

Ballyfeeny Green Energy Project



Environmental Impact Assessment Report Volume II

Chapter 5 - Population and Human Health September 2025

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Table of Contents

5. Population and Human Health	1
5.1 Introduction	1
5.1.1 Statement of Authority	2
5.2 Legislation, Policy and Guidance	3
5.2.1 Legislation	3
5.2.2 Guidance	3
5.2.3 Policy	4
5.3 Methodology	6
5.3.1 Consultation	6
5.3.2 Study Area	8
5.3.3 Site Visits	11
5.3.4 Desk Study	12
5.3.5 Approach to Project Design	12
5.3.6 Approach to Impact Assessment	13
5.3.7 Determining the Significance of Effects	15
5.3.8 Assumptions and Limitations	17
5.4 Baseline Environment	18
5.4.1 Existing Land use	18
5.4.2 Tourism	18
5.4.3 Local Resources and Amenities	23
5.4.4 Population and Settlement Patterns	25
5.4.5 Property Values	35
5.4.6 Human Health	37
5.5 Embedded Mitigation	46
5.6 Assessment of Effects	47
5.6.1 Do Nothing Scenario	47
5.6.2 Construction Phase	48
5.6.3 Operational Phase	61
5.6.4 Decommissioning Phase	76
5.6.5 Summary	77
5.7 Mitigation Measures	77
5.8 Residual Effects	79
5.8.1 Construction Phase	79
5.8.2 Operational Phase	83
5.8.3 Decommissioning Phase	84
5.8.4 Summary	85

5.9	Risk of Major Accidents and/or Disasters	85
5.10	Cumulative Effects	86
5.10.1	Sliabh Bawn Wind Farm	87
5.10.2	Derryadd Wind Farm.....	87
5.10.3	Derrane Wind Farm.....	88
5.10.4	Ballyfeeney Rock Quarry.....	88
5.10.3	N5 Ballaghaderreen to Scramoge Realignment Scheme	89
5.10.4	Housing Development Strokestown (2560099) and the Avenir Homes Housing Development (2460265).....	90
5.10.5	Strokestown Public Realm Enhancement Scheme (23374)	90
5.10.6	Lanesboro - Sliabh Bawn 100kV overhead line.....	90
5.10.7	N4 Carrick-on-Shannon to Dromod and the N4 Mullingar to Longford (Roosky) 91	
5.10.8	Remaining Other Developments	91
5.10.9	TDR	92
5.11	Inter-Related Effects.....	92
5.12	Summary of Effects	92
5.13	References	99

Acronyms

Acronym	Term
EIAR	Environmental Impact Assessment Report
GCR	Grid Connection Route
TDR	Turbine Delivery Route
LA	Local Authority
CEMP	Construction Environmental Management Plan
DMP	Decommissioning Management Plan
EU	European Union
EC	European Commission
Hz	Hertz
GHz	Gigahertz
EMF	Electromagnetic fields
EPA	Environmental Protection Agency
DoHPLG	Department of Housing, Planning and Local Government
DECLG	Department of the Environment, Community and Local Government
IEMA	Institute of Environmental Management and Assessment
CDP	County Development Plan
EIA	Environmental Impact Assessment
ED	Electoral Division
CSO	Central Stati
OSI	Ordnance Survey Ireland
IFI	Inland Fisheries Ireland
TII	Transport Infrastructure Ireland
WEDG 2006	Wind Energy Development Guidelines 2006
Draft WEDG 2019	Draft Wind Energy Development Guidelines 2019
WEI	Wind Energy Ireland
SEAI	Strategic Energy Authority of Ireland
EIS	Environmental Impact Statement
SEA	Strategic Environmental Assessment
RLB	Redline Boundary
Ha	Hectares
ITM	Irish Transverse Mercator
T01	Turbine 1
T02	Turbine 2
T03	Turbine 3
T04	Turbine 4
T05	Turbine 5
T06	Turbine 6
HDD	Horizontal Directional Drilling
kV	Kilovolt
PV	Photovoltaic
SE1	Site Entrance 1
SE2	Site Entrance 2
SE3	Site Entrance 3
SE4	Site Entrance 4
SE5	Site Entrance 5
SE6	Site Entrance 6
GVA	Gross Value Added
US	United States
UK	United Kingdom

NSL	Noise Sensitive Location
LBNL	Lawrence Berkley National Laboratory
CEBR	Centre for Economics and Business Research
HSE	Health Service Executive
NHMRC	National Health and Medical Research Council
NSW	New South Wales
MIT	Massachusetts Institute of Technology
dBA	A-weight decibels
μT	microtesla
ICNIRP	International Committee on Non-Ionising Radiation Protection
ELF	Extremely low frequency
WHO	World Health Organisation
FRP	Fibre-reinforced polymer
PSDP	Project Supervisor Design Phase
GHG	Greenhouse gases
PPE	Personal Protective Equipment
CAFE	Clean Air for Europe
WFD	Water Framework Directive
ATCs	Automatic Traffic Counters
CCTV	Close-circuit television
SCADA	Supervisory Control and Data Acquisition
COMAH	Control of Major Accident Hazards
CEA	Cumulative Effects Assessment
MW	Megawatts
kW	Kilowatt (power)

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5. Population and Human Health

5.1 Introduction

This Chapter assesses the likely significant direct and indirect effects on population and human health during the construction, operational and decommissioning phases of the proposed Project.

The proposed Project includes six no. turbines and all associated infrastructure including Turbine Foundations, Turbine Hardstands, Site Access Tracks, Wind Farm Internal Cabling, Grid Connection Route (GCR), Relay Tower, Onsite Substation and works required along the public road network for the two Turbine Delivery Route (TDR) options to facilitate the delivery of turbine components. A full description of the proposed Project is provided in **Chapter 2 - Project Description**

The Applicant is in receipt of a notification of opinion by the Local Authority on design flexibility. The notification is provided in **Appendix 1.5 - DFR-25-1 Notification of Opinion by Local Authority**. This opinion from the Local Authority confirmed that it was *'appropriate that the proposed application be made and decided before the prospective applicant has confirmed certain details of the application'*.

Chapter 1 – Introduction, Section 1.6 Approach to Design Flexibility, outlines with respect to the notification of opinion by the Local Authority, the Applicant in this EIAR, assesses three distinct Technology Options within the range outlined by the Local Authority and in accordance with the design flexibility parameters sought. **Chapter 1 – Introduction Table 1-3**, outlines the options and associated parameters that are used in the EIAR, comprising three potential turbines classified as Technology Option 1, 2 and 3. Further detail on the assessment of the Technology Options in this Chapter is provided in **Section 5.3.5**.

The Chapter has addressed two environmental aspects:

- Population which considers land use, the local population, local amenities, employment, economy and tourism
- Human health which considers the environmental pathways by which health may be impacted by the proposed Project. This section of the Chapter is primarily supported by the findings of other assessments in the EIAR such as air, noise, visual, shadow flicker, water and traffic.

This Chapter is supported by the following:

- **Volume 4 - EIAR Figures;**
- **Appendix 1-3 - Scoping Consultation Responses;**
- **Appendix 2.1 - Construction Environmental Management Plan (CEMP);**
- **Appendix 2.1.4 – Decommissioning Management Plan (DMP); and**
- **Appendix 5.1 - Community Report.**

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The assessment should be read in conjunction with:

- **Chapter 7 - Land, Soils and Geology;**
- **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology;**
- **Chapter 9 - Air Quality and Climate;**
- **Chapter 10 - Noise and Vibration;**
- **Chapter 11 - Landscape and Visual Impact Assessment;**
- **Chapter 12 - Traffic and Transport;**
- **Chapter 15 - Shadow Flicker;**
- **Chapter 16 - Cumulative Effects**, which considers other plans and projects that may act cumulatively with the proposed Project; and
- **Chapter 17 - Interrelated Effects**, which address the interactions between effects on different environmental aspects.

5.1.1 Statement of Authority

This section of the EIAR has been prepared by Rowan Engineering Consultants Ltd., (Rowan). Rowan has been providing environmental, ecological and planning services since the company was founded in 1998 to a broad range of clients.

This Chapter of the EIAR has been written by Jessica Boyd. Jessica is a Senior Environmental Consultant, having joined Rowan Engineering Consultants Ltd., in February 2024 with over 6 years' experience in Environmental Impact Assessment, in relation to Pharmaceutical, Aggregate Industry and Onshore Wind Developments. Additionally, Jessica's experience includes Environment and Planning preparation for Onshore Wind, Solar and Battery Energy Storage Systems across Ireland. Jessica holds a BSc in Environmental Management and MSc in Spatial Planning: Cities, Water & Climate Change.

Dr James Massey has reviewed this Chapter. James is a Senior environmental consultant and ecologist with over 25 years' experience, specifically on environment assessment of renewable projects, onshore and offshore in Ireland and worldwide. James is a Fellow of the Institute of

Environmental Sciences and a member of several professional organisations. James is a Chartered Environmentalist and Chartered Scientist and holds a PhD, DSc, BSc in Applied Marine Biology and a number of professional and industry qualifications.

Denise Meade has reviewed this Chapter. Denise has over 20 years' experience working on both public and private sector developments. Her experience lies in the environmental co-ordination of large infrastructure projects across a range of industries including renewable energy, roads, water and wastewater. She has managed all aspects of planning applications, with a focus on the technical review and delivery of EIARs. She is a Chartered Environmentalist (CEnv) and Chartered Water and Environmental Manager (C.WEM) and hold an MSc in Applied Environmental Science and AdvDip in Planning & Environmental Law.

5.2 Legislation, Policy and Guidance

5.2.1 Legislation

The population and human health assessment has been carried out in accordance with all applicable legislation including the following:

- EU Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (the EIA Directive);
- The Council Recommendation 1999/519/EC on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz);
- The Planning and Development Act 2000 (as amended);
- The Planning and Development Regulations, 2001 (as amended);
- Safety, Health and Welfare at Work Act 2005 (as amended); Health and Welfare at Work (General Application) Regulations 2007-2023 (as amended);
- Safety Health and Welfare at Work (Construction) Regulations 2013 (as amended); and
- Machinery Directive and the European Communities (Machinery) Regulations 2008 (as amended)

5.2.2 Guidance

The chapter has been prepared in accordance with all relevant guidance including the following:

- Your Guide to Understanding Electric and Magnetic Fields (EMFs) in the Electricity Transmission System, (EirGrid, 2024);
- EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects (Fáilte Ireland, undated);

- Guide on Effective Scoping of Human Health in Environmental Impact Assessment (Institute of Environmental Management and Assessment (IEMA), 2022);
- IEMA Discussion Document (IEMA, 2017);
- Guide on Determining Significance for Human Health in Environmental Impact Assessment (IEMA, 2022);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- Draft Revised Wind Energy Development Guidelines (Department of Housing Planning and Local Government (DoHPLG), 2019) (hereafter referred to as Draft WEDG 2019);
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out Environmental Impact Assessment (Department of Environment, Community and Local Government (DECLG), August 2018);
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission (EC), 2017); and
- Wind Energy Development Guidelines (Department of the Environment, Heritage and Local Government, 2006); (hereafter referred to as WEDG 2006).

5.2.3 Policy

The overarching planning policy relevant to the proposed Project is detailed in **Chapter 4 - Planning and Policy**. A Planning Statement has been provided with the planning applications documents.

The Roscommon County Development Plan (CDP) 2022-2028 outlines a range of policies to promote tourism in the County, listed as follows:

- **(ED 6.22)** Promote tourism as an integral part of County Roscommon's economic profile, supporting urban and rural enterprise, and recognising the key strategic location of the county and access to tourist sites and attractions;
- **(ED 6.23)** Continue to support the implementation of the Roscommon Tourism Strategy 2017-2020 (and subsequent revisions) in line with national and regional policy, tourism trends and identified challenges, in collaboration with Fáilte Ireland, Waterways Ireland, tourism businesses and communities and other supporting agencies;
- **(ED 6.25)** Promote the development of sustainable tourism as part of our economy, that recognises our landscapes, our cultural heritage and our environmental;

- **(ED 6.28)** Encourage walking and cycling as sustainable transport modes and healthy recreational activities by ensuring that a network of safe, well-marked and maintained rights-of-way, walking and cycle routes, and footpaths are provided throughout the county;
- **(ED 6.29)** facilitate the creation of a network of cycling/walking routes (including existing footpaths and walking routes, off road routes, local walks, tourist walks, medium and long distance walking routes) within the County;
- **(ED 6.30)** Develop linkages between existing and new trails, particularly those with a historic association in adjoining counties, in cooperation with Inland Waterways, Failte Ireland and with other relevant stakeholders to provide linkages with trails in adjoining counties in partnership with their Councils; and
- **(ED 6.31)** Ensure that development proposals in the vicinity of walking routes and cycleways do not hinder the use and general amenity value of the routes.

Furthermore, the Roscommon CDP 2022-2028 outlines a range of policies to promote Economic Development in the County, listed as follows:

- **(ED 6.1)** Ensure that sufficient and suitable land is reserved for new industry/enterprise development and other employment uses in a range of sizes at key locations throughout the County;
- **(ED 6.2)** Promote the coordinated alignment of population and employment in designated growth towns, providing for natural increases and to enable towns to become more economically self-sustaining, in line with the quality and capacity of public transport, services and infrastructure available;
- **(ED 6.3)** Support appropriately scaled economic development and services, together with the enhancement of local infrastructure and amenities and improved sustainable transport links;
- **(ED 6.4)** Support the regeneration of the core areas of the county's settlements through sustainable, targeted measures that address vacancy, encourage economic development and deliver sustainable reuse and regeneration outcomes;
- **(ED 6.5)** Continue the promotion of a unique niche economic development approach in each of the urban settlements in the County; and

- **(ED 6.6)** Support appropriately scaled development in the villages of the county in line with the development of a SMART village network.

The Roscommon CDP 2022-2028 outlines a policy to improve Rural Economic Development as follows:

- **(RD 5.1)** Work with all relevant stakeholders to implement the recommendations of the CEDRA Report on Energising Ireland's Rural Economy and Our Rural Future, Ireland's Rural Development Policy 2021-2025 to develop economic, social and cultural benefits for the rural community.

5.3 Methodology

The methodology used in this Chapter accords with the EPA Guidelines (2022) and best practice.

5.3.1 Consultation

Scoping and consultation have been carried out in support of the proposed Project and in line with the EIA Directive, together with the EPA Guidelines and with due regard for the *Environmental Impact Assessment of Projects: Guidance on Scoping (European Commission, 2017)*.

All scoping consultation responses are provided in **Appendix 1.3 - Scoping Consultation Responses**.

Table 5-1 summarises issues raised during this consultation process and relevant to population and human health.

Table 5-1: Consultation responses relative to population and human health

Stakeholder Details	Stakeholder Comment	How comment has been addressed in the EIAR
Fáilte Ireland	Provided a copy of Guidelines for the Treatment of Tourism in an EIA with guiding principles of EIAR and EIAR requirements.	This content of this Chapter has been prepared in line with the Fáilte Ireland Guidelines received in regard to tourism and amenity as a result of the proposed Project.
Transport Infrastructure Ireland (TII).	TII has responded with, as outlined in Table 1-7 of Chapter 1 and Appendix 1.3 – Scoping Consultation Responses . These requests	Issues raised through the consultation process have been addressed in Chapter 12 – Traffic & Transport . In addition, potential traffic-related impacts on human

Stakeholder Details	Stakeholder Comment	How comment has been addressed in the EIAR
	relate to, but are not limited to, consultations with the Local Authority regarding existing and proposed road schemes in the area; potential significant impacts of the project on the surrounding road network; visual impacts from existing national roads; and cumulative impacts. The response also highlights various regulations that the EIAR should consider.	health due to increased exhaust emissions have been assessed. Corresponding mitigation measures are detailed in Chapter 9 – Air Quality & Climate, Chapter 11 – Landscape & Visual and Chapter 12 – Traffic & Transport.
Inland Fisheries Ireland	The IFI response outlines the necessary environmental assessments and precautions required for construction projects relating to wind turbines, emphasising the importance of the protection of aquatic habitats, soil stability and hydrology, in addition to implementing proper waste management. Guidelines are stipulated for scheduling construction to avoid disrupting fish spawning seasons, monitoring impacts, maintaining riparian zones, and obtaining necessary permits and licenses.	Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology assesses the potential for construction, operation and decommissioning phase effects on the water environment and details mitigation measures to avoid, prevent and/or reduce or, if possible, offset any significant adverse effects. The assessment has taken account of the IFI Guidance. Furthermore, monitoring of surface water will be conducted in regards of quantitative and qualitative parameters during the construction phase as outlined in Section 5.7. Additionally, aspects pertinent to site drainage and soils are

Stakeholder Details	Stakeholder Comment	How comment has been addressed in the EIAR
	A full summary of the IFI responses is available in Appendix 1.3 – Scoping Consultation Responses .	considered in Chapter 7 – Land, Soils and Geology .

5.3.2 Study Area

The assessment has considered the proposed wind farm Site, the proposed GCR and the sections of the TDR that include temporary works such as hedge and tree cutting and sections of road widening. These works are described in detail in **Chapter 2 - Project Description**. The assessment is primarily focused on the proposed wind farm Site and the GCR and on this basis, the collation of baseline data has centred on these areas.

The temporary works on the TDR have been considered in the assessment, with **Table 5-2** detailing where residential properties are located in proximity to these works. Proposed works have been considered in regard to proximity of works to residential receptors.

Table 5-2: Nodes on TDR's where residential properties are located

TDR1 1A and TDR 1B		
Node No.	Description of associated works	Dwellings located within a node or adjacent to a node
2025	Street Furniture to be relocated/ removed.	Yes
2060	- Works to roundabout required. - Street Furniture to be relocated/ removed.	Yes
2090	- Works to traffic island required. - Street Furniture to be relocated/ removed.	Yes
3020	- Street Furniture to be relocated/ removed. - Hedge cutting required - Works to traffic island required. - Works to roundabout required	Yes
3050	Works to roundabout required	Yes
3070	- Works to roundabout required - Street Furniture to be relocated/ removed.	Yes

TDR1 1A and TDR 1B		
Node No.	Description of associated works	Dwellings located within a node or adjacent to a node
3080	- Street Furniture to be relocated/ removed. - Hedge cutting required - Work to traffic island required	Yes
3085	- Hedge and tree cutting required - Road widening works required	Yes
4155	- Street Furniture to be relocated/ removed. - Works on traffic island required - Works on footpath required - Works on roundabout required - Tree cutting required	Yes
4160	- Street Furniture to be relocated/ removed. - Tree cutting required	Yes
4165	- Street Furniture to be relocated/ removed. - Works on traffic islands required - Hedge and tree cutting required	Yes
3085	- Hedge and tree cutting required - Road widening works required	Yes

In order to collate and assess information relative to population and human health, the study area has primarily focused on the Electoral Divisions (EDs) surrounding the proposed wind farm Site and GCR. The EDs are administrative areas used by the Central Statistics Office (CSO) when publishing population based statistics.

The proposed wind farm Site is located within Kilglass South ED. Townlands within this ED include Ballyfeeny and Tully. The proposed wind farm Site location in relation to the ED's and townlands is detailed in **Figure 5-1** and **Figure 5-2**.

