5 POPULATION AND HUMAN HEALTH

5.1 INTRODUCTION

5.1.1 Background and Objectives

This Chapter of the EIAR assesses the likely significant direct or indirect effects of the Project on population and human health. The Project refers to all elements of the application for the construction, operation and decommissioning of the proposed Moanmore Lower Wind Farm (**Chapter 2: Project Description**). Where negative effects are predicted, the chapter identifies appropriate mitigation strategies. The assessment considers the potential effects during the following phases of the Project:

- Construction
- Operation and maintenance
- Decommissioning

This chapter of the EIAR is supported by figures provided in **Volume III**. A glossary of common acronyms can be found in **Appendix 1.4** of this EIAR.

5.1.2 Statement of Authority

This Population and Human Health Chapter has been prepared jointly by Ms. Sarah Moore, with assistance from Mr. Padraig O'Dowd and Ms. Siobhan Roddy of Jennings O'Donovan & Partners Limited (JOD). The final review was conducted by Managing Director Mr David Kiely.

Mr. David Kiely is Managing Director of JOD and holds a BE in Civil Engineering from University College Dublin and MSc in Environmental Protection from IT Sligo. He is a Fellow of Engineers Ireland, a Chartered Member of the Institution of Civil Engineers (UK). David has over four decades of experience in the preparation of EIARs and EISs for environmental projects including Wind Farms, Solar Farms, Wastewater Projects, and various commercial developments. David has also been involved in the construction of over 60 wind farms since 1997.

Ms. Sarah Moore is an Environmental Scientist in JOD with over 17 years of environmental consultancy experience. She has obtained a MSc in Environmental Engineering from Queens University, Belfast, and a BSc in Environmental Science from University of Limerick. Since joining JOD, Sarah has been involved as a Project Environmental Scientist on a range of renewable energy, wastewater, structures and commercial projects. She has experience in the preparation of Appropriate Assessments, Ecological Impact Assessments, Environmental Impact Assessments and Geographic Information Systems.

Mr. Padraig O' Dowd is a Junior Environmental Scientist at JOD. He holds a BA (Hons) in Creative Design, an MSc in Design Innovation, and a GradDip in Design Thinking for Sustainability. As a Graduate Member of IEMA, his expertise includes EIAR report writing, grant-funded research applications, and data analysis, with a focus on the environmental and renewable energy sectors. He also has research experience with Wind Energy Ireland.

Ms. Siobhan Roddy is a Graduate Environmental Scientist and holds a BSc (Hons) in Environmental Science and Technology from Dublin City University. Siobhan's key capabilities are in report writing, and ArcGIS. She forms part of the Environmental team responsible for preparing the EIAR Chapters and Appropriate Assessments.

5.1.3 Relevant Legislation and Guidance

The population and human health assessment has been carried out in accordance with legislation and guidance contained in **Chapter 1: Introduction** and **Chapter 4: Planning Policy** (schedule 6 of the Planning and Development Regulation, 2001 (as amended)).

The distance of receptors from the proposed turbines complies with Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (WEDG) (2006) and DoHPLG, Draft Revised Wind Energy Development Guidelines (2019). The design, construction, operation and decommissioning of the Proposed Development including the installation of associated equipment such as switchgear and substations is governed by the Safety, Health and Welfare at Work Act 2005 (as amended), The Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2023.

The assessment complies with the EPA 2015[1] report entitled the *'Investigation into the Assessment of Health Impacts within National Environmental Regulation Processes*' that outlines how human health impacts are dealt with, throughout the European Union (EU) by environmental regulators with an emphasis on the role at the planning / environment interface.

European Commission guidance relating to the implementation of the 2014 Directive, in reference to "human health" states "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 the other factors in Article 3(1) of the EIA Directive and thus environmentally related

[1] Golder Associates (2015) *Investigation into the Assessment of Health Impacts within National Environmental Regulation Processes*. Available online at: https://www.epa.ie/publications/research/environment--health/assessment-of-health-impacts-report.php [Accessed: 01/12/2024]

health issues (such as health effects caused by the release 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 obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population.[2]"

5.1.4 Assessment Structure

In line with the EIA Directive, as amended and current EPA guidelines the structure of this chapter is as follows:

- Assessment Methodology and Significance Criteria – a description of the methods used in desktop surveys and in the assessment of the significance of effects.
- Baseline Description – a description of the socio-economic profile of the local area of the Project i.e., local electoral areas and County Clare, based on a desk-based study using Central Statistics Office (CSO) data.
- Assessment of Potential Effects –identifying the ways in which the population and human health of the area could be affected by the Project.
- Mitigation Measures and Residual Effects – a description of measures recommended to avoid, prevent, reduce or, if necessary, offset any potential significant adverse effects and a summary of the significance of any residual effects of the Project after mitigation measures have been implemented.
- Cumulative Effects – identifying the potential for effects of the Project to combine with those from other existing, permitted and/or proposed projects to affect the population and human health. **See Appendix 1.2.** (20km radius from the Site for large scale developments such as wind farms and 10km radius from Site for other major developments, as is consistent with the EPA "Guidelines on the information to be contained in environmental impact assessment reports" (2022).
- Summary of Significant Effects.
- Statement of Significance – See **Chapter 1: Introduction Table 1.5: Impact Classification Terminology (EPA Guidelines, 2022)** which highlights the general framework for the assessment of significance of effects and Table 1.6: **Rating of Significant Environmental Impacts (EPA Guidelines, 2022)** which describes how the significance of the potential effects of the Development have been classified by

[2] Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report, European Commission, 2017 http://ec.europa.eu/environment/eia/eia-support.htm

comparing the character of the predicted effect to the sensitivity of the receiving environment.

Section 1.2.2 of the EIA Directive as amended, amalgamates the findings of other assessments as part of the EIA process. Limited interactions with Human Health are possible and consideration has been given to the findings of the following assessments:

- **Soils and Geology: Chapter 8**
- **Hydrology and Hydrogeology: Chapter 9**
- **Noise and Vibration: Chapter 10**
- **Landscape and Visual: Chapter 11**
- **Air Quality and Climate: Chapter 12**
- **Shadow Flicker and EMI: Chapter 13**
- **Traffic and Transport: Chapter 16**

5.1.5 Scope of the Assessment

The effect of a development on population and human health includes the following broad areas of investigation:

- Population and Settlement Patterns
- Economic Activity
- Employment
- Land Use and Topography
- Tourism
- Human
- Property Value
- Natural Disasters and Major Accidents.

This assessment considers the following criteria:

- Sensitive receptors in the area
- Existing land use in the area
- General amenities in the area
- Potential effects from water, noise, shadow flicker, air quality and traffic.
- Vulnerability of the project to risk of major accident

5.2 ASSESSMENT METHODOLOGY

In line with the EIA Directive as amended and current EPA guidelines, this chapter includes the following elements:

- Details of methodologies utilised in the context of legal and planning frameworks
- Baseline Descriptions
- Assessment of Potential Effects (do-nothing, construction, operational and decommissioning phases)
- Detailed Mitigation Measures
- Assessment of Cumulative Impacts; and
- Summary of Significant Effects and Statement of Significance

A desktop study was undertaken using the Central Statistics Office (CSO) data along with the currently adopted Clare County Development Plan (CDP) 2023 - 2029. The 2015 report produced by the EPA entitled the *'Investigation into the Assessment of Health Impacts within National Environmental Regulation Processes'* has been complied with and outlines how human health impacts are dealt with, throughout the European Union (EU) by environmental regulators with an emphasis on the role at the planning / environment interface.

