live register is taken from the total 2016 figures for those aged 15-64 which shows that in March 2016, the figures for those on the live register from the 15-64 age group in the state was 10.1% and in Co. Waterford was 25.7%. The figure is useful to gauge unemployment estimations for an area, however, it is noted that the Live Register data includes part-time workers (working up to three days per week), seasonal workers and casual workers who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, cannot be relied upon entirely for conclusive employment data. Furthermore, 2020 and 2021 saw a significant increase in unemployment throughout the country due to the COVID-19 pandemic. Live register data is presented below in Table 6-4 for the State and County Waterford.

Table 6-3: Total Population aged 15-64 for State, Waterford City & County 2016:

	Total Population Aged 15+ 2016 Note 1
Waterford City & County	74,260
State	3,117,746

Table 6-4: Live Register Data for Waterford County and the State March 2016 – March 2023

	March 2016	March 2017	March 2018	March 2019
Waterford City & County	19,114	16,211	14,813	12,537
State	315,364	267,202	232,366	192,407
	March 2020	March 2021	March 2022	March 2023
Waterford City & County	12,367	11,192	10,544	10,881
State	205,209	183,096	178,996	179,777

Source: CSO & data.gov.ie

Note 1 As per OECD (Demography – Working age population – OECD Data) the working age population is defined as those aged 15 to 64. Citizens Information (Children and rights in Ireland, citizensinformation.ie) states that those aged 15 are able to work 8 hours a week light work in school term time. The maximum working week for children outside school term time is 35 hours or up to 40 hours if they are on approved work experience.



Between 2016 and 2023, unemployment trends in County Waterford and the State show a continuous decreasing trend of those on the live register with the numbers dropping by 43.1% throughout Waterford City & County in that period, the state figures correlate to that with numbers recorded on the live register decreasing by 43% in the same period. During the COVID-19 period encompassing figures for March 2020 and March 2021, the numbers of people on the live register increased from March 2019 to March 2020 by 6.7% across the State, however there was actually a slight decrease of 1.4% in Waterford during the same period of March 2019 to March 2020. These numbers have since decreased by 10.8% across the State and by 9.5% across County Waterford between March 2020 and March 2021 during the COVID period. In the last two years since (March 2021- March 2023) figures for both the State and county Waterford have both seen decreases of 1.8% and 2.8% of those on the liver register respectively.

At the time of writing, CSO 2022 figures for the Economic status of the total population are currently unavailable and 2022 figures will be made available in November 2023 and thus 2016 figures are the most recent figures made available.

Taking account of the 2016 Census population figures for those aged 15 to 64 along with the live register data from March 2023 detailed in Table 6-5, this represents an unemployment rate of 5.8% across the State, and an unemployment rate of 14.7% across County Waterford, indicating a greater than average unemployment rate of 6.9% for the County Waterford as a whole compared to the State.

The labour force consists of those who are able to work, i.e. those who are aged 15+, out of full-time education and not performing duties that prevent them from working. Table 6-5 sets out the percentage of the total population aged 15+ who were in the labour force during the 2016 Census. Table 6-5 also sets out those who were not in the labour force, this includes students, retired people, those unable to work, persons performing home duties etc.

Table 6-5: Employment Status of the Total Population Ages 15+ in 2016

	Status	State	County Waterford	Wind Farm Site	TDR	Grid Connection
% of Population aged 15+ which are:	At Work	53.4%	49.8%	52.4%	54.1%	55.1%
	First time job seeker	0.8%	0.9%	0.6%	0.7%	0.4%
	Unemployed	7.1%	8.2%	5.7%	6.6%	4.1%
	Student	11.3%	11.3%	12.1%	10.6%	10.6%
	Home duties	8.2%	8.3%	7.8%	8.7%	9.8%
	Retired	14.4%	16.5%	17.5%	15.2%	17%
	Unable to work	4.3%	4.6%	3.9%	3.8%	3%
	Other	0.4%	0.5%	0%	0.2%	0.1%

As set out in Table 6-6, the principal employment status in 2016 across the State, County Waterford and the Study Area is 'at work', and the percentage of the population spread across the employment categories (status) generally align across the State, County and Study Area.



Table 6-6: Industry Distribution by Area in 2016

Persons at Work by Industry	State	County Waterford	Wind Farm Site	TDR	Grid Connection
Agriculture forestry & fishing	4.4%	5.7%	22.7%	8.4%	19.8%
Building & construction	5.1%	4.5%	7.1%	6.2%	3.6%
Manufacturing industries	11.4%	16.3%	18.2%	18.4%	17.6%
Commerce and trade	24%	20.9%	12.6%	20.6%	16.5%
Transport and communications	8.5%	5.2%	3.3%	4.9%	4.5%
Public administration	5.3%	4.3%	5.9%	4.4%	5.5%
Professional services	23.5%	25.3%	25.7%	23%	22.9%
Other	17.8%	17.8%	4.5%	14.2%	9.6%

The Census (2016) also indicates the employment composition of Electoral Divisions. As detailed in Table 6-6, the employment sectors for each of the areas show similarities with professional services, manufacturing industries having the largest share across the State, County and Study Area.

The Study Area has a higher percentage of employment from the Agriculture, Forestry and Fishing sector compared to State and County figures. This higher figure may be attributed to the rural nature of the Wind farm Site.

Manufacturing industries in the Study Area including a number of engineering firms (Mechanical Engineering), plastic fabrication companies, steel fabrication, machining manufacturing including agricultural.

6.6.3 Land Use

This section assesses the compatibility of the land use of the Project with the current land use. The determination of the potential effects on existing land use is assessed for the construction, operation and decommissioning phases of the proposed project. The potential impact on sensitive land uses in the area of the Project have been examined in this section.



The Corine Land Cover mapping for County Waterford shows land use for the Site at the proposed locations for T1, T4 and T12 to be natural grassland. However, this landcover more correctly correlates to Moors and Heathland as determined through field survey. The Corine land cover shows that T5 is located within a peat bog, but is more accurately defined as pastureland, as determined through field survey. The Corine land cover shows T6 and T7 to be located in a peat bog, however this land more accurately correlates to heath. Turbines T8, T10 and T11 are shown to be located within 'Land Principally occupied by agriculture with significant areas of natural vegetation' however this land more accurately represents moor and heath. Thus, with the above in consideration, there is no peatland present on the Site as the soil type is more of a clay-peat which is very shallow. Please see Chapter 11- Soils, Geology and Hydrogeology for further information on the soil type which shows that the soil type present is more of a peaty topsoil and is very shallow.

There are very few hedgerows within the Site, with the improved grassland fields delineated by electric fencing and most of the heathland grazed by free roaming sheep.

Fenor Pig Farm is located approx. 2.5km to the west of the Site. The farm has a number of main access points to the west on the Pig Farm on the main R671 road and unnamed local road to the east. As The TDR/GCR passes 2.5km to the west located on the L5119, it is considered that this proposal would not impact upon access to this pig farm.

Tierney Farms is located approx. 3.1km to the west of the Site. The farm has a number of main access points to the north, on an unnamed local road, to the east on an unnamed local road and to the south on an unnamed local road. As The TDR/GCR is located on the L5119, it is considered that this proposal would not impact upon access to this pig farm.

The closest Schools in proximity to the Site is Kilbrien National School which is located 3.6km to the south and St Mary's National School which is located 3.8km to the west.

As illustrated in Table 6-7, there are 3 operational wind farms, 1 permitted wind farms and one proposed wind farm and one permitted solar farm located within 20km of the Site.

Table 6-7: Cumulative Energy Developments

Energy Development Name	Number of Turbines/Panels	Distance and Direction from proposed site	Status
Tierney Single Turbine	1	5.1km west of Site	Operational since 2015
Dyrick Hill Wind Farm	12	8.3Km South-West	At Planning Stage
Kilnagrange Single Turbine	1	14km east of Site	Operational since 2015
Woodhouse Wind Farm	8	17.2km west of Site	Operational since 2015
Knocknamona Wind Farm	8	17.6 km west of Site	Permitted since 2016



The proposed point of connection will be the existing Dungarvan Substation to the south of the Site which will be connected by the installation of a 22.47 km of high voltage (110kV) and communication cabling underground between the proposed on-site substation and the existing Dungarvan Substation. The proposed grid connection cable works will include existing watercourse and drain crossings and the installation of 30 no. pre-cast joint bays. One horizontal directional drilling (HDD) crossing is required of one waterbody.

Large components associated with the wind farm construction will be transported to the Site via the identified turbine delivery route (TDR). The TDR includes the following roads:

- N29
- N25
- N72
- R672
- L5119

The TDR shall be confined to the public road corridor associated with the above roads with the exception of locations where temporary accommodation works will be required to facilitate the delivery of oversized loads. These accommodation works include hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and local road widening. For these locations, private lands have been identified and assessed in the EIAR. The TDR and location of temporary accommodation works are described in detail in Chapter 14- Traffic and Transportation.

There are two recorded archaeological sites within the Site and both of these have been classified as 'redundant records' by the Archaeological Survey of Ireland as there is no evidence for the presence of any archaeological sites at their locations. There are 28 archaeological sites, including two classified as 'redundant records' by the Archaeological Survey of Ireland, located within private lands within an area extending for 1km in all directions from the Site boundary.

Given the types of features identified and their locations relative to the Proposed Development, these are not considered a constraint to the Proposed Development.

The Wind Farm Site is at a very low risk of flooding from fluvial sources, surface water runoff or groundwater. Mitigation to ensure that the Project does not increase the risk of flooding as a result of increased impermeable area, or impact on existing watercourses and overland flow routes resulting from the construction of access tracks is prescribed in Chapter 12 – Hydrology and Water Quality.

6.6.4 Recreation, Amenity and Tourism

This section provides an overview of the recreation, amenity and tourism value for the Study Area, in order to assess the potential effects arising from the Project. Tourism is one of the major contributors to the national economy and is a significant source of full-time and seasonal employment. As 2020 and 2021 have experienced an unprecedented negative impact on international tourism due to the COVID-19 epidemic, this section focuses on statistics from 2018 and 2019 as a reasonable scenario for tourism potential for the County and wider region. The preparation of this section had regard to Fáilte Ireland's 'Guidelines on the Treatment of Tourism in an Environmental Impact Statement'. Consultation has taken place with local recreation groups, as detailed in Chapter 5 of this EIAR, in order to thoroughly understand potential affects to recreation activity in the area.



Tourism statistics for 2019 as published by Fáilte Ireland (March 2021) state that overseas tourism grew by 0.7% on 2018 figures with over 9.7 million visitors. Expenditure from overseas tourism was estimated to be down by -0.8% remaining strong at €5.1 billion.

Fáilte Ireland’s 2019 survey results indicate the top 5 most popular recreation activity for tourists in Ireland:

1. Hiking and cross country walking;
2. Cycling;
3. Golf;
4. Equestrian;
5. Angling.

Fáilte Ireland’s Regional Tourism performance figures for 2018 and 2019 are set out in Table 6-8 and Table 6-9 for the South-East Region which includes County Waterford. As demonstrated in the tables, tourism numbers for the South-East Region contribute a significant tourism revenue of €834 million and €855 million in 2018 and 2019 respectively.

Table 6-8: South-East Regional Performance (Tourists in 2018)

Region		Britain	Mainland Europe	North America	Other Areas	All Overseas	Northern Ireland	Domestic Trips
South-East	Tourists (000s)	296	358	296	78	1,028	22	1,683
South-East	Tourist Revenue (€mn)	83	86	70	22	261	8	304



Table 6-9: South-East Regional Performance (Tourists in 2019)

Region		Britain	Mainland Europe	North America	Other Areas	All Overseas	Northern Ireland	Domestic Trips
South-East	Tourists (000s)	274	320	272	79	945	53	1,795
South-East	Tourist Revenue (€mn)	75	100	66	20	261	21	312

Thus, with the above figures in mind, tourism is considered an important industry for County Waterford. Chapter 4 on Economy, Tourism, Education and Retail of the Waterford City & County Development Plan 2022-2028, identifies as a Strategic Objective in assisting and ensuring that Waterford is:

‘To develop, deliver and promote Waterford as a year-round world class tourism destination, with authentic, memorable experiences which attracts local, regional, national and international visitors generating long term and lasting benefits to enhance and support local communities and realise additional economic growth, jobs and prosperity for the people of Waterford’.

Top attractions in the Waterford area in 2019, listed by Fáilte Ireland, include House of Waterford Crystal, Reginald’s Tower, Medieval Musuem (Waterford Tresures Musuems), Lafcadio Hearn Japanese Gardens, Mount Congreve Gardens, Waterford and Suir Valley Railway, Lismore Heritage Centre and Lismore Castle Gardens. which are located approx. 36.5km, 36.9km, 36.8km, 34.6km, 29km, 27km, 22.9km and 22km respectively from the Site.