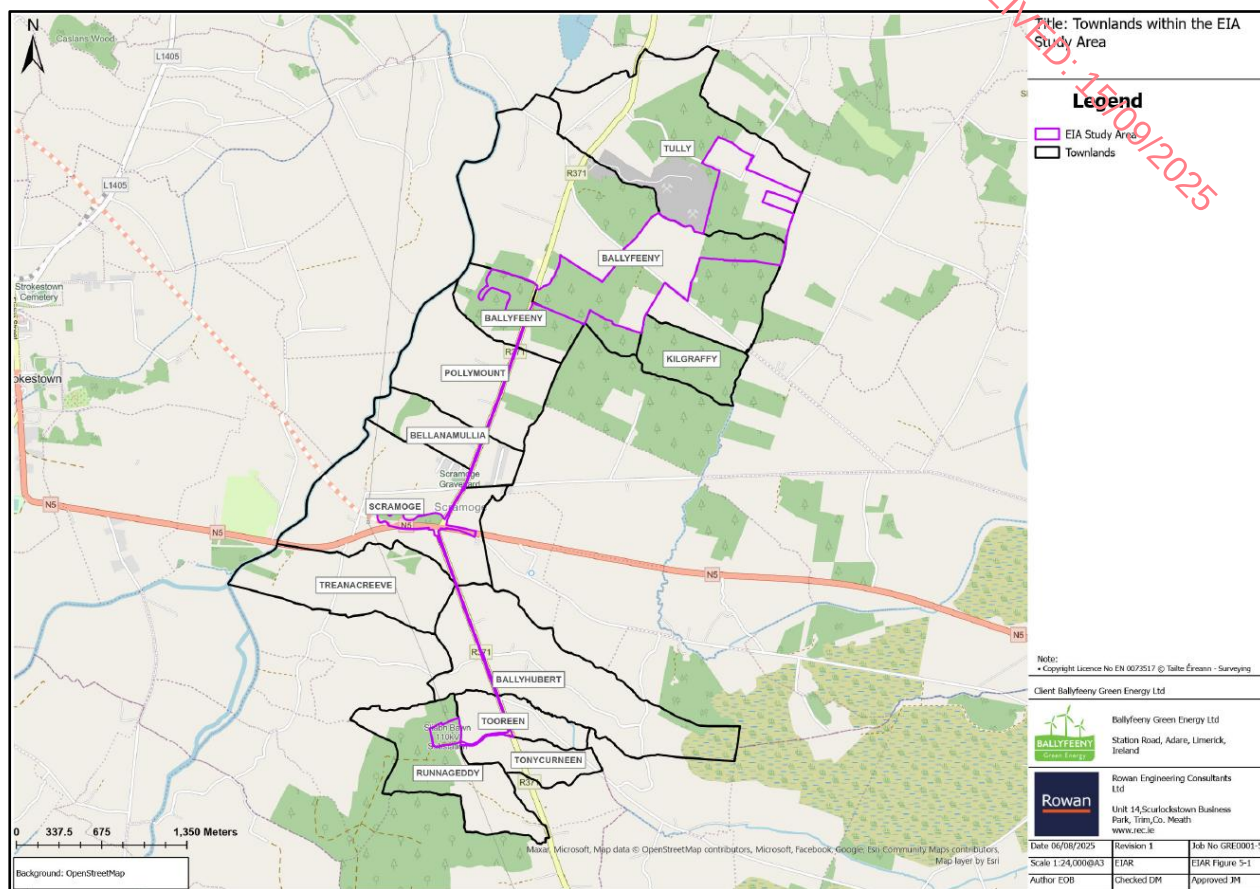


Figure 5-1: EIA Study Area and Townland (Ref: EIAR Figure 5-1 (Volume 4))

The proposed GCR and nodes within Co. Roscommon are located within two EDs, including Kilglass South and Bumlin. Townlands within these EDs include Ballyfeeny (also known as Ballyfeeney), Polymount, Bellanamullia, Scramoge, Ballyhubert, Treanacreeve, Tooreen, Tonycurneen and Bunnageddy (also known as Runnageddy) which are shown in **Figures 5-1 and 5-2**.

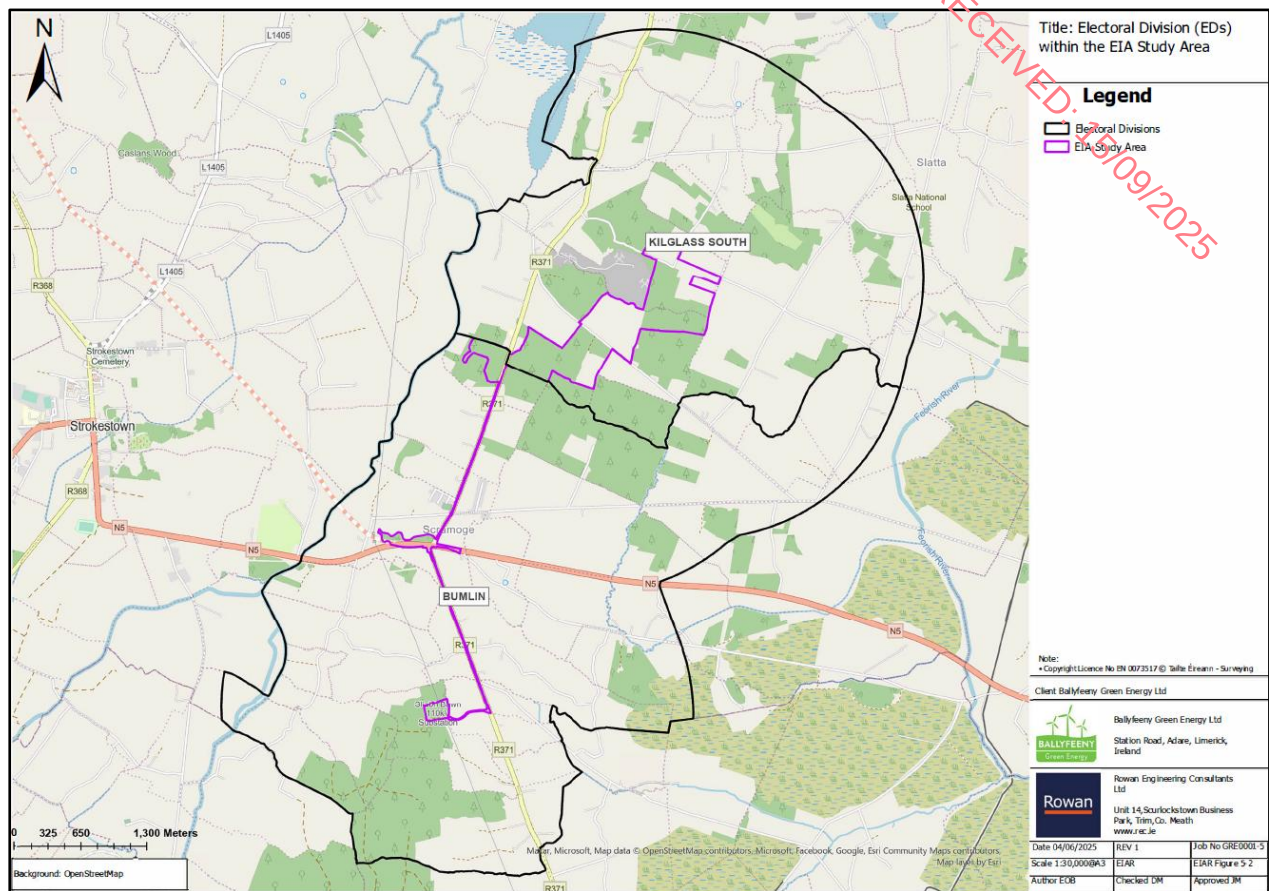


Figure 5-2: EIA Study Area and Electoral Divisions (Ref: EIAR Figure 5-2 (Volume 4))

For the tourism, local resources and amenities aspects the assessment extends beyond the nearest ED's, taking into account a wider study area of up to 20km from the proposed wind farm Site. This study area was aligned with **Chapter 11 - Landscape and Visual Impact Assessment** and allow the assessment to account for potential indirect effects on population and human health receptors.

Baseline details at a national scale for aspects such as population and tourism have been considered for comparative purposes, where relevant.

5.3.3 Site Visits

A site visit was conducted on 18th of May 2024 to assess the proposed Project and its surrounding environment. The purpose of the visit was to enhance understanding and verify information about the local area. Aspects reviewed during the site visit included land use, surrounding amenities and business and settlements around the proposed Project.

5.3.4 Desk Study

A desktop study was undertaken to examine information relevant to the baseline environment with regard to population and human health. Information was sourced from the following:

- Roscommon CDP 2022-2028;
- Roscommon Climate Action Plan 2024 – 2029;
- Longford CDP 2021-2027
- Leitrim CDP 2023-2029
- Roscommon Tourism Strategy 2017-2020;
- Draft Roscommon Town Local Area Plan 2024-2030;
- Regional Planning Guidelines for the West Region 2010-2022;
- Aerial photography and Ordnance Survey Ireland (OSI) mapping;
- Central Statistics Office (CSO) 2022;
- Fáilte Ireland website -www.failteireland.ie;
- Report on Visitor Awareness and Perceptions of the Irish landscape, (Fáilte Ireland, 2023);
- Wind Farms and Tourism Trends in Scotland, (BIGGAR Economics, 2016);
- A Macroeconomic Analysis of Onshore Wind Deployment to 2020 (SEAI, 2015);
- Economic Impact of Onshore Wind in Ireland (Wind Energy Ireland (WEI), 2022); and
- Heritage Ireland (Roscommon) website – www.heritageireland.ie.

5.3.5 Approach to Project Design

As set out in **Chapter 1 - Introduction**, under Section 32I of the Planning and Development Act 2000 (as amended), the Applicant is in receipt of an opinion on flexibility, relating to 3 no. options of Turbines. This opinion from the Local Authority confirmed that it was *‘appropriate that the proposed application be made and decided before the prospective applicant has confirmed certain details of the application’*.

Changes in economic and population profiles during the construction, operational and decommissioning phases would not be impacted by the installation of a particular Technology Option, i.e. the expected level of employment would not differ across the three Technology Options. On this basis, the assessment conclusions (i.e. the significance of effects) for economic and population aspects will not differ across the three Technology Options. The assigned significance rating is applicable to each of the Technology Options.

For some aspects such as land use, tourism, local resources and human health, the impact assessment incorporates the assessment outputs from other environmental aspects i.e. air, noise, visual, shadow flicker and traffic.

These individual Chapters have each established a respective approach in terms of assessing the three Technology Options and therefore the identification of an assessment approach is not considered applicable for this Chapter. Refer to the following EIAR chapters for details on the assessment of the three Technology Options:

- **Chapter 7 - Land, Soils and Geology**
- **Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology**
- **Chapter 9 - Air Quality and Climate**
- **Chapter 10 - Noise and Vibration**
- **Chapter 11 - Landscape and Visual Impact Assessment**
- **Chapter 12 - Traffic and Transport**
- **Chapter 15 - Shadow Flicker**

5.3.6 Approach to Impact Assessment

Population

According to the EPA Guidelines, the following should be addressed within the Population and Human Health chapter of an EIAR:

- Employment;
- Settlement patterns;
- Land use patterns;
- Baseline population;
- Demographic trends;
- Human health (considered with reference to other headings, such as water and air); and
- Amenity (e.g. effects on amenity uses of a site or of other areas in the vicinity may be addressed under the factor of Landscape)

With the exception of human health, these topics have been addressed in the population assessment under the land use, tourism, population (capturing settlement patterns and demographic trends), employment and economic development and local resources and amenities sections. Where relevant, the assessment of these aspects is supported by the findings of other assessments in the EIAR such as air, noise and visual.

The approach to the population assessment is as follows:

- **Baseline data collection:** Baseline data was collated from key sources such as the CSO and Fáilte Ireland. This was supported with the outputs of the site visit and map searches which were used to verify any information on the surrounding environment.
- **Assessment of likely significant effects:** An assessment of the potential environmental impacts was undertaken and the significance of effects was determined.
- **Mitigation measures:** Mitigation measures to avoid and/or reduce significant adverse effects are detailed.
- **Cumulative effects assessment:** The list of other projects provided in **Appendix 16.1 - Long List of other Projects & Plans for the Cumulative Effects Assessments** were assessed to determine the potential for cumulative effects
- **Unplanned events:** The potential for unplanned events associated with the construction, operation or decommissioning phases of the proposed Project and the potential impact on the surrounding population was considered.

Human Health

According to the EPA Guidelines, no clear definition of the term "human health" has been provided within the context of the EIA Directive. However, the same term was previously used in the SEA Directive (2001/42/EC). The Commission's SEA Implementation Guidance states:

'The notion of human health should be considered in the context of other issues mentioned in paragraph (f). Paragraph (f) lists the environmental factors including soils, water, air etc). This is consistent with the approach outlined in the 2002 EPA EIS Guidelines where health was considered through assessment of the environmental pathways through which it could be affected, such as air, water or soil, namely:

'The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. These standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors [protection criteria] for analysis relating to the environment.'

With regards to Human Health, EC guidance relating to the implementation of the EIA Directive, pertinent to 'human health',

"Human health is a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of other factors in Article 3 (1) of the EIA Directive and thus environmentally related health issues (such as health effects

caused by the releases of toxic substances to the environment, health risks arising from major hazards associated with the project, effects caused by changes in disease vectors caused by the project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are foreseeable aspects to study.

A Report prepared in 2017 by the Health Service Executive Public Health Medicine Environment and Health Group states:

‘Examining whether wind farm emissions may affect human health is complex, as both the character of the emissions and individual perceptions of them are highly variable. The emissions of greatest concern include noise (including infrasound), shadow flicker and electromagnetic radiation.

A number of comprehensive evidence reviews have been conducted in recent years in order to examine the effects of wind farms and wind turbines on human health. While a range of effects have been reported anecdotally, there is no published scientific evidence to support adverse effects of wind farms and wind turbines on health. However, there is lack of high quality evidence investigation possible relationships between wind farms and health outcomes, and further research is required’.

Additionally, the EPA Guidelines outline:

‘In an EIAR, the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc. The Advice Notes provide further discussion of how this can be addressed.’

The potential likely and significant effects of the proposed Project on human health have been assessed in other Chapters of the EIAR regarding environmental factors such as air, noise, visual, shadow flicker and traffic. The baseline data and assessment methodology for these individual topics is defined in detail within each EIAR Chapter. The outputs of these Chapters have been used to inform the human health assessment in this Chapter.

5.3.7 Determining the Significance of Effects

The effects on Population and Human Health are assessed using the methodology outlined in **Chapter 1 – Introduction** with the assessment and conclusions detailed within this Chapter. The significance of an effect was determined by considering the magnitude of the impact and the

sensitivity of the receptor, with the classifications assigned in accordance with the EPA Guidelines, including **Imperceptible**, **Not Significant**, **Slight**, **Moderate**, **Significant**, **Very Significant** and **Profound**.

In considering the effects, criteria such as quality, duration, probability and type were also considered. These criteria are detailed in **Table 3.4** of the EPA Guidelines and are presented in **Table 1-6 of Chapter 1 Introduction**. As per the guidelines, all categories of these terms do not need to be used for every effect.

For the purpose of this assessment, effects rates as '**Significant**' or above are considered to be Significant in EIA terms. Effects identified as '**Moderate**' significance or below are considered Not-Significant in EIA terms.

In order to determine the significance of effect, the EPA Guidelines (EPA, 2022) has provided a matrix which compares the character (magnitude) of the potential impact to the sensitivity of the receiving environment, see **Figure 5.3**.

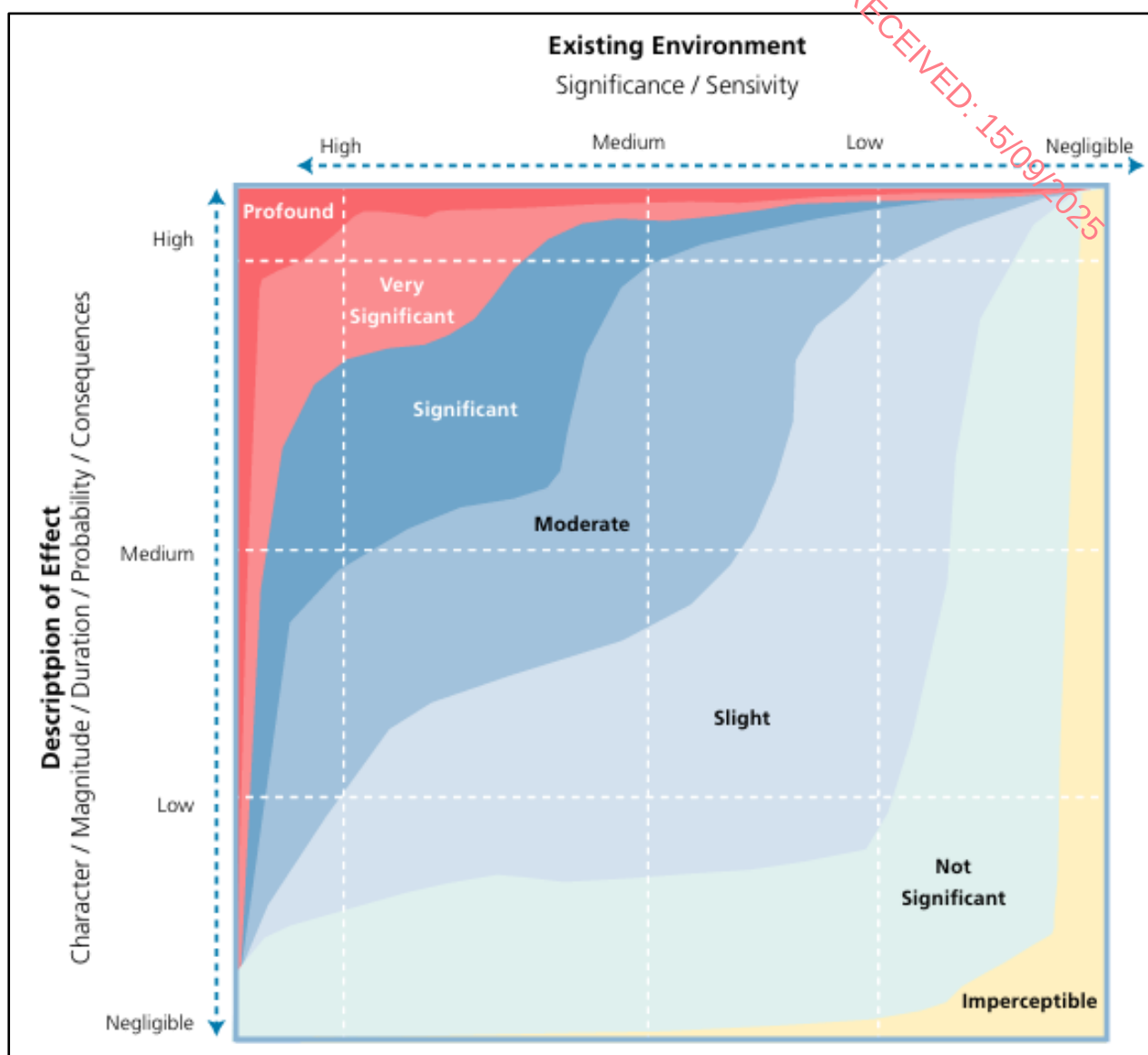


Figure 5-3 Typical Classification of the Significance of Effects (EPA, 2022).

5.3.8 Assumptions and Limitations

The most up to date baseline information has been used in the development of the Baseline Environment section of this Chapter. However, it is noted that new information for national datasets may be published after this EIAR is submitted for planning approval. Regardless, a comprehensive description of the Baseline Environment has been described in this Chapter. Based on professional experience and expertise, the available data was sufficient to inform the impact assessment.

5.4 Baseline Environment

5.4.1 Existing Land use

The proposed wind farm Site is situated in the townland of Ballyfeeny and Tully, Co. Roscommon, and is c. 4.5km northeast from Strokestown, (ITM: E598813 N782007). The area within the Redline Boundary (RLB) site approximately 49.774 Hectares (Ha), encompassing the total area of the proposed wind farm Site.

The proposed wind farm Site consists of areas of forestry, portions of agricultural grassland and pastureland for cattle together with parcels of mature and private forestry. Additionally, an adjacent active quarry, known as Ballyfeeney Rock Quarry, exists on the western boundary of the Site. Two watercourses traverse the Site, known as the Culliagh Stream and Ballymartin Stream. Dominant habitats within the Site include hedgerows, treelines and drainage ditches.

A total of 219 sensitive receptors have been identified within a 2km radius of the proposed turbines. These include 215 residential receptors, 2 community receptors, and 2 commercial receptors. In line with the WEDG 2006 and Draft WEDG 2019, all identified receptors are located more than 500 metres from the proposed turbines. The closest receptor is residential receptor H35, located c.599 metres west of turbine T02. Community receptor H30, Ballyfeeney National School, is situated c.779 metres northwest of turbine T01. The second community receptor 162, including a church are located c.1.97km southwest of turbine T01.

The two commercial receptors within the 2km are receptor 168, a recruitment agency located c.1.87 km southwest of turbine T01, and Receptor 159, a pub c.1.95km southwest from turbine T01. All receptors within the 2km study area are illustrated in **(EIAR Figure 2-1 (Volume 4))**.

A 5.8km GCR will connect the Onsite Substation to the existing Sliabh Bawn 110kV Substation, where it will connect to the electricity grid. On leaving the proposed wind farm Site, the route is entirely within public roads and public road verges. Installation works will consist mainly of 3 no. power ducts and 1 no. communications duct installed within an excavated trench, typically 0.6m wide by 1.235m deep. Horizontal direct drilling (HDD) methods will be employed to cross the N5 National Road at the R371/N5 junction without an open excavation of the road.

5.4.2 Tourism

National Tourism

Overseas tourists to Ireland stood at 6.3 million in 2023 and the total expenditure of the visitors was €7.3 billion (CSO, 2024). In 2024, Fáilte Ireland announced ambitious plans with a focus on sustainable tourism development, including the following:

- A strategic partnership between SEAI and Fáilte Ireland to support decarbonisation of tourism businesses in Ireland;
- A new Climate Action Programme for tourism industry; and
- Eight new tourism capital projects open across the country focusing on leveraging Ireland's heritage, history and natural landscape.