5.2.1 Definition of Study Areas

Four geographical study areas have been identified for this assessment. While Study Areas 3 and 4 offer baseline data for this chapter, they are not included in the evaluation of local impacts. Note: Study Area 1 lies within Study Area 2 and information outlined for Study Area 2 incorporates data for Study Area 1. Study Areas 1 and 2 lie within Study Area 3 and Study Area 3 lies within Study Area 4. The four Study Areas are outlined below:

- **Study Area 1: The proposed Project area and Environs – Electoral Divisions (EDs) Einagh, Kilrush Rural, Clooncoorha, Kilrush Urban (288km^2)**
- **Study Area 2: Clare County (3,450km^2)**
- **Study Area 3: The Midwest Region: Clare, Limerick and Tipperary (8,248km^2)**
- **Study Area 4: Ireland (State) (70,273km^2)**

Descriptive terminology for impact assessment, and the general framework for the assessment of significance of effects, follows the systematic method of description from the EPA Guidelines (2022), as outlined in **Chapter 1: Introduction**, Table 1.5: Impact Classification Terminology (EPA Guidelines, 2022).

Study Area 1: The proposed Project area and Environs – Electoral Divisions (EDs) Einagh, Kilrush Rural, Clooncoorha, Kilrush Urban (288km^2).

In order to make inferences about the population and other statistics in the vicinity of the Development, Electoral Divisions (EDs) were analysed. The entire Project falls under the

Municipal District (MD), West Clare and EDs Einagh, Kilrush Rural, Clooncoorha, Kilrush Urban. The EDs can be further broken down into townlands. See **Table 5.1** for details.

Table 5.1 Electoral Divisions (EDs) & Townlands

Electoral Divisions (EDs)	Townlands
Einagh	Lismuse, Lisgurreen, Kildeema, Garrann, Garrann, Baunmore, Einlagh, Moyaste and Eanagh.
Kilrush Rural	Moanmore North, Moanmore South, Moanmore Upper, Moanmore Lower, Carrowncalla North, Carnaun, Duragh, Carrowncalla South, Leadmore East, Leadmore West, Ballynote West, Feagarroge, Ballymote East, Dysert, Clooneylissaun, Ballymacrinan, Carrowdotia North, Moyne and Scattery Island.
Clooncoorha	Tullaback, Tullaback West, Tullaback East, Breaghva, Ballykett, Parknamoney, Moyedda Beg, and Rapepark
Kilrush Urban	Ballyurra, Leadmore East, Kilrush, Ballycurtaun and Cappagh
Einagh	Lismuse, Lisgurreen, Kildeema, Garrann, Garrann, Baunmore, Einlagh, Moyaste and Eanagh.
Kilrush Rural	Moanmore North, Moanmore South, Moanmore Upper, Moanmore Lower, Carrowncalla North, Carnaun, Duragh, Carrowncalla South, Leadmore East, Leadmore West, Ballynote West, Feagarroge, Ballymote East, Dysert, Clooneylissaun, Ballymacrinan, Carrowdotia North, Moyne and Scattery Island.
Clooncoorha	Tullaback, Tullaback West, Tullaback East, Breaghva, Ballykett, Parknamoney, Moyedda Beg, and Rapepark
Kilrush Urban	Ballyurra, Leadmore East, Kilrush, Ballycurtaun and Cappagh

Study Area 1 is shown in **Figure 5.1:** in Volume III of the EIAR.

The site is situated within the Kilrush Rural Electoral Division (ED), and the proposed Grid Connection Route (GCR) extends through both Kilrush Rural ED and Clooncoorha Rural ED. Temporary works along the construction haul route also fall within these two EDs.

The Turbine Delivery Route (TDR) similarly passes through the Kilrush Rural ED and Clooncoorha ED. Kilrush Urban ED is located 1.45km south-east of the Site, while Einagh ED, situated 0.18km west, is in the surrounding area and does not have direct contact with the site. Both Einagh ED and Kilrush Rural ED are important to consider due to their proximity for Population and Human Health impacts.

Each ED comprises townlands, which may be impacted by various elements of the Project. These townlands are detailed in **Table 5.2** The wind farm is in the Moanmore Lower.

Table 5.2: Locations of proposed works

Element of the Project	Electoral Division (ED)	Townlands
Wind Farm Site		
Moanmore Wind Farm	Kilrush Rural	Moanmore Lower
Grid Connection Route		
Moanmore Wind Farm to Tullabrack Substation	Kilrush Rural Clooncoorha	Moanmore South Tullabrack
Construction Haul Route		
Temporary Road Widening Works	Kilrush Rural Clooncoorha	Moanmore Lower Moanmore South Tullabrack
Turbine Delivery Route		
Temporary Road Widening and Verge Strengthening Works (L6132)	Clooncoorha Cooraclare Tullycreen	Tullabrack East Gower South Gowerhass Tullagower Derreen
Temporary Road Widening and Verge Strengthening Works (L		
Vertical Realignment (L6132)	Cooraclare	Gower South
Site entrance and Blade set-down Area	Clooncoorha	Tullabrack East

Grid Connection Route

A Grid Connection Route (GCR) between the Site and the 110kV Tullabrack Substation will be necessary to export electricity from the Development. It is intended that the Development will connect to the national grid via a 38kV Grid Connection cable to the existing Tullabrack 110kV Substation (Tullabrack Substation), located in the townland of Tullabrack, County Clare.

The proposed Grid Connection Route between the Moanmore Lower Wind Farm and the Tullabrack 110kV substation will consist of a 2.76km underground cable (UGC). An alternative option considered was a 20kV underground connection to the Moneypoint 400kV substation.

To minimise potential impacts on the local population and human health, the cable will be routed alongside public roads, utilising existing road sections for the entire length of the route. This approach not only reduces the disturbance to the environment but also mitigates

potential health risks associated with construction activities, ensuring that the local community is protected during the installation process. See **Figure 5.2**.

Turbine Delivery Route

Details of works associated with the Turbine Delivery Route (TDR) are included in section 2.5.4 (Access to Site) and section 2.5.5 (Turbine Delivery Route Works) of **Chapter 2: Project Description**. The TDR is shown on **Figure 2.3**.

The Haul Route is shown on **Figure 16.3.**

Furthermore, all works along the TDR are assessed in **Chapter 16: Traffic and Transport** and shown on drawings within **Appendix 16.1**.