Other recreation and tourism amenities located in the area (15 km) of the Site include:

- The Magic Road c. 3.3 km
- Nire Valley Glamping c. 3.5 km
- Standing Stone c. 4 km
- APS Clay Pidgeon Practice Ground c. 4.2 km
- Nire valley eco Camp c. 4.3 km
- Deise Animal Sanctuary c. 4.4 Km
- Mahon falls c. 4.5 km
- Comeragh Mountains c. 5 km
- Crough Wood c. 5km
- Toorala Equine c. 5.3 km
- Kilgobinet GAA Club c. 5.8 km
- Coumshingaun Lake c. 5.8 km
- Coumshingaun Lough Trailhead c. 6.0 km
- Ned Curran's Cottage, c. 6 km.
- Clonnav Fly Fishing c. 6.5 Km
- Crotty's Lake c. 6.6 km
- St Brigid's Church c. 6.8 km
- Sleadly Castle 7.7km
- The Boolas National Looped Walk c. 8.4 km
- Lough Mohra & rath Beag Loop Walk c. 8.8 km
- Carey's Castle c. 9.1 km
- Carey's Castle Forest Recreational Area c. 9.2 km
- Colligan Wood walks c. 9.5 km
- Powers the Pot Camping & Caravan park c. 10.2 km
- Clonmel Golf Club c. 10.2 km
- Kilmacthomas Viaduct c. 10.4 km
- Molough Abbey c. 10.4 Km
- Newcastle GAA Grounds 10.5 Km
- Fishers Water Gardens 10.6 km
- InspireMe Ireland 11 Km
- Gurteen Nature Walk 11.5 Km
- Modeligo GAA Club 11.8 Km
- Marlfield Forest Recreational Area 11.8 km
- Rathgormack Old Parish Church Graveyard 12.1 km
- Rathgormack Hiking Centre 12.3 km
- Colligan Wood Walk 12.3km
- Holy Well 12.5 Km
- Colligan Wood Hire 12.8 km
- Ballyvoyle Tunnel 13 km
- Maol Mor 13 km
- Ballyvoyle viaduct 13.7 km
- Durrow Viaduct 13.7 km
- Beechfield Stables 14 km
- Ballyvole Cove 14 km
- Liam Lynch memorial 14 km
- Master Mc Grath Monument 14.4 Km
- Mount Melleary Cistercian Order 14.7 Km
- Dungarvan Golf Club 14.8 km
- Rathgormack Football Club 14.8 Km
- Burgery Ambush Memorial 15Km
- Glenshelane River Walk 15 Km
- Colligan & District Angling Club 16km

Overall, the most significant recreation activity/attractions in proximity to the Site is trail walking/hiking/cycling, Glamping, Clay Pidgeon Shooting, Eco-Camping, Animal Sanctuary, Fly-fishing, Equestrian Activity, Fly-fishing, Mountain and Sports Grounds.

Outdoor recreational facilities such as cycling, walking and hiking trails associated with the Comeragh Mountains act as a major attraction for recreation and amenity. As mentioned above, some of the top visitor attractions in the surrounds of the Comeragh Mountains include: 'Mahon Falls' and the 'Nire Valley' and activities around these are all located within close proximity to the site. Notable amenity and recreation features within and in the near surrounds of the Comeragh Mountains include; the Nire Valley National Looped walking trails, the Sean Kelly Cycling Loop trails, the Lough Mohra Loop, the East Munster Way and the Comeragh Mountains scenic drive. As part of this, there a number of walking clubs such as the Comeragh Mountaineering Club that that use the facilities associated with a number of mountaineering and hiking facilities.

The Coumshingaun Lough looped hiking trail is also a popular and highly scenic trail amongst outdoor recreationalists, whilst areas surrounding the Nire Valley encompass several camping areas and holiday parks.



Further detail on potential visual impacts of the Project are set out in Chapter 16- Landscape and Visual Impact.

Community Facilities & Services

Community facilities and services in proximity to the Site are centred on towns and villages in the area. The closest settlement to the Site is the village of Ballymacarby, located 4.7 km to the north-west. Facilities and services within the village include a community Centre, a Garda Station, GAA Club, Healthcare Pharmaceutical Company, Gas Station, a School and a Child Care Facility.

The most proximate town to the Site is Clonmel, ca. 14 km north of the site. Community facilities and services within the town include a range of town centre retail, supermarkets, food places and public houses, pre-school, primary and secondary schools, shopping centre gyms, swimming pools, further education centre, guest houses, hotels, church, garda station, sports grounds, care centres, medical centres, post office and park and playground.

The TDR also passes through the northern proximities of the town of Dungarvan, ca. 16.7 km south of the site. The TDR passes through the northern outskirts extremities of the town on the N72. Community facilities and services within the town include a range of town centre retail, food places, shopping centre, public houses, a preschool, guesthouses, pitch and putt club, gyms, sports grounds, marina, strand, beaches, playground, a greenway, hotels, equestrian centre, a church and a primary school.

The proposed GCR does not pass by any significant community facilities.

6.6.5 Human Health & Safety

This section provides an overview of the health profile of the receiving environment and the State, in order to provide for the assessment of potential impacts that the Project may have on human health. An assessment of peer reviewed literature has been carried out to provide a sound, scientific basis for the potential impacts arising from the proposed Coumragappul Wind Farm.

Human health in relation to this assessment refers to the nature and possibility for adverse health effects on humans. In the context of existing human health, The Department of Health (2022) has published a report entitled 'Health in Ireland, Key Trends 2022' which provides statistics relating to human health in Ireland over the last 10 years (2012 to 2022). Generally speaking, Ireland's population has a high level of good health as demonstrated in self-evaluation statistics included in Census data (see Table 6-10 below). Human health in relation to this assessment refers to the nature and possibility for adverse health effects on humans.

From analysis of the health statistics below, the majority of the general health of persons living in the Study Area is recorded as 'Very Good' or 'Good'. This broadly aligns with National and County figures albeit the percentage of people in the Study Area in 'Very Good' health is ever so slightly higher than State and County. This might be attributed to the predominantly rural nature of the Study Area.



Table 6-10: Population by General Health (Census, 2016)

General Health (Census 2016)	State	County Waterford	Wind Farm Site	TDR	GCR
Very Good	59.4%	58.9%	61.4%	62.9%	64.2%
Good	27.6%	28.2%	28.4%	26.4%	26.2%
Fair	8%	8.3%	8.3%	7%	7.6%
Bad	1.3%	1.3%	1.4%	1%	0.8%
Very Bad	0.3%	0.3%	0%	0.3%	0.2%
Not Stated	3.3%	3.1%	0.5%	2.4%	0.9%

From a desktop review of the GSI Landslide Susceptibility database carried out in June 2022 and a later review for the Geotechnical Assessment Report was completed in April 2023, the Project and proposed infrastructure locations are generally located within areas of ‘Low’ to ‘Moderate High’ susceptibility, with localised areas classified as ‘High’. A summary of the GSI landslide susceptibility with respect to the Project is provided in Figure 11.13, Volume IV.

No evidence of slope instability was observed at the Site and there are no historical records of landslide activity within 1km of the Site on the GSI database (Landslide Location and Extent mapping, last updated January 2022).

According to the OPW (floodinfo.ie, accessed October 2023), no major flood incidents are recorded at the wind farm site or grid route. Flood events have been recorded along or adjacent to sections of the TDR, however, no major flood events have been recorded at the TDR node upgrades where works are required.

Extensive areas of heath habitat have been subjected to regular uncontrolled burning at the Site and surrounding environs. Large scale burning occurred most recently in September 2022². While any uncontrolled burning activity that takes place outside of the Site falls outside the control of the Applicant. The turbines can be equipped with a Fire Suppression System.

² <https://www.irishexaminer.com/news/munster/arid-40953893.html>



6.7 Assessment of Likely Significant Effects

6.7.1 Potential Effects on Population - Construction

Population Trends and Population Density

During the construction phase of the project, it is likely that many of the workers travelling to the Site will do so from outside of the area. It is expected that there will be relative low opportunities for employment from within the immediate locality (EDs associated with the Site) owing to the low population density and the high percentage of employed persons (with a large portion in agriculture), as identified in Table 6-6. As such, many workers employed for the construction of the wind farm are likely to travel from farther afield and may require to avail of accommodation in the area. This may give rise to short-term/brief population increase associated with construction workers staying in local accommodation during the construction period. However, this influx of workers is unlikely to affect the population of the EDs associated with the Site given the low density of available accommodation. It is more likely that construction workers would station themselves in the nearby towns of Dungarvan or Clonmel.

Overall, this will result in a slight, short-term increase in population resulting in a slight, short-term neutral impact.

The construction works associated with the grid route will be undertaken on a rolling basis with short sections of road closed for short periods before moving onto the next section. It is expected that these works will be conducted over an approximate 18-24 month period. However, due to the transient nature of the grid route works, this is expected to have a temporary and neutral impact on the population of the Grid Connection area.

There is a potential for impact to local residents during construction and construction/delivery vehicle movements on the existing road network associated with construction of the grid connection and turbine delivery including:

- delay and disruption to road users,
- road safety issues should the works not be carried out in line with good traffic management practices,
- inappropriate parking of construction related vehicles along the route of the works,
- soiling of the public road leading to a general lack of cleanliness and poor skid resistance on roads and
- damage to existing road surface.

Chapter 14 on Traffic and Transportation details a number of proposed mitigation works at construction as part of a wider Traffic Management Plan to be agreed with the road's authority and An Garda Síochána prior to commencing construction.

With the necessary mitigation measures applied, it is unlikely that permanent impact to population in the Wind Farm Site, TDR or Grid Connection will occur, in terms of changes to population trends or population density as a result of the construction phase.



6.7.2 Potential Effects on Population - Operational

Once constructed, it is envisaged that there will be direct and indirect employment associated with the operational phase of the Proposed Development. Opportunities for mechanical-electrical contractors and craftspeople to become involved with the operation and maintenance of the project will arise.

It is expected that the operational phase of the Proposed Development could create 14.4 to 28.8 long term jobs (with an installed capacity of 60-72MW). These jobs include operations and maintenance, back-office support and indirect jobs created by other activities related to installed turbines including IPP/utilities, consultancy firms, research institutions, universities and financial services.

However, only a small proportion of these jobs are likely to be based within the Study Area given that operational phase employees tend to be specialist contractors who move between developments and generally do not take up residence close for the purpose of the operation and maintenance of the wind farm.

Furthermore, as previously stated the wind farm design has been developed with local receptors in mind with a minimum set back of a 4 times tip height is achieved meaning that operational effects on receptors are aimed to be minimised. For further reference on any effects to receptors during the operational phase, please see Chapter 7- Air and Climate, Chapter 8- Noise & Vibration and Chapter 13- Shadow Flicker.

Any effect on population within the Study Area is expected to be imperceptible.

6.7.3 Potential Effects on Population - Decommissioning

The decommissioning phase of the proposed project is described in Chapter 2 of this EIAR provides for the removal of turbines and associated infrastructure from the Site. The potential impacts associated with the decommissioning phase in relation to population trends will be similar to those associated with the construction phase but of a reduced magnitude.

A construction crew will be required for dismantling the infrastructure and carrying out remediation where necessary. As the decommissioning of the Project is expected to be less intensive than the construction phase, it is likely that less construction workers will be required for this phase. During the decommissioning phase, the influx of workers to the Wind Farm Site will increase daily during working hours and then return to normal levels outside of working hours.

The grid route element of the project will remain in situ following decommissioning. There is no expected impact on population trends in the Grid Connection area as a result of the decommissioning phase. Similarly, there is no expected impact on population trends across the TDR as a result of the decommissioning phase.

6.7.4 Potential Effects – Socio-economics, Employment and Economic Activity - Construction

The construction of the Coumnagappul Wind Farm will create employment opportunities.

According to the European Wind Energy Association's (EWEA) Report 'Wind at Work' (2009), 1.2 jobs per MW are created during installation of wind energy projects. Using this figure, a projection of approximately 72 to 86 jobs could be created as a result of the construction of the Proposed Development (for an installed capacity of approximately 60-72MW).



The 2014 report “An Enterprising Wind: An economic analysis of the job creation potential of the wind sector in Ireland” published by the Irish Wind Energy Association (IWEA) predicted that the wind energy sector in Ireland would result in 6,659 direct jobs in a scenario where 4GW capacity is achieved by 2020. This figure of 6,659 is broken down further; 5,596 of these jobs are associated directly with the construction and installation of windfarms, while the remaining 1,063 jobs are associated with the national grid. Under this scenario this contributes 1.66 direct jobs per Megawatt (MW) of wind capacity throughout the various stages of installation. In the case of Coumragappul Wind farm, this would create approximately 100-120 jobs for an installed capacity of approximately 60-72MW)

The potential effects on population arising from the Project during its construction phase relate to the influx of construction workers to the locality. The Sustainable Energy Authority of Ireland 2015 report ‘A Macroeconomic Analysis of Onshore Wind Deployment to 2020’ puts direct construction jobs from wind farm developments at 1.7 per MW. With an export capacity of 60-72 MW, an estimate of between 102 and 122 jobs might be associated with the construction stage of the Project (anticipated to be 24-month period).

Therefore, taking account the 2009, 2014 and 2015 figures and taking a capacity of 66 MW that could be installed on the Site, it is estimated that between 79 direct and 112 indirect jobs respectively could be created during the construction phase of the Project. It is not expected that all these jobs will be based at the wind farm Site, however, the employment of tradespeople, labourers, and specialised contractors for the construction phase will have a direct, short-term significant, positive impact on employment in the study area.