To further increase the appeal of destinations across Ireland, Fáilte Ireland will support the continued development and delivery of visitor experiences and attractions in Ireland. In 2024, eight new capital investment projects opened, including the following:

- Connaught Harbour, Portumna, Galway, Ireland's Hidden Heartlands;
- Dublin Castle Records Tower, Dublin City, Dublin;
- Queen Maeve Square and Garavogue River Walk, Sligo, Wild Atlantic Way;
- Dunbrody Famine Ship, New Ross, Wexford, Ireland's Ancient East;
- Kilkenny City - Urban Animation, Ireland's Ancient East;
- Outdoor Sports Facility, Curracloe, Co. Wexford, Ireland's Ancient East;
- Mountain Trail Biking - overall trail network of 191km nationally; and
- Wexford, New Ross and Waterford Blueway, Ireland's Ancient East.

While the intent is in place to boost Ireland's tourism industry, the Fáilte Ireland (2024) has detailed that the sector is facing numerous challenges (Refer to **Figure 5-4**). A number of sectors have struggled to match previous visitor volumes, including the accommodation sector. Dublin performed exceptionally well in 2023 due to the strength of overseas markets.

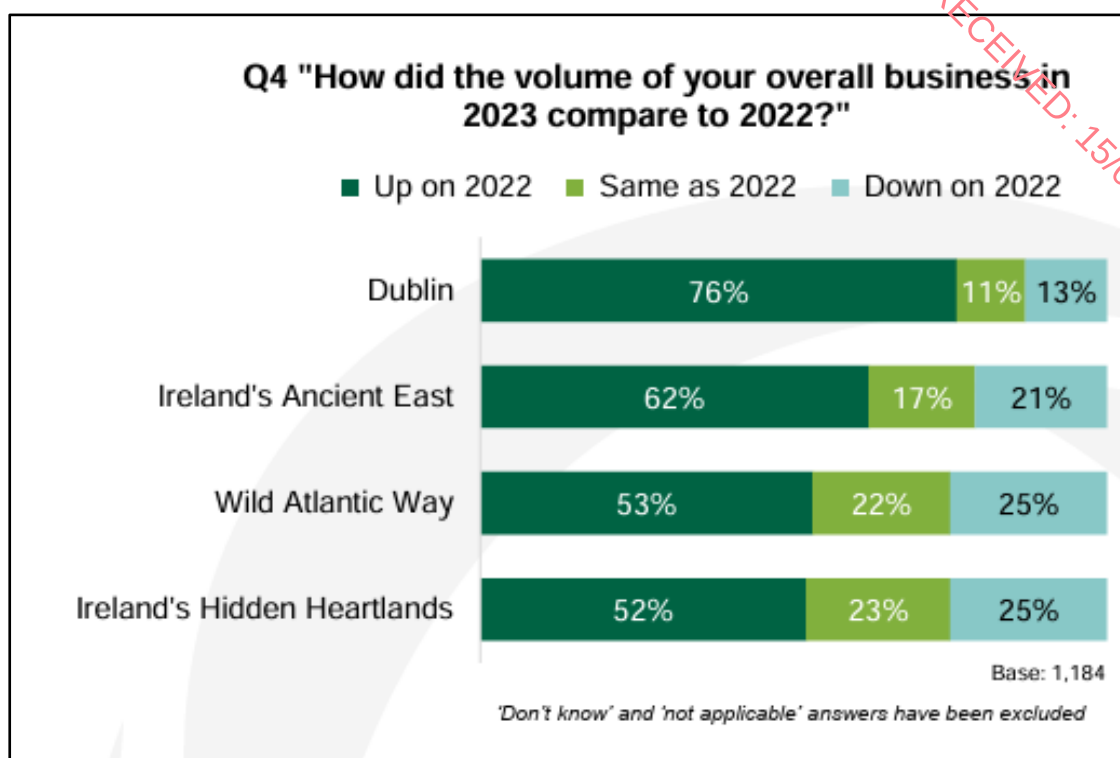


Figure 5-4: Tourism barometer findings on regional business in 2024 (Failte Ireland, 2024)

Regional Tourism

County Roscommon offers a distinctive tourist experience, due to its abundance in natural landscapes, waterways, walking and cycling routes. Additionally, Co. Roscommon is rich in history and heritage, providing a number of popular attractions such as the Rathcroghan Archaeological Complex, Lough Key Forest and Activity Park, The Beara Breifne Way, Roscommon Castle, Clonalis House, Arigna Mining Experience and Strokestown Park House, Gardens and National Famine Museum.

The wider study area contains a more diverse range of amenity and heritage features. The Royal Canal Way and Greenway trace part of the Royal Canal corridor located c.10km Southeast from the Site. This wider area is also closely linked with water-based recreational activities, due to the presence of the River Shannon and Lough Ree, which is the largest lake along the Shannon corridor. The River Shannon serves as a focal point for outdoor pursuits, with walking, cycling, and various water sports commonly enjoyed along its banks.

Furthermore, the wider study area holds a number of local heritage features, including church ruins, graveyards, and demesne landscapes. Castleforbes Demesne is located c.10km east of the Site and is one of the largest demesne landscapes within the study area.

Ireland's Hidden Heartlands regional tourism brand was initiated in 2018 by Fáilte Ireland. The 'Hidden Heartlands' include a selection of midland Counties, including Roscommon, encompassing numerous tourism assets for visitors to discover throughout. Roscommon County Council and Ireland's Hidden Heartlands are working collectively to further develop the tourism assets of the County.

Furthermore, the roll out of the Shannon Tourism Masterplan and the Tourism Masterplan for the Beara-Breifne Way will promote development and tourism on both the Shannon and Beara-Breifne Way, which are integral natural resources of Co. Roscommon.

County Roscommon benefits from the increased demand for activity lead tourism in Ireland noted over the previous decade, due to it encompassing over 20 no. walking/hiking and cycling trails throughout the County. Consequently, it is within Roscommon County Council's policy to work toward expanding the existing network of greenways traversing the County.

The Roscommon CDP 2022-2028 outlines a range of policies to promote tourism in the County, which are listed in **Section 5.2.3**.

Local Tourism

The Sliabh Bawn Recreation Area is a tourist attraction located c.3km from the proposed wind farm Site. This area is located on Slieve Bawn Mountain in Doughill Forest and comprises several facilities including loop walks, an equestrian trail, a raised viewing platform, picnic areas, and local heritage features. The GCR will connect into the existing Sliabh Bawn 110kV Substation.

Additionally, the National Famine Museum and Strokestown Park House & Gardens is located in Strokestown, c.4.5km west from the proposed Project. The National Famine Way is located c. 1.8km south of the proposed wind farm Site. This walking route crosses the R371, just north of the R371/N5 junction and the GCR is installed along the R371 at this location.

The National Famine Way is a c.165km marked walking trail that retraces the journey of the Strokestown tenants—men, women, and children—who were forced to walk from Roscommon to Dublin in 1847 after being unable to pay their rent. The route begins in the town of Strokestown and follows a network of local roads through the central study area, passing approximately 1.3km south of the proposed wind farm Site at its closest point.

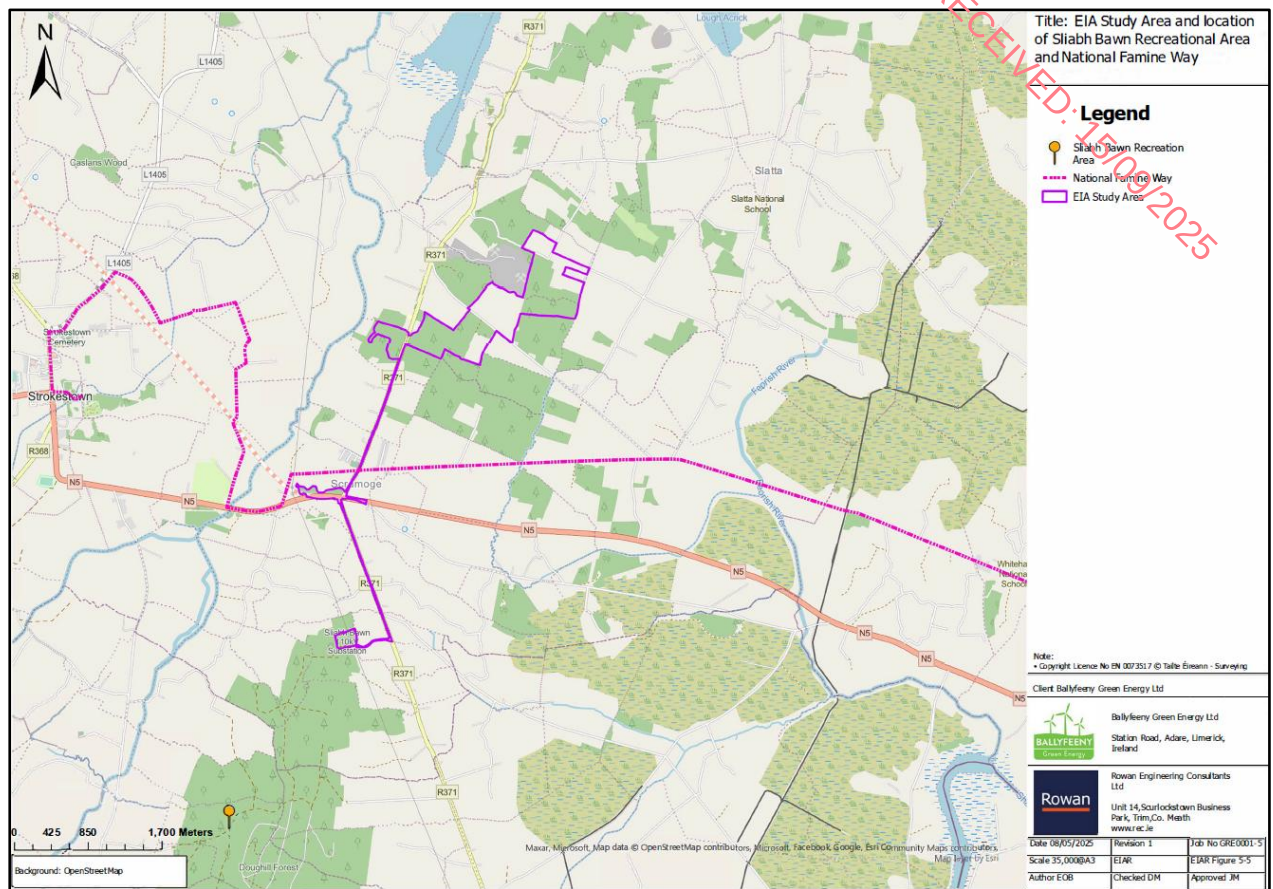


Figure 5-5: Location of Sliabh Bawn Recreational Area and the National Famine Way in respect of the proposed Project (Ref: EIAR Figure 5-5 (Volume 4)).

Additionally, the surrounding area also encompasses several loughs, the nearest of which is Kilglass Lough, which includes a small marina located c.1.8km northwest of the proposed Project.

Fáilte Ireland have recently launched a new 5-year plan to assist in driving tourism in rural areas of Co. Roscommon, Cavan and Leitrim. The Plan aims to maximise opportunities presented by the National Famine Museum and the National Famine Way to connect businesses and communities with the Irish diaspora market (Fáilte Ireland, 2025).

Tourist Perceptions to Wind Farms

A survey carried out by Fáilte Ireland in 2007 entitled, '*Visitor Attitudes On The Environment – Wind Farms*' found that almost nine in ten visitors to Ireland had claimed to have seen a wind farm in their lifetime. Almost half (49%) of those surveyed had claimed to have seen at least one wind farm during their holiday on the island of Ireland.

The majority of visitors who partook in the survey claimed that the sight of the wind farms did not diminish the quality of their sightseeing. 15% of responders claimed that the sight of wind farms

had a negative impact on their stay, while the majority claimed that the presence of the wind farm had a positive impact on their enjoyment of sightseeing.

The research carried out by Fáilte Ireland was updated in 2012, due to over 100 wind farms constructed in Ireland during the intervening period, thus it became necessary to determine if there were any changes in visitor attitudes during this period. The 2012 survey noted an increase in the number of tourists that have seen a wind farm while on holiday in Ireland (56%), an increase from 49% in 2007. The 2012 research also denoted an increase in the polarisation of opinion, with increased positive and negative responses and a decrease in neutral responses. There was an increase noted in the number of visitors who felt that viewing a wind farm while holidaying in Ireland had no impact on their sight-seeing experience.

71% of visitors claimed that the proliferation of wind farms in future would either have no impact or a positive impact on their experience. The primary driver for a positive outlook on wind farms includes support for renewable energy together with reduced carbon emissions.

A slight increase was noted from Fáilte Ireland 2007 surveys, regarding those who claimed it would negatively impact on their likelihood to visit again due mainly to the negative aesthetics of wind farms followed by preferences for alternative renewable energy sources.

In 2021, a study was undertaken by BiGGAR Economics to find empirical evidence of a relationship between the development of wind farms and the tourism sector in Scotland. Research involved the examining of 44 wind farms in Scotland in relation to tourism trends. Both tourism-related employment and the onshore wind industry saw growth during the decade leading up to 2019, particularly between 2015 and 2019. A review of local authority-level trends revealed no correlation between the increase in wind turbine installations and tourism-related employment.

The study also explored potential localized effects by analysing employment trends proximal to 16 wind farms built between 2015 and 2019, while revisiting earlier case studies of 28 wind farms developed from 2009 to 2015. In most cases, tourism-related employment in areas surrounding wind farms performed better than trends observed both nationally and within their respective local authority areas. The study found no meaningful link between wind farm development and tourism employment, either at the national scale, within individual local authorities, or in areas directly surrounding the wind farms.

5.4.3 Local Resources and Amenities

A variety of amenity and heritage features is located within the wider study area, which considers any significant resources and amenities within 20km of the proposed wind farm Site. The Royal Canal Way and Greenway follow a section of the Royal Canal corridor to the southeast of the

proposed Project. Additionally, the wider study area also has a strong association with water-based recreation due to the presence of the River Shannon and Lough Ree, the largest lake along the River Shannon corridor. The River Shannon itself is a key feature for outdoor recreation, with walking, cycling, and water sports being popular along its banks.

The surrounding environment is serviced with other community resources and amenities, including the following:

- St. Anne's Church (Slatta) (c. 2.3km east)
- Kilglass Marina (c.1.7km northwest)
- Kilglass Lough (c.1.3km northwest)
- Lough Arrick (c.3km northeast)
- Lough Ree (c.9.1km south)
- Grange Lough (c.4km northwest)
- Lough Bofin (c.6.8km northeast)
- Lough Forbes (c.7.9km east)
- Clooneen Bog (c.7.6km east)
- Aghnamona Bog (c.7.9km northeast)
- Strokestown Golf Club (c.1.3km southwest)
- Slatta Fairy Trail (c.3.1km northeast)
- Kilglass Gaels GAA Club (c.4.7km northeast)
- Kiltristan Sports Club (c.4.8km northeast)
- Rathcline Castle (c.11.5km south)
- Ballyfeeny National School (c.780m west)

Please note that all measurements were taken from nearest point to the RLB.

Sensitive Receptors

There are 45 residential dwellings located along the R371 within a 2km radius of the proposed Project. Ballyfeeny National School is also located along the R371, located to the West and North of the proposed wind farm Site. Turbine T01 is closest to Ballyfeeny National School and will be located c. 780m east. The GCR will be installed along the R371 and the connection point at the existing Sliabh Bawn 110kV Substation. The GCR is located c.240m south from the school at its nearest point.

A total of 219 sensitive receptors are noted with 2km of the turbines. Sensitive receptor No. 35 is the closest to the proposed wind farm Site. It is c.599m from turbine T02 as depicted in EIAR Figure 2-1 (Volume 4).

5.4.4 Population and Settlement Patterns

While assessing the demographic trends in the vicinity of the proposed Project, an assessment of the pertinent CSO area has been conducted from 2016 – 2022. Ireland's population has steadily increased since the 1990's, with the population standing at 3.53 million in 1991, increasing to 5.15 million in April 2022. The 2022 Census marked for the first time in 171 years that the population of Ireland exceeded 5 million people.

On a national basis, population growth from 2016-2022 was stronger in the east of the Country with Meath, Fingal, Kildare, growing by 11.4%, 11.6%, 13.2%, respectively (CSO, 2022).

Table 5-3: Population % from 2016-2022 in Ireland and each respective County

County & City	Natural Increase (number) from 2016- 2022	Net migration (Number)	% Population Change from 2016-2022
State	167,487	219,787	8.1%
County Roscommon	1,415	4,300	8.9%

Source: CSO, 2022

The population of Co. Roscommon increased by 8.1% (annual increase of 1.3%), in 2022 from April 2016, standing at 70,259 in April 2022. The number of people in the County rose by 5,715 during this period. From 2011 to 2016, the total population growth in the County was 3.8% (annual increase of 0.7%).

Population decline and growth in Co. Roscommon is depicted in **Figure 5-6**, showing a steady population increase since 1996 following a period of decline from 1841.

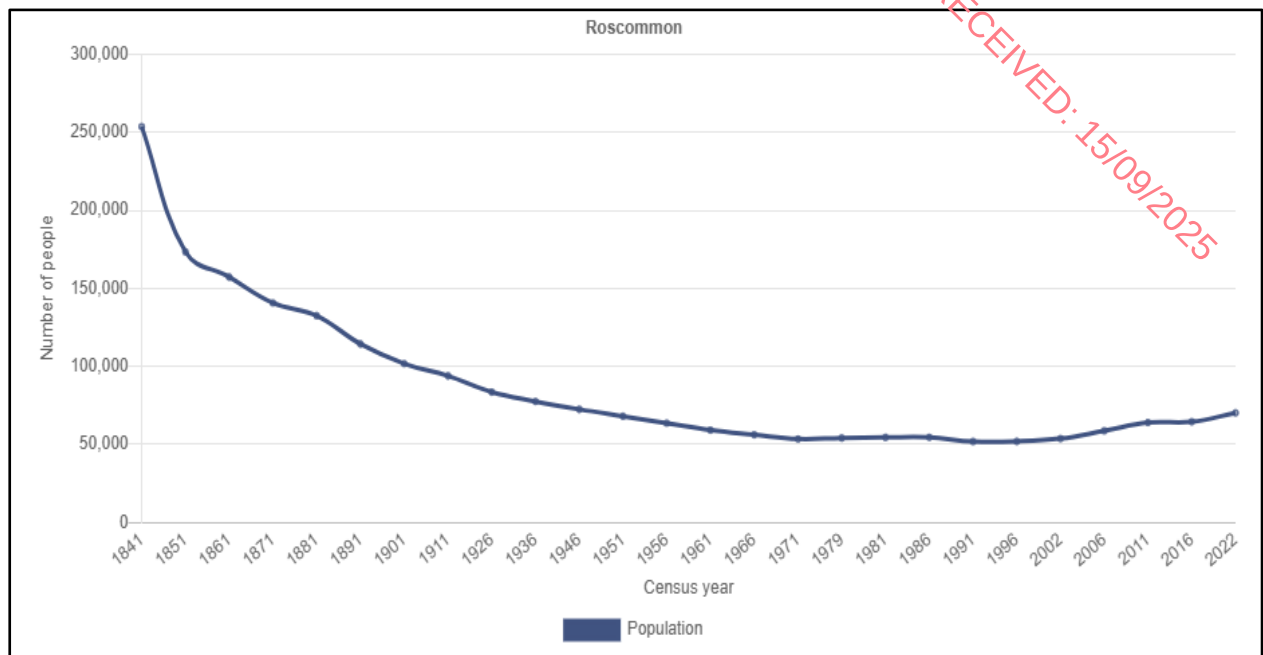


Figure 5-6 Population change of Co. Roscommon from 1841 to 2022. Source: CSO, 2022

The average age of Co. Roscommon's population in April 2022 was 40.8 years, compared with 39.7 years in April 2016. The number of people aged 65 and over continues to grow (CSO, 2022).

Figure 5-7 overleaf displays Co. Roscommon's demographics, encompassing population structure against age.