5.2.2 Consultation

Consultation with relevant organisations was initiated during the initial phase of the EIA process to identify any effects that could potentially result from the Project. A summary of the consultation responses is presented in **Chapter 1 Table 1.7: Scoping Responses Received on The Project.**

Table 5.1: Summary of Consultation response on Human Health

Consultee	Type and Date	Summary of Consultee Response	Location within the EIAR
HSE	30/09/2024	Summary of the EIA Directive and Assessment Requirements for Wind Farm Developments The EIA Directive mandates a comprehensive assessment of significant impacts on population and human health in Environmental Impact Assessments (EIAs). The National Environmental Health Service (NEHS) emphasises that human health impacts are often inadequately assessed and recommends considering broader determinants of health and well-being. In evaluating the Environmental Impact Assessment Report (EIAR), the Health Service Executive (HSE) will review the methodology and evaluation criteria used to assess both negative and positive impacts of the proposed development. Key areas recommended for inclusion in the EIAR include: **Public Consultation:** Early and meaningful engagement with the local community to address all potential impacts and ensure transparency.	Public Consultation: Section 1.7.1 of **Chapter 1: Introduction** summarises the public consultation process. Additionally, a report has been included as **Appendix 1.5: Community Engagement Report** detailing all public consultation for the Project.

Consultee	Type and Date	Summary of Consultee Response	Location within the EIAR
		Decommissioning Phase: Clear information on the fate of turbines and materials post-operation, including recycling or disposal methods.	Decommissioning Phase: A designated decommissioning plan has been appended to this EIAR as **Appendix 2.1: Construction Environmental Management Plan** (Appendix D). Details of decommissioning works are included in this plan, including the fate of turbines and materials.
		Siting and Location of Turbines: Detailed maps and specifications of turbine locations, heights, and models.	Siting and Location of Turbines: Detailed maps and specifications of turbine locations, heights, and models are included in **Chapter 2: Project Description** and **Volume III: EIAR Figures** and also in the **Planning Drawings**.
		Noise and Vibration: Assessment of potential noise and vibration impacts on sensitive locations, along with proposed mitigation measures.	Noise and Vibration: Assessment of potential noise and vibration impacts on sensitive locations, along with proposed mitigation measures have been included in **Chapter 10: Noise and Vibration**, specifically in Sections 10.10 and 10.13.
		Shadow Flicker: Identification of dwellings affected by shadow flicker and implementation of mitigation strategies.	Shadow Flicker: Identification of dwellings affected by shadow flicker and implementation of mitigation strategies are included in **Chapter 13: Shadow Flicker**, and specifically in Sections 13.3 and 13.4.

Consultee	Type and Date	Summary of Consultee Response	Location within the EIAR
		Air Quality: Inclusion of a Construction Environmental Management Plan (CEMP) to address dust generation during construction.	Air Quality: A designated air and climate assessment has been included as **Chapter 12** of the EIAR. Dust generation has also been assessed in **Appendix 2.1: Construction Environmental Management Plan** (Section 3.6).
		Surface and Groundwater Quality: Identification of all drinking water sources and measures to protect them.	Surface and Groundwater Quality: A designated assessment of water and water resources has been included in **Chapter 9: Hydrology and Hydrogeology**. Identification of all drinking water sources and measures to protect them has been included in Sections 9.4.10 and 9.7.
		Geotechnical and Peat Stability Assessment: Evaluation of ground stability and potential impacts of construction on water quality and peat stability, including monitoring programs.	Geotechnical and Peat Stability Assessment: Soils and Geology is fully assessed in **Chapter 8: Soils and Geology**. Evaluation of ground stability and potential impacts of construction on water quality and peat stability, including monitoring programs are included in Sections 8.3.8 and 8.5.
		Ancillary Facilities: Location and details of all support facilities required during construction.	Ancillary Facilities: Chapter 2: Project Description gives details of all proposed works associated with the Development as well as elements of the Project which are not being applied for in this Planning Application. Location and details of all support facilities required during construction are included in Section 2.5.8.

Consultee	Type and Date	Summary of Consultee Response	Location within the EIAR
		Cumulative Impacts: Assessment of impacts from existing or proposed nearby wind farm developments. (Sections 5.5.8, 6.4.10, 7.8, 8.7, 9.8.4, 10.12, 11.4.6, 12.3.8, 13.2.8, 14.6, 15.4.5, 15.5.6, 15.6.6, 15.7.7, 15.8.5, 16.5) These aspects will be thoroughly addressed in the EIAR to ensure a comprehensive evaluation of the proposed Project as is expected by the NEHS.	Cumulative Impacts: Cumulative effects are assessed in all assessment chapters of this EIAR. Please see Sections 5.5.8, 6.4.10, 7.8, 8.7, 9.8.4, 10.12, 11.4.6, 12.3.8, 13.2.8, 14.6, 15.4.5, 15.5.6, 15.6.6, 15.7.7, 15.8.5, 16.5. These aspects have been thoroughly addressed in the EIAR and the Project's potential impacts have been comprehensively evaluated.

5.3 BASELINE DESCRIPTION

5.3.1 Population and Settlement Patterns

Study Area 1: The proposed Project area and Environs – Electoral Divisions (EDs) Einagh, Kilrush Rural, Clooncoorha, Kilrush Urban (288km^2).

The population distribution across Study Area 1 is as follows: In Einagh ED, there is a total of 312 residents, with 151 males and 161 females. Clooncoorha ED has a population of 389, comprising 188 males and 201 females. Kilrush Urban ED is recorded as having a significantly higher population of 2,790 individuals, with 1,348 males and 1,442 females. Meanwhile, Kilrush Rural ED has a smaller population of 738, with 382 males and 356 females. The total population of Study Area 1 is 4,229 people. See **Figure 5.1** showing the extent of Study Area 1.

The nearest urban settlement is Kilrush, located approximately 3.0km south-east of the Site, with a population of 2,649 people[3]. Doonbeg is located 7.5km to the North of the Site and has a population of 279. Kilkee is located 8.8km north-west of the Project and has a population of 1,214 people.

The nearest major centre of population to the Site is Ennis, County Clare, which is located approximately 40km to the north-east. There were 27,923 persons living in Ennis in 2022 according to the central statistics office.

The Site is located in a rural setting. Housing density in the area is low to medium. There are 183 dwellings within a 2km radius of the Site comprising one off houses and farm holdings (**Figure 1.3**). A distance of 10 times the rotor diameter (1,360 m) as per the Wind Energy Development Guidelines was expanded to 2km from the Site for completeness. This distance was used to identify houses for leaflet drops, public consultation and Shadow Flicker analysis.

There are small townlands in the surrounding area north and north-east of the site including the villages of Quilty (17km north) which has a population of 211; Lissycasey (26.5km north-east) which has a population of 396; Kildysart (29km east) which has a population of 436; Spanish Point (31km north) which has a population of 261; Kilmaley (31.5km north-east) which has a population 296 and Miltown Malbay (33km north) which has a population of 921.

[3] Central Statistics Office. Available at: https://visual.cso.ie/?body=entity/ima/cop/2022&boundary=C04167V04938&guid=2ae19629-1fa8-13a3-e055-000000000001 – [Accessed: 01/12/2024]

Chapter 2: Project Description, Table 2.2 outlines the only other major developments or proposed developments (bigger than one-off houses) within 10km of the Site**.** Over the last five years, Clare County Council have granted planning permission in the Study Area for developments including one off housing, alterations to existing dwelling houses, agricultural buildings and commercial developments (including a car park and a solar PV energy development). Planning permissions granted for developments with more than a 5-year operational life include two commercial wind farms (Tullabrack Wind Farm and Moanmore Wind Farm), and an electrical substation development[4]. The 2022 Census statistics note 3,476 occupied permanent residences in the Study Area 1.