It is possible that there will be direct employment for people living in the Study Area who may be qualified for construction related roles. Materials will also be sourced in the general locality where possible. This will assist in sustaining employment in the local construction trade. Furthermore, local businesses in the nearby towns and villages of Dungarvan, Ballymacarbry and Clonmel will likely receive a slight indirect positive economic impact due to the influx of workers to the area who will require services such as shops and food places.

As a result, the construction phase of the Project will have a short-term, significant positive impact on the employment profile of the area and a short-term slight, positive impact on local businesses and services in the nearby towns and villages of the Study Area.

6.7.5 Potential Effects – Socio-economics, Employment and Economic Activity – Operational

6.7.5.1 *Economic Value & Employment Potential*

The proposed project will contribute to achieving Ireland’s energy targets as set out in the Climate Action Plan 2023, which has a target of 80% of electricity generated from renewable sources by 2030. With a target increase in onshore wind of 9GW by 2030, the Coumragappul Wind Farm has the potential to contribute up to 0.8% of this total.

The Sustainable Energy Authority of Ireland’s (SEAI) Energy in Ireland 2022 Report states that wind energy provided Ireland with 34% of its electricity in from September 2021 to 2022. The use of renewable energy reduced CO2 emissions by approx 6.1 million tonnes in 2021, avoiding additional costs related to fossil fuel imports for that year. It is estimated that wind energy alone resulted in the avoidance of approximately 4 million tonnes of CO2 emissions in 2021. These savings will continue to rise with the installation of further wind energy and other renewable energy developments. Increased renewable electricity production as a result of the operational phase of the Project will likely have a positive medium to long-term economic effect due to the cost savings associated with the avoidance of fossil fuel imports. This will also act cumulatively with other proposed, consented and existing renewable energy projects throughout the country in providing cost savings.



Once the proposed Coumna­gappul Wind Farm is constructed, it is envisaged that there will be direct and indirect employment associated with the operational phase of the Project. Opportunities for mechanical-electrical contractors and craftspeople to become involved with the operation and maintenance of the project will arise.

According to the European Wind Energy Association's (EWEA) Report 'Wind at Work' (2009), 0.4 long-term jobs are created per MW of total installed capacity. These jobs include operations, maintenance, back-office support and indirect jobs created by other activities related to installed turbines including IPP/utilities, consultants, research institutions, universities and financial services.

A study carried out by the Institute for Sustainable Futures (2015) estimates that the operational and maintenance job output for a wind farm is 0.3 jobs per MW of total installed capacity based on an average of 7 studies examined. SEAI's 2015 report 'A Macroeconomic Analysis of Onshore Wind Deployment to 2020' estimates 0.34 jobs per MW for operations and maintenance of new wind turbines and in the wider electricity supply sector.

Therefore, based on these studies and considering an installed capacity of approx. 68MW, the operational phase of the proposed Coumna­gappul Wind Farm could produce between 23 to 28 jobs.

Although only a small proportion of these jobs are likely to be directly based at the Coumna­gappul Wind Farm Site, it is likely that the indirect jobs the operational phase will support, such as consultants, research institutions, universities and financial services, will provide an indirect, long-term slight, positive effect to the employment profile of the wider economy of County Waterford.

It is likely that there will be direct employment available for people living in the Study Area who may be qualified for jobs associated with operation and maintenance. It is therefore considered that the operational phase of the Project has potential for an indirect, long-term slight, positive effect on employment in the Study Area, nearby towns and wider County Waterford.

Rates and development contributions paid by the developer will contribute significant funds to Waterford City and County Council which will likely be used to improve the services available to the people of the City & County. Business rates will also contribute significantly throughout the lifetime of the Proposed Development. General council services will benefit from rates and development contributions which include road upkeep, fire services, environmental protection, street lighting, footpath works etc., along with other local community initiatives and supports. This is likely to have a slight positive, long-term effect on resources of the Local Authority during the operational phase.

The terms of the Renewable Energy Support Scheme (RESS) states that all projects looking for support under the new RESS will need to meet pre-qualification criteria including the provision of a community benefit fund. This is discussed further in the following section.

6.7.5.2 *Proposed Community Benefit Scheme*

In May 2023, the government produced the Terms and Conditions for the Third Competition under the Renewable Electricity Support Scheme known as RESS3. The document sets out the terms and conditions that will apply to the third competition to be conducted under the RESS and to the ongoing administration of awards made in the RESS 3 Auction.

As set out in the terms of the Renewable Energy Support Scheme (RESS), all renewable energy projects applying for RESS are required to establish a Community Benefit Fund prior to Commercial Operation of the relevant RESS 3 Project. With effect from the Commercial Operation Date a RESS 3 Project shall be required to make a contribution of €2/MWh of Loss-Adjusted RESS Metered Quantity for all RESS 3 Projects



Furthermore, as part of RESS 3, the Community Benefit Fund will provide a minimum of €1,000 that shall be paid to each household located within a distance of a 1 kilometre radius from the Onshore Wind RESS 3 Project. The 1-kilometre distance specified is measured from the base of the nearest turbine of the RESS 3 Project to the nearest part of the structure of the household, the location of which is identified in the An Post's GeoDirectory. Furthermore, a minimum of 40% of the funds shall be paid to not-for-profit community enterprises whose primary focus or aim is the promotion of initiatives towards the delivery of the UN Sustainable Development Goals, in particular Goals 4, 7, 11 and 13, including education, energy efficiency, sustainable energy and climate action initiatives.

A Good Practice Principles Handbook was published in 2021 setting out a range of principles, including the need to ensure community participation in fund decision-making via the establishment of a local committee which should ensure successful dispersal of funds throughout the community.

Thus, for each megawatt hour (MWh) of electricity produced by the wind farm, the project will contribute €2 into a community benefit fund for the RESS period i.e. the first 15 years of operation.

Coumragappul Wind Farm has the potential to produce approximately 68 MW of electricity per year and is contracted under the RESS, it is anticipated that the proposed Coumragappul using this figure which has potential to deliver an average of €337,155 per annum to the local community for the proposed Coumragappul Wind Farm is paid into the fund every year for 15 years following the commissioning of the project. The amount of funding will be dependent on the final capacity and the amount of electricity generated by the wind farm when operational.

The provision of the Community Benefit Fund will have a significant long-term, positive effect on the socioeconomic profile of the study area and wider area, providing a regular payment to near neighbours of the project and providing for projects which will benefit the community as a whole, bringing long-term socio-economic benefits.

6.7.5.3 Property Values

In the absence of any Irish studies on the effect of wind farms on property values, this section provides a summary of the largest and most recent studies from the United States, United Kingdom and Scotland.

The largest study of the impact of wind farms on property values has been carried out in the United States. 'The Impact of Wind Power Projects on Residential Property Values in the United States: A multi-Site Hedonic Analysis' (Hoen, et al. 2009), was carried out by the Lawrence Berkley National Laboratory (LBNL) for the U.S Department of Energy. This study collected data on almost 7,500 sales of single-family homes situated within ten miles of 24 existing wind farms in nine different American states over a period of approximately ten years. The conclusions of the study are drawn from eight different pricing models including repeat sales and volume sales models. Each of the homes included in the study was visited to demonstrate the degree to which the wind facility was visible at the time of the sale, and the conclusions of the report state that *"The result is the most comprehensive and data rich analysis to date on the potential impacts of wind energy projects on nearby property values."*

The main conclusion of this study is as follows:

"Based on the data and analysis presented in this report, no evidence is found that home prices surrounding wind facilities are consistently, measurably, and significantly affected by either the view of wind facilities or the distance of the home to those facilities. Although the analysis cannot dismiss the possibility that individual or small numbers of homes have been or could be negatively impacted, if these impacts do exist, they are either too small and/or too infrequent to result in any widespread and consistent statistically observable impact."



This study has been recently updated by LBNL who published a further paper entitled “A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States”, (Hoen, et al. 2013). This study analysed more than 50,000 home sales near 67 wind farms in 27 counties across nine U.S. states yet was unable to uncover any impacts to nearby home property values. The homes were all within 10 miles of the wind energy facilities - about 1,100 homes were within 1 mile, with 331 within half a mile.

The report is therefore based on a very large sample and represents an extremely robust assessment of the impacts of wind farm development on property prices. It concludes that:

“Across all model Specifications, we find no statistical evidence that home prices near wind turbines were affected in either the post-construction or post announcement/pre-construction periods.”

Both LBNL studies note that their results do not mean that there will never be a case of an individual home whose value goes down due to its proximity to a wind farm – however if these situations do exist, they are considered to be statistically insignificant. Therefore, although there have been claims of significant property value impacts near operating wind turbines that regularly surface in the press or in local communities, strong evidence to support those claims has failed to materialise in all the major U.S. studies conducted thus far.

A further study was commissioned by Renewable UK and carried out by the Centre for Economics and Business Research (Cebr) in March 2014. Its main conclusions are:

- Overall, the analysis found that the county-wide property market drives local house prices, not the presence or absence of wind farms.
- The econometric analysis established that construction of wind farms at the five sites examined across England and Wales has not had a detectable negative impact on house price growth within a five kilometre radius of the sites.

A relatively new study issued in October 2016 ‘Impact of wind Turbines on House Prices in Scotland’ (Heblich, et al. 2016) was published by Climate Exchange, Scotland’s independent centre of expertise on climate change which exists to support the Scottish Governments policy development on climate and the transition to a low carbon economy.

The report presents the main findings of a research project estimating the impact on house prices from wind farm developments. It is based on analysis of over 500,000 property sales in Scotland between 1990 and 2014.

The key findings from the study are:

- No evidence of a consistent negative effect on house prices: Across a very wide range of analyses, including results that replicate and improve on the approach used by Gibbons (2014), they do not find a consistent negative effect of wind turbines or wind farms when averaging across the entire sample of Scottish wind turbines and their surrounding houses. Most results either show no significant effect on the change in price of properties within 2km or 3km or find the effect to be positive.
- Results vary across areas: The results vary across different regions of Scotland. The data does not provide sufficient information to enable them to rigorously measure and test the underlying causes of these differences, which may be interconnected and complex.



Although there have been no empirical studies carried out in Ireland on the impacts of wind farms on property prices, the literature described above demonstrates that at an international level, wind farms have not impacted property values in the local areas.

It is a reasonable assumption based on the available international literature, that overall on balance that the provision of a wind farm at the proposed location would not impact on the property values in the area and will therefore have a long-term imperceptible impact.

6.7.6 Potential Effects – Socio-economics, Employment and Economic Activity – Decommissioning

The potential impacts associated with the decommissioning phase in relation to socio-economics, employment and economic activity will be similar to those associated with the construction phase but of a reduced magnitude.

A construction crew will be required for dismantling the infrastructure and carrying out remediation where necessary. As the decommissioning of the Project is expected to be less intensive than the construction phase, it is likely that less construction workers will be required for this phase. During the decommissioning phase employment opportunities will be available at the Wind Farm Site and outlying areas. The influx of construction workers to the Wind Farm Site will have a temporary to short-term indirect positive impact on local businesses and services contributing to the local economy, similar to that of the construction phase but of lesser magnitude.

The influx of construction workers will have a temporary to short-term indirect positive impact on local businesses and services contributing to the local economy, similar to that of the construction phase but of lesser magnitude.

There will be a temporary to short-term slight, positive impact to socioeconomics, employment and economic activity in the Wind Farm Site associated with the employment of construction workers within the vicinity of the development during the decommissioning phase.

6.7.7 Potential Effects – Land Use - Construction

The existing land-uses in proximity to the proposed Coumnaagappul Wind Farm will remain broadly unchanged during the construction phase of the Project. However, there will be some loss of pastureland where turbines and associated infrastructure are proposed.

During the construction phase, felling of approximately 5.4 ha of coniferous forestry is required at the main entrance to the wind farm and along the internal access track for approximately 1.2km to accommodate the construction of turbine access tracks. It should be noted that the clear-felling of trees in the State requires a felling licence. The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing which is governed by the Forestry Act 2014 as amended and the Forestry Regulations 2017 (S.I. No. 191 of 2017). A felling licence will include the provision of relevant replant lands (afforestation area) to be planted in lieu of the proposed tree felling on the Site. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear-felled is also subject to licensing ('afforestation licensing').

It should be noted that the forestry within the Site was originally planted as a commercial crop and will be felled and replanted in the coming years should the Project not proceed.



The area of trees to be felled should be the minimum required to accommodate the Project. However, for the purpose of the EIAR the area identified for felling has been identified as the maximum area that could conceivably be required to construct the Project. In advance of other construction works, clearance felling will commence on site and is expected to take up to 2 weeks.

Temporary effects on land use will arise as a result of the installation of the grid connection along the grid route which will be constructed within the public road corridor. Full road closures will be put in place to facilitate cabling works in combination with lane closures, partial road closures and stop/go systems. This will allow for the works to be completed efficiently and minimise disruption time for residents.

This will result in a temporary slight, negative impact to residential and agricultural land use where access may be temporarily restricted. Traffic management measures will be put in place as detailed in Chapter 14 of this EIAR, which shall result in a more limited disruption to land use along the grid route.