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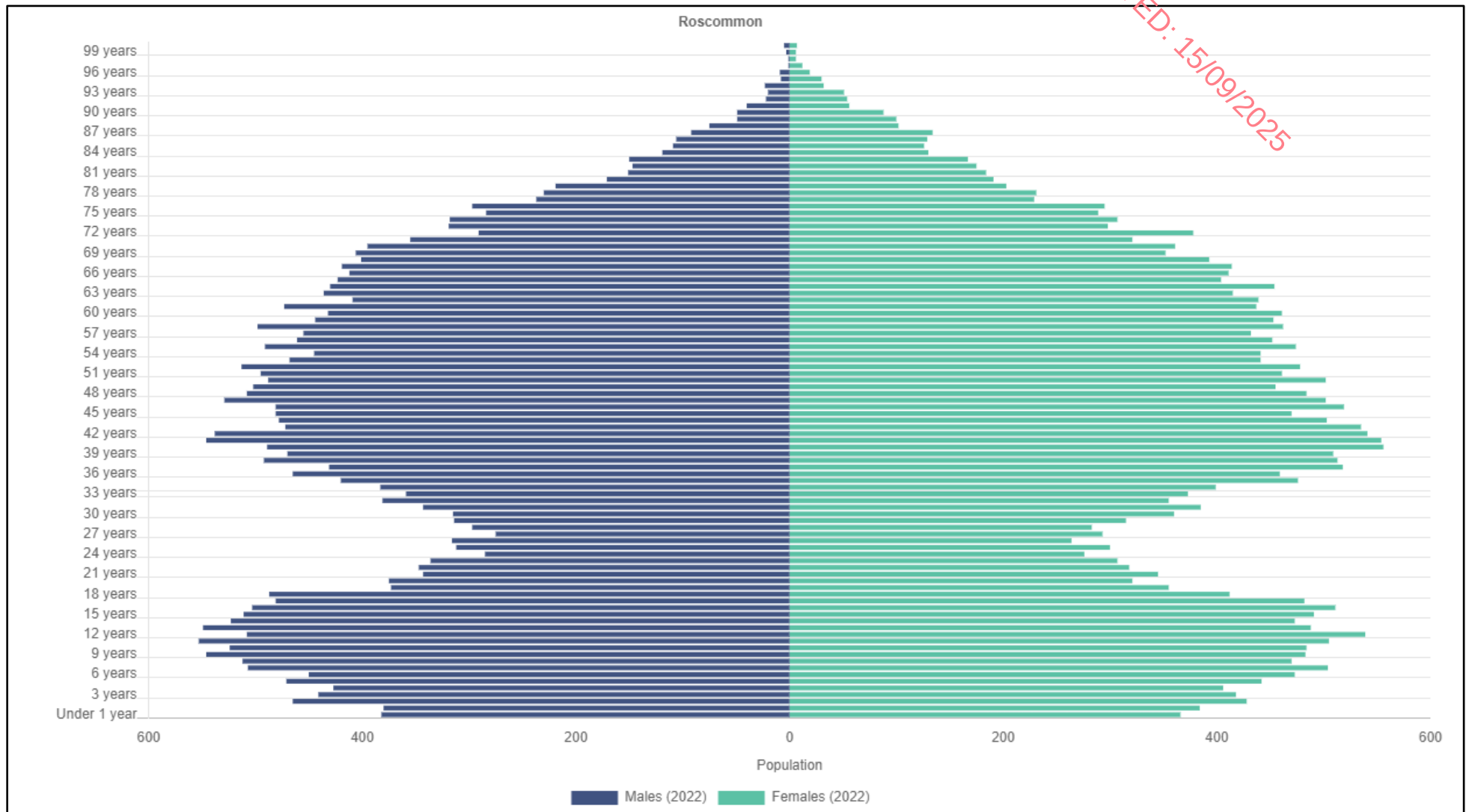


Figure 5-7: Average age of population in County Roscommon. Source: (CSO, 2022)

There are 110 EDs located in Co. Roscommon, of which 89 experienced population growth between 2016 and 2022, thus, 21 EDs either recording a decline or zero growth in population during this period. EDs which experienced an above average population growth rate included Rosmoylan (31.7%), Oakport (25.9%), Termonbarry (23.8%), Kilbryan (19.2%), Ballytarnan (19.2%) and Strokestown (18.9%).

The EDs relevant to the proposed wind farm Site and the GCR include Kilglass South and Bumlin, of which the 2022 population stood at 354 and 534, respectively.

The projected housing demand for Co. Roscommon and the distribution of future population in the County is detailed in **Table 5-4**.

Table 5-4: Predicted population growth in Co. Roscommon Settlements

Settlement	2016 population	Predicted Population Growth 2021-2027	New Residential Units	Residential Zoned land requirement	Units to be delivered infill/brownfield lands
Athlone	21,300	1,763	658	13.16Ha	197
Roscommon	5,900	1514	565	16.14 Ha	170
Carrick-on-Shannon	4100	188	70	2 Ha	21
Boyle	2570	541	202	10.1Ha	61
Strokestown	825	155	58	2.9 Ha	17
Elphin	565	107	40	2 Ha	64
Ballaghaderreen	1800	340	127	6.35 Ha	38
Castlerea	1990	354	132	6.6Ha	40

Source: Roscommon CDP 2022-2028

The Roscommon CDP 2022-2028 population targets and housing unit requirements set out in the table above identify relevant population figures and residential zoned land required. Roscommon and Athlone towns are leading in population growth in Co. Roscommon, thus facilitating economic growth of the County together with an increase in employment.

With regards to **Table 5-2**, the nearest settlement is Strokestown (c.5km southwest of the proposed wind farm Site), which is projected to require 2.9Ha of residential zoned land.

Population Density

In 2022, population density in Ireland was 73 people per km². Dublin and Cork had some of the most populated EDs. Of the 32 EDs that had over 10,000 people per km² in 2022, 25 were in Dublin, five were in Cork, one in Waterford and one in Limerick.

As of 2022, population density was 14 people per km² in Kilglass South and 22 people per km² in Bumlin. Strokestown ED has a slightly higher population density, with 68 people per km² recorded in 2022 (CSO, 2022).

Public perception of Wind Energy

The first wind farm was completed in Ireland in 1992 in County Mayo. Thereafter, wind farms have generated a range of opinions from Irish people. As a result, in 2003, Sustainable Energy Ireland (now the Sustainable Energy Authority of Ireland) carried out a survey to determine public attitudes to renewable energy.

The SEAI survey revealed a strong public support for wind farms, with 84% of respondents expressing a positive or very positive attitude. Only 1% held a negative view, while 14% were neutral. Around two-thirds (67%) said they would be in favour of having a wind farm in their local area. Among those who expressed concerns, the most commonly cited issue was the visual impact of turbines on the landscape. However, the survey also found that people living near existing wind farms generally do not see the visual impact as a significant concern.

The national survey found 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.’

The study highlighted a degree of uncertainty among respondents regarding noise levels, local benefits, and the overall reliability of wind energy. However, it noted that individuals who have seen wind farms tend to view these economic and environmental aspects more positively, suggesting that direct experience with wind farms often leads to more favourable attitudes toward wind energy.

Consistent with national findings, surveys of residents living near wind farms also reflected generally positive attitudes. About three-quarters of those interviewed believed the presence of a wind farm had a positive impact on their local area.

In regions where planning permission for wind farms had been approved but construction had not yet commenced, 75% of respondents supported the future development, while a mere 4% opposed it. Supporters cited various reasons, including wind energy being a clean source (78%), the potential to create local jobs (44%), contributing to regional development (32%), and enhancing the landscape (13%). Overall, people with direct experience of a local wind farm were generally pleased with its presence as a feature in the landscape.

In 2022, the SEAI surveyed over 1,700 households in rural Ireland. Out of those surveyed, 1,100 households are proximal to 50 new commercial wind and solar photovoltaic (PV) Projects. Findings of the surveys included high levels of support for renewable energy generation from wind and solar farms.

Primary findings from the survey are as follows:

- The majority of households proximal to new wind or solar power projects have positive attitudes to renewable projects nearby;
- Levels of support remain high for wind and solar across rural Ireland, regardless of whether people live proximal to new projects or far away;
- A large majority of those living in rural areas support the provision of financial benefits for households and communities proximal to renewable energy infrastructure through 'Community Benefit Funds';
- Most people feel their community can express their opinion in the planning process.

Throughout the community engagement programme as listed within **Appendix 5.1- Community Report**, Ballyfeeny Green Energy conducted a sentiment analysis with residents in the nearby community.

All in-person, door to door consultations regarding the proposed Project took place from and were recorded and categorised as positive, neutral, or negative based on residents' responses during engagement. The findings revealed a mix of sentiments, with 39% of interactions deemed positive, 28% neutral, and 32% negative (see **Appendix 5.1 – Community Report**).

Employment and Economic Development

The Labour Force Survey released by the CSO sets out national employment data quarterly. During 2020, when COVID-19 arose, a decline was noted in national employment, whereby employment stood at 2,368,200 in Q1 2020. An estimated 2,704,200 persons were employed in Q1 2024, an increase of 1.9% from Q1 2023. In Ireland, the economic sectors that experienced the largest year-on-year growth in Q1 2024 were the:

- Professional, Scientific & Technical activities, which increased by 26,300 or 15.4%;
- Education, which increased by 16,900 or 7.9%; and
- Agriculture, Forestry & Fishing, which increased by 6,500 or 6.4%.

The largest decreases by economic sector in Q1 2024 were observed in the:

- Industry sector (-3.4%);
- Administrative & Support Service sector (-2.6%); and
- Wholesale & Retail trade; repair of motor vehicle and motorcycles (-1.6%).

In terms of regional employment, the total at work in Co. Roscommon increased from 2016 to 2022. The total at work in April 2022 was c. 29,611 people, an increase of 15% since 2016 (c. 25,800 people recorded at work in Census 2016). Nationally, there were 313,656 additional people (+16%) at work.

Table 5-5: Total at Work in County Roscommon (2016-2022)

County	April 2016	April 2022	% Change
Roscommon	c. 25,800	c.29,611	(+)15%

Regarding labour force, participation rate stood at 58% in Co. Roscommon in comparison with 61% nationally in April 2022. The majority of those in work in Co. Roscommon were in full-time employment, with approx. 29,611 people in this category.

For national context, the **Table 5-6**, presents the Labour Force Participation rate by sex for Ireland overall and Co. Roscommon, adapted from the 2022 CSO results.

Table 5-6: Labour force participation rates by sex for Ireland overall and Co. Roscommon, 2022

County	Both sexes (%)	Male (%)	Female (%)
Ireland	61	67	55.6
Roscommon County	58	63.5	51.7

Boyle had the lowest labour force participation rate recorded at 49% (among towns nationally with a population of at least 1,500 people). Categories excluded from the labour force are students, those looking after family, retired persons and persons unable to work due to disability. In 2022, there were approximately 245,000 women looking after the home/family, which was c. 40,000 fewer in 2016.

There were almost 10,700 retired people in Roscommon, an increase of 22% since Census 2016. There was a 16% increase in the number of people who were unable to work as a result of permanent sickness or disability to more than 2,900 people. The number of people looking after their home/family decreased by 10% to almost 4,100. Ballaghaderreen held the highest rate (among towns with at least 1,500 residents) at 11%.

The wholesale and retail trade sector dominated Roscommon's workforce, with almost 3,800 employed in this sector. Human health and social work activities followed, with almost 3,700 workers, and subsequently manufacturing, with approx. 3,400 workers employed (CSO, 2022).

With regards to labour catchment, Roscommon town is the primary labour catchment for some areas of central Co. Roscommon, which is shaded in green in **Figure 5-8**. North Roscommon County are linked to Carrick-on-Shannon and southern parts of the County are linked to Athlone. However, Roscommon town is the primary economic driver for the immediate areas surrounding the town and stretching north to Strokestown.

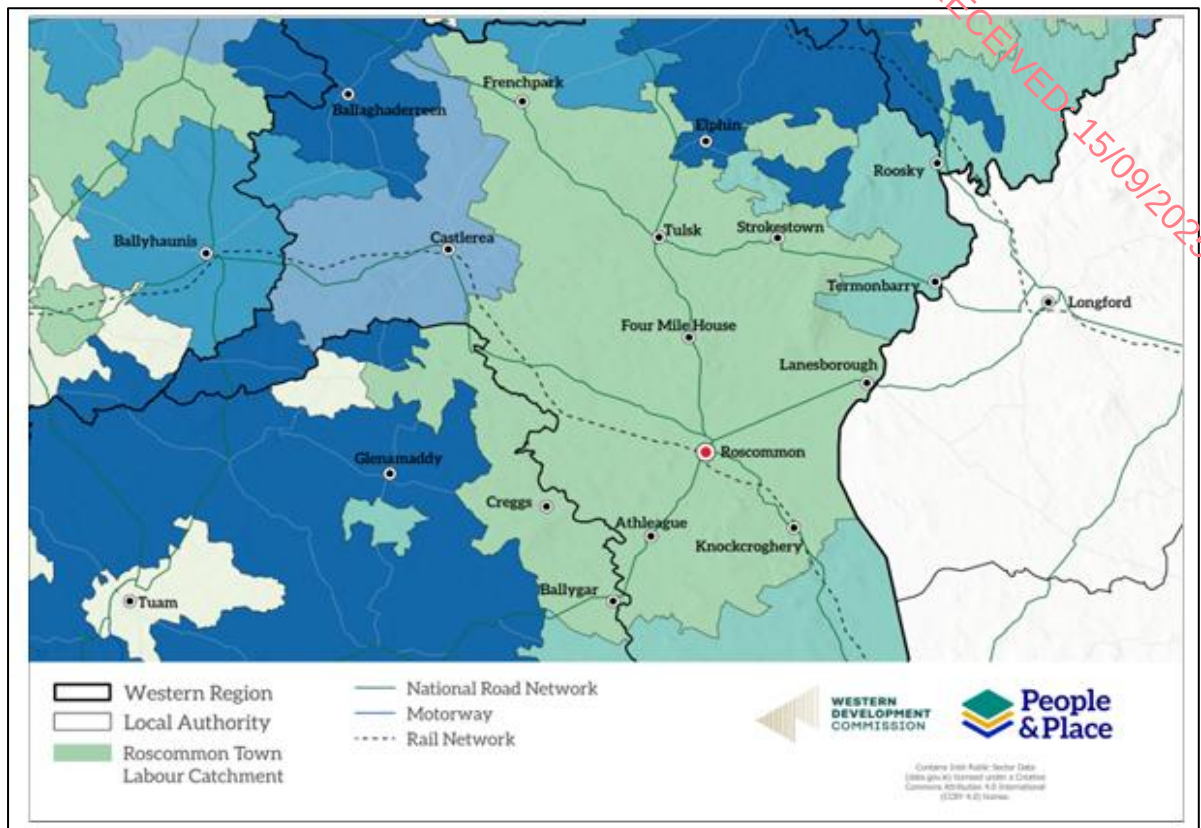


Figure 5-8: Roscommon Town Labour Catchment, 2022. Source (Western Development Commission, 2024)

In 2022, there were 9,168 people noted as at work and living within the Roscommon town labour catchment (equating to 3.1% of all Western Region resident workers). The Roscommon town labour catchment has a population at work 3.6 times larger than the town of Roscommon (9,168 to 2,531, respectively).

Additionally, the Roscommon town labour catchment is the eighth largest labour catchment in the Western Region. The total resident workers residing in the labour catchment in 2022 was 9,168, an increase of +26.7% since 2016 (from 7,235) and by +25.5% since 2006 (from 7,306) (Western Development Commission, 2024).

The Roscommon CDP 2022-2028 outlines a range of policies to promote Economic Development in the County, as listed in Section 5.2.3. listed as follows:

Rural Economic Development is a chief objective within the Roscommon CDP 2022-2028, with the requirement to promote development of rural areas alongside the need to protect the countryside. A masterplan has been initiated for the development of rural areas in Ireland from 2021-2025. The policy's main objective is to help rural areas to recover and create increasingly resilient rural economies and communities for the future.

Contribution of onshore wind to the economy

Onshore wind makes an important contribution to Gross Value Added (GVA) on a regional level, taking the form of spend on suppliers to maintain existing wind farms and turbines, and these suppliers' induced spend in local shops and on local services.

Table 5-7 summarises the regional contribution the sector contributes to GVA merely from its operational spend. Nationally, total GVA from operational spend was approximately 140 million in 2020.

County Roscommon forms part of the Northern and Western region included in the summary **Table 5-7**.

Table 5-7 GVA Contribution per region Ireland, 2020

Region	MW	GVA
Northern and Western	~1,540	~€50 million
Southern	~2,450	~€83 million
Eastern and Midlands	~220	~€7 million

Source: (Wind Energy Ireland, KPMG Model, 2020)

5.4.5 Property Values

A number of studies have been undertaken in the United States (US) and the United Kingdom (UK). The 2009 study of wind farms on property values, entitled 'The Impact of Wind Power Projects on Residential Property Values in the United States: A multi-Site Hedonic Analysis' was carried out by the Lawrence Berkley National Laboratory (LBNL) for the US Department of Energy. Data was collected on almost 7,500 sales of single-family homes situated within a 10-mile radius of 24 existing wind farms in nine American states over a period of ten years. The conclusion of the study is derived from eight different pricing models including repeat sales and volume sales models. Every property included in the study was visited to establish the extent to which the wind facility was visible at the time of the sale, and the conclusions of the report states 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 primary 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 too small and/or too infrequent to result in any widespread and consistent statistically observable impact.'

This study has since been updated by LBNL in 2013, who released a further paper entitled, 'A spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States'. Data was collected from more than 50,000 home sales among 27 counties in nine states. All homes surveyed were within a 10-mile radius from existing wind farms, similar to the previous study. The study concluded that:

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

The LBNL studies conducted in 2009 and 2013 recognize the possibility that some individual homes may experience a decline in value due to their proximity to a wind farm. However, such instances are considered statistically not significant. While claims of substantial property value impacts near operational wind turbines often appear in the media or within local communities, these claims have not been substantiated by any of the major U.S. studies conducted to date. Moreover, a study carried out by the Centre for Economics and Business Research (Cebr) in March 2014, served the purpose of delineating effects of wind farms on house prices. The findings of the study were included in a report entitled, 'The effect of wind farms on House Prices'. The primary conclusions from the report are as follows:

- Poor property values within 5km of the wind farm site studied was driven by a general property turndown as opposed to the construction of the wind farm
- Construction of wind farms across all sites examined across England and Wales did not pose a negative impact on house price growth within 5km radius of sites studied.

A more recent study, published by Climate Exchange in October 2016 and titled "*Impact of Wind Turbines on House Prices in Scotland*," presented key findings from a research project examining how wind farm developments affect property values. The analysis considered dates when individual turbines became operational, accounting for the before and after, effects of wind turbine construction.

The study analysed over 500,000 property sales across Scotland between 1990 and 2014, considering both natural landscapes and the built environment to assess how visually exposed a property is to nearby wind turbines. The results showed no consistent evidence that wind turbines negatively impact house prices. The effects are complex and vary depending on region, proximity, and visibility—some areas even experienced positive impacts due to the

economic and amenity benefits associated with wind developments. Additionally, the report noted that some wind farms contribute positively to local communities by offering economic benefits through community funding or enhancing access to rural areas with walking and cycling tracks.

In the absence of any Irish peer reviewed/published evidence to the contrary, it is a reasonable assumption that the above studies provide context from the international perspective and indicate that the wind farms generally were not found to affect property values.

5.4.6 Human Health

Overview

HSE Public Health Medicine Environment and Health Group

In Ireland the Health Service Executive (HSE) Public Health Medicine Environment and Health Group drafted a position paper in 2017 titled *Position Paper on Wind Turbines and Public Health*. The group identified that there is no published scientific evidence to support adverse effects of wind turbines on health and concluded that:

“Published scientific evidence is inconsistent and does not support adverse effects of wind turbines on health. However, adequate setback distances and meaningful engagement with local communities are recommended in order to address public concern.”

Dáil Éireann Discussion – Wind Turbine Noise and Health Considerations

On Wednesday, 26 February 2025, a Dáil Éireann debate addressed concerns regarding wind turbine noise and the potential health effects of wind turbine noise and shadow flicker. In response to a parliamentary question on this matter, the Minister for Health, Deputy Jennifer Carroll MacNeill, stated:

“The position of the Department of Health on wind turbine noise and shadow flicker from a health perspective is informed by advice from the HSE. The most recent advice from colleagues in the HSE found that there is currently no robust evidence in the international scientific literature to show that wind turbines negatively affect people’s physical health once they are appropriately installed, in accordance with guidelines.

The Deputy may wish to note that the Department of Housing, Local Government and Heritage in conjunction with the Department of Environment Climate and

Communications and their expert noise consultants are currently updating the wind energy guidelines having appropriate regard to the impact of noise and shadow flicker.”

The National Health and Medical Research Council

The relevant Australian authority on health issues, the National Health and Medical Research Council (NHMRC), conducted a comprehensive independent assessment of the scientific evidence on wind farms and human health. The findings are contained in the NHMRC Information Paper: *Evidence on Wind Farms and Human Health 2015*, which concluded:

“After careful consideration and deliberation, NHMRC concluded that there is no consistent evidence that wind farms cause adverse health effects in humans. This finding reflects the results and limitations of the direct evidence and also takes into account the relevant available parallel evidence on whether or not similar noise exposure from sources other than wind farms causes health effects”.