All wind farms within 20km of the Site have been included in the cumulative assessment and are listed in **Appendix 1.2**.

Grid Connection Route (GCR)

A Grid Connection between the Site and the national electricity grid will be necessary to export electricity from the Development. It is intended that the Development will connect to the national grid via a 38kV Grid Connection cable to the existing Tullabrack 110kV Substation (Tullabrack Substation), located in the townland of Tullabrack, County Clare. The Tullabrack substation is located 1.75km east of the Development at its closest point. The proposed Grid Connection route between Moanmore Lower Wind Farm and Tullabrack 110kV substation is as an underground cable (UGC), utilising sections of cabling in public roads. The length of the Grid Connection is c. 2.76km see **Figure 2.4**.

Turbine Delivery Route (TDR)

To assess potential impacts on population and settlement patterns along the TDR, a review of properties in the vicinity of the areas for which temporary widening works are proposed (**Table 5.1**) was carried out. The majority of development along the TDR comprises rural farmstead properties and one-off housing.

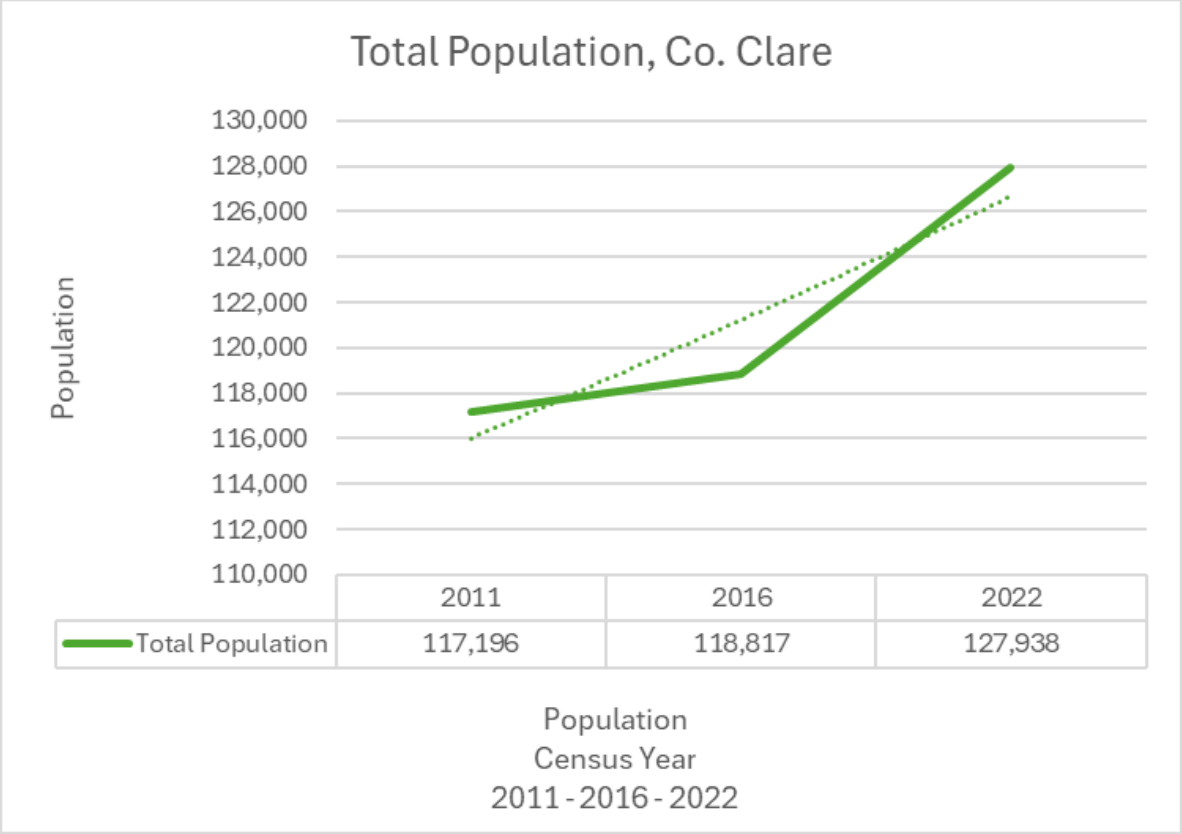
The TDR passes through five defined settlements: Foynes and Limerick City in County Limerick, and Shannon, Ennis, and Lissycasey in County Clare. However, all proposed TDR works associated with the Project are located outside these settlement areas.

[4]Clare County Council. *Planning map Search* Available online at https://www.clarecoco.ie/services/planning/applications/view/ [Accessed: 01/12/2024].

Study Area 2: Clare County (3,450km^2)

The total population in the 2022 CSO for County Clare was 127,938, of which males numbered 62,686 and females were 64,733. There has been a 7.24% increase in the population since 2016, as shown in **Graph 5.1**.

The population density was 36.93 persons per square kilometres in 2022 (a 7.2% increase from 34.44 per square kilometre in 2016, and a 14.6% increase from 32.23 per square kilometre in 2011). The total number of private households was 46,553 in 2022 (a 7.2% increase from 43,469 in 2016, and a 10.5% increase from 42,106 in 2011). The average household size has remained consistent at three persons per household based on the 2011, 2016, and 2022 census results.



Graph 5.1: Total Population trend for County Clare's in recent National Census years.

County Clare is the seventh largest county in Ireland with a land mass of 3,450km^2. There are a number of small towns, and large and small villages geographically spread throughout the County. In total, there are 41 settlements, and they provide essential services for the local communities and the rural hinterlands. The different settlement tiers perform differing roles with the result that no area in the county is significantly peripheral or isolated. This provides a reasonable platform upon which to build an integrated local economic and

community plan and strong sustainable communities. The Local Economic and Community Plan 2023-2029[5] (LECP) (as part of the Clare County Development Plan) sets out the objectives and actions needed to promote and support the economic development of the communities in County Clare. The LECP is compiled by local community development committees of which there is one in each local authority area, established under the Local Government Reform Act 2014 (as amended).

The increase in rural population over a 6-year period from 2016 to 2022 in County Clare was 9,121[6]. The towns of Ennis (27,923), Shannon (10,256), Kilrush (2,649) and the village of Sixmilebridge (2,832) are the most populated within the County[7]. Ennis, is the County Town and the administrative centre of County Clare.

Study Area 3: The Midwest Region: Clare, Limerick and Tipperary (8,248km²)

The Regional Spatial and Economic Strategy (RSES) for the Southern Regional Assembly 2040[8] outlines the assembly's aim of reversing of town/village and rural population decline, by encouraging new roles and functions for buildings, streets and sites. The National Planning Framework (NPF)[9] projects a population growth for the southern region of between 340,000 to 380,000, during this period, with an additional 225,000 people in employment.