TDR accommodation works has potential for slight, brief to temporary impacts to land use. Most works have potential to cause non-significant brief impacts with the Temporary accommodation works associated with the Turbine Delivery Route and provision of passing opportunities along the local road network to facilitate the delivery of turbine components and haulage to Site including hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and local road widening.

Brief impact may also occur to the supply of electricity and telecommunications to homes and businesses as a result of temporary removal of services to accommodate turbine delivery. Turbine delivery will impact on land use temporarily due to the transportation of oversized loads on the public road and associated noise effects as further considered in Chapter 8 – Noise and Vibration.

6.7.8 Potential Effects – Land Use - Operation

The operational phase of the Coumna gappul Wind Farm will result in a change of land use in areas where access tracks, wind turbine foundations, hardstanding areas, met mast, substation, bridge crossing and associated drainage infrastructure will be located. The lands affected currently comprise Moors and Heathland, Pasture Land and a small area of conifer forestry near the Site access. There are a number of land agreements in place with the landowners in terms of compensation for loss of land use.

During public consultation queries were raised in relation to potential for wind farms to affect livestock. There are numerous examples of renewable energy developments throughout the country and internationally where livestock coexist and routinely graze in the same fields as wind turbines (AWEA, 2019). Existing land-use, such as grazing livestock or crops can continue on the Site as normal. As such, there will be no likely significant negative impact to agricultural practice as a result of the Project. Additionally, it is of note that dogs are being used to carry out carcass searches for bats and birds at operational windfarms, indicating that they do not appear to be deterred by any low frequency noise or wake effects.

The proposal will include the creation of an internal access track which will be 25.43 km and will comprise almost entirely of new road infrastructure, with the exception of a small section of existing forestry road and an agricultural track which will be upgraded for 2,580 m of length. Access tracks will be used throughout the operational phase for operation and maintenance of the proposed development. The existing tracks will remain largely unchanged and will continue to provide a long-term slight, positive impact to these land uses through provision of upgraded and new roads infrastructure throughout the Site.



There is potential for repair works along the Grid Connection Route to take place, however, these will likely be brief or temporary and not significant. It is unlikely that the TDR route will be required during the operational phase of the project, unless in the unlikely event a turbine component requires to be transported for replacement or repair. In this case, there is potential for slight temporary negative impact on residential land-use due to noise nuisance as a result of machinery.

As covered in greater detail in Chapter 9 Biodiversity and Biodiversity Enhancement Management Plan, a number of biodiversity enhancement measures will be incorporated into the Site. Higher value habitats will be actively managed to maintain and improve their value and lower value habitats will see specific interventions designed to improve their attractiveness for a wide range of species. Inputs (e.g., fertiliser, herbicide) will be controlled and appropriate planting will increase the available feeding, roosting and nesting cover for wildlife. Certain measures (e.g., control of stocking density) will be universal across the management lands. The measures take into account the habitats present and their current condition and importance in the local landscape. This will have a positive impact on land-use by enhancing the biodiversity of the area. A Biodiversity Enhancement Management Plan for Coumnaappul Wind Farm can be found in Appendix 9.1, Volume III.

6.7.9 Potential Effects – Land Use – Decommissioning

The decommissioning phase of the Project is described in Chapter 2 of this EIAR and provides for the removal of turbines and associated infrastructure from the site. The potential impacts associated with the decommissioning phase in relation to land use will be similar to those associated with construction phase but of a reduced magnitude.

Decommissioning works will include removal of all above ground structures including the turbines and met mast. The on-site substation will be taken in charge by EirGrid / ESB and therefore will remain in situ. The turbine foundations, hardstanding areas and access roads (with the exception of pre-existing accesses) will be covered over and allowed to re-vegetate naturally.

The decommissioning works will require a construction crew on-site and may cause temporary disruption to surrounding land uses. Removal of infrastructure from the site may temporarily impact on forestry and agricultural practices. During decommissioning works forestry and agricultural access tracks within the wind farm site may be in use by construction crews which may temporarily prohibit access to certain areas of forestry or hinder access to areas of agricultural pasture. Impact to these land uses during the decommissioning phase is expected to be temporary to short-term slight, negative.

The underground grid connection will remain in situ following decommissioning and form part of the national grid. Therefore, impact to land use along the grid route is unlikely during the decommissioning phase.

The BEMP lands are contracted for the duration of the project, thereafter their full control will revert back to the landowner.

6.7.10 Potential Effects – Recreation, Amenity and Tourism - Construction

There are a number of walking routes and trails associated with the Comeragh Mountains. None of these routes are accessed via the Site and as such the Project will not impede tourist use of the Mountains. Potential effects on visual amenity are discussed in Chapter 16 - Landscape and Visual Impact.

The potential impacts on the physical landscape associated is considered to have a significant 'short term' impact but this will cease as soon as the proposed development is constructed within an approximate 24 months. Furthermore, there will be some long term/permanent construction stage effects on the physical landscape with associated infrastructure remaining in place.



Furthermore, there will be a high-medium impact on the landscape character during the construction stage due to the intensity of construction activities, but these effects are considered to be temporary/short term.

The proposed works, including the construction haul routes do not interact with nearby recreation and tourism amenities and therefore there are no expected direct impacts on these features.

During turbine delivery, there is no potential for indirect impact to any town/settlement centre services due to the transportation of large and bulky loads as the TDR and GCR does not go through any significant settlements. This will likely be as a result of traffic calming measures during the escorting of the turbine components.

Mitigation is set out in Chapter 14: Traffic and Transportation in order to avoid indirect impact so far as possible on residents and services during turbine delivery.

6.7.11 Potential Effects – Recreation, Amenity and Tourism - Operation

In relation to tourism and wind energy development, the Wind Energy Development Guidelines for Planning Authorities (2006) states the following:

“Wind Energy developments are not incompatible with tourism and leisure interests, but care needs to be taken to ensure that insensitively sited wind energy developments do not impact negatively on tourism potential. The results of survey work indicate that tourism and wind energy can co-exist happily”.

The Draft Revised Wind Energy Development Guidelines (2019) also maintain that wind energy development “can co-exist happily” with tourism and go on to detail the survey works as also cited in the 2006 guidelines.

The survey work referred to in the guidelines is Sustainable Energy Ireland’s (SEI’s) Attitudes towards the Development of Wind Farms in Ireland (2003). The SEI (now SEAI) report found that the overall attitude towards wind farms is positive.

“The overall attitude to wind farms is very positive, with 84% of respondents rating it positively or very positively (Chart 2.6). Only 1% rate it negatively (‘fairly bad’), with 14% not having an opinion either way, and no one rating wind farms ‘very negatively’. Interestingly, this time it is those from Dublin who are most positively disposed; this could arise from the fact that Dubliners are less likely than others to have a wind farm built in their locality.”

Where negative attitudes were voiced towards wind farms, the visual impact of the turbines on the landscape was the strongest influence. The report also notes however that the findings obtained within wind farm catchment areas showed that impact on the landscape is not a major concern for those living near an existing wind farm (SEI, 2003).

With regard to the economic and environmental impacts of wind farm development, the national survey reveals that attitudes towards wind energy are influenced by a perception that wind is an attractive source of energy:

“Over 8 in 10 recognise wind as a non-polluting source of energy, while a similar number believe it can make a significant contribution to Ireland’s energy requirements. People therefore seem to have little difficulty with the concept of wind energy”.

This report concludes that based on the detailed study of attitudes, it is clear that there is “widespread goodwill towards wind farm developments”.



More Recent independent research conducted by BiGGAR Economics in 2016 entitled ‘Wind Farms and Tourism Trends in Scotland’, assessed the relationship between wind farm developments and the tourist industry in Scotland. An analysis was carried out on eight local authorities which had witnessed a higher increase in wind energy developments than the Scottish average. Of the eight local authorities, five also witnessed a greater increase in sustainable tourism employment than that of the National Average with just three witnessing less growth than the Scottish average. The research concluded that at local authority level, no detrimental impact occurred on the tourism sector as a result of wind energy development, rather that, in the majority of cases, sustainable tourism employment performed better than other areas.

Fáilte Ireland conducted research titled “Visitor Attitudes on the Environment”, which was first published in 2008 and updated in 2012. The research surveyed both domestic (25%) and overseas (75%) holidaymakers to Ireland to determine their attitudes to wind farms. The survey results indicate the following:

- Most visitors are broadly positive towards the idea of building more wind farms on the island of Ireland. A minority (one in seven) were negative towards wind farms in any context.
- Despite the fact that almost half of the tourists interviewed had seen at least one wind farm on their holiday, most felt that their presence did not detract from the quality of their sightseeing.
- The largest proportion (45%) said that the presence of the wind farm had a positive impact on their enjoyment of sightseeing, with 15% claiming that they had a negative impact.
- Almost three quarters of respondents claimed that potentially greater numbers of wind farms would either have no impact on their likelihood to visit or would have a positive impact on future visits to the island of Ireland.

The updated survey, 2012, found that over half of tourists surveyed had seen a wind turbine while travelling the country. The survey results were as follows:

- 32% said that the wind turbines enhanced the surrounding landscape.
- 47% said that it made no difference to the landscape.
- 21% claimed wind turbines had a negative impact on the landscape.
- 71% of respondents claimed that potentially greater numbers of wind farms would either have no impact on their likelihood to visit or have a positive impact on future visits to the island of Ireland.

In 2019, Fáilte Ireland’s produced its guidelines on tourism and environmental impacts stated in Chapter 5- EIA Scoping and Consultation titled ‘Project Factors Affecting Tourism’, this document titled ‘EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects’ states that whilst tourism projects may be diverse, the projects which can impact tourism are considerably more wide ranging, from large infrastructural developments to local energy developments. Disruption to or suppression of a tourist resource or amenity can have very local or more strategic impacts, directly or indirectly- for example energy projects in a rural area can have both a negative and positive impact in different regards. There can be temporary, periodic or even seasonal impacts occurring during construction or operational periods.



The 2022 Public Attitudes Monitor document produced by Wind Energy Ireland states that in relations to wind farm favorability that 'over 4 in 5 nationally (81%) are in favour of wind power; over half (54%) claim to be strongly in favour, while a further quarter (27%) generally tend to favour wind power. Furthermore, amongst those in Rural areas that 55% of those are strongly in favour with 4 in 5 rural residents registered favourable attitudes while only a very niche minority (3%) claimed to be against wind power. Finally, in terms of openness to local Wind farm in rural areas, the survey points out that 21% are strongly in favour and that 35% tend to favour wind farms.

From a review of literature as detailed above, it is concluded that the majority of tourists surveyed had a generally positive view on wind energy development in the landscape. Further analysis of the potential visual impact of the proposed Coumnaagappul Wind Farm is described in Chapter 16 – Landscape and Visual.

The most proximate major tourist attraction to the Coumnaagappul Wind Farm Site located to the east is the numerous hiking, amenity and walking trails associated with the Comeragh Mountains.

The Zone of Theoretical Visibility (ZTV) included in Chapter 16 – Landscape and Visual for the Project shows that the largest area of comprehensive visibility is situated to the western and southern extents of the study area to the west of the Comeragh Mountains and the east of the Knockmealedown Mountains, potential for visibility of between 1-6 Turbines to the north and south of the Nire River, comprehensive visibility in the west half of the study area in the low rolling landscape between the Comeragh and Knockmealedown Mountains, comprehensive visibility of all turbines throughout the southern area of the site, limited potential for turbine visibility to the eastern half of the site with potential visibility of up to 6 turbines. Furthermore, it is noted that that nearly three-quarters of the study area affords no visibility of the proposed turbines with no turbine visibility in settlements of Clonmel, Kilsheelan, Carrick on Suir, Kilmacthomas, Lemybrien and Cappoquin. Visual impact as outlined in Chapter 16 therefore ranges from 'substantial-moderate' to 'Imperceptible especially to the south of the site. However, beyond this, visual impacts reduce rapidly throughout the central and wider study area, and in over 66% of the 20km study area, there will be no visibility of the proposed turbines. Thus, it is not considered that the proposed Coumnaagappul Wind Farm will result in significant visual impacts at surrounding receptors. Furthermore the impact to the Comeragh Mountains during the operational phase will be lessened, as the site is being located in a contained part of the western part of the Comeragh Mountains will mean that the development will be entirely screened in the eastern half of the study area with extensive parts of settled southern and northern half of the study area will afford no visibility of the proposed development.

Thus, it is considered that whilst the proposed wind farm would represent an intensification of development in the local landscape context within up to 5km. However, it is considered that the scale of the proposed development will be well assimilated within its landscape context without undue conflicts of scale with underlying land form and land use patterns. Thus, the magnitude of the landscape impact is deemed to be High-Medium within the site and its immediate environs (c.1km) reducing to Medium for the remainder of the central Study Area. The quality of the landscape effects is deemed Negative. Beyond 5km from the site, the magnitude of landscape impact is deemed to reduce to Low and Negligible at increasing distances as the wind farm becomes a proportionately smaller and integrated component of the overall landscape fabric.