Health Canada

Health Canada, Canada’s national health organisation, released preliminary results of a study into the effect of wind farms on human health in 2014 (Health Canada 2014, Wind Turbine Noise and Health Study: Summary of Results.). The study was initiated in 2012 specifically to gather new data on wind farms and health. The study considered physical health measures that assessed stress levels using hair cortisol, blood pressure and resting heart rate, as well as measures of sleep quality. More than 4,000 hours of wind turbine noise measurements were collected and a total of 1,238 households participated.

No evidence was found to support a link between exposure to wind turbine noise and any of the self-reported illnesses. Additionally, the study’s results did not support a link between wind turbine noise and stress, or sleep quality (self-reported or measured). However, an association was found between increased levels of wind turbine noise and individuals reporting of being annoyed.

New South Wales Health Department

In 2012, the New South Wales (NSW) Health Department provided written advice to the NSW Government that stated existing studies on wind farms and health issues had been examined and no known causal link could be established.

NSW Health officials stated that fears that wind turbines make people sick are ‘not scientifically valid’. The officials wrote that there was no evidence for ‘wind turbine syndrome’, a collection

of ailments including sleeplessness, headaches and high blood pressure that some people believe are caused by the noise of spinning blades.

The Australian Medical Association

The Australian Medical Association put out a position statement, *Wind Farms and Health 2014* (Australian Medical Association, 2014, Wind farms and health). The statement said:

“The available Australian and international evidence does not support the view that the infrasound or low frequency sound generated by wind farms, as they are currently regulated in Australia, causes adverse health effects on populations residing in their vicinity. The infrasound and low frequency sound generated by modern wind farms in Australia is well below the level where known health effects occur, and there is no accepted physiological mechanism where sub-audible infrasound could cause health effects.”

Journal of Occupational and Environmental Medicine

The review titled, *Wind Turbines and Health: A Critical Review of the Scientific Literature* was published in the *Journal of Occupational and Environmental Medicine*, 2014. An independent review of the literature was undertaken by the Department of Biological Engineering of the Massachusetts Institute of Technology (MIT). The review took into consideration health effects such as stress, annoyance and sleep disturbance, as well as other effects that have been raised in association with living close to wind turbines.

The study found that:

“No clear or consistent association is seen between noise from wind turbines and any reported disease or other indicator of harm to human health.”

The report concluded that living near wind farms does not result in the worsening of the quality of life in that particular region.

Polish Study

The study *Cognitive neuroscience approach to explore the impact of wind turbine noise on various mental functions* March 2025 conducted by Cognitive Neuroscience Centre, Adam Mickiewicz University, Poznan, Poland and Department of Acoustics, Faculty of Physics and Astronomy, Adam Mickiewicz University, Poznan, Poland et al, took a cognitive neuroscience approach to experimentally and multifactorial explore wind turbine noise's impact on various mental functions.

The study considered the wider social context around wind farm developments and submitted that it is was “impossible to conclude whether the impact of wind turbine noise on physical-mental health is objective or merely a socio-culturally constructed stressor”. It emphasised that the objective impact of wind turbine noise “increase the share of evidence in discussions among stakeholder groups, such as residents, policymakers, and energy developers.”

The study concludes that although it has been established that individuals exposed to elevated noise levels undergo adverse psychophysiological changes, exposure to wind turbine noise does not adversely affect any of the examined cognitive functions and is not perceived as more stressful or bothersome than road traffic noise of the same level (65 dBA).

Although the results cannot be generalised, it supports the concept that the interlinkage between exposure to wind turbine noise and human cognitive functioning is not a cause-and-effect relationship.

In regard to the potential for health impacts resulting from shadow flicker, persons with photosensitive epilepsy tend to be sensitive to flickering light between 3 and 60 flashes per second (Hz) (Epilepsy Action, 2012) with sensitivity under 3Hz deemed uncommon.(Epilepsy Society, 2025). This is supported by research asserting that flicker from turbines must interrupt or reflect sunlight at frequencies greater than 3Hz to pose a potential risk of inducing photosensitive seizures (Smedley, Webb and Wilkins, 2010) The frequencies of flicker caused by modern commercial wind turbines are typically less than 1Hz (Harding et al., 2008). At between 0.3 and 1Hz, shadow flicker falls well below the frequencies known to trigger effects in these individuals. Therefore, any potential shadow flicker effect from the proposed Project is considered an effect on residential amenity, rather than having the potential to affect the health of residents.

Concerns associated with turbines in terms of human health are widely related to hydrology, air, noise, landscape and visual, traffic and shadow flicker effects as well as the health and safety of staff working on the proposed Project and members of the public that come into contact with the elements of the proposed Project. This Chapter incorporated elements of the following chapters in this EIAR; **Chapter 7 – Land, Soils and Geology, Chapters 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology, Chapter 9 – Air Quality and Climate, Chapter 10 - Noise and Vibration, Chapter 11 – Landscape and Visual, Chapter 12 – Traffic and Transport and Chapter 15 – Shadow Flicker.**

Human Health Baseline

Ireland has the highest self-perceived health status in the EU, with approximately 80% of people rating their health as good or very good. Moreover, those reporting a chronic illness or health problem is better than the EU average, at around 29.5% of the population. It must be noted that health status reflects income inequality, with fewer low-income earners reporting good health in Ireland (Department of Health, 2023).

Table 5-8: Population by General Health

General Health	County Roscommon (%)	Ireland (%)
Very Good	52.5	53.2
Good	31	29.7
Fair	9.7	8.6
Bad	1.6	1.4
Very Bad	0.4	0.3
Not Stated	4.8	6.7

Source: CSO, 2022

As previously outlined in this Chapter, the turbines are located within Kilglass South ED and much of the GCR is located within Bumlin ED. The CSO 2022 recorded the following health profile for Kilglass South ED:

- The Age Dependency Ratio, which is a measure of the proportion of dependents (aged under 15 and over 65) to the working-age population (aged 15–64) of this ED is 55.9, in comparison to 53.2 nationally;
- Kilglass South has a total 354 persons and 94 families living in private households
- There are a total of 80 persons living with a disability in this ED, representing 22.6 of the population;
- 1 person in this ED has bad or very bad health representing 0.3% of the population; 1.7% of the population have bad or very bad general health nationally; and
- 12.7% of this ED smoke tobacco products.

The CSO 2022 noted the following health statistics for Bumlin ED:

- The Age Dependency Ratio of this ED is 68.5;
- Bumlin, Roscommon has a total of 534 persons and 142 families living in private households;
- There is a total of 124 persons living with a disability in this ED, representing 23.2% of the population. This compares with 21.5% nationally; and
- 10.5% of this ED smoke tobacco products.

Electromagnetic Fields

EMFs are a function of voltage and current which can occur together or separately. EMFs can be measured in microtesla (μT) which is a measurement of magnetic field strength. EMFs near Ireland's high-voltage transmission infrastructure generally remain well below safety thresholds as demonstrated in an investigation carried out by EirGrid which found, EMFs (emissions) from 440kV lines measuring maximum field strength of 17.7 to 19.8 μT beneath overhead power lines. Underground cabling up to a height of 1m can generate around 43 μT which remains below the International Commission on Non-Ionizing Radiation Protection (ICNIRP) /EU occupational limit of 360 μT . In relations to existing transmission substations managed by EirGrid EMF levels are recorded between 5-10 μT at boundaries. These electromagnetic fields (EMFs) fall within the extremely low frequency (ELF) range of the electromagnetic spectrum. EMFs are present in homes, workplaces, and any location where electricity is used. EMFs can be dissipated by objects such as building or can decrease by distance. Additionally, EMFs occur naturally, produced by the Earth's geomagnetic field and the electric fields associated with storm clouds. Electric and magnetic fields are associated with the operation of wind turbines, underground electric cables, substations, and related infrastructure.

EMF are produced both naturally and from human activity. They are associated with operation of underground electric cables. Electric fields are created by variations in voltage, where the voltage is higher, the resultant field will be stronger and vice versa. Magnetic fields are caused when electric current flows. An electric field will exist with or without current flowing. If current does flow, the strength of the magnetic field will vary with power consumption, but the electric field strength will be constant.

EMF are present everywhere in our environment and are produced by the local build-up of electric charge in the atmosphere associated with thunderstorms (WHO, 2016).

Exposure to EMF has progressively increased throughout the 20th century in line with a rising demand for electricity, together with advancements in technology and changes in social behaviour. People are exposed to EMF at home and at work, due to the generation and transmission of electricity, domestic appliances, industrial equipment, telecommunications and broadcasting (WHO, 2016).

The Council Recommendation 1999/519/EC on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) stipulates essential restriction and reference levels for limiting overall exposure of the general public to EMF and ensuring an increased level of

protection. This recommendation is derived from the ICNIRP for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz) as the scientific basis.

EirGrid published a document entitled EMF in July 2014, providing additional information on EMF and electricity. This publication states the following:

‘Recent studies conducted in the UK, France, Denmark and the US have not established associations between a home near transmission lines and childhood leukaemia.’ The publication also states that ‘Based on this history and its own review of research, the World Health organisation states that there is no evidence to conclude that exposure to low-level EMFs is harmful to human health’.

Additionally, in 2015, the NHMRC of Australia released a comprehensive systematic review on the health impacts of wind farms, conducted by the University of Adelaide (Merlin et al., 2015). In relation to EMF, the review concluded the following:

‘There is no direct evidence on whether there is an association between electromagnetic radiation produced by wind farms and health outcomes. Extremely low-frequency electromagnetic radiation is the only potentially important electromagnetic emission from wind turbines. Limited evidence suggests that the level of extremely low-frequency electromagnetic radiation close to windfarms is less than average levels inside and outside Australian suburban homes. There is no consistent evidence of human health effects from exposure to extremely low-frequency electromagnetic radiation at much higher levels than is present near wind farms’.

Moreover, EirGrid has published *Your Guide to Understanding Electric and Magnetic Fields* (EirGrid, 2024). In reference to their safety standards, EirGrid note that ‘*EirGrid designs the electricity network to make sure that public exposure to EMFs does not exceed EU restriction levels.*’. The restriction levels are those that are set out in Council Recommendation 1999/519/EC.

It is also noted in this publication that ‘*Extensive research has shown that there is no evidence to conclude that exposure to low level electromagnetic fields – such as those from the electricity grid – is harmful to human health... Based on a [2007] in-depth review of the scientific literature, the World Health Organization (WHO) concluded that current evidence does not confirm the existence of any health consequences, including cancer, from exposure to low level electromagnetic fields.*’

On the basis that the existing electricity network does not exceed EU restriction levels for EMF, it was concluded any EMF in the baseline environment would be very localised and at low levels.

Workplace Accidents and Incidents

The WEDG 2006 state that 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. The WEDG 2006 state that there is a very remote possibility of injury to people from flying fragments of ice or material from a damaged blade. However, wind turbine blades are composite structures moulded in a single mould with no intermediate bolts or separate components and the danger is therefore minimised. The wind turbines will be fitted with anti-vibration sensors, which will detect any imbalance caused by icing of the blades. The sensors will prevent the turbine from operating until the blades have been de-iced. Turbine blades are made of fibre-reinforced polymer (FRP's) or unsaturated polyester, a non-conducting material which will prevent any likelihood of an increase in lightning strikes within the Site or the local area. Lightning protection conduits will be integral to the construction of the turbines. Lightning conduction cables, encased in protection conduits, will follow the electrical cable which is run, from the nacelle to the base of the turbines. The conduction cables will be earthed adjacent to the turbine bases. The earthing system will be installed during the construction of the Turbine Foundations. In extremely high wind speed conditions, (usually at Beaufort Storm Force 10 or greater) the turbines will shut down to prevent excess wear and tear, and to avoid any potential damage to the turbine components.

Directly adjacent to the proposed Project is the active Ballyfeeny Rock Quarry, located in the townlands of Tully and Ballyfeeny, Co. Roscommon which is directly adjacent to the proposed wind farm Project. Planning Permission for the quarry was granted by the Local Authority (Planning Authority Reference: 07272) and by An Bord Pleanála (Planning Reference: 20.227917) in 2008. Planning was granted for a period of 20 years from the date of the An Bord Pleanála Order. As outlined in the Quarries & Ancillary Activities – Guidelines for Planning Authorities (DoEHLG, 2004), aggregates such as those produced at the Ballyfeeny Rock Quarry are seen as a significant natural resource. Therefore, for the purpose of the Project EIA it is assumed (subject to a new planning application) that quarry activities at the quarry will continue beyond the planning expiration date.

The quarry has an annual yield estimation of 350,000 tonnes. The frequency of blasting to win stone for the quarry is assumed to be once per month, however this could be more or less

frequent based on the material requirements at the time. Blasting operations are only permitted between 10:00 hours and 17:00 hours, Monday to Friday inclusive. Blasting at any other time shall only be undertaken for emergency or safety reasons.

An Environmental Management and Monitoring program has been established by the quarry operators including a blasting specification. The blasting specifications are prepared by the Blasting Supervisor to ensure Health and Safety Risks associated with blasting are controlled such as;

- Minimise the risk of flyrock being projected outside of the declared danger zone;
- Minimise the risk of misfires;
- Enable the location of any misfired shots to be accurately determined; and
- Ensure, where possible, that faces are left in a safe condition after a blast.

The provision of underground electric cables of the capacity proposed is common practice throughout the country and installation to the required specification does not give rise to any specific health concerns.

Wind Farm - Noise

A review the literature and findings on the potential health effects of noise from wind farms is provided below.

Polish Study

The study *Cognitive neuroscience approach to explore the impact of wind turbine noise on various mental functions* March 2025 conducted by Cognitive Neuroscience Centre, Adam Mickiewicz University, Poznan, Poland and Department of Acoustics, Faculty of Physics and Astronomy, Adam Mickiewicz University, Poznan, Poland et al, took a cognitive neuroscience approach to experimentally and multifactorial explore wind turbine noise's impact on various mental functions.

The study considered the wider social context around wind farm developments and submitted that it is was "impossible to conclude whether the impact of wind turbine noise on physical-mental health is objective or merely a socio-culturally constructed stressor". It emphasised that the objective impact of wind turbine noise "increase the share of evidence in discussions among stakeholder groups, such as residents, policymakers, and energy developers."

The study concludes that although it has been established that individuals exposed to elevated noise levels undergo adverse psychophysiological changes, exposure to wind turbine noise does not adversely affect any of the examined cognitive functions and is not perceived as more stressful or bothersome than road traffic noise of the same level (65 dBA).

Although the results cannot be generalised, it supports the concept that the interlinkage between exposure to wind turbine noise and human cognitive functioning is not a cause-and-effect relationship.

Summary

The peer reviewed research outlined in the preceding sections concludes that there is no evidence to suggest that wind turbines have a negative impact on Human Health. For further details on the noise assessment for the proposed Project please refer to **Chapter 10 – Noise and Vibration**.

Wind Farm – Shadow Flicker

As outlined in **Chapter 15 – Shadow Flicker**, with regard to the potential for health impacts resulting from shadow flicker, persons with photosensitive epilepsy tend to be sensitive to flickering light between 3 and 60 flashes per second (Hertz (Hz)) (Epilepsy Action, 2012) with sensitivity under 3Hz deemed uncommon. (Epilepsy Society, 2025). This is supported by research asserting that flicker from turbines must interrupt or reflect sunlight at frequencies greater than 3Hz to pose a potential risk of inducing photosensitive seizures (Smedley, Webb and Wilkins, 2010) The frequencies of flicker caused by modern commercial wind turbines are typically less than 1Hz (Harding et al., 2008). At between 0.3 and 1Hz, shadow flicker falls well below the frequencies known to trigger effects in these individuals. Therefore, any potential shadow flicker effect from the proposed Project is considered an effect on residential amenity, rather than having the potential to affect the health of residents. A full Shadow Flicker assessment for the proposed Project is contained in **Chapter 15 – Shadow Flicker**.

5.5 Embedded Mitigation

Through the development of the proposed Project, measures have been adopted as part of the evolution of the design to avoid or reduce adverse effects on the environment. These measures are referred to as 'embedded mitigation' and are effectively built into the impact assessment. Embedded mitigation relevant to population and human health is set out below.

Where additional mitigation measures are proposed, these are detailed after the impact assessment (**Section 5.7**).

The process of site selection and the consideration of alternatives (**Chapter 3 - Consideration of Reasonable Alternatives**) has considered alternative locations, designs and processes for the proposed Project.

The process included a multi staged assessment which was guided by the 'Methodology for Local Authority Renewable Energy Strategies' Report from the SEAI (SEAI, 2013) and which included the consideration of environmental effects.

The proposed Project has been designed in accordance with the relevant health and safety legislation for Ireland (Safety, Health and Welfare at Work (Construction) Regulations 2013, The Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (General Application) Regulations 2007). A Project Supervisor Design Phase (PSDP) has been appointed through the design phase of the proposed Project. The PSDP coordinated all health and safety considerations from the Project during the design phase. Mable Consulting Engineers Limited were appointed as Designers for the proposed Project. Through the design phase of the proposed Project, steps were taken to reduce or control risks to health and safety where they could not be eliminated in accordance with best practice design techniques. A key focus of the Designer and the PSDP was to eliminate foreseeable health and safety risks to anyone impacted by the project where possible.

5.6 Assessment of Effects

5.6.1 Do Nothing Scenario

If the proposed Project did not proceed, land use in the area would remain as is and the opportunity to generate renewable electricity would be lost, as would the opportunity to contribute to meet Government and EU targets pertinent to the production and consumption of electricity from renewables to achieve reduction in greenhouse gas (GHG) emissions.

If the proposed Project were not to proceed, the opportunity to capture part of Roscommon's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions". The Roscommon CDP 2022-2028 supports the concept of generating renewable energy at 'local' level and the significant contribution that wind energy can make as a clean sustainable solution to energy

requirements. The existing land use would continue as agricultural and forestry, with no significant changes. Any opportunities for local employment and wider economic spend would not be realised.

Overall, the significance of the effects for this scenario would be **long-term, neutral** and **Not Significant**. This is **Not Significant** in EIA terms.

5.6.2 Construction Phase

Land Use

The construction of the proposed Project will encompass a long-term to permanent land use change at the proposed wind farm Site as a result of the installation of aspects including the wind turbines, Onsite Substation, Relay Tower, Turbine Foundations, Site Access Tracks and Turbine Hardstands and associated infrastructure.

Construction will be phased and will take place over approximately 18 months, and as a result, all proposed construction locations will not be impacted simultaneously. Agricultural and forestry activities surrounding the proposed wind farm Site will be able to continue during the construction phase.

There will also be a short term, adverse effect as a result of forestry felled to facilitate the installation of the Turbine Hardstands and Turbine Foundations. Unfelled forested areas will be returned to forestry use once construction has ceased. Construction activities may require some restrictions for forestry operations within the Site. The effects are considered to be **Short-term, Adverse** and **Not Significant**. In EIA terms, the effect is considered as **Not Significant**.

Additionally, the effect of the use of construction on the agricultural lands to facilitate the **Temporary** Construction Compound during the construction phase is **Short-term, Adverse**, and **Not Significant**. In EIA terms, the effect is considered as **Not Significant**.

On leaving the proposed wind farm Site, the GCR will be installed predominately within private tracks and the public road carriageway and along the R371 and whilst some traffic management may be required, the use of the R371 will continue during the installation works. The works to install the GCR are transient and it will be installed in sections over approximately 5 months. The effects of the GCR relating to land use are considered to be **Temporary, Adverse** and **Imperceptible**. In EIA terms, the effect is considered as **Not Significant**.

The works required for the TDR (surface levelling, compaction) may require some traffic management, but the use of the public road network will continue during this phase of works.

Once the turbine deliveries are completed, the sections along the TDR will be reinstated. The effects of the TDR relating to land use are considered overall **Brief, Adverse** and **Imperceptible**. In EIA terms, the effect is considered as **Not Significant**.

Tourism

The nearest tourist attraction to the wind farm Site includes the Sliabh Bawn Wind Farm Recreation Area, which is located c.3km south. There will be no direct impacts on Sliabh Bawn Wind Farm Recreation Area during the construction phase as access to these trails will not be impeded due to the construction of the proposed wind farm Site as they do not overlap with the boundaries of the site.

No other designated tourism assets will be impacted directly by the construction phase of the proposed wind farm Site.

The GCR accesses the Sliabh Bawn Wind Farm Recreation Area, where it will connect into the existing Sliabh Bawn 110kV Substation, along the Sliabh Bawn Substation Road. The Sliabh Bawn 110kV Substation is located at the Northern tip of the recreation area and is c.1km north of the marked walking trails within this area. Works within the recreation area are expected to take c. one month. During the construction phase, there will be a **Temporary, Adverse**, and **Slight** effect on visitors to the Sliabh Bawn Wind Farm Recreation Area as a result of disturbance from operating vehicles and machinery i.e. construction noise, visual and increased traffic movements. In EIA terms, the effect is considered as **Not Significant**.