RSES notes that the population living in '*aggregate rural area'* (i.e. persons living in the open countryside or in settlements of less than 1,500) are home to almost 49.15% of this region's population, and as such represent a sizeable cohort of the population. Population growth needs to be matched by the delivery of critical enabling infrastructure and services, thus ensuring that these places grow as successful significant employment centres and service locations not only for the urban areas themselves but, importantly, for their extensive hinterlands that include smaller towns, villages and rural areas. The RSES outlines the importance for the energy sector being a regional driver of the rural economy (White Paper-Irelands transition to a Low Carbon Energy Future 2015-2030). The RSES outlines a key objective relating to supporting enterprise and employment in rural areas, as set out in the Department of Heritage, Regional, Rural and Gaeltacht Affairs Action plan for Rural

[5] Local Community Development Committees (LCDCs), on behalf of Clare County Council, '*Draft Clare Local Economic and Community Plan 2023-2029'* https://www.clarecoco.ie/services/community/lecp/#lecp23 – [Accessed01/12/2024]
[6] Local Community Development Committees (LCDCs), on behalf of Clare County Council, '*County Clare Economic and Community Plan 2016-2021'* Published May 2016. Available at: https://www.clarecoco.ie/services/community/publications/clare-county-lecp-2016-2021-22631.pdf- [Accessed: 01/12/2024]
[7] Central Statistics Office (CSO), 'Census 2016 Reports'. Available at: https://www.cso.ie/en/census/census2016reports
[8] Southern Regional Assembly, *'Regional Spatial & Economic strategy 2020-2040 (RSES)'*. Available at: http://www.southernassembly.ie/regional-planning/rses - [Accessed01/12/2024]
[9] The Department of Housing Planning and Local Government, on behalf of the Government, 'Project Ireland 2040 - The National Planning Framework' published February 2018. Available at: https://npf.ie/project-ireland-2040-national-planning-framework/ [Accessed: 01/12/2024]

Development, which includes the support of sectoral growth through roll out of initiatives to develop the renewable energy sector in rural Ireland.

5.3.2 Economic Activity

5.3.2.1 Primary sectors

Study Area 1: The proposed Project area and Environs – Electoral Divisions (EDs) Einagh, Kilrush Rural, Clooncoorha, Kilrush Urban (288km^2)

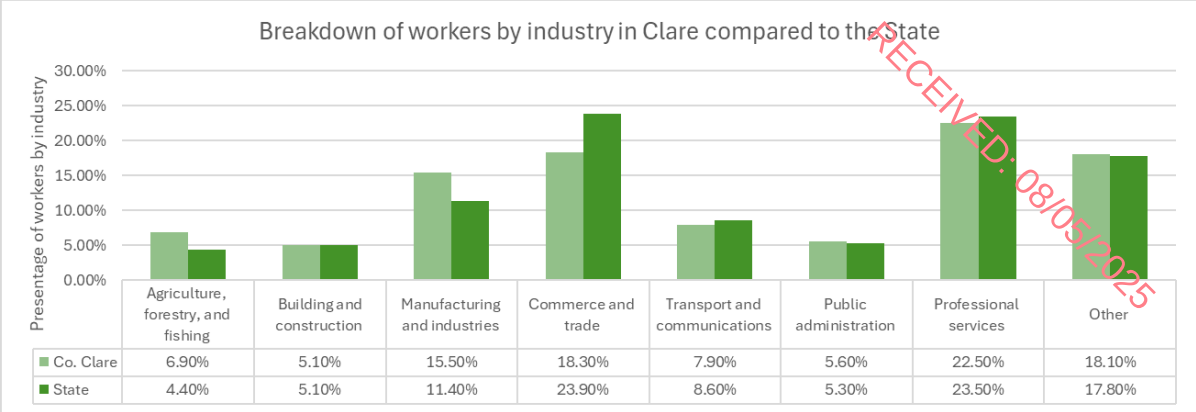
Study Area 1, the employment distribution is as follows: Agriculture, forestry, and fishing provide 92 jobs (6% of the total); building and construction offer 89 jobs (6%); manufacturing industries support 150 jobs (10%); commerce and trade employ 322 individuals (21%); transportation and communications account for 89 jobs (6%); public administration provides 73 jobs (5%); professional services are the largest employer with 406 jobs (26%); and other sectors collectively offer 316 jobs (21%). Overall, there are 1,537 jobs across these various sectors in the study area.

Study Area 2: Clare County (3,450km^2)

The economy of County Clare is diverse, with strengths in industry, health, wholesale and retail, hospitality and tourism, and education. In 2022, as a predominantly rural constituency, County Clare had a higher percentage of residents working in agriculture, forestry, or fishing (6.9%) compared to the national average of 4.4%. The County also outperformed the national average in manufacturing and industry employment, with 15.5% of residents employed in this sector, compared to 11.4% nationally.

Conversely, the proportion of workers in commerce and trade was lower in County Clare (18.3%) than the national average (23.9%). Similarly, the percentage of residents working in transport and communications was also lower, at 7.9% compared to 8.6% nationally. However, County Clare had a similar share of residents employed in building and construction (5.1%), matching the national figure.

Additionally, the percentage of residents in Clare working in public administration was slightly lower (5.6%) than the national average (5.3%), while employment in professional services was also lower in Clare (22.5%) compared to the national average (23.5%). The percentage of workers in "other" categories was comparable between Clare (18.1%) and the national average (17.8%). Moreover, County Clare had fewer workers in sales and customer service occupations (5%) compared to the national average (6%), but a higher proportion in skilled trade occupations (16% compared to 13% nationally).



Graph 5.2: Economic Activity

5.3.3 Employment

Study Area 1: The proposed Project area and Environs – Electoral Divisions (EDs) Einagh, Kilrush Rural, Clooncoorha, Kilrush Urban (288km^2)

The distribution of principal economic statuses within the study area is as follows: Individuals at work constitute 1,537 people (45%). Those seeking their first regular job account for 57 individuals (2%), while short-term unemployed individuals total 72 (2%). Long-term unemployed individuals amount to 137 (4%). Students number 271 (8%), and those looking after the home or family members constitute 239 individuals (7%). Retired individuals are the largest group, with 791 people (23%). Those unable to work due to permanent sickness or disability total 309 (9%), and other economic statuses account for 33 individuals (1%). Overall, there are 3,446 individuals classified by their principal economic status within the study area. **Table 5.2** sets out.

Table 5.2: Principle Economic Status within Study Area 1

Principal Economic Status	No. Persons
At work	1537
Looking for first regular job	57
Short term unemployed	72
Long term unemployed	137
Student	271
Looking after home/family	239
Retired	791
Unable to work due to permanent sickness or disability	309

Principal Economic Status	No. Persons
Other	33

Study Area 2: Clare County (3,450 km^2)

According to the CSO 2022, there were 56,144 persons over 15 years of age at work in Clare County, an increase of 6,633 people (+13%) between 2016 and 2022. Nationally, there was an increase of over 16% of people over 15 years of age at work.[10]

The leading employment sectors in County Clare are Professional Services (24%) and Commerce and Trade (18.3%)[11]. Of the 46,796 persons aged 15 years and over who were outside the working population, 25% were students, 14% were looking after the home/family and 39% were retired. **Table 5.2** sets out employment status in Clare County in 2022.

Table 5.2: Principle Economic Status within Study Area 2

Principal Economic Status	No. Persons
At work	56,144
Looking for first regular job	813
Short term unemployed	1,669
Long term unemployed	2,485
Student	11,726
Looking after home/family	6,565
Retired	18,317
Unable to work due to permanent sickness or disability	4,462
Other	759
Total	**102,940**

5.3.4 Land Use and Topography

Study Area 1: The proposed Project area and Environs – Electoral Divisions (EDs) Einagh, Kilrush Rural, Clooncoorha, Kilrush Urban (288km^2).