Overall, it is expected that the operational phase of the Project will have a non-significant neutral impact on recreation and tourism in the area due to the distance of the proposed turbines from significant features. The provision of the community benefit fund will likely have a moderate positive long-term impact on the amenities of the nearby residents. Thus, in summary, it is not considered that the proposed Coumnaagappul Wind Farm will result in significant visual impacts at surrounding receptors.



6.7.12 Potential Effects – Recreation, Amenity and Tourism - Decommissioning

The decommissioning phase of the Project is described in Chapter 2 of this EIAR and provides for the removal of turbines and associated infrastructure from the site.

The decommissioning phase will have similar temporary impacts as the construction phase with the movement of large turbine components away from the site. There may be a minor loss of roadside and trackside vegetation that has grown during the operational phase of the project, but this can be reinstated upon completion of decommissioning. Areas of hard standing that are of no further use will be reinstated and reseeded to blend with the prevailing surrounding land cover of the time. It is expected that the decommissioning phase would be completed within a period of approximately 3 months.

Furthermore, within 2-3 years of decommissioning there will be little evidence that a wind farm ever existed on the site, albeit the proposed on-site substation will remain in perpetuity as part of the national grid infrastructure, in addition to residually useful access tracks.

Due to the temporary nature of the decommissioning phases of the Coumnagappul Wind Farm, it is expected to have an insignificant and temporary impact on recreation, amenity and tourism.

6.7.13 Potential Effects – Human Health & Safety - Construction

With respect to health and safety, the Health and Safety Authority of Ireland monitor fatal workplace injuries throughout Ireland. In relation to construction activities, in the past 10 years (2013 to 2022) an average of 9.4 fatal workplace injuries have occurred throughout Ireland per annum. This is above average in relation to most other economic sectors with only Agriculture, Forestry and fishing being higher. This indicates the above average danger levels which workers are exposed to on construction sites when compared to other economic sectors.

The Project will be obliged to be constructed in accordance with national legislation including Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013).

Construction and accommodating works taking place on the public road and the delivery of heavy/bulky goods (TDR) and machinery on narrow roads may lead to temporary limited access to farmlands, forestry lands and residential properties creating a potential hazard. This may cause a potential temporary moderate, negative impact to public safety along the TDR route and grid route during the construction phase.

The project will be obliged to be constructed and any road closures will be in accordance with national legislation including the Road Traffic Act 1993 (S.I. No.75 of 1993). Furthermore, any road closures must be in accordance with local authority licence and any abnormal loads must be transported in accordance with Road Traffic (Permits for Specialised Vehicles) Regulations 2009 requiring a An Garda Síochána to grant permission to move abnormal loads as defined on inter-urban routes specified in the Schedule of Designated Roads in above Regulations require independent authorization from the Local Authority concerned and or Minister for Transport.

The delivery of turbines will require transport of heavy/bulk goods from the Port of Waterford in County Kilkenny via the N29, N25, N72 before entering the local roads R672 and L5119 on approach to the proposed Site. Due to the abnormality of the turbine components, there is potential human safety risks associated with their delivery including traffic safety and pedestrian safety at special maneuvering points. This has potential for temporary significant, negative impacts to human safety during the delivery of turbine components if unmitigated.



Potential impacts on air quality have the potential to affect human health. This has been assessed in Chapter 7: Air and Climate.

The potential impacts from noise during the construction phase at the Proposed Wind Farm site is expected to have a temporary slight, negative impact on nearby residential receptors. The works will remain below the construction noise limit of 65dB as detailed in Chapter 8: Noise and Vibration. Vibration is not expected to be perceived at nearby residences.

Potential impacts on human health associated with land, soils and geology during the construction phase relate to potential contamination of ground water which can be caused by hydrocarbon spills, siltation and landslide. Furthermore, landslides have the potential to cause injury and fatality. As set out in Chapter 11: Soils, Geology and Hydrogeology, the site is mainly within an area of 'Low' to Moderately High' landslide susceptibility. Following implementation of a number of mitigation measures such as installation of drainage infrastructure, incorporating drainage measures for turbines located in areas adjacent to Peat deposits, stability of conditions assessment prior to commencement of excavations, non-permission of rock blasting, non-commencement of Earthworks during heavy or sustained rainfall and the implementation of an emergency plan. It should be noted that site walkover results show no evidence of recent or historic landslides other than localised shallow peat failures.

Overall, if unmitigated, the construction phase of the Project has potential for temporary significant, negative impact to human health and safety for construction workers and members of the public in proximity to the site, if proper construction safety protocols and traffic management which are legally required. Mitigation measures to prevent potential impact to human health and safety are set out herein. Once mitigation is put in place, impacts to human health and safety during the 24-month construction period are not significant.

6.7.14 Potential Effects – Human Health - Operation

6.7.14.1 *Site access and usability of lands*

As previously outlined, the limited available studies available show no harmful link between the effect of windfarms on grazing livestock.

Potential human safety issues can occur due to the falling ice as a result of the icing of turbine blades in cold weather conditions. This is unlikely to present safety problems as wind turbines are fitted with anti-vibration sensors. These sensors detect any imbalance caused by the icing of the blades. The sensors will cause the turbine to shut down until the blades are de-iced prior to beginning operation again. Furthermore Vestas V162 turbines can also be equipped with the Vestas Ice Detection and Vestas Anti-Icing System. This de-icing system is a hot air system for the active removal of ice from the surface of the rotor blade.

Potential impacts to the safety of operation and maintenance staff are associated with working at heights, working at steep gradients or uneven ground, moving vehicles and machinery and working with high-voltage electricity. Properly qualified staff will be employed at the wind farm site and safety protocol will be followed at all times. Therefore, impact to the safety of operation and maintenance staff is unlikely. As noted in the CEMP, there is a legal requirement to comply with safety measures in Design and Construction which include the Safety, Health and Welfare at Work Act 2005 (as amended) and the Safety, Health and Welfare at Work (Construction) Regulations 2013 (as amended). Furthermore, Each wind turbine, incorporating the tower, blades, gearbox and ancillary equipment in the tower and nacelle is a machine under the European Machinery Directive [2006/42/EC]. The duties of designers and manufacturers of machinery are set out in the Machinery Directive, which has been transposed into national law by the 2008 European Communities (Machinery) Regulations [S.I.No.407/2008] (as amended). Further detail of this is set out in the CEMP.



Under normal conditions, operational wind turbines do not pose a threat to public safety or the safety of animals. Section 5.7 of the Wind Energy Development Guidelines (2006) states the following:

“There are no specific safety considerations in relation to the operation of wind turbines. Fencing or other restrictions are not necessary for safety considerations. People or animals can safely walk up to the base of the turbines. There is a very remote possibility of injury to people or animals from flying fragments of ice or from a damaged blade.”

Furthermore, the Vestas Ice Detection and Vestas Anti-Icing System will stop the turbine from rotating if ice is forming on a turbine blade until the blades are de-iced prior to beginning operation again in an aim to prevent ice throw which can cause injury.

There are no expected works to take place along the grid route or TDR during the operational phase of the Project. If maintenance works are required in these areas or bulk equipment is required to be delivered, proper safety protocols will be put in place in line with the mitigation measures set out any abnormal load delivery permits. Therefore, impact to human safety on public roads during the operation phase is unlikely.

6.7.14.2 Health and Safety Standards and Procedures

As part of the human health assessment of the proposed Coumna­gappul Wind Farm, an analysis of peer-reviewed literature on potential health impacts arising from wind energy projects was undertaken.

The review of literature did not find any published, credible scientific sources that link wind turbines to adverse health effects. The key documents that have been taken into consideration with respect of potential effects on human health are as follows:

- ‘Wind Turbine Sound and Health Effects - An Expert Panel Review’, American Wind Energy Association and Canadian Wind Energy Association, December, 2009.
- ‘Wind Turbine Syndrome – An independent review of the state of knowledge about the alleged health condition’, Expert Panel on behalf of Renewable UK, July 2010.
- ‘A Rapid Review of the Evidence’, Australian Government National Health and Medical Research Council (NHMRC) Wind Turbines & Health, July 2010.
- ‘Position Statement on Health and Wind Turbines’, Climate and Health Alliance, February 2012.
- ‘Wind Turbine Health Impact Study - Report of Independent Expert Panel’ – Massachusetts Departments of Environmental Protection and Public Health, 2012.
- ‘Wind Turbines and Health, A Critical Review of the Scientific Literature Massachusetts Institute of Technology’, Journal of Occupational and Environmental Medicine, Vol. 56, Number 11, November 2014.
- ‘Wind Turbine Noise and Health Study’, Health Canada, 2014.
- ‘Wind Turbines and Human Health’, Front Public Health, 2014.
- ‘Position paper on wind turbines and public health’, Health Service Executive, February 2017.
- ‘Environmental Noise Guidelines for the European Region’, World Health Organisation, 2018.



'Infrasound' has been cited as a cause of potential health impacts as a result of wind turbine development. This is discussed in detail in Chapter 8: Noise and Vibration as it states that infrasound is noise occurring at frequencies below that at which sound is normally audible, that is, less than about 20 Hz, due to the significantly reduced sensitivity of the ear at such frequencies. In this frequency range, for sound to be perceptible, it must be at very high amplitude, and it is generally considered that when such sounds are perceptible then they can cause considerable annoyance. However, wind turbines do not produce infrasound at amplitudes capable of causing annoyance as outlined in the following paragraphs.

The UK Department of Trade and Industry study, 'The Measurement of Low Frequency Noise at Three UK Windfarms' (2006), concluded that:

"Infrasound noise emissions from wind turbines are significantly below the recognised threshold of perception for acoustic energy within this frequency range. Even assuming that the most sensitive members of the population have a hearing threshold which is 12 dB lower than the median hearing threshold, measured infrasound levels are well below this criterion. "

It goes on to state that, based on information from the World Health Organisation, 'there is no reliable evidence that infrasound below the hearing threshold produce physiological or psychological effects' and that 'it may therefore be concluded that infrasound associated with modern wind turbines is not a source which may be injurious to the health of a wind farm neighbour'.

In terms of perceived effects from shadow flicker and noise, a shadow flicker assessment has been conducted and is included in Chapter 13- Shadow Flicker of this EIAR and a Noise assessment which is included in Chapter 8- Noise and Vibration.

Following a review of literature regarding the potential impact of operational wind farms on human health, it is concluded that there is no scientific consensus to support an association between negative health impacts and responsible wind turbine development. The operational phase will therefore likely have a long-term, imperceptible, neutral impact on human health in proximity to the wind farm site.

6.7.14.3 Potential Health and Safety Impacts from Proposed Cables and Electromagnetic Interference

Wind turbines, like all electrical equipment, produce electro-magnetic radiation. The provision of underground electricity cables similar to the proposed capacity is however commonplace throughout Ireland and the installation to the required specification does not give rise to health concerns. The following research outlines the potential for health impacts caused by electromagnetic interference.

The EirGrid document 'EMF & You: Information about Electric & Magnetic Fields and the electricity transmission system in Ireland' (EirGrid, 2014) provides information on studies which have been carried out on the health impact of electromagnetic fields (EMF). This report notes that since 1979, many scientific studies have been carried out on the possible effects of EMF on people. Agencies include the World Health Organisation (2006), the National Radiological Protection Board of Great Britain (2004), and the International Agency for Research on Cancer (IARC) (2002).

In 2009 the International Commission on Non-Ionising Radiation Protection (ICNIRP) issued guidelines for exposure for members of the public to DC magnetic fields. Other more recent reviews have been performed for the UK's Health Protection Agency (2012) and the European Union's Scientific Committee on Emerging and Newly Identified Health Risks (2015). The Eirgrid (2014) report notes that:

"These agencies concluded that exposure to only very strong DC magnetic fields can cause biological effects. The exposures required to produce such effects, however, are extraordinarily high relative to levels of DC magnetic fields produced by common sources."



The EirGrid (2014) report concludes that exposure to extremely low frequency (ELF)-EMF from power lines or other electrical sources is not a cause of any long-term adverse effects on human, plant, or animal health. A 2019 EirGrid report titled ‘The Electricity Grid and Your Health’ states that:

“The consensus from health and regulatory authorities is that extremely low frequency EMFs do not present a health risk.”

To ensure such adverse effects do not occur, the WHO (World Health Organisation) monograph recommended that policymakers establish guidelines for ELF-EMF exposure for both the public and workers, and that the best source of guidance is the ICNIRP guidelines.

In 2010, ICNIRP issued updated guidelines, which reviewed the research since the 1998 report and replaced previous recommendations given by ICNIRP for this frequency range. The revised range is detailed in Table 6-11. The underground cable to be installed complies with these ICNIRP guidelines:

- ICNIRP Guidelines for limiting exposure to time varying electric and magnetic fields (1Hz–100kHz) Health Physics 99(6):818-836; 2010.

Magnetic flux densities for Alternating Current (AC) magnetic fields are reported using units of microtesla (μT) and electric fields in kilovolts per metre (Kv/m). The ICNIRP guidelines formed the basis of the EU guidelines for human exposure to EMF (EU, 1999) and the EU Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks from EMFs.

Table 6-11: ICNIRP Guidelines

Exposure Characteristics	Electric Field Strength (kV/m)	Magnetic Flux Density (μT)
ICNIRP 2010 General Public Reference Level	5	100

The magnetic fields associated with underground cables decrease rapidly with distance. For underground cables, the fields decrease with the square of distance. The electric field emissions from underground cables are negligible as the ground absorbs the field.