The installation of the GCR will directly interact with the National Famine Way, where the walkway crosses the R371. Whilst some management measure for walkers may be required, the use of the R371 will continue during the installation works. The works to install the GCR are transient and it will be installed in sections, over approximately 5 months in total and at an approximate length of 100m per day. On this basis, direct effects on the National Famine Way at the R371 are considered **Brief, Adverse** and **Not Significant**. In EIA terms, the effect is considered **Not Significant**.

Similarly, the works required for the TDR (i.e. surface levelling, compaction) may require some traffic management. The works are **Temporary** only and once the turbine deliveries are completed, the sections along the TDR will be reinstated. Any effects on tourism assets are considered overall **Brief, Adverse** and **Imperceptible**. In EIA terms, the effect is considered as **Not Significant**.

Traffic movements associated with construction vehicles on the local road network during construction and the delivery of turbines along the TDR may impact on tourism related traffic. However, any effects would be **Short-term, Adverse** and **Not Significant**. In EIA terms, the effect is considered as **Not Significant**.

Local Resources and Amenities including Sensitive Receptors

There is potential for impacts on local resources, amenities and sensitive receptors resulting from construction works, such as increases in noise, construction traffic movements and/or the generation of dust. These potential effects are assessed in **Chapters 9 - Air Quality and Climate, Chapter 10 – Noise & Vibration, Chapter 11 - Landscape and Visual and Chapter 12 - Traffic and transport.**

In consideration of the Draft WEDG 2019, the proposed Project has a setback distance of 4 times the tip height (640m) from sensitive receptors (which is 4 times the tallest tip height of the 3 turbine Technology Options) which is greater than the mandatory minimum setback of 500 metres. The 640m setback distance has been maintained for all sensitive receptors apart from sensitive receptor No. 35, located 599m from turbine T02 (**EIAR Figure 2-1 (Volume 4)**). This stakeholder has provided consent to the siting of Turbine T02 at this distance. A consent letter accompanies the planning application for the proposed Project.

Works for the GCR and the works required for the TDR (i.e. surface levelling, compaction) will bring construction activities closer to sensitive receptors. However, these works are transient and would last for only a few days at most, outside any particular receptor.

Effects on local resources, amenities and sensitive receptors (including sensitive receptor No. 35) were considered **Short-term, Adverse** and **Slight**. In EIA terms, the effect is considered as **Not Significant**.

Population and Settlement Patterns

Small increases in the daily number of persons working in the area is anticipated during the construction phase of the proposed Project, with approximately 35 people employed, over an approximate 18-month construction period. This includes works required for the GCR and on the TDR.

Some construction workers may choose to stay in local accommodation in the surrounding area during the construction phase. However, there will be no discernible effect on the existing local population number or profile during the construction phase. This effect would be

considered **Short-term, Neutral and Imperceptible**. In EIA terms, the effect is considered as **Not Significant**.

Employment and Economic Development

In regard to onshore wind development impacts in Ireland, a report prepared by KPMG in 2021 entitled '*Economic impact of onshore wind in Ireland*', assessed the economic impacts of onshore wind in Ireland. Numerous positive outcomes were noted for 2020, including: 4,200 MW installed capacity across Ireland; approximately 5,130 jobs created throughout the sector and its supply chain; €225 million total payments in incomes to workers across the supply chain and €410 million GVA for the Irish economy arising from the sectors activities.

The construction phase of the proposed Project is expected to have a direct, positive impact in terms of employment and economic aspects. There will be approximately 35 people employed full time for the construction works, but an estimate can be made that 200 people including all support, supply and ancillary people would be engaged with the Project. Employment will take place over an approximate 18-month period, with a positive impact on wider services and industry such as those manufacturing materials or involved in delivery of the materials. Additionally, those employed during the construction phase of the proposed Project are expected to spend wages in the local and/or regional area. This would result in local businesses experiencing a positive impact on their cash flow, thus, boosting the economy of County Roscommon. The effects are expected to be **Short-term, Positive and Slight**. In EIA terms, the effect is considered as **Not Significant**.

The KPMG Report noted potential future outcomes with continued onshore wind farm development including the potential to grow jobs throughout the sector and its supply chain to 7,020 by 2030. The proposed Project will result in an increase of skilled people into the area, adding specialist skills during the construction phase which could also result in the transfer of skills into the local workforce. This would have a longer-term benefit and present future opportunities for the workforce as more windfarms are developed in Ireland. The effects are expected to be **Long-term, Positive and Moderate**. In EIA terms, the effect is considered as **Not Significant**.

Property Values

In the absence of any Irish peer reviewed/published evidence to the contrary, the above studies provide context from the international perspective and indicate that the proposed Project would not impact property/ house values in the area.

Construction phase activities for the wind farm Site will be carried out within the site boundary and construction traffic travelling to/from the site will be short term and use existing public roads. The works along the TDR and GCR will be localised, relatively minor and brief as they undertaken in proximity to properties.

It is considered that the construction phase activities for the proposed Project would have a **Short Term, Adverse** and **Imperceptible** effect on local property values. In EIA terms, the effect is considered as **Not Significant**.

EMF

EMF will be generated from sources during the construction phase such as power tools. Sources of EMF will also include the turbine infrastructure, the Onsite Substation and underground cabling for the Internal Wind Farm Cabling and GCR as they are installed. EMF's will be very localised and are predicted to pose a **Short-term, Adverse** and **Imperceptible** effect during the construction phase. In EIA terms, the effect is considered as **Not Significant**.

Human Health

The outcome is detailed in **Table 5-9**. These construction phase human health effects would range from **Brief** to **Temporary** and are considered **Adverse**. In EIA terms, the effect is considered as **Not Significant**.

Table 5-9 Construction Stage Effects on Human Health (pre mitigation)

Source	Description of the potential effect	Assessment of Effects (pre mitigation)
Workplace Accidents and Incidents	As with any Project of this type, there is the potential for accidents to occur. In the context of human health and safety, these are addressed under two main headings, accidents to personnel and accidents to plant and equipment ('infrastructure'). <u>Accidents to Personnel</u> Risks present during the construction phases of the Project, which have potential to cause injury to personnel, may include but are not limited to: • Burial under earthfalls / falling into bog holes or soft peat areas. • Falling from height • Work which puts personnel at work at risk from chemical or biological substances • Work which involves energies – utilities such as electricity, gas, water, pressurized equipment. • Work exposing personnel to the risk of drowning. • Work involving the assembly or dismantling of heavy prefabricated components. • Construction activities which have potential to cause accidents/incidents. • Use of vehicles or mobile plant / machinery / equipment	Ireland's Safety, Health and Welfare at Work (Construction) Regulations 2013, mandate duties for designers, clients and construction firms to ensure workplace safety. These regulations require risk management through safety plans, the use of personal protective equipment (PPE), proper welfare facilities and adherence to specific rules for activities such as working at height and management of excavations etc. The aim of the regulations is to prevent accidents and manage on site risks throughout the construction process. By implementing the Construction Regulations 2013 and without additional site-specific mitigation measures. The assessment of effects is considered to be Slight. This is considered to be Not Significant in EIA Terms.

Source	Description of the potential effect	Assessment of Effects (pre mitigation)
	- Fly rock from quarry blasting potentially causing hurt/injury to personnel working on the proposed Project <u>Accidents to Infrastructure</u> Potential risk to infrastructure, again for the construction phase include but are not limited to: - Burial under earthfalls / falling into bog holes or soft peat areas which impact the ground conditions of nearby structures, collapse of structures. - Tools or equipment falling from height causing damage to property - Work which puts personnel at work at risk from chemical or biological substances - Work which involves energies – utilities such as electricity, gas, water, pressurised equipment which have potential to cause damage through fire, explosion, pressure release etc. - Work involving the assembly or dismantling of heavy prefabricated components. - Construction activities which have potential to cause accidents/incidents. - Use of vehicles or mobile plant / machinery / equipment – failure of plant/machinery/ equipment, loss of control. - Potential for Flyrock from quarry blasting to damage to property.	

Source	Description of the potential effect	Assessment of Effects (pre mitigation)
Air pollution from dust during site excavations and site construction	The level of dust generation at any development is contingent on the type of activity undertaken, the location, the nature of the dust, i.e. soil, sand, etc., and weather conditions. Additionally, dust emissions are increased during periods of dry weather and/or higher wind speeds. There are countless sources of dust including soils and road surfaces, together with general construction works. Exposure to construction dust can result in respiratory issues and also result in adverse effects to amenity for human receptors.	Chapter 9 - Air Quality, contains a detailed assessment of air quality effects including construction dust emissions. The assessment considered the risk rating of dust effects from trackout, earthworks and general construction activities. Taking into account both the distance to the closest human receptors and the scale of the works, it was concluded that the risk of dust related impacts on human receptors ranged from low to negligible. Pre mitigation, the Chapter - 9 Air Quality assessment concluded that dust effects would be Slight, which is Not Significant in EIA terms. Pre mitigation, the human health effects from dust emissions was determined to be Slight, which is Not Significant in EIA terms.
Air Pollution from Combustion emissions from construction	Internal combustion engines will generate emissions include emissions such as nitrogen oxide and sulphur oxides at high concentrations which effect human health due to respiratory problems.	Chapter 9 – Air Quality provides a detailed assessment of air quality effects including construction dust emissions.

Source	Description of the potential effect	Assessment of Effects (pre mitigation)
equipment		The assessment considered in line with the CAFÉ Directive, whereby Zones are designated to areas for the purpose of managing air quality. The EPA have carried out continuous monitoring across Zone D sites (which encompasses the proposed Project). There have been no exceedances in Nitrogen Oxides and Sulphur Oxides recorded during monitoring rounds. Pre mitigation, the Chapter 9 – Air Quality assessment concluded that effects from combustion would be Imperceptible, which is Not Significant in EIA terms. Pre mitigation, the human health associated with combustion emissions has also been considered to be Imperceptible, which is Not Significant in EIA terms.
Pollution of surface water and ground water quality by sediment and hydrocarbons	Uncontrolled surface water runoff from the proposed Project could lead to health effects during the construction phase if the water discharges to a drinking water supply. Polluted surface water can lead to unsafe drinking water, causing illnesses such as gastrointestinal infections, cholera and dysentery.	Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology provides a detailed assessment on potential pollution of surface water and groundwater quality. The assessment included a desktop study of GSI, Water Framework Directive (WFD) and EPA Mapping.

Source	Description of the potential effect	Assessment of Effects (pre mitigation)
during construction works		Furthermore, a WFD Assessment was carried out to assess potential effects to groundwater as a result of the proposed Project. Pre mitigation, Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology confirmed that any effects on drinking water sources including Lough Forbes and nearby groundwater wells during the construction phase would be Slight, which is Not Significant in EIA terms. On this basis, pre mitigation, the significance of any effects on human health associated with surface water and ground water sources has also been considered to be Slight, which is Not Significant in EIA terms.
Noise & Vibration from construction equipment	Excessive noise can harm human health and effect mental health, cognitive performance and high blood pressure (WHO, 2010). Excessive noise levels can also cause noise-induced hearing loss.	Chapter 10 – Noise and Vibration provides a detailed assessment on noise & vibration effects during the construction phase. Pre mitigation, effects would range from Adverse and Imperceptible with a duration ranging from Brief to

Source	Description of the potential effect	Assessment of Effects (pre mitigation)
		Temporary. Aspects of the proposed Project causing Significant noise effects include the construction of Internal Access Tracks and Site Entrance, Material Volumes Traffic together with the Grid Connection Route at distances below 60m from receptors. These effects are envisaged to be of Brief duration, lasting less than a day. Noise levels are not expected to reach levels that could cause noise-induced hearing loss. Additionally, construction activities are anticipated to remain within the proposed threshold limits for both noise and vibration It must be noted that the assessment considered a 'worst case' assessment, with all plant operating simultaneously (which is not expected to occur). On this basis, pre mitigation, the significance of any effects on human health associated with noise and vibration is considered to be overall Not Significant (which is Not Significant in EIA terms).

Source	Description of the potential effect	Assessment of Effects (pre mitigation)
Traffic	Health impacts may be experienced by receptors using the local road network due to traffic impacts which may cause nuisance, delays and disruption to routes and access. Traffic is a significant source of air pollutants such as NO₂, CO, PM_{2.5} and PM₁₀. Increases in traffic levels can lead to air pollution and in turn impact human health causing respiratory problems and cardiovascular diseases.	Chapter 12 – Traffic and Transport provided a detailed assessment of traffic and transport effects as a result of the proposed Project. The assessment comprised field inspections together with data collection for baseline conditions via installation of Automatic Traffic Counters (ATCs) and review of the TII Permanent Traffic Counter website for the National Road traffic flows. Pre mitigation, the Chapter 12 – Traffic & Transport assessment concluded that the effects from traffic during the construction phase would be Not Significant, which is Not Significant in EIA terms. On this basis, pre mitigation, the significance of any effects on human health associated with traffic and transport has also been considered to be Not Significant, which is Not Significant in EIA terms.
EMF	Electric and magnetic fields are produced both naturally and from human activity. They are associated with operation of underground electric cables.	EMF is addressed in this chapter and it was concluded that EMF's would be very localised and the significance of effects would be Imperceptible , which is Not Significant in EIA terms.

Source	Description of the potential effect	Assessment of Effects (pre mitigation)
		On this basis, the significance of any effects on human health associated with EMF has been considered to be Imperceptible , which is Not Significant in EIA terms

5.6.3 Operational Phase

Land use

The operational phase of the proposed Project will encompass a long-term to permanent land use change at the proposed wind farm Site as a result of the installation of aspects including the Onsite Substation, Relay Tower, Turbine Foundations, Site Access Tracks and Turbine Hardstands and all ancillary infrastructure. The area of land within the RLB is 49.774ha and the proposed built structures for the wind farm will cover only c. 12.678 ha of the Site.

Whilst there will be a long-term loss of existing agricultural and forestry lands, for an estimated period of 45 years (35 year Operation and up to 10 years for replanted forestry to reach maturity), the development of the wind farm Site will also provide a long term commercial land use, generating clean renewable energy which will in itself present a long term positive effect.

Overall, the effects on the land use during the operational phase will be **Long-term, Positive, Slight**. In EIA terms, the effect is considered as **Not Significant**.

Tourism

The 2007 Fáilte Ireland survey noted in **Section 5.4.2** found that almost nine in ten visitors to Ireland had claimed to have seen a wind farm in their lifetime. The 2012 Fáilte Ireland survey found that 47% of those interviewed felt that wind farms had a positive impact and 71% of visitors claimed that an increased number of wind farms in Ireland in the future would either have no impact or a positive impact on their likelihood to visit Ireland.

Additionally, a research study in Scotland was carried out by BIGGAR Economics in 2016, titled '*Wind Farms and Tourism Trends in Scotland*' with the aim of assessing relationship between the onshore wind energy sector and sustainable tourism sector in Scotland. Overall, the study concluded that there is no direct relationship between the development of onshore wind farms and tourism employment at the level of the Scottish economy, at local authority level nor in the areas immediately surrounding the wind farm development.

There are tourism assets in the vicinity of the proposed Project including the National Famine Museum, the National Famine Way, Sliabh Bawn Recreation Area and Strokestown House and Gardens. These are all located c.1.8km - 4.5km from the proposed wind farm Site. During the operational phase the proposed Project will be visible in the surrounding environment and from these receptors. The visual impacts are discussed in **Chapter 11 - Landscape and Visual** and the assessment concluded no significant visual effects on tourism, heritage and

amenity receptors in the area. Additionally, **Chapter 10 – Noise and Vibration** concluded that during the operational phase, the proposed Project is predicted to operate within the established criteria and there would be no significant effects.

It is considered that the proposed Project will have a **Long-term, Neutral** and **Slight** effect on tourism during the operational phase. In EIA terms, the effect is considered as **Not Significant**.

Local Resources and Amenities including sensitive receptors

During the operational phase, the proposed wind farm Site will be generally unmanned and will be monitored remotely at an offsite control centre, 24 hours per day. Local resources and amenities will continue to operate in their surrounding environment. Local resources will be used for the ongoing maintenance of the proposed wind farm Site, maintaining access tracks, turbines, thus creating long term employment in the area.

The proposed Project will generate a Community Benefit Fund estimated at over €1.8 million over the first 15 years of operation, amounting to approximately €125,000 per annum. Furthermore, the applicant is committed to working with local suppliers where possible. Full details of the Community Benefit Fund is outlined in **Appendix 5.1 - Community Report**.

The effects of the operational phase on local resources and amenities are considered to be **Long-term, Positive, Imperceptible**. In EIA terms, the effect is considered as **Not Significant**.

In terms of residential amenity during the operational phase, detailed assessments have been carried out for aspects including noise, visual effects and shadow flicker. These including any mitigation measures are detailed in **Chapters 10 – Noise and Vibration, Chapter 11 – Landscape and Visual and Chapter 15 – Shadow Flicker**. No significant residual effects were noted in these chapters. The effects of the operational phase on residential amenity are considered overall to be **Long-term, Adverse** and **Slight**. In EIA terms, the effect is considered as **Not Significant**.

Population

During the operational phase, the proposed wind farm Site will be generally unmanned and will be monitored remotely at an offsite control centre, 24 hours per day. Site visits during this phase will occur occasionally for turbine maintenance.

The proposed Project will provide two permanent jobs that would be created locally due to the requirement for operation and maintenance on the turbines. However, overall there will be no discernible effect on the existing local population number or profile during the operational phase. Any effect would be considered **Long-term, Neutral and Imperceptible**. In EIA terms, the effect is considered as **Not Significant**.

Employment and Economic Development

Operational activities of the proposed Project will include the ongoing purchases of local materials, services and equipment needed to operate and maintain the wind farm Site.

It is expected that approximately two permanent jobs would be created locally due to the requirement for operating and maintaining the turbines. Additionally, ongoing compliance, together with safety and security must be maintained throughout the lifespan of the Project. These requirements would create numerous jobs over various employment sectors. The SEAI's 2015 analysis report on onshore wind, estimated 0.34 jobs per MW for the operation of new onshore turbines and in the wider sectors. On this basis, the proposed Project could be expected to create approximately 9-10 long term jobs in the industry.

Additionally, positive economic effects will be noted in the wider study area as a result of the ongoing benefits of renewable electricity generation. The energy generated will provide a low impact energy supply to electricity consumers, thus, providing a positive long-term effect for consumers.

The likely significant direct and indirect effects regarding employment and economic development are considered to be **Long-term, Positive and Slight** during the operational phase. In EIA terms, the effect is considered as **Not Significant**.

Property Values

In the absence of any peer reviewed/published evidence to the contrary, the above studies provide some context from the international perspective and indicate that wind farms do not affect property/ house value.

It is considered that the operational phase of the proposed Project would not significantly affect local property values in the area. The significance of effect is considered to be **Long-Term, Imperceptible and Not Significant**. In EIA terms, the effect is considered as **Not Significant**.

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EMF

EMF are produced both naturally and from human activity. They are associated with operation of underground electric cables. Sources of EMF during the operational phase include the turbine infrastructure, the Onsite Substation and underground cabling for the Internal Wind Farm Cabling and GCR as they are installed.

In 2014, a study was carried out at a Wind Farm near Goderich, Ontario, Canada. The study concluded that:

‘The results suggest that there is nothing unique to wind farms with respect to EMF exposure; in fact, magnetic field levels in the vicinity of wind turbines were lower than those produced by many common household electrical devices and were well below any existing regulatory guidelines with respect to human health’, (McCallum et al. 2014).

When taking account of the EU restriction levels for EMF and EirGrid’s adherence to these standards, it is concluded that any EMFs would be localised and predicted to pose an **Long-term, Adverse** and **Imperceptible** effect during the operational phase. In EIA terms, the effect is considered as **Not Significant**.

Human Health

The assessment of human health impacts has been based on the Source, Pathway and Receptor model; for an impact to occur, the three elements must occur together. The outcome is detailed in **Table 5-10**. These operational phase human health effects would be **Long-term** and **Adverse**.