[10] CSO, Census 2022 Summary Results Clare Available at: https://www.cso.ie/en/csolatestnews/pressreleases/2023pressreleases/pressstatementcensusofpopulation2022-summaryresultsclare/#:~:text=There%20were%2056%2C144%20people%20(aged,%25)%20between%202016%20and%202022. [Accessed: 01/12/2024]

[11] CSO, Census 2022 Available at: https://visual.cso.ie/?body=entity/ima/cop/2022&boundary=C03789V04537&guid=2ae19629-14a2-13a3-e055-000000000001&theme=13 [Accessed: 01/12/2024]

The land use within Study Area 1 is predominantly rural, consisting mainly of agricultural activities such as livestock grazing, mixed farming, and bogland. The area is characterised by low, level terrain with elevations between 8m and 18m AOD. The region includes a mix of farmland, pasture, and some forestry, along with scattered residential areas, small settlements, and natural features like wetlands or woodlands. Kilrush Urban, within this area, is more developed, with residential, commercial, and industrial zones, acting as a local service and administrative centre surrounded by parks and undeveloped land on the outskirts.

Study Area 2: Clare County (3,450km^2)

Land use in County Clare is shaped by a diverse landscape, which includes coastal areas, agricultural lands, rural settlements, and natural heritage sites. The County Clare Development Plan 2023-2029 sets out the strategic vision for sustainable land management, focusing on balancing development needs with the preservation of natural and cultural resources.

The Plan emphasises the protection of the County's natural landscapes, particularly the Burren region and other areas of ecological importance. It also outlines specific zones for residential, commercial, and industrial development, prioritising areas that are already serviced with infrastructure to ensure efficient land use.

Agricultural land, which dominates much of the County's landscape, is primarily used for pasture and farming, reflecting the importance of agriculture to the local economy. However, there is also a growing focus on the development of renewable energy projects, particularly wind farms, in suitable rural areas.

In urban areas like Ennis and Shannon, land use is directed towards accommodating population growth and economic development while maintaining green spaces and ensuring that new developments adhere to high environmental standards.[12]

Study Area 3: The Midwest Region: Clare, Limerick and Tipperary (8,248km^2)

In Ireland's Midwest region, which includes County Clare, County Limerick, and County Tipperary, land use is predominantly agricultural, with around 70-80% of the land dedicated

[12] Clare County Council, '*The Clare County Development Plan 2023-2029, Clare Wind Energy Strategy*'. Available at: https://clarecdp2023-2029.clarecoco.ie/stage3-amendments/adoption/volume-6-clare-wind-energy-strategy-clare-county-development-plan-2023-2029-51390.pdf – [Accessed01/12/2024]

to farming. This includes dairy, beef, and sheep farming, particularly in areas like the Golden Vale in Tipperary.

Forestry also plays a role, with various afforestation initiatives in place. Urban development is concentrated in cities like Limerick and towns such as Clonmel and Thurles, where growth is managed under the National Planning Framework (NPF) and Regional Spatial and Economic Strategy (RSES), ensuring a balance between urban expansion, rural preservation, and environmental sustainability.[13]

5.3.5 Tourism

5.3.5.1 Tourist Attractions

Study Area 1: The proposed Project area and Environs – Electoral Divisions (EDs) Einagh, Kilrush Rural, Clooncoorha, Kilrush Urban (288km^2)

Tourist attractions (receptors) were collated using the suggested information sources outlined in the Fáilte Ireland EIAR Guidance document and using an internet search engine.

- The nearest attraction, the **Vandeleur Walled Garden**, is 3.7km south-east of the Site. Opened in 2000, it spans a 170ha area of native woodland.
- The **JJ Corry Irish Whiskey Experience** is 5.6km east of the Site. This popular attraction offers tours and whiskey tastings on a family farm.
- The **Scattery Island Visitor Centre** is approximately 3km south of the Site in Kilrush. It provides boat trips to Scattery Island, guided tours of the historic monastery, and includes an information centre, restaurant, and coach parking.
- **Scattery Island**, about 4km south of the Site, was awarded the European Destination of Excellence (EDEN) in 2017. The island features significant cultural heritage sites, including five churches, a cathedral, a round tower, a Napoleonic-era artillery battery, and a working lighthouse.
- **The Flying Alpaca**, 4.5km south-west of the site, is an alpaca farm offering alpaca trekking experience.
- The **Shannon Dolphin and Wildlife Centre** in Kilrush is approximately 3km south of the site. Open from mid-May to mid-September, it offers free guided tours by marine biologists, providing insights into ongoing research on the Shannon Estuary bottlenose dolphin population and other marine species in Irish waters. There are also several scenic trails/walks/cycles around the area. The **Cliff Walk in Kilkee** (10.8km west) offers breathtaking Atlantic views, while the **Doonbeg Castles Heritage Trail** (7.8km

[13] CSO, Census 2022 Summary Results Clare Available at: https://www.cso.ie/en/csolatestnews/pressreleases/2023pressreleases/pressstatementcensusofpopulation2022-summaryresultsclare/#:~:text=There%20were%2056%2C144%20people%20(aged,%25)%20between%202016%20and%202022. [Accessed: 01/12/2024]

north) explores ancient sites. For a unique coastal experience, **rent e-bikes at Loop Head** (14.5km south-west) or the **Bridges of Ross** (13 km south-west). **The Ballybunion Cliff Walk** (26 km north-west) provides stunning vistas, and the **Burren National Park** (40 km north-east) offers diverse hiking through a unique karst landscape.

Study Area 2: Clare County (3,450km²)

Tourism is a cornerstone of County Clare's economy, making it one of Ireland's foremost travel destinations. With its diverse landscapes, vibrant towns, and a rich tapestry of natural and cultural attractions, Clare offers a memorable experience for both domestic and international visitors.

- **The Cliffs of Moher**: Are a major visitor attraction regionally and nationally, featuring dramatic cliffs that rise over 200 meters above the Atlantic Ocean, home to a myriad of seabird colonies and are located approximately 34km north of the Site.
- **Bunratty Castle & Folk Park:** Is approximately 43.3km east of the Site. It offers a window into the past with its medieval castle and immersive 19th-century village experience.
- **Craggaunowen:** About 46.8km north-east of the Site, showcases reconstructed Iron Age dwellings, providing a glimpse into ancient Irish life.
- **The Burren**: Approximately 44.3km north of the Site, is a UNESCO World Heritage Site is renowned for its unique karst landscape, rich in flora and archaeological sites.
- **Poulnabrone Dolmen:** A significant megalithic tomb, adds to the region's ancient mystique. Located about 47.5km north-east
- **The Loop Head Peninsula**: Promises stunning coastal vistas, lighthouse tours, and scenic walks and is 28.8km south-west of the Site.
- **Fanore Beach:** Is located about 51.1km north-east. It offers a peaceful escape with its unspoiled sands and natural beauty.
- Adventure seekers will appreciate.
- **Aillwee Cave** and **Doolin Cave**; the latter boasts one of the largest stalactites in the Northern Hemisphere. Aillwee Cave: 50.8km northeast of the Site. Doolin Cave: 41.8km northeast of the Site.
- **Lough Derg:** Ideal for boating and fishing, further enhance Clare's diverse appeal. Located approximately 66.94km east of the Site.
- **Ennis:** 35.1km north-east of the Site, is the county town, known for its lively traditional music scene and charming streets.
- **Kilrush:** 2.5km south-east of the Site, offers scenic harbour views

- **Shannon Estuary:** Where visitors can embark on dolphin-watching tours. Approximately 1.3km south of the Site.
- **Tulla:** About 51.9km north-east, Famed for its traditional Irish music.
- **Mountshannon**: With its picturesque harbour and lakeside walks. Located approximately 75km north-east of the Site.