As the proposed cable does not pass under housing, the exposure levels will be extremely low. Most homes have average magnetic field levels in the range 0.2 μT to greater than 0.4 μT . These magnetic fields are attributable to low voltage sources such as wiring, appliances, and distribution circuits (Mastanyi et al, 2007). In dwellings and other properties with electricity, the levels will not exceed the ICNIRP guidelines by a significant margin.

Based on the details of the Project, there will be no impact on residential properties at any distance from the Project as the ICNIRP guidelines are not exceeded at all relevant distances including directly above the cables. The magnetic field associated with an underground 110kV cable is 2.32 μT directly above ground and 0.15 μT at 10 meters from the cable (EirGrid, 2019), significantly below the ICNIRP Guidelines levels of 100 μT . The ESB state that exposure to electrical fields associated with underground cables are considered negligible (ESB, 2017).

The HSE, in their 2017 report ‘Position paper on wind turbines and public health’ state the following with regard to Electromagnetic radiation:



“There is no direct evidence from which to draw any conclusions on an association between electromagnetic radiation produced by wind farms and health effects. Extremely low-frequency electromagnetic radiation is the only potentially important electromagnetic emission from wind farms that might be relevant to health. Limited evidence suggests that the level of extremely low-frequency electromagnetic radiation close to wind farms is less than average levels measured inside and outside suburban homes.”

In the case of the proposed grid connection between the Coumnagappul Wind Farm and the on-site substation and the proposed grid connection point at the existing Dungarvan substation, the electric and magnetic fields expected to be associated with the operation of the proposed cable fully complies with the ICNIRP and EU guidelines on exposure of the general public to ELF EMF. Therefore, the potential impact to human health as a result of electromagnetic interference associated with the operational phase of the Coumnagappul Wind Farm will be negligible and imperceptible.

EU Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks from EMFs was transposed into Irish law on 1st July 2016 by the Safety, Health and Welfare at Work (Electromagnetic Fields) Regulations 2016 (S.I. No. 337 of 2016). The regulations impose a number of duties on employers to maintain safety during work procedures. This includes the carrying out of risk assessment, avoiding and reducing risk, employee information, training and consultation and health surveillance where appropriate. The Project will comply with both EU and Irish law and will result in a negligible impact to human health on employees at the Coumnagappul Wind Farm during the operational phase.

With respect to safety, only trained and licensed employees will be permitted to access the turbines. Appropriate training will be provided for potential emergencies; therefore, the operational phase of the Project will have a negligible impact on public health and safety.

6.7.14.4 Vulnerability of the Project to Major accidents and Natural Disasters

EU Directive 2014/52/EU which amends Directive 2011/92/EU states the following in relation to vulnerability of a project to major accidents and natural disaster:

‘In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment.

For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment’.

The following section considers the Project’s vulnerability to major accidents and natural disasters and considers the preparedness of the project in case of accident, disaster or emergency.

Should a major accident or natural disaster occur, the potential sources of pollution onsite during the construction and operational phases of the Coumnagappul Wind Farm are limited. The primary sources with the potential to cause significant environmental pollution and associated negative impacts on human health and the environment include the storage of hydrocarbons, chemicals (Incl. grout and cementing chemicals, potentially drilling muds and chemicals/explosives for blasting ammonium nitrate fuel oil) and wastes. It should be noted that vehicles will be refueled off-site as especially the case for regular, road going vehicles. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site. In the case of the proposed Coumnagappul Wind Farm development site, the storage of chemicals of this kind are strictly limited.



There is limited potential for significant natural disasters to occur at the Coumna­gappul Wind Farm as Ireland does not suffer from extreme temperatures like that of many countries at a similar latitude due to the dominant influence of the Gulf Stream. This provides Ireland with a mild temperate climate. Potential natural disasters that may occur are therefore limited to:

- Flooding;
- Fire;
- Major incidents involving dangerous substances;
- Catastrophic events; and
- Landslides.

Flooding

As outlined in Chapter 12 Hydrology and Water Quality & FRA chapter, the Site is not located within an area at risk of fluvial flooding.

Access tracks will be constructed from a permeable aggregate material allowing the runoff to infiltrate underground. Excess water will drain into the swales which will be connected, during the construction stage to the settlement ponds. Settlement ponds will have a diffuse outfall dispersing flow across the site. Thus, the site will not add to risk of major accidents. will be managed at all stages of development by a surface water drainage network incorporating swales, drainage channels and settlement ponds. The settlement ponds will have a diffuse outfall which will disperse the flow across the site. The network will be designed to retain high flows during storm events and allow these to disperse naturally, with no uncontrolled discharge to downstream areas.

Fire

Regular uncontrolled burning has been documented in the Comeragh Mountains. The wind farm roads and hardstands will act as fire breaks. The substation is located within agricultural lands which are not susceptible to risk of fire in the same way that the heath habitat would be.

In the event of electrical equipment catching fire at the proposed Coumna­gappul Wind Farm, there is very low potential for negative impact on human health and safety, air quality, water quality, biodiversity, soils, material assets, archaeological or architectural heritage and landscape and visuals. This is due to the proposed development being located in a very sparsely populated area and also this proposal is located within a reasonable proximity where there are fire services that can respond e.g. Clonmel (14.5km away), Dungarvan (15.8km away) and Waterford (34km away). Furthermore, the area is regularly subjected to burning and there has been no notable effect on air quality or water quality.

Major Incidents Involving Dangerous Substances

Major industrial accidents involving dangerous substances pose a significant risk to human health and to the environment both on and off the site of an accident. The Health and Safety Authority (HSA) of Ireland list all upper and lower tier SEVESO establishments throughout Ireland.

The proposed Coumna­gappul Wind Farm Site is not in proximity to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO site, that would fall within the consultation radius distance from a SEVESO site as per Waterford County Development Plan 2022-2028 Policy Objective ECON 21. The most proximate SEVESO site located approx. 16.3km Northeast of the proposed Site is MSD Ireland, Ballydine, Co. Tipperary (upper tier Seveso Site).



Given the nature of the Project, coupled with the lack of proximity to established Seveso sites, there is a negligible potential risk of negative impact to the Project and its receiving environment, as set out throughout this EIAR, arising from the occurrence of such a potential accident.

Catastrophic Events

According to the Health and Safety Authority (HSA), operational wind farms are still considered a workplace (albeit not permanently occupied). All persons who have control to any extent over the wind farm have duties to ensure, so far as reasonably practicable, that the wind farm does not pose a risk to those working there or to anyone not employed there but who may be affected by activities on the wind farm.

Each wind turbine, incorporating the tower, blades, gearbox and ancillary equipment in the tower and nacelle are considered to be machines under the European Machinery Directive [2006/42/EC]. The duties on designers and manufacturers of machinery are set out in the Machinery Directive, which has been transposed into national law by the 2008 European Communities (Machinery) Regulations [S.I.No.407/2008]. All wind turbines will be CE marked, which is in effect, a mark of assurance that the wind-turbine complies with the essential health and safety requirements (EHSRs) of EU supply law.

In all cases, the manufacturer or the manufacturer's authorised representative must compile information in a technical file confirming how the machine complies with these requirements. The maintenance of turbines and ancillaries must only be carried out by competent, trained and qualified personnel. The system of work for operation and maintenance must be planned, organised, maintained and revised to ensure safety of personnel.



Potential catastrophic events associated with operational wind turbines include:

- Wind turbine toppling (due to foundation or tower failure);
- Wind turbine rotational failure in extreme wind conditions (due to control system or rotor break failure); and
- Fire.

The primary mitigation against a catastrophic event that may endanger the health and safety of the public has been implemented at design stage through adequate siting of wind turbines which provide sufficient set back distances from occupied buildings and other infrastructure to avoid the risk of negative impact in the event of wind turbine collapse.

The tip height for wind turbines at the Coumnagappul Wind Farm are 185 m. There are no residential dwellings are located within 500m as the minimum set back distance is 4 times the tip height at 740m with the closest residential receptor located ca. 820m distance. No turbines have been located within 2 x tip height of the proposed on-site substations in accordance with EirGrid general functional specifications.

Turbines have been sited with consideration for existing ground conditions to minimise the risk of turbine foundation failure, toppling and landslide.

Intrusive site investigations have been carried out to confirm ground conditions at turbine locations as well as slope stability analysis for turbines located on sloped ground. Other design mitigation measures employed for the siting of wind turbines include the following:

- Turbine locations have been assessed by site investigation and visually by geotechnical engineers prior to confirmation of final siting;
- Turbines are located on sloped ground, and particular care has been taken in design of road and hard standing alignments, cutting and filling and drainage; Peat probing has been carried out at turbine locations. Peat deposits were relatively thin (maximum 0.70m thick, average thickness 0.15m), presenting low risk to slope stability. Locating turbines in peat has been carried out in accordance with best practice guidelines and standards as set out in Chapter 11 Soils, Geology and Hydrogeology.

Wind turbines are fitted with sophisticated remote monitoring and control systems to manage rotational speed. Turbines also have the capability to shut down in storm conditions through adjustment of blade pitch. Turbines are also fitted with emergency power supply (EPS) units to provide backup power in the event of a loss of mains power supply that could impact the control system.

Wind turbines will be fitted with fire suppression systems and will have emergency escape procedures in place for operational staff in the event of fire in a wind turbine. An emergency response plan is contained in the CEMP which is included in Appendix 2.1 of Volume III of this EIAR.

Landslides

Landslides pose a risk to a range of environmental receptors including human safety (including traffic), hydrology and water quality, biodiversity, land, soil, geology and hydrogeology, material assets and archaeological and cultural heritage. The negative impacts associated with landslides can have a significant to profound effect on environmental sensitivities, depending on the scale of the landslide and the receiving environment.



As detailed in Chapter 11 Soils, Geology and Hydrogeology, given the sporadic and shallow nature (on average 0.15m thick) of blanket peat deposits across the Site, and in accordance with the guidance in the Scottish Executive – Peat Landslide Hazard and Risk Assessments (2017), a peat stability analysis is not warranted.

Furthermore, results from the two site walkover surveys show no evidence of recent or historic landslides other than localized shallow peat failures. No failures within the underlying till deposits were recorded. Till underlying proposed turbine or infrastructure locations is anticipated to be shallow (similar to the peat deposits) thereby reducing any significant risk of slope failure. Thus, it is considered that there is a low risk to sensitive receptors.

In relation to potential vulnerability of the project to major accidents and natural disasters, it is concluded that the potential susceptibility of the project to major accidents and or natural disaster of the proposed Coumngappul Wind Farm is not significant/slight.

6.7.15 Potential Effects – Human Health – Decommissioning

The decommissioning phase of the Project, as described in Chapter 2 of this EIAR, provides for the removal of turbines and associated infrastructure from the site. The potential impacts associated with decommissioning phase in relation to human health will be similar to those associated with construction phase.

Decommissioning works will include removal of above ground structures including the turbines, mountings, and fencing. The proposed on-site substation will be taken in charge by EirGrid or ESB following decommissioning. During the decommissioning works there is potential for significant impact to human health and safety for construction workers on site. Potential impacts to human health and safety on-site will be prevented through best practice methods as per the construction phase CEMP and will include staff training and knowledge of the site-specific decommissioning plan. Once mitigation measures and best practice construction site methods are followed, potential negative impact on human health and safety is expected to be imperceptible and temporary.

During the decommissioning works there is potential for negative impact on health and safety of the public. Impacts are associated with the presence of a construction crew, increased traffic, presence of heavy goods vehicles and machinery, potential obstructions on the public road and potential obstruction to recreation and amenity trails. Potential impact to public health and safety during the decommissioning phase is considered temporary moderate and negative.

However, a Construction and Environmental Management Plan for decommissioning works will be followed, clear signage will be utilized on public roads and walkways and the community will be informed of works prior to commencement to avoid any potential negative impact to public health and safety. Once good practice is followed, the potential for negative impact on public health and safety is expected to be temporary and not significant.

6.8 Mitigation Measures

6.8.1 Mitigation Measures - Population

As there are no significant impacts predicted on population trends and population density, no mitigation measures are required.



6.8.2 Mitigation Measures – Socio-economics, Employment and Economic Activity

Given that potential effects of the Project at construction, operation and decommissioning phases are predominantly positive in respect of socio-economics, employment and economic activity, no mitigation measures are considered necessary.

6.8.3 Mitigation Measures – Land Use

Mitigation measures for land use are primarily related to preliminary design stage, which has allowed for the prevention of unnecessary or inappropriate ground works or land use alterations to occur. The construction and operational footprint of the Project has been kept to the minimum necessary to avoid impact on existing land uses as far as possible.

As per Chapter 2 - Project Description, 5.4ha of coniferous forestry will be subject to felling at the main entrance to the wind farm and along the internal access track for approximately 1.2km to accommodate the Proposed Development. The clear-felling of trees in the State requires a felling licence. The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing which is governed by the Forestry Act 2014 as amended and the Forestry Regulations 2017 (S.I. No. 191 of 2017). A felling licence will include the provision of relevant replant lands (afforestation area) to be planted in lieu of the proposed tree felling on the Site. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear-felled is also subject to licensing ('afforestation licensing'). The Applicant commits to not commencing tree removal on Site to accommodate the Project until both felling licences are in place, assessed and licensed appropriately by the relevant consenting authority.