Table 5-10 Operational Phase Effects on Human Health (pre mitigation)

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
Workplace Accidents and Incidents	As per the construction phase a project of this type, there is the potential for accidents to occur. In the context of human health and safety, these are addressed under two main headings, accidents to personnel and accidents to plant and equipment ('infrastructure'). <u>Accidents to Personnel</u> Risks present during the construction phases of the Project, which have potential to cause injury to personnel, may include but are not limited to: • Falling from height • Work which puts personnel at work at risk from chemical or biological substances • Work which involves energies – utilities such as electricity, gas, water, pressurized equipment. • Work involving the assembly or dismantling of heavy prefabricated components. • Use of vehicles or mobile plant / machinery / equipment • Flyrock from quarry blasting potentially causing hurt/injury to personnel working on the proposed Project • Ice Throw • Storm or lightning damage to infrastructure including turbine blades causing debris to fall to the ground	The Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (General Application) Regulations 2007, provides a framework for occupational health and safety legislation across all work sectors. Specific safety measures and practices are set out that employers must follow particularly regarding risk management legislation, these regulations also cover areas such as PPE, manual handling and ergonomics. Employers are required to carry out risk assessment to identify potential hazards and implement appropriate measures through a risk assessment process. By understanding and adhering to these regulations the effects on workplace accidents and incidents are considered to be Slight. In EIA Terms, this is considered to be Not Significant.

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
	• Unauthorised access of personnel to the wind turbines or the Onsite Substation <u>Accidents to Infrastructure</u> Potential risk to infrastructure, again for the construction phase include but are not limited to: • Tools or equipment falling from height causing damage to property • Work which puts personnel at work at risk from chemical or biological substances • Work which involves energies – utilities such as electricity, gas, water, pressurised equipment which have potential to cause damage through fire, explosion, pressure release etc. • Work involving the assembly or dismantling of heavy prefabricated components. • Use of vehicles or mobile plant / machinery / equipment – failure of plant/machinery/ equipment, loss of control. • Potential for Flyrock from quarry blasting to damage to property. • Storm or lightning causing damage to equipment/infrastructure • Ice Throw causing damage to plant or equipment	

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
Hydrology – effects on drinking water / groundwater supplies	During the operational phase, drainage and maintenance activities have the potential to impact on water receptors. This could lead to health effects if the water receptors are a drinking water supply (or linked to one).	Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology provides a detailed assessment on potential effects of drinking water/groundwater supplies during the operational phase. The assessment included a desktop study of GSI, WFD and EPA Mapping. Furthermore, a WFD Assessment was carried out to assess potential effects to groundwater as a result of the proposed Project. Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology confirms that there are no Group Water Schemes Source Protection Areas or Public Supply Source Protection Areas proximal to the proposed Project. However, there are several potential pathways for fine sediment and pollutants to be mobilised from to groundwater and drinking water receptors. Pre mitigation, Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology confirmed

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
		that any effects on the water environment during the operational phase would range from Slight – Moderate, which are Not Significant in EIA terms. On this basis, pre mitigation, the significance of any effects on human health associated with surface water and ground water sources have been considered to be Moderate, which is Not Significant in EIA terms.

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
Noise	Excessive noise can harm human health and effect mental health, cognitive performance and high blood pressure (WHO, 2010).	Chapter 10 – Noise and Vibration provides a detailed assessment on noise effects during the operational phase. Pre mitigation, Chapter 10 – Noise & Vibration confirmed that effects during the operational phase would be Not Significant, which is Not Significant in EIA terms. In terms of noise emissions, the proposed Project is predicted to operate within the established criteria. In terms of tonality, A warranty will be sought from the eventual supplier of turbines for the proposed Project that the turbines will emit no tonal component. In the event of a complaint regarding tonality once the turbines are operational, a detailed assessment following the guidance outlined in the IOA GPG and Supplementary Guidance Note 5: Post Completion Measurements (July 2014) will be followed.

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
		In terms of vibration, Wind turbines generate minimal vibration levels when operational, which is too weak to be felt by people or affect buildings and structures. As a result, no noticeable impact on nearby receptors or structures are anticipated. The significance of the effect is therefore considered Imperceptible. In EIA terms, the effect is considered as Not Significant. Furthermore, the Blasting Technical Report (Appendix 10.8) concluded that the nearby quarry operations did not pose any risk to the integrity of the turbine structures. Operational noise emissions assume no special audible characteristics including Amplitude Modulation, Tonality or Infrasound/Low Frequency Noise apply as these cannot be foreseen at this stage. On this basis, pre mitigation the significance of any effects on human health associated with noise and vibration have been considered to be Not Significant, which is Not Significant in EIA terms.

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
Shadow Flicker	Shadow flicker is defined as the alternating light intensity produced by a wind turbine as the rotating blade casts shadows on the ground and stationary objects, such as the window of a residence, which may have the potential to cause disturbance or annoyance.	Chapter 15 - Shadow Flicker provides a detailed assessment on potential effects from Shadow Flicker as a result of the turbines when operational. Pre mitigation, Chapter 15 – Shadow Flicker concluded that in the worst-case scenario for each of the three Technology Options, the shadow flicker effects at each receptor which exceeds the WEDG 2006 (78 no.) is considered Significant. This is Significant in EIA terms. On this basis, pre mitigation, the significance of any effects on human health associated with shadow flicker have been considered to be Significant, which is Significant in EIA terms. For the receptors that showed potential to experience shadow flicker and did not exceed the WEDG 2006 (141 no.), the effects are considered Long Term, Adverse and Not Significant. This is considered Not Significant in EIA terms

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
		On this basis, pre mitigation, the significance of any effects on human health associated with shadow flicker have been considered to be Not Significant, which is Not Significant in EIA terms. Overall, effects from Shadow Flicker range from Significant to Not Significant prior to the deployment of mitigation.
EMF	Electric and magnetic fields are produced both naturally and from human activity. They are associated with operation of underground electric cables	EMF is discussed within this Chapter and concludes '<i>....taking account of the EU restriction levels for EMF and EirGrid's adherence to these standards, it is concluded that any EMFs would be localised and predicted to pose an Long-term, Adverse and Imperceptible effect during the construction phase. In EIA terms, the effect is considered as Not Significant.</i>' On this basis, the significance of any effects on human health associated with EMF have been considered to be Imperceptible, which is Not Significant in EIA terms

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
Air Quality	There are no air emissions associated with the operation of the turbines. There will be emissions to air associated with maintenance activities i.e. plant, equipment and site vehicles.	The effects on air quality during the operational phase are assessed in Chapter 9 - Air Quality and Climate. The assessment concluded that the effect of emissions during the operational phase will be Imperceptible. In EIA terms, this is Not Significant. Additionally, once the proposed Project is operational, it will support a reduced reliance on electricity generated from coal and oil. This effect during the operational phase will be long-term, positive and Slight. On this basis, in terms of human health, the air quality effects are considered long-term, positive and Slight. In EIA terms, this is Not Significant.
Traffic	Health impacts may be experienced by receptors using the local road network due to traffic impacts which may cause nuisance, delays and disruption to routes and access.	Chapter 12 - Traffic and Transport provides a detailed assessment on traffic and transport effects as a result of the proposed Project during the operational phase. Pre mitigation, Chapter 12 – Traffic and Transport concluded that indirect and direct effects from traffic during the operational phase would range from

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
		Adverse- Not Significant, which is Not Significant in EIA terms. On this basis, pre mitigation the significance of any effects on human health associated with traffic and transport have been considered to be Not Significant, which is Not Significant in EIA terms.
Landscape & Visual	Health impacts may be experienced by receptors using the surrounding environment and where views of the proposed Project may cause frustration or upset.	Chapter 11 – Landscape and Visual concluded that some visual effects during the operational phase would result in localised Substantial-Moderate effects. However, these were not considered to reach a significant threshold. The assessment notes '<i>While the proposed Project will present a dominant visual presence from some of the nearest receptors, the design of the proposed wind farm Site directly responds to the guidance for the 'Hill and Flat Farmland' landscape type in the current WEDG 2006, which helps the development assimilate into this robust, rolling rural landscape context .</i>'

Source	Potential Pathway and Receptor	Assessment of Effect (pre mitigation)
		Pre mitigation, in terms of human health, the visual effects are considered to be Not Significant in EIA terms.

5.6.4 Decommissioning Phase

The Applicant is seeking consent for a period of 35 years for the operation of the proposed Project from the date of commissioning. Following the end of the operational phase the Applicant may wish to replace the turbines with a new set of turbines, subject to fulfilling the planning requirements at the time or the proposed Project may be decommissioned. The Onsite Substation and grid connection will remain in place as it will be in the ownership of ESB Networks and will form part of the National Grid. The Relay Tower will remain in place as it will form part of the telecommunication network in the area.

A description of the decommissioning is as follows:

- Removal of the turbines including the blades, hub, nacelle and wind turbine towers.
- Removal of the above ground section of the Turbine Foundation called the 'plinth'.
- Removal of all Wind Farm Internal Cabling. The cable ducting will remain in-situ to minimise the associated ground disturbance.
- Reinstatement of the Turbine Hardstands and Turbine Foundations, by covering with earth and reseeded/replanted as appropriate.

The Turbine Foundations will remain in place underground except for the foundation plinth that will be removed below ground level. The Site Access Tracks and associated drainage will serve the ongoing forestry and farming practices in the area. All other hard surfaced areas such as the Turbine Hardstands will be covered by earth and reseeded/replanted as agreed at the time with the landowners and the Local Authority.

A **DMP** has been prepared as part of this EIAR (**Appendix 2.1.4**). This Plan and all final requirements for the infrastructure will be updated and finalised with the Local Authority in advance of decommissioning activities commencing. Further details on the decommissioning phase are provided in **Chapter 2 - Project Description**.

It is anticipated that for the purposes of the assessment, that the effects arising during the decommissioning phase will be similar to those identified during the construction phase. Furthermore, in most cases the impacts in terms of population and human health will be of a shorter duration and scale during the decommissioning phase. The effects are considered to be **Short-term, Adverse and Not Significant**. In EIA terms, the effect is considered as **Not Significant**.

1.1.1 Summary

The final selection of Technology Option 1,2 or 3 would not introduce any new receptor pathways that have not already been considered in this assessment and would not result in any changes to the significance of effects, which have been determined for the construction, operational and decommissioning phases.

5.7 Mitigation Measures

Construction, operational and decommissioning phase mitigation measures in relation to elements under which human health could be impacted by have been outlined in the appropriate Chapters throughout this EIAR and are also presented in **Appendix 2.1 - CEMP**. The relevant chapters are:

- **Chapter 7 – Land, Soils and Geology**
- **Chapter 8 –Water, Hydrology (Flood Risk Assessment) and Hydrogeology**
- **Chapter 9 – Air Quality and Climate**
- **Chapter 10 – Noise and Vibration**
- **Chapter 11 – Landscape and Visual Impact Assessment**
- **Chapter 12 – Traffic and Transport**
- **Chapter 15 – Shadow Flicker**

A Blasting Coordination and Cooperation Plan (See **Appendix 2.1.5**) has been prepared for the proposed Project. The plan outlines the procedures which will be taken during a blasting event at the Ballyfeeny Rock Quarry, in the construction, operational and decommissioning phases of the proposed Project. It is the responsibility of the Project Site Manager and the Health and Safety Manager to implement this plan during the construction and decommissioning phases and the responsibility of the wind farm operator during the operational phase of the proposed Project. The Blasting Coordination and Cooperation Plan is a live document and will be updated prior to the construction phase of the project to include and changes to the blasting schedule of the quarry and any potential conditions of planning on the proposed Project. The plan will ensure health and safety controls are in place during each phase of the proposed Project to protect staff and onsite vehicles and equipment.

Monitoring of surface water will be conducted in regards of quantitative and qualitative parameters during the construction phase. As a minimum, the following parameters will be recorded in surface waters: pH, conductivity, chemical oxygen demand, suspended solids and total dissolved solids. If monitored levels exceed the threshold levels outlined in S.I. No 77/2019 European Union Environmental Objectives (Surface Waters) (Amendment)

Regulations 2009 to 2019, mitigation measures to protect surface water will be reviewed by the Environmental Manager acting on behalf of the Appointed Contractor.

For operation phase staff working at the proposed wind farm site, appropriate site safety measures will be utilised during the operational phase by all permitted employees. All personnel undertaking works in or around the turbines will be fully trained and will use appropriate PPE to prevent injury. Equipment within high voltage substations presents a potential hazard to health and safety. The proposed Onsite Substation and Relay Mast will be enclosed by palisade fencing and equipped with intruder and fire alarms in line with ESBN and EirGrid standards.

The Onsite Substation will be equipped with emergency lighting and closed-circuit television (CCTV), to monitor and discourage unauthorised access. Suitable signage will be erected at the wind farm entrance (SE2) and at the Onsite Substation to inform persons of the hazards associated with the wind farm and the contact numbers to use in the event of an emergency.

All electrical elements of the Project are designed to ensure compliance with electrical and 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 site access track or Turbine Hardstand surface extents.

Lightning conductors will be installed on each wind turbine, the Relay Mast and Onsite Substation, where tall structures require this protection. The wind farm infrastructure specifically requires this to prevent power surges to electrical components.

Turbine doors will be equipped with a secure lock and anti-vandal measures to ensure unauthorised access is prohibited.

Turbines will be fitted with ice detection systems which will stop the turbine from rotating if ice is forming on a turbine blade and this helps to prevent ice throw. The turbines will not restart until the blades have been visually checked for ice build up or the temperature of the blades increases to such point where icing is not possible.

Rigorous statutory and engineering safety checks imposed on the turbines during design, construction, commissioning and operation will ensure the risk posed to humans is negligible. 24-hour remote monitoring and fault notifications are included as standard in the Turbine Operations and Maintenance Contracts. A Supervisory Control and Data Acquisition ("SCADA") system will monitor the wind farms performance. If a fault occurs, then a message is automatically sent to the operations personnel preventing emergency situations. 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 licenced employees for maintenance.

The wind turbines and onsite substation will be fitted with necessary fire fighting equipment. Training will be provided to the site maintenance engineers on fire prevention/management. A nominated person shall undertake routine checks and maintenance to all firefighting equipment including fire alarms, smoke detectors and emergency lighting equipment.

The wind farm control system will include a system override switch that can be operated at any time, to facilitate manual shutdown in the event of an emergency.

No further mitigation measures are required in addition to those outlined in the Chapters of this EIAR. **Chapter 18 - Schedule of Mitigation and Monitoring**, details all Mitigation proposed for the Project, respective to each environmental topic.

5.8 Residual Effects

5.8.1 Construction Phase

The residual effects during the construction phase are summarised in **Table 5-11**.

Table 5-11 Residual effects during the Construction phase

Population and Human Health aspect	Residual Effects	Statement of Significance
Workplace Accidents and Incidents	Short Term, Adverse, and Slight	Not Significant in EIA terms.
Land use	Short-term, Adverse and ranging from Not Significant to Imperceptible	Not Significant in EIA terms.
Tourism	Short-term, Adverse and ranging from Not Significant to Imperceptible	Not Significant in EIA terms.

Population and Human Health aspect	Residual Effects	Statement of Significance
Local Resources and Amenities	Short-term, Adverse and Imperceptible	Not Significant in EIA terms.
Population and settlement patterns	Short-term, Neutral and Imperceptible	Not Significant in EIA terms.
Employment and Economic effects	Short-term, Positive and Slight & Long-term, Positive and Moderate	Not Significant in EIA terms.
Property Values	Short Term, Imperceptible, Not Significant	No effects: Not Significant in EIA terms.
EMF	Short-term, Adverse and Imperceptible	Not Significant in EIA terms.
Human Health (air pollution, traffic, EMF, noise and water)	Brief to Temporary, Adverse, ranging from Imperceptible to Slight.	Pre mitigation, air pollution (dust and vehicle emissions) and traffic effects on human health were concluded to be Not Significant in EIA terms. Construction phase mitigation measures are detailed in Chapter 9 – Air Quality and Climate and Chapter 12 – Traffic and Transport. All air quality and traffic residual effects on human health are Not Significant in EIA terms.
		Pre mitigation, effects from EMF were concluded to be Not Significant in

Population and Human Health aspect	Residual Effects	Statement of Significance
		EIA terms. The residual effects are also Not Significant in EIA terms.
		Pre mitigation, some significant noise effects were concluded in Chapter 10 – Noise and Vibration . However, these would be Brief in duration and were based on an assessment considered a ‘worst case’ assessment. The significance of all associated construction works on human health due to noise and vibration were considered to be overall Not Significant in EIA terms.
		Construction phase mitigation measures is detailed in Chapter 10 – Noise and Vibration .
		During the construction phase of the proposed Project, the significance of noise effect ranges from Imperceptible (Not Significant in EIA terms) to Slight (Not Significant in EIA terms) depending on the activity and distance to the NSL. After the proposed mitigation measures have been adopted, the range of residual noise effects will be minimised. These mitigation measures, in accordance with the EPA Guidelines along with the application of binding limits, working hour restrictions, and implementation of appropriate noise control

Population and Human Health aspect	Residual Effects	Statement of Significance
		measures, will ensure that noise and vibration effects are kept to a minimum.
		No mitigation measures are required in relation to vibration emissions from the wind turbines and the residual vibration effects will remain as Imperceptible. In EIA terms, the effect is considered as Not Significant.
		No mitigation measures are required in relation to the operation of the substation and the residual noise effects will remain as Imperceptible. In EIA terms, the effect is considered as Not Significant.
		Pre mitigation, effects from EMF were concluded to be Not Significant in EIA terms. The residual effects are also Not Significant in EIA terms.
		Pre-mitigation, the significance of effects on human health associated with surface water and ground water sources has been considered to be Significant in EIA terms. This was associated with construction phase risks to drinking water sources including Lough Forbes. Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology details construction phase mitigation measures including

Population and Human Health aspect	Residual Effects	Statement of Significance
		surface water management, fine sediment pollution control and measures to prevent accidental spills and leaks. A number of measures are also detailed to protect the groundwater environment. These include management of refuelling activities, groundwater monitoring and drainage measures to facilitate groundwater dewatering. With mitigation in place, Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology concludes that residual effects on groundwater and source protection zones would be Not Significant in EIA terms. With the adoption of construction phase mitigation measures, drinking water sources will be protected from spillages and pollution during the construction phase. Any associated residual effects on human health are considered Not Significant in EIA terms.

5.8.2 Operational Phase

The residual effects during the operational phase are summarised in **Table 5-12**.

Table 5-12 Residual Effects during the Operational phase

Population and Human Health aspect	Residual Effects	Statement of Significance
Workplace Accidents and Incidents	Long-term, Adverse and Slight	Not Significant in EIA terms.
Land use	Long-term, Positive and Slight	Not Significant in EIA terms.
Tourism	Long-term, Neutral and Slight	Not Significant in EIA terms.
Local Resources and Amenities	Long-term, Positive and Imperceptible & Long-term, Adverse and Slight	Not Significant in EIA terms.
Population and settlement patterns	Long-term, Neutral and Imperceptible	Not Significant in EIA terms.
Employment and Economic effects	Long-term, Positive and Slight	Not Significant in EIA terms.
Property Values	Long-Term, Imperceptible, Not Significant	Not Significant in EIA terms.
EMF	Long-term, Adverse and Imperceptible	Not Significant in EIA terms.
Human Health	Long-term, Adverse, ranging from Imperceptible to Not Significant	Not Significant in EIA terms.

5.8.3 Decommissioning Phase

It is anticipated that the residual effects for the decommissioning phase will be no greater than those identified for the construction phase. On this basis, any residual effects will be **Not Significant** in EIA terms.

5.8.4 Summary

The final selection of Technology Option 1, 2 or 3 would not result in any changes to the significance of the residual effects, which have been determined for the construction, operational and decommissioning phases.

1.2 Risk of Major Accidents and/or Disasters

This section considers the vulnerability of the proposed Project to major accidents and/or disasters, the risk of those major accidents and/or disasters occurring and the potential for any significant adverse effects on population and human health.

According to EPA Guidelines, these unplanned events can include ‘spill from traffic accidents, floods or landslides affecting the site, fire, collapse or equipment failure on site’. Additionally, the EIA Directive requires “major accidents, and/or natural disasters (such as flooding, sea level rise or earthquakes)” be addressed.

The *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (European Commission, 2017) requires the consideration of major hazards in the context of the SEVESO III Directive. It is noted that the proposed Project will not come under the Control of Major Accident Hazards (COMAH) Regulations and the closest COMAH establishment is c. 37km west of the development.

The structural integrity of wind turbines can fail on extremely rare occasions. The proposed turbines will be installed by an experienced contractor, and the turbines will be located at a considerable distance from residential receptors (receptor No. 35 is the closest residential receptor, located c. 599m from T02). Therefore, the unlikely occurrence of an accident of this type would not result in any significant impacts to population or human health. This is considered **Not Significant** in EIA terms.

Additionally, during the construction and decommissioning phase, there is a risk of contamination being mobilised into ground or surface waters during a heavy rainfall event and which could impact on population and human health. However, a **CEMP (Appendix 2.1)** and **SWMP (Appendix 2.1.1)** have been prepared for the proposed Project and will be implemented by the Appointed Contractor for the construction phase. These documents set out a framework to ensure that appropriate controls will be implemented on site, including the implementation of an ERP. With this mitigation in place, it is considered that the risk associated with heavy rainfall events is low and there are no associated significant adverse effects on population and human health. This is considered **Not Significant** in EIA terms.