As part of the "Wild Atlantic Way" one of the world's longest defined coastal routes, County Clare is positioned as a premier international tourism destination, offering a cohesive and unparalleled experience of Ireland's rugged west coast.

5.3.5.2 Tourism: Numbers and Revenue

Study Area 2: Clare County (3,450km^2)

Tourism is regarded as one of Ireland's most important economic sectors and is key to dispersing wealth into rural economies and smaller towns. In County Clare, the industry generated €244 million in 2018 and supported approximately 6,600 tourism jobs, positioning the sector as a core component of Clare County Council's vision. A review of the industry's performance highlights Clare's appeal in international markets, ranking 5th among counties in 2017. In total, 8% of all overseas visitors to Ireland spent time in Clare, and 5% of all domestic trips originated in the County.[14]

Study Area 3: The Midwest Region: Clare, Limerick and Tipperary (8,248km^2)

The Mid-West Region includes the counties of Clare, Limerick and Tipperary. The region has a wealth of natural, cultural and heritage assets of national importance and is a significant tourist destination. Ireland's Mid-West Region benefits annually from an influx of foreign and domestic visitors with this market proving particularly important for the region's tourism and hospitality sectors. Prior to the Covid-19 pandemic, the region benefited from approximately 1.4 million overseas visitors each year, and over 900,000 domestic tourists, which when combined contributed over €600m annually to the regional economy.[15]

5.3.5.3 Visitors Attitudes to Windfarms

Sustainable Energy Ireland Survey 2003

The first Wind Farm in Ireland was completed in 1992 at Bellacorrick, Co. Mayo and since then wind farms have elicited a range of reactions from Irish people (Failte Ireland, 2012). In 2002, Sustainable Energy Ireland (SEI) now the Sustainable Energy Authority of Ireland

14 County Clare Tourism Strategy 2030, available at: https://www.yumpu.com/en/document/read/65325108/county-clare-tourism-strategy-2030. [Accessed at 01/12/2024]

15 Regional Enterprise Plan to 2024 Mid-West, https://enterprise.gov.ie/en/publications/publication-files/mid-west-regional-enterprise-plan-to-2024.pdf, [Accessed01/12/2024]

(SEAI) commissioned a survey aimed at identifying public attitudes to renewable energy, including wind energy in Ireland[16]. A windfarm catchment area survey was also carried out by SEAI (formerly SEI) in order to focus specifically on people living with a wind farm in their locality or in areas where wind farms are planned.

The survey found that the overall attitude of Irish people to wind farms is very positive, with 84% of respondents rating it positively or very positively. One percent (1%) rates it negatively and 14% had no opinion either way. Additionally, approximately two thirds of respondents (67%) were found to be positively disposed to having a Wind Farm in their locality. Where negative attitudes were voiced towards Wind Farms, the visual impact of the turbines on the landscape was the strongest influence, therefore special care should be taken to ensure that wind farms respond to contextual landscape characteristics. The report also notes however that the findings obtained within wind farm catchment areas showed that impact on the landscape is not a major concern for those living near an existing wind farm.

Similar to the national survey, the surveys of those living within the vicinity of a Wind Farm found that the findings are generally positive towards wind farms. Perceptions of the impact of the development on the locality were generally positive, with some three-quarters of interviewees believing it had impacted positively. In areas where a wind farm development had been granted planning permission but was not yet under construction, three quarters of the interviewees expressed themselves in favour of the wind farm being built in their area. Four per cent were against the development. The reasons cited by those who expressed themselves in favour of the wind farm included the fact that wind energy is clean (78%), it would provide local jobs (44%), it would help develop the area (32%) and that it would add to the landscape (13%).

Survey Update 2017

Additionally, a survey carried out by Interactions in October 2017, published by the SEAI, show 47% of Irish adults polled said they were strongly in favour of wind power in Ireland while a further 38% favour it.

The SEAI survey found that the overall attitude to Wind Farm is very positive, with 84% of respondents in favour of the use of wind energy in Ireland. Approximately two thirds of

[16] Sustainable Energy Ireland (2003), Attitudes towards the Development of Wind Farms in Ireland, Dublin

respondents (70%) would prefer to power their home with renewable energy over fossil fuels, and 45% would be in favour of a wind farm development in their area.

The final section of the 2017 report states:

"The overwhelming indication from this study is that wind energy enjoys great support and, more specifically, that the development of wind farms is supported and welcomed. The single most powerful indicator of this is to be found among those living in proximity to an existing Wind Farm: *over 60% would be in favour of a second wind farm or an extension of the existing one. This represents a strong vote in favour of wind farm developments — especially important since it is voiced by those who know from direct experience about the impact of such developments on their communities."*

IWEA Interactions Opinion Poll on Wind Energy

Interactions Research have conducted omnibus research commissioned by Wind Energy Ireland (WEI), formerly the Irish Wind Energy Association (IWEA), in October 2017, November 2018, November 2019 and again in November 2020 with the objective to *"measure & track perceptions and attitudes around wind energy amongst Irish adults."*

The most recent survey, conducted online in November 2020 and published in January 2021[17] sampled a representative sample of 1,004 Irish adults nationwide, together with a supplementary booster sample of 203 rural dwellers. The key findings from the survey included:

- 82 per cent in favour of wind energy with 50 per cent strongly in favour
- Opposition to wind energy at 4 per cent
- Majority in rural Ireland – 52 per cent – would support a wind farm in their area while opposition is at 15 per cent.
- The top five reasons for supporting wind energy were identified as:
  - Good energy source
  - Good for the environment
  - Creates jobs.
  - No reason to be against wind energy.
  - Cheaper energy.

As a result of the ongoing research, trends in the attitudes of windfarms over the past four years can be assessed. The survey showed that the trend in attitude amongst the nationally representative sample is increasingly positive. Despite very consistent overall satisfaction,

[17] https://windenergyireland.com/images/files/2032-wei-version-2020-for-media.pdf [Accessed: 01/12/2024]

some movement can be seen over time within the rural sample from being 'strongly in Favour' towards 'tending to favour' wind power.

Public acceptance of new renewable electricity survey 2021[18]

Ireland's 2030 targets for renewables (primarily wind, solar) in electricity generation are ambitious, essentially doubling, growing from 36.5% in 2019 to 80% by 2030. The electricity demand is anticipated to be between 28% and 55% higher in 2030 compared to 2018. To meet the anticipated growth in electricity demand in Ireland, as well as achieve the renewable electricity policy targets, a substantial investment in electricity infrastructure is required. However, often these large new scale power system infrastructure developments, face strong public opposition.

The result of this survey indicates that 77% of people are positively disposed to wind turbines. However, just 36% are willing to accept the development of wind farms within 5km of their homes.