The construction and decommissioning works will be planned and controlled by a Construction and Environmental Management Plan (CEMP). The CEMP for the construction phase is included in Appendix 2.1 of Volume III of this EIAR. This provides details on day-to-day works and methodologies. As part of these works, the public and other stakeholders will be provided with updates on construction activities which will affect access to lands. This will be communicated to members of the public through a community liaison officer employed for the duration of the construction period.

Prior to the grid connection installation works within public roads residents and businesses that might be temporarily effected (e.g. impediment to access) will be consulted to determine how best to accommodate them during the works. All proposed works and deliveries along the TDR route will also be controlled by a Construction and Environmental Management Plan to avoid undue impact to adjacent land uses.

6.8.4 Mitigation Measures – Recreation, Amenity and Tourism

Mitigation measures for recreation, amenity and tourism are primarily related to the preliminary design stage of the Coumna gappul Wind Farm, which has allowed for the prevention of unnecessary or inappropriate development to occur that would significantly affect any recreational or tourist amenity. In designing the Coumna gappul Wind Farm, careful consideration was given to the potential impact on landscape amenity. The magnitude of visual impact on the landscape is assessed in Chapter 16 – Landscape and Visual.

Mitigation measures to avoid impacts to recreational facilities such as trails and scenic drives includes the distribution of signage and maps of alternative routes to reduce the effect on tourists and local users of the Comeragh Trails.



Mitigation measures for Recreation, Amenity and Tourism include mitigation by avoidance and design which has involved containing the development, insofar as possible, within the horseshoe ridge the site is located along and within a final layout of 10 turbines at a max tip height of 185m generated from an iterative design process.

Chapter 14: Traffic and Transportation sets out mitigation measures for potential effects associated with increased traffic volumes of the construction and decommissioning phases of the Project which may have an indirect impact on recreation and amenity in the area of the wind farm site and potential indirect impact on town centre and village center facilities and services along the TDR during transportation of turbine components.

6.8.5 Mitigation Measures – Human Health & Safety

6.8.5.1 *Mitigation Measures – Construction & Decommissioning*

A Construction and Environmental Management Plan is included in Appendix 2.1, which details safety protocols and methodologies. This CEMP will be adopted and further developed in consultation with the local authority and other competent bodies prior to implementation. Furthermore, site investigation has been completed and mitigation has been proposed as detailed in Chapter 11: Soils, Geology and Hydrogeology.

Public safety is addressed by restricting access to the public in the vicinity of the site works during the construction and decommissioning stage. The construction site will be closed to the public for the 24-month construction period as well as the decommissioning period. This measure aims to avoid potential injury to members of the public as a result of construction activities.

Appropriate warning signage will be posted at the construction site entrance, directing all visitors to the site manager. Appropriate warning signage shall be provided on public roads approaching site entrances and along haul routes including clear signage relating to the development, both temporary and permanent will be provided for accessing the site.

In relation to the TDR, extra safety measures must be employed when large loads are being transported, for instance, Garda escort will be requested for turbine delivery and a comprehensive turbine delivery plan must be utilized to avoid potential impact to human safety for road users and pedestrians. A traffic and transport assessment has been completed and is detailed in Chapter 14: Traffic and Transportation.

For the installation of the grid connection cable in the public road, a detailed traffic management plan as part of the CEMP shall be finalized following the appointment of the contractor for the main construction works and turbine supply contract which will plan shall be developed in discussion with locals who will be directly impacted by the works, and in agreement with the Local Authority.

Appropriate warning signage will be posted at the construction site entrance, directing all visitors to the site manager. Appropriate signage will be provided on public roads approaching site entrances and along haul routes to maintain public safety.

In relation to the TDR, extra safety measures will be employed when large loads are being transported, for instance, Garda escort will be requested for turbine delivery and a comprehensive turbine delivery plan will be utilised to avoid potential impact to human safety for road users and pedestrians. A traffic and transport assessment has been completed and is detailed in Chapter 14: Traffic and Transportation



Once mitigation measures and health and safety measures are implemented and followed, the potential for impact on human health for members of the public during construction and decommissioning of the proposed project is expected to be not significant and temporary to short-term.

6.8.5.2 *Mitigation Measures - Operational*

For operation and maintenance staff working at the Site, appropriate site safety measures will be utilized during the operational phase by all permitted employees. This is further detailed in the Safety & Health Management Plan detailing the work practices, procedures and management responsibilities relating to the management of health and safety during the design, construction and operation of the Coumragappul Wind Farm and shall be read in conjunction with the Preliminary Safety & Health Plan prepared for the project by the Project Supervisor for the Design Process. Some key mitigation measures that shall be implemented during the operation phase include:

- All personnel undertaking works in or around the turbines will be fully trained and will use appropriate Personal Protective Equipment (PPE) to prevent injury.
- Equipment within high voltage substations presents a potential hazard to health and safety. The proposed substation will be enclosed by palisade fencing and equipped with intruder and fire alarms in line with ESB and EirGrid standards.
- All electrical elements of the Project are designed to ensure compliance with EMF standards for human safety.
- All on-site electrical connections are carried by underground cable and will be marked out above ground where they extend beyond the track or hardstanding surface. Details of cables installed in the public road will be available from ESNB.
- All personnel undertaking works in or around the turbines will be fully trained and will use appropriate Personal Protective Equipment (PPE) to prevent injury.
- Equipment within high voltage substations presents a potential hazard to health and safety. The proposed substation will be enclosed by palisade fencing and equipped with intruder and fire alarms in line with ESB and EirGrid standards.
- All electrical elements of the Project are designed to ensure compliance with EMF standards for human safety.
- All on-site electrical connections are carried by underground cable and will be marked out above ground where they extend beyond the track or hardstanding surface. Details of cables installed in the public road will be available from ESNB.
- Design includes a glass fibre reinforced polyester hood covers the nacelle. The turbines shall be equipped with a Lightning Protection System (LPS) earthing and isolation to help protect the wind turbine against the physical damage caused by lightning strikes. Additionally, the turbines can be equipped with a Fire Suppression System. Furthermore, the wind farm will be remotely monitored, and potential accidents will be quickly identified and reported.
- Furthermore, a nominated competent person will carry out checks and routine maintenance work to ensure the reliability and safe operation of fire-fighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be kept on site at all times.
- In line with WEI Health and Safety Guidelines for the Onshore Wind Industry (2011), Emergency Response Plans will include emergency response procedures for initial actions in the event of a fire. Records will be kept for testing of fire alarms and drills and maintenance/inspection of fixed and portable firefighting equipment.



- Information will be provided to employees on fire safety and fire prevention, including risks of and control measures to prevent fire outbreak, evacuation procedures and those responsible for their implementation, and the use of firefighting equipment, in line with HSA guidance (Fire Prevention - Health and Safety Authority (hsa.ie)). The wind farm system will include a kill switch that can be operated at any time with an overriding manual shutdown system in case of an emergency.
- During the construction phase of the Project, an emergency response plan will be in place as set out in the CEMP, included in Appendix 2.1 of Volume III of this EIAR.
- Turbines will be fitted with a Fire Suppression System. Additionally, each turbine will have a number shown in large print on the top of the nacelle which is intended to aid in any aerial fire support to control wildfires which are known to occur at the Comeragh Mountains.
- Lightning conductors will be installed on each turbine as all structures standing tall in the sky require this protection. Turbines specifically require this to prevent power surges to electrical components.
- Turbines will be fitted with ice detection systems which will stop the turbine from rotating if ice is forming on a turbine blade. This aims to prevent ice throw which can cause injury.
- 24-hour remote monitoring and fault notifications are included as standard in the Turbine Operations and Maintenance Contracts.
- In addition to scheduled maintenance, the maintenance contracts will allow for call out of local engineers to resolve any issues as soon as they are picked up on the remote monitoring system.
- Access to the turbines inner structure will be locked at all times and only accessed by licensed employees for maintenance.
- Risk avoidance by design such as a detailed design risk assessment at detailed design stage, a detailed method statement for all elements of the work, supervision by geotechnical personnel during excavation and avoidance of earthworks during severe weather conditions.
- During the construction phase of the Project, an emergency response plan will be in place as set out in the CEMP in the unlikely event of a landslide/slope failure.

In line with the Health Service Executive's Emergency Planning recommendations, any incident which may occur at the site which requires emergency services, incident information will be provided in the 'ETHANE' format.

- Exact location;
- Type of incident;
- Hazards;
- Access and egress;
- Number of casualties (if any) and condition;
- Emergency services present and required.

Shadow flicker detection systems will be installed on all turbines in order to reduce potential occurrence of shadow flicker on nearby receptors. This is further detailed in Chapter 13: Shadow Flicker.

A nominated competent person will carry out checks and routine maintenance work to ensure the reliability and safe operation of fire-fighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be kept on site at all times.



The wind farm system shall include a kill switch that can be operated at any time with an overriding manual shutdown system in case of an emergency.

6.9 Residual Impacts

6.9.1 Residual Impacts - Population

The residual effects of the Project with respect to population are associated with operation and maintenance jobs during the operational phase of the Coumnaagappul Wind Farm. This is likely to result in a temporary slight, neutral impact on population statistics due to population increase in the Wind Farm Site during working hours. As per the assessment of operational impacts, any impact to the population of the Wind Farm Site in terms of changes to population trends will be imperceptible. It is therefore unlikely that long term residual impacts will occur to population and demographic trends as a result of the proposed project.

6.9.2 Residual Impacts – Socio-economics, Employment and Economic Activity

The residual effects of the development with respect to socio-economics is considered to be slight positive effect with respect to employment. This is as a result of the employment opportunities associated with the operation and maintenance of the development. There will also be a temporary slight positive economic effect from income spent by construction workers in the local area.

The Community Benefit Fund associated with the Renewable Energy Support Scheme (RESS) will provide a significant long-term, positive impact to socio-economic profile of the Wind Farm Site and greater community.

The terms of the Community Benefit Fund will also promote social inclusion across the community as a minimum of 40% of the funds shall be paid to not-for-profit community enterprises, focusing on UN Sustainable Development Goals, 4, 7, 9, 11, 13 and 15 which include quality education, Affordable and Clean Energy, Industry, innovation and Infrastructure, Sustainable Cities, Communities and Climate Action and Life on Land.

Rates payments and development contributions have potential to improve service provision throughout County Waterford and in the local area. This will likely have a slight positive, residual effect on resources of the Local Authority.

A positive residual effect is also envisaged in that wind energy decreases the cost of electricity. A cost benefit analysis of wind energy in Ireland was published by Baringa in association with IWEA in January 2019 (Baringa, 2019). The study indicates that the more renewable energy (low-cost) produced, the less dependency on fossil fuels is required which costs more per MW.

The report states that the savings involved with wind energy outweigh the amount of funding provided to support wind energy through the public service obligation levy, therefore the more wind power produced, the less electricity will cost. The proposed project will result in a slight long-term positive impact for electricity users throughout the country.

Overall, the residual effect associated with socio-economics, employment and economic activity as a result of the Project is considered long-term significant and positive.



6.9.3 Residual Impacts – Land Use

Once mitigation measures are in place and the appropriate design measures are incorporated, as proposed, there will be no significant adverse negative residual effects arising from the project on land use.

Other infrastructure that will remain in situ includes turbine foundations and hardstands which will be covered over and vegetated. The on-site substation will be taken in charge by EirGrid. The grid route cable will remain in situ and form part of the national grid. The residual impact on land use as a result of the in-situ hardstands, foundations, substation and grid connection following decommissioning is likely to be permanent, imperceptible and neutral due to the small extent of land affected.

6.9.4 Residual Impacts – Recreation, Amenity and Tourism

Due to the proximity of a number of tourist and amenity sites associated with the Comeragh Mountains being in close proximity to the site, the significance of visual impacts for receptor types ranges between 'Substantial-moderate' to 'Imperceptible' with a negative short term context. The most notable visual impacts will occur within the immediate surrounds of the turbines at local residential receptors to the south of the horseshoe ridge that contains the site. Impacts beyond this will reduce quickly to 'Moderate' and 'Moderate-slight', as the horseshoe ridge and surrounding upland landscape context tends to screen and partially contain the overall perceived scale of the proposed development from surrounding receptors. Furthermore, even when clearly visible from surrounding receptors outside of the immediate site context, the proposed turbines generally present in a compressible manner and are well accommodated in this broad landscape context that comprises large-scale landscape features and broad transitional land uses.

The community benefits gained during the operational phase due to the capital investment in the area are expected to last beyond the decommissioning phase resulting in a residual permanent significant, positive impact on the amenities of the area.

6.9.5 Residual Impacts – Human Health

Through various aspects of the design process for the Coumragappul Wind Farm, negative residual impact on human health is expected to be imperceptible. This is due to the significant setback distance from nearby dwellings, the zero shadow flicker policy for neighbouring dwellings through the use of shadow flicker detection systems and predicted noise levels at all stages being within noise limits. Furthermore, the mitigation measures as set out throughout the EIAR will prevent any potential significant negative impacts on human health during the construction and decommissioning phases.