Unplanned events such as lightning and ice throw, and fly rock during blasting at the Ballyfeeny Rock Quarry during the operational phase have been assessed within this chapter associated with the construction, operation or decommissioning of the proposed Project. Mitigation measures are proposed in Section 5.9. Based on the implementation of the mitigation measures outlined the significance of effects on population and human health in relation to unplanned events associated with all phases of the Project are deemed to be **Not Significant**. In EIA terms, this is noted as **Not Significant**.

5.9 Cumulative Effects

This section presents the findings for the cumulative effects assessment (CEA) and considers the residual effects for population and human health presented in **Section 5.8** against the potential effects of other relevant projects during the construction, operational and decommissioning phases.

Full details on the approach to the assessment of cumulative effects are provided in **Chapter 16 - Cumulative Effects Assessment**. A list of other projects relative to the proposed Project was compiled by the project team and is provided in **Appendix 16.1 - Long List of other Projects & Plans for the Cumulative Effects Assessment**.

In summary, the CEA has been approached in a staged process. The stages included the following:

- Stage 1: Establishing the list of other projects;
- Stage 2: Applying topic specific criteria to the list of other projects, to confirm a short list for each topic chapter;
- Stage 3: Collating information on each of the other projects to inform the CEAs; and
- Stage 4: Undertaking the assessment to an appropriate level of detail. This is based on the information available on each of the other projects.

The initial list of other projects for the proposed wind farm Site and GCR (Stage 1) was produced based on a 20km radius from the outermost turbines. The 20km radius aligned with the study area (the zone of theoretical visibility) applied in **Chapter 11 - Landscape and Visual Impact** and which is defined in the Draft WEDG 2019.

In confirming the topic specific screening range for population and human health (Stage 2), it was determined that the area of 20km would be employed. This allowed the assessment to account for potential indirect cumulative effects on population and human health receptors.

In terms of the TDR, a 50m buffer was applied to collate a list of other projects. This distance reflects the temporary and localised nature of the works at these locations on the public road network. This 50m list was considered to account for potential cumulative effects on population and human health receptors.

Sections 5.10.1 – 5.10.9 present the CEA for population and human health (Stages 3 and 4).

5.9.1 Sliabh Bawn Wind Farm

The Sliabh Bawn Wind Farm has been a feature in the local landscape since c. 2017 and is located c. 4.2km from the proposed wind farm Site. There is a limited spatial overlap where the proposed GCR is installed along the Sliabh Bawn access route, in order to access the existing Sliabh Bawn 110kV substation. Any such works to install the proposed GCR would be temporary in nature.

There is potential for cumulative effects to human health once the proposed Project is operational, in terms of shadow flicker, noise and visual amenity. The shadow flicker, noise and visual amenity assessments accounted for the operation of the existing Sliabh Bawn Wind Farm, in addition to the proposed Project in their assessments (**Chapter 10 – Noise and Vibration, Chapter 11 – Landscape and Visual Impact Assessment and Chapter – 15 Shadow Flicker**). The assessments each concluded that the operation of the existing Sliabh Bawn Wind Farm, together with the proposed Project would not result in significant effects.

Given that there will be no significant visual, shadow flicker or noise effects at sensitive receptors/dwellings during the operational phase of the proposed Project, it is considered that there will be no potential for any associated cumulative effects on human health. This is considered **Not Significant** in EIA terms.

No significant residual effects were concluded for tourism, local resources, economy, property values and population from the proposed Project which took account of the operation of the Sliabh Bawn Wind Farm within the baseline environment. This is considered **Not Significant** in EIA terms.

5.9.2 Derryadd Wind Farm

Derryadd Wind Farm is located c.11.2km to the southeast of the proposed Project. The proposed Derryadd Wind Farm comprises up to 22 turbines and is located across a flat peatland context, considerably offset from the proposed project.

It is not known if the construction periods would overlap for the two projects. However, given the distance to the Derryadd Wind Farm (c.11.2km), there is no potential for cumulative effects

during the construction phase in terms of noise, traffic and air quality. On this basis, it is considered that there is no potential for any associated cumulative effects on human health. This is considered **Not Significant** in EIA terms.

Chapter 11 - Landscape and Visual determined that during the operational phase, there would be **No Significant** effects in EIA terms, when the proposed Project is considered cumulatively with Derryadd Wind Farm. In terms of noise and shadow flicker, the Derryadd Wind Farm is located at a distance where there would be no effects during the operational phase of the two projects. On this basis, it is considered that there is no potential for any associated cumulative effects on human health. This is considered **Not Significant** in EIA terms.

5.10.3 Derrane Wind Farm

Derrane Wind Farm is not yet constructed and is located c.16km from the proposed Project and hence there is no spatial overlap in the developments.

It is not known if the construction periods would overlap for the two projects. However, given the distance to the Derrane Wind Farm (c.16km), there is no potential for cumulative effects during the construction phase in terms of noise, traffic and air quality. On this basis, it is considered that there is no potential for any associated cumulative effects on human health. This is considered **Not Significant** in EIA terms.

Chapter 11 - Landscape and Visual determined that during the operational phase, there would be **No Significant** effects in EIA terms, when the proposed Project is considered cumulatively with Derrane Wind Farm. In terms of noise and shadow flicker, the Derrane Wind Farm is located at a distance where there would be no effects during the operational phase of the two projects. On this basis, it is considered that there is no potential for any associated cumulative effects on human health. This is considered **Not Significant** in EIA terms.

5.10.4 Ballyfeeny Rock Quarry

The Ballyfeeny Rock Quarry is located on the western boundary of the proposed wind farm Site. An EIS was produced with the planning application for the Quarry, in 2010. No significant adverse residual effects were reported in the EIS. The Quarry site is subject to planning conditions for aspects including environmental management noise, blasting and dust management and monitoring.

Appendix 2.1.5 Blasting Coordination and Cooperation Plan has been prepared for the proposed Project. The plan outlines the procedures which will be taken during a blasting event

at the Ballyfeeny Rock Quarry, in the construction, operational and decommissioning phases of the proposed Project. It is the responsibility of the Project Site Manager and the Health and Safety Manager to implement this plan during the construction and decommissioning phases and the responsibility of the wind farm operator during the operational phase of the proposed Project, in accordance with the management of the Ballyfeeny Rock quarry. The Blasting Coordination and Cooperation Plan is a live document and will be updated prior to the construction phase of the project to include and changes to the blasting schedule of the quarry and any potential conditions of planning on the proposed Project. The plan will ensure health and safety controls are in place during each phase of the proposed Project to protect staff and onsite vehicles and equipment.

There is potential for cumulative effects with regard to human health in terms of water, air quality (including dust) and noise during construction and decommissioning phases. The residual human health effects of the proposed Project for these aspects were determined to be **Not Significant** in EIA terms.

Taking account of the planning condition requirements on the operational Ballyfeeny Rock Quarry and mitigation measures for the proposed Project detailed in **Chapter 8 – Water, Hydrology (Flood Risk Assessment), and Hydrogeology, Chapters 9 – Air Quality and Climate** and **Chapter 10 – Noise and Vibration**, it is considered that the cumulative human health effects for these topics would also be **Not Significant** in EIA terms.

The Ballyfeeny Rock Quarry has been operating within the local landscape since c. 2010. Any residual effects from the proposed Project associated with tourism, local resources, economy, property values and population reflect the operation of the quarry within the baseline environment. The effects are considered **Not Significant** in EIA terms.

With regard to blasting at the quarry, as detailed in **Chapter 10 – Noise and Vibration** of this EIAR, there is no significant cumulative effects associated with the quarry operations on the operation of the proposed Project. Thus, the effect is considered **Not Significant** in EIA terms.

5.9.3 N5 Ballaghaderreen to Scramoge Realignment Scheme

The N5 Ballaghaderreen to Scramoge Realignment Scheme extends from Ballaghaderreen to Scramoge and was granted planning permission in 2019. An EIAR was submitted with the planning application, and no significant adverse residual effects were reported. The scheme is subject to planning conditions for aspects including implementation of mitigation measures from the EIAR, implementation and monitoring of a CEMP and preparation of an Environmental Operating Plan (for the operational phase).

There is no direct spatial overlap with the N5 Ballaghaderreen to Scramoge Realignment Scheme and proposed Wind Farm Site and GCR. It is also likely that N5 Ballaghaderreen to Scramoge Realignment Scheme will be in operation in advance of construction commencing for the proposed Project.

In the event of a temporal overlap with the proposed Project, during the construction or decommissioning phases, both projects will be controlled by their individual planning applications and associated mitigation measures. In addition, the closest point of the N5 Ballaghaderreen to Scramoge Realignment Scheme to the proposed Project is c.3km away and any such activities would also be temporary in nature. The cumulative effects during the construction and decommissioning phases would be **Not Significant** in EIA terms.

Chapter 11 - Landscape and Visual determined that during the operational phase, effects would be **Not Significant** in EIA terms, when the proposed Project is considered cumulatively with realignment scheme. There will be some combined views but the two development types are not inter-related and there is a distance of c.3km between the projects.

On this basis, it is considered that there is no potential for any associated cumulative effects on human health during the construction, operational and decommissioning phases. This is considered **Not Significant** in EIA terms.

5.9.4 Housing Development Strokestown (2560099) and the Avenir Homes Housing Development (2460265)

These housing developments are located outside Strokestown, which is c.3km from the proposed Project. Given the lack of a spatial overlap and the small scale of the developments, there is no potential for cumulative effects on population and human health.

5.9.5 Strokestown Public Realm Enhancement Scheme (23374)

This development is located in the centre of Strokestown which is c.3km from the proposed Project. Given the lack of a spatial overlap and the contained nature of this development within the town centre, there is no potential for cumulative effects on population and human health.

5.9.6 Lanesboro - Sliabh Bawn 100kV overhead line

An EIA Screening Report was submitted with this planning application, which detailed that the proposed uprate works would be undertaken in either 2024 or 2025 during the outage months (March- October). On this basis, the overhead line and poles will have been replaced in advance of works commencing for the proposed Project. There will be no spatial or temporal

overlaps and on this basis, there is no potential for cumulative effects on population and human health.

5.9.7 N4 Carrick-on-Shannon to Dromod and the N4 Mullingar to Longford (Roosky)

The N4 road schemes are road schemes proposed for development by TII. The schemes are of a strategic nature with the objective of improving connections within the North West region and also to the wider regions. Final details of the schemes have not yet been confirmed.

As the N4 schemes have not yet been submitted for planning consent, there is no detailed information currently available in terms of design or environmental assessment. Furthermore, these schemes are located c.9.7km from the proposed Project at its nearest point.

It is considered that these schemes would be controlled by the proposed mitigation measures in their planning applications and by any conditions imposed in a grant of planning and there would be no cumulative effects with the proposed Project. This is considered **Not Significant** in EIA terms.

5.9.8 Remaining Other Developments

- Ballykenny Solar Farm – Planning Reference: 305969/19222
- Cleggill Solar Farm – Planning Reference: 248470/1747
- Kinbrace BESS - Planning Reference: 301965/PD18/7
- Cloon to Lanesborough 110kV Overhead line - Planning Reference: 302597/18/320
- Fisheries base at Portrun, Co. Roscommon – Planning Reference: 2460407
- Polecat Group Water Scheme - Planning Reference: 243009/19366
- Halcyon Commercial Premises - Planning Reference: 22641
- Lough Ree Power Station (BESS & Sync Con) – Planning Reference: 2275/315485
- Ross Engineering Industrial Retention – Planning Reference: 2460028/321335
- Ion Renewables BESS – Planning Reference: 22223

There is no spatial overlap between the proposed Project and these developments. These developments range between c.9km-18km from the proposed Project.

Given the lack of a spatial overlap and also the localised scale and nature of the developments, any potential for cumulative effects would be limited.

There may be a temporal overlap with the proposed Project, if construction and decommissioning activities occurred during the same periods. However, these developments would be controlled by their individual planning applications together with any conditions imposed in a grant of planning. Any such activities would also be temporary in nature. Taking into account the localised scale and nature of the other developments and the application of planning controls, it is considered that any cumulative effects would be **Not Significant** in EIA terms during these phases and no additional mitigation measures would be required.

Given that there is no spatial overlap and the localised scale and nature of the other developments, it is considered that any cumulative effects on population and human health would be **Not Significant** in EIA terms, during the operational phase and no additional mitigation measures would be required.

5.9.9 TDR

The potential for cumulative effects with other developments and works on the TDR is limited. The TDR works are localised, minor and temporary in nature. Once delivery of the turbine components is completed, the areas will be reinstated. It is considered that any cumulative effects would be **Not Significant** in EIA terms.

The final selection of Technology Option 1,2 or 3 would not introduce any new receptor pathways that have not already been considered in this CEA and would not result in any changes to the significance of effects, which have been determined.

5.10 Inter-Related Effects

The topics addressed in this EIAR do not exist separately from one another, and therefore, any effect on a specific element of the environment has the potential to impact another. The interactions between effects on various factors identified throughout the EIAR are addressed within **Chapter 17 – Interrelated Effects**.

5.11 Summary of Effects

The significance of effects of all aspects of the construction, operation, and decommissioning of the proposed Project on the receiving environment in regard to Population and Human Health, including, land use, tourism, population and settlement patterns, property values and human health (water contamination, noise and vibration, shadow flicker, EMF, air quality and climate and traffic have been assessed individually and cumulatively. The assessment has

concluded that there will be **No Significant** residual effects on Population and Human Health because of the proposed Project.

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Table 5-13: Summary of Effects

Receptor	Potential Effect	Significance of effect	Additional Mitigation	Residual significance of effect
Construction Phase				
Land Use receptor	Permanent Land use change at the Site due to the works proposed. Additionally, felling is proposed to facilitate works proposed during construction. GCR installation will impact land use, though installations will be transient. The TDR will require reinstatement due to works proposed.	The significance of effect during the construction phase on land use ranges from Temporary to Short-term, Adverse and Not Significant to Imperceptible .	Construction phase mitigation measures are outlined in Section 5.7 .	The residual effects during the construction phase on land use is assessed as Short-term, Adverse and ranging from Not Significant to Imperceptible . In EIA terms, the effect is considered as Not Significant .
Tourism receptor	The connection of the proposed GCR to Sliabh Bawn 110kV Substation will comprise the encroachment of construction works into Sliabh Bawn Wind Farm Area. The GCR will directly interact with the National Famine Way, though works will be transient in nature. Additionally, TDR works will require reinstatement.	The significance of effect during the construction phase on land use ranges from Brief to Temporary to Short-term, Adverse to Slight and Not Significant to Imperceptible .		The residual effects during the construction phase on tourism is assessed as Short-term, Adverse and ranging from Not Significant to Imperceptible . In EIA terms, the effect is considered as Not Significant .
Local Resources and amenities including sensitive receptors	Works proposed for GCR and TDR are transient in nature. Increases in noise, traffic and generation of dust are outlined in the respective chapters of this EIAR.	Effects on local resources, amenities and sensitive receptors were considered Short-term, Adverse and Slight . In EIA terms, the effect is		The residual effects during the construction phase on local resources and amenities is assessed as Short-term, Adverse and ranging from Not Significant to Imperceptible . In EIA terms, the effect is considered as Not Significant .

Receptor	Potential Effect	Significance of effect	Additional Mitigation	Residual significance of effect
		considered as Not Significant .		
Population and Settlement Patterns	There will be a small increase in the number of people onsite during the construction phase.	Effects on population and settlement patterns would be considered Short-term, Neutral and Imperceptible . In EIA terms, the effect is considered as Not Significant .		Effects on population and settlement patterns are assessed as Short-term, Neutral, Imperceptible and Not Significant . In EIA terms, the effect is considered as Not Significant .
Employment and Economic Development	Approximately 35 persons will be employed during the construction phase. Aside from increasing employment in the area, those employed are likely to spend locally during the 18-month construction duration. Additionally, the proposed Project will result in the transfer of skills to the local workforce.	The effects are expected to be Short-term, Positive and Slight . In EIA terms, the effect is considered as Not Significant . The effects are expected to be Long-term, Positive and Moderate . In EIA terms, the effect is considered as Not Significant .		Effects on population and human health are assessed as Short-term, Positive and Slight and Long-term, Positive and Moderate . In EIA terms, the effect is considered as Not Significant .
Property Values	It is considered that the construction phase activities for the proposed Project would generally not have any effects on local property values.			
Human Health	Human Health effects during the Construction phase are outlined in Section 5.6.2 and within respective Chapters of this EIAR.	The effects range for human health, though no significant effects were identified. In		Effects on population and human health are assessed as Brief to Temporary, Adverse, ranging from Imperceptible to Slight . In EIA terms, the effect is considered as Not Significant .

Receptor	Potential Effect	Significance of effect	Additional Mitigation	Residual significance of effect
		EIA terms, this is considered as Not Significant		
EMF	EMF will be generated during the construction phase of the proposed project. However, any EMFs generated will be localised	The effects of EMF are considered to be Imperceptible . In EIA terms, the effect is considered as Not Significant .		It is concluded that any EMFs would be localised and predicted to pose a Short-term, Imperceptible and Adverse effect during the construction phase. In EIA terms, the effect is considered as Not Significant .
Operational Phase				
Land Use	Long term loss of existing agricultural and forestry lands	The effects on the land use during the operational phase will be Long-term, Positive and Slight . In EIA terms, the effect is considered as Not Significant .		The residual effects during the operational phase on land use are assessed as Long-term, Positive and Slight . In EIA terms, the effect is considered as Not Significant .
Tourism	The visual effects are discussed in Chapter 11 - Landscape and Visual and the assessment concluded no significant visual effects on tourism, heritage and amenity receptors in the area.	The effect on tourism is considered to be Long-term, Neutral and Slight during the operational phase. In EIA terms, the effect is considered as Not Significant .		Effects on tourism are assessed as Long-term, Neutral and ranging from Slight . In EIA terms, the effect is considered as Not Significant .
Local Resources and amenities including sensitive receptors	The proposed Project will generate a Community Benefit Fund estimated at over €1.8 million over the first 15 years of operation, amounting to approximately €125,000 per annum. Residential amenity effects is outlined in the respective Chapters of this EIAR	The effects of the operational phase are considered to be Long-term, Neutral and Imperceptible . In EIA terms, the effect is considered as Not Significant .		Effects on local resources are assessed as Long-term, Positive and Imperceptible . In EIA terms, the effect is considered as Not Significant .

Receptor	Potential Effect	Significance of effect	Additional Mitigation	Residual significance of effect
Population and Settlement Patterns	The Site will be generally unmanned during the operational phase and will create approx. two permanent jobs	Any effect would be considered Long-term, Neutral and Imperceptible . In EIA terms, the effect is considered as Not Significant .		Effects on population and settlement patterns are assessed as Long-term, Neutral and Imperceptible . In EIA terms, the effect is considered as Not Significant .
Employment and Economic Development	Positive economic effects are considered in the wider study area due to the ongoing benefits of renewable electricity generation.	The effect is considered to be Long-term, Positive and Slight during the operational phase. In EIA terms, the effect is considered as Not Significant .		The residual effects during the operational phase on employment are assessed as Long-term, Positive and Slight . In EIA terms, the effect is considered as Not Significant .
Property Values	It is considered that the operational phase of the proposed Project would generally not have any effects on local property values.			
Human Health	Human health effects are outlined in Section 5.6.3 and within the respective Chapters of this EIAR.	The effects range for human health during the operational phase, though no significant effects were identified. In EIA terms, this is considered as Not Significant		The residual effects during the operational phase on human health are assessed as Long-term, Adverse, ranging from Imperceptible to Not Significant . In EIA terms, the effect is considered as Not Significant .
EMF	EMF will be generated during the construction phase of the proposed project. However, any EMFs generated will be localised	The effects of EMF are considered to be Long-term, Imperceptible and Adverse . In EIA terms, the effect is		It is concluded that any EMFs would be localised and predicted to pose an Long-term, Adverse and Imperceptible effect during the operational phase. In EIA terms, the effect is considered as Not Significant .

Receptor	Potential Effect	Significance of effect	Additional Mitigation	Residual significance of effect
		considered as Not Significant.		
Decommissioning Phase				
All receptors	It is anticipated that the effects will be no greater than those identified for the construction phase.	The likely significant direct and indirect effects are considered to be Short-term, Adverse and Not Significant. In EIA terms, the effect is considered as Not Significant.		It is anticipated that the residual effects for the decommissioning phase will be no greater than those identified for the construction phase. On this basis, any residual effects will be Not Significant in EIA terms.

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