The current research shows that public acceptance levels for new energy infrastructure is significant. The cost of building and operating the power system could dramatically escalate if there is a sharp deterioration in the public's acceptance of new energy infrastructure. The implication for policy and the wider electricity sector is that community and stakeholder engagement should remain a top priority.

5.3.6 Human Health

Common concerns around wind farms in terms of human health are generally associated with issues such as electromagnetic interference, shadow flicker and noise.

These topics are considered in this EIAR in addition to air quality and water contamination. See **Chapter 8: Soils and Geology, Chapter 9: Hydrology and Hydrogeology, Chapter 10: Noise and Vibration, Chapter 12: Air Quality and Climate,** and **Chapter 13: Shadow Flicker**.

5.3.6.1 General Health of Population

Human health of communities can vary greatly owing to a number of factors including susceptibility to disease, location, income inequality, access to health care etc. The Department of Health routinely publishes a review of Irish public health indicators derived

[18] Public acceptance of renewable electricity generation and transmission network developments: Insights from Ireland, Manuel Tong, Koecklin,GenaroLongoria, Desta Z.FitiwiabJoseph, F.DeCarolisc, JohnCurtis , Energy Policy, Volume 151, April 2021, 112185

from several areas, including demographics, population health, hospital and primary care, employment and expenditure. In 2021 it published "*Health in Ireland – Key Trends 2021*" which indicates a generally positive picture of decreasing mortality rates set against high self-perceived health over the past decade. According to this report, Ireland has the highest self-perceived health status in the EU area, with 83.9% of people rating their health as good or very good[19].

The 2022 census data for the general health of the population as shown in **Table 5.3** indicates the health status across three of the Study Areas as "*Very Good*" to "*Good*". The health status of the Site and environs is very similar to that of County Clare as a whole. Both these areas are in line with the national average. The "*Very Good*" health status for County Clare at 58% is 1% lower than the national average.

Table 5.3: Population by General Health (2022)

General Health	The Site & Environs (10km)	County Clare	Ireland
	Percentage (%)		
Very good	45.3	51.6	53.2
Good	32.1	31.0	29.7
Fair	13.5	9.0	8.6
Bad	2.5	1.4	1.4
Very bad	0.5	0.3	0.3
Not stated	6.1	6.6	6.7

Note: The Site & Environs (10km) Population by General Health is based of the average population by General Health for each Electoral Division Area within 10km of the Site.

5.3.6.2 Electromagnetic Interference

Electromagnetic fields ("*EMF*") are invisible lines of force that surround electrical equipment, power cords, wires that carry electricity and outdoor power lines. Electric and magnetic fields can occur together or separately and are a function of voltage and current. When an electrical appliance is plugged into the wall, an electric field is present (there is voltage but no current); when that appliance is turned on, electric and magnetic fields are present (there is both voltage and current). Both electric and magnetic fields decrease with distance. Electric fields are also dissipated by objects such as building materials. On a daily basis,

[19] The Department of Health (2021) – "*Health in Ireland: Key Trends 2021"* Available at: https://www.gov.ie/en/publication/350b7-health-in-ireland-key-trends-2021/ [Accessed 01/12/2024]

people are exposed to extremely low frequency ("*ELF*")) electric and magnetic fields (EMF) as a result of using electricity.

National and international health and scientific agencies have reviewed more than 35 years of research including thousands of studies. None of these agencies has concluded that exposure to ELF-EMF from power lines or other electrical sources is a cause of any long-term adverse effects on human, plant, or animal health. The International Commission on Non-Ionising Radiation Protection (ICNIRP) Guidelines give a limit of 100µT for sources of AC magnetic fields. This compares to 0.13 µT for 110 kV underground cable when directly above it, 1.29 µT for 220kV underground cable when directly above it and 11.4 µT for 400 kV AC underground cable that is one metre deep and measured directly above it. The ESB published an information booklet in 2017 called "*EMF & You*" which provides information about Electric & Magnetic Fields and the electricity network in Ireland[20].

In 2014 a scientific study was undertaken in Canada[21], measuring electromagnetic fields around wind farms and their impact on human health. This study concluded the following: *"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"*.

5.3.6.3 Shadow Flicker

The Department of Energy and Climate Change for England stated in its report *Update of UK Shadow Flicker Evidence Base* (2011) that it is considered that the frequency of the flickering caused by the wind turbine rotation is such that it should not cause a significant risk to health.

Chapter 13 Shadow Flicker and EMI provides the full baseline description of shadow flicker for the Project for this EIAR.

Shadow flicker is directly associated with the operation of turbines. There are currently no turbines on the Site. However, the operational Moanmore Wind Farm is located 1.7 km Northeast of the Site. Some receptors have potential to experience some shadow flicker from this wind farm, as detailed in **Chapter 13: Shadow Flicker and EMI**. The assessment

[20] EMF & You, ESB, 2017 - https://esb.ie/docs/default-source/default-document-library/emf-public-information_booklet_v9.pdf?sfvrsn=0, [Accessed 01/12/2024]
[21] Lindsay C McCallum, *et al*. (2014) *Measuring electromagnetic fields (EMF) around wind turbines in Canada: is there a human health concern?Available at: https://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-13-9*. [Accessed: 01/12/2024]

showed 13 no. receptors H96, H97, H110, H116, H117, H121, H122, H138, H150, H163, H172, H177, and H178 are predicted to be affected by the operational Moanmore Wind Farm and not the proposed Development (**Table 13.4**).

5.3.6.4 Noise

Chapter 10: Noise and Vibration provides baseline description of noise in relation to the Project. This chapter also assesses the significance of the potential effects of the Development during operation, construction and decommissioning.

5.3.6.5 Air Quality

Chapter 12: Air and Climate provides a detailed baseline description of the Site in terms of Air and Climate.

Environmental risk factors, such as air pollution and climate change, pose growing threats to public health in the EU. In 2021, fine particulate matter ($PM_{2.5}$) exposure alone caused over 253 000 deaths, with the highest mortality in Central and Eastern Europe.[22] It is estimated that there are approximately 1,300 premature deaths annually in Ireland due to poor air quality from fine particulate matter ($PM_{2.5}$). [23]

These emissions, along with others including nitrogen oxides (NO_x) and sulphur oxides (SO_x) are produced during the burning of fossil fuels for energy generation, transport or home heating. There are no such emissions associated with the operation of wind turbines.

5.3.6.6 Water Quality

A full and detailed baseline description of water quality for the Project has been included in **Chapter 9: Hydrology and Hydrogeology**.

Contaminants such as sediments arising from the Project have the potential to cause negative aquatic ecological effects.

The Environmental Protection Agency (EPA) conducts an ongoing monitoring programme as part of Ireland's requirements under the WFD[24]. The monitoring programme includes an assessment of biotic indices (biological quality ratings ranging from Q1-5) known as Q-Values. The Q-Rating is a water quality rating system based on both the habitat and the

[22] OECD/European Commission (2024), Health at a Glance: Europe 2024: State of Health in the EU Cycle, OECD Publishing, Paris, https://doi.org/10.1787/b3704e14-en
[23] Air Quality in Ireland Report 2022; EPA, 2023.
[24] EPA (2023) EPA