Long-term positive imperceptible residual impacts will occur due to the provision of clean, renewable electricity. The operation of the Coumragappul Wind Farm will result in the net displacement of c. 46,358 tonnes of CO₂ per annum which would otherwise be emitted through the burning of fossil fuels.

6.10 Do-Nothing Scenario

In the event that the proposed Coumragappul Wind Farm does not proceed, the existing land use on the site will continue in its present form consisting of heathland and small areas of commercial forestry and pastureland for the foreseeable future.



In the absence of renewable energy development, it is possible that there will likely be a continuance of excessive greenhouse gas emissions and consumption of fossil fuels. The opportunity to harness the wind energy capacity of the site would be lost, further constraining the State from achieving its renewable energy share of sources of 80% by 2030. The net displacement of c. 46,358 tonnes of CO₂ per annum as a result of the operational phase of the Project will not be achieved.

Overall renewable energy supply was 13.6% of gross final consumption in Ireland in 2020 (SEAI, 2022). The remaining 86.4% of energy came from fossil fuels indicating Ireland's heavy dependency on the importation of fossil fuels to meet its energy needs in transport, heat and electricity. This dependency on energy imports leaves Irish consumers exposed to fluctuating international oil and gas prices. Harvesting renewable, indigenous resources such as wind will help diversify the Irish generation portfolio and reduce Ireland's dependency on imported fuel resources. In the do-nothing scenario, the proposed 60 MW- 72 MW wind farm will not contribute to reducing fossil fuel dependency.

Additionally, if the Coumnaagappul Wind Farm Project does not proceed, opportunity for employment relating to the construction, operation and decommissioning of the Project will be lost, resulting in a lost opportunity for potential economic activity in the County Waterford Area. Development contributions and considerable commercial rates would not be made payable to Waterford County Council by the developer, and no Community Benefit Fund Scheme will be put in place in the locality resulting in a lost opportunity for benefit to community infrastructure.

6.11 Cumulative Impacts

As part of the cumulative impact assessment included throughout this EIAR, proposed, consented and existing developments/projects in the Site, GCR and TDR were considered for potential cumulative impacts on the receiving environment.

As set out previously, a 20km distance was considered a reasonable zone of influence for the purpose of assessing potential cumulative impacts on population, human health and material assets, considering the limited size and extent of the project, the nature of the impacts and the relatively non-sensitive receiving environment. Smaller projects were examined in closer proximity to the Proposed Development including developments within 500m of the Wind Farm Site.

Developments in the planning system within the vicinity of the wind farm site, GCR and TDR consisting of one-off housing and agricultural developments were identified for potential cumulative assessment, however, these developments are small in scale and will have an imperceptible cumulative impact with the construction and operation of the proposed wind farm, in relation to population, human health and material assets.

This is due to the setback of the Proposed Development from nearby planned and existing projects. Therefore, potential cumulative impacts associated with small scale development were considered to have an imperceptible effect.



As illustrated below and in Table 6-12, there are a number of operational and permitted renewable developments within the wider 20km:

Table 6-12: Cumulative List of Energy Developments

Energy Development Name	Number of turbines	Distance and Direction from proposed site	Status
Tierney Single Turbine	1	5.1km west of Site	Operational since 2015
Dyrick Hill Wind Farm	12	8.3Km South-West	At Planning Stage
Kilnagrange Single Turbine	1	14km east of Site	Operational since 2015
Woodhouse Wind Farm	8	17.2km west of Site	Operational since 2015
Knocknamona Wind Farm	8	17.6 km west of Site	Permitted since 2016

The Proposed Development in combination with the proposed Dyrick Hill, Knocknamona Wind Farm, Kilnagrange Single Turbine, Woodhouse Wind Farm, Tierney Single Turbine will have a cumulative impact on land use in the area, introducing additional renewable energy land use to an established area consisting of Moors and Heathland. The proposed Coumnagappul Wind Farm will reduce the overall available Moors and Heathland. This is expected to have a non-significant to slight long-term negative impact on agricultural land availability in the area of the wind farm site due to the existing topography and elevated nature of the surrounding landscape.

The cumulative impact of the proposed development in combination with the Dyrick Hill, Woodhouse and Tierney Wind Farms within 20km on Landscape and Visual is detailed in Chapter 16: Landscape and Visual is considered that there is no potential for in combination effects with other types of development and no notable negative cumulative aesthetic effects as well as notable separation distances afforded from all existing, permitted and proposed developments within the study area which will not generate notable negative aesthetic effects such as stacked views of proposed turbines. However, it should be noted that the proposed development will result in an intensification of development within the immediate landscape context of surrounding Comeragh and Knockmealedown Mountains especially when looked at in the context of other development within a wider 20km study area. Thus, Coumnagappul Wind Farm is considered to contribute to a cumulative impact no greater than low with other existing and permitted developments and no greater than medium with existing and proposed wind farm developments.

It is noted that this cumulative impact on Tourism, amenity and employment has not taken the Tierney Single Wind Turbine in consideration as this has been in operation since 2015 and currently consists of a single 150 Kw wind turbine that is only 30m in height located within a private farm holding and thus in-combination with other proposed, permitted and operational wind farms including Coumnagappul Wind Farm would not have a wider overall bearing on tourism and its effects in the wider area.



Furthermore, it is also noted that this cumulative impact on Tourism, amenity and employment has also not taken the Kilnagrange Single Wind Turbine in consideration as this has been in operation since 2015 and currently consists of a single 500 Kw wind turbine that is 60m in height located within a private land holding serving the Flahavans Food Supplier to the south which is located 14km away and thus in-combination with other proposed, permitted and operational wind farms including Coumna gappul Wind Farm would not have a wider overall bearing on tourism and its effects in the wider area.

The cumulative effects of the Proposed Development would result in increased temporary employment figures to the local area which if developed concurrently along with Dyrick Hill, and Knocknamona Wind Farm would mean up to approximately 359 direct and indirect jobs associated with the construction phase in combination and even if all proposed windfarms and solar farms were not developed concurrently, this may potentially result in up to the creation of up to approx. 70 jobs in combination during operation. This in turn would have a temporary positive effect on employment during construction and during operation would have some slight long-term positive effects as a number of those in operational phase may be employed from within in the wider area.

The cumulative effects of the projects in-combination with other permitted Wind and Solar Farm developments especially during the construction phase if other Wind and Solar farm developments were to be developed concurrently would mean a degree of benefit to increased local businesses in the wider area especially in the village of Ballymacarby and the nearby towns of Dungarvan and Clonmel with a temporary increase in temporary workers in the area during working hours, which although temporary, may allow some businesses to invest in improvements that would not otherwise be affordable, leading to a potential long-term enhancement.

Furthermore, it is considered that this proposal in combination with other proposed and existing renewable developments would have a long-term and slight impact on recreation, amenity and tourism in the area. This is based on a number of findings of the BiGGAR Economics report (as previously outlined in Section 6.7.9), the 2012 Failte Ireland 'Visitor Attitudes on the Environment' survey in pointing out that a greater numbers of wind farms do have not have a negative impact on future visits to the island of Ireland. Additionally, (Prinsloo, 2015) points out that that wind farms can themselves act as a tourist attraction and ecotourism in an area may increase as the renewable structures such as solar panels and wind turbines further provide the necessary energy in remote areas, meaning that a number of rural areas would have both the energy resources and natural landscape to attract increased number of tourists than before.

Thus, the overall effects of the Development with regards to recreation, amenity and tourism are short-term, slight, negative during both construction and decommissioning phases which could be mitigated against by carrying out construction during the off-season for tourism and construction works for all developments not being carried out concurrently in order to reduce pressure on the main routes leading to surrounding amenities and a long-term, slight imperceptible impact during operational phase following the implementation of a number of mitigation measures (i.e. Traffic Management Plan during construction, Signage, Design and enhancement of soft boundaries for solar) which is also mitigated against due to the wider separation of distance i.e. greater than 5km for Coumna gappul from other larger scale renewable projects.

Planning applications on the Waterford County Council Website, An Bord Pleanála Website and EIAR Portal Website have been examined to identify proposed or permitted developments with potential cumulative effects on the area. Planning applications in proximity to the site consist of residential one-off dwellings, various agricultural developments, and telecommunications structure. However, due to the quite sparsely populated nature of the surrounding area, it is unlikely that these proposed and consented developments will have a negative cumulative effect on population, human health, and materiel assets in the area due to their size and nature.



Finally, the electricity generating capacity of the Project, in combination with the consented and existing solar and wind farms in the wider area from the Coumragappul site, will have a long-term significant positive cumulative impact on utility infrastructure and renewable energy resources and will have a positive impact on national renewable energy resources as well as reduction in requirements for the use of non-renewable fossil fuels. This will increase national savings on fossil fuel imports.

6.12 Conclusion

The assessment of Population and Human Health has established the existing environmental conditions of the Study Area, including the Wind Farm Site, the Grid Connection Route (GCR) and the Turbine Delivery Route (TDR) Area. Potential impacts were considered for the construction, operational and decommissioning phases of the Project as well as potential residual and cumulative impacts. Mitigation measures have been proposed where relevant.

The Population and Human Health Chapter has been subdivided into the following topics for the purpose of the assessment:

- Population Trends;
- Socio-Economics, Employment and Economic Activity;
- Land Use;
- Recreation, Amenity and Tourism;
- Human Health and Safety;
- Renewable, Non-Renewable Resources and Utility Infrastructure

The population of the Wind Farm Site and Grid Connection were found to be of low density and dispersed when compared to averages of County Waterford as a whole and the State.

The construction and decommissioning of the project will likely result in a short-term/temporary population growth in the Wind Farm Site, Grid Connection and TDR mainly during working hours due to the influx of construction workers during the construction and decommissioning phases. However, permanent impact on the population of the study area is considered negligible as a result of the Project of the Coumragappul Wind Farm due to the short-term nature of the construction works.

The economic profile of the Wind Farm Site and Grid Connection does show a higher percentage working in the primary economic sector compared to National and County figures likely as a result of the rural nature of the Wind farm Site and GCR. This is also evident with the lower numbers working in Commerce and Trade in the Site and Grid Connection Route compared to County, State and TDR levels possibly due to the predominantly rural nature of the Site and GCR. However, for other industries, there are only slight discrepancies with figures and in general, the baseline conditions of the study area shows healthy socio-economic characteristics.

Positive direct and indirect benefits to economic activity are identified during the construction and decommissioning phases due to the creation of construction jobs based in the area which may provide employment opportunities for those living in the study area and surrounding areas of County Waterford and into South County Tipperary. The construction and decommissioning phases are likely to have a temporary positive significant impact on local businesses and services.



The operational phase of the Project has been identified as having a positive economic and social impact on the Wind Farm Area with the provision of a Community Benefit Fund which will contribute to social infrastructure in the area and financially benefit those in closest proximity to the proposed development.

Other positive economic benefits as a result of the operational phase of the proposed Coumnagappul Wind Farm includes reducing the State's reliance on fossil fuels which will reduce electricity prices, economically benefiting the consumer in the long-term throughout the State. Rates and development contributions will also benefit the local authority.

The predominant land use of the Wind Farm Site consists of Moors and Heath Pastureland. The land use in proximity to the proposed grid connection is primarily agriculture characterized by one-off housing and the land use along the TDR is agriculture and town centre/village centre including a degree of forestry, residential and industrial premises. Thus, there will be a slight, temporary impacts to the existing land use along the GCR and TDR which is expected during the construction phase. During the operational phase, whilst there may be a change in land use in areas of the site and along routes where infrastructure is present and in transit, biodiversity mitigation measures including avoidance by design to reduce impacts on designated sites, flora and fauna which will help in further transitioning prior habitats post-construction.

With respect to Recreation, Amenity and Tourism, trail walking, mountain biking, equestrian activity and sports grounds are the main activities and attractions in the greater area with a number associated with the Comeragh Mountains of the proposed site. There are numerous walking trails as the closest major amenity and recreational facilities in proximity to the site. At construction and decommissioning phases, it is considered that the proposal will have a modest physical impact, temporary and limited effect on the landscape within the site. Due to the mitigation already applied by virtue of avoidance and design and buffering of residential receptors a minimum of 820m away, it is expected that the operational phases of the project will overall have an impact on amenity in the area ranging from High-Medium in the immediate environs from and beyond 5km reduced to low and negligible.

Potential impacts on human health and safety have been identified for both construction workers and the general public as a result of the construction and decommissioning of the Coumnagappul Wind Farm. Best practice construction methods and improved safety measures on public roads have been identified as measures to prevent potential accidents during the construction and decommissioning works. Potential health impacts from noise and electromagnetic fields during the operational phase are considered negligible.

Cumulative impacts have also been considered in relation to proposed, consented and constructed projects located nearby the wind farm site, grid route and TDR. No significant in-combination impacts were identified in relation to population, human health and material assets.

In conclusion, once mitigation measures set out throughout this EIAR are implemented, it is unlikely that overall significant negative impacts to population, human health and material assets will occur as a result of development of the proposed Coumnagappul Wind Farm.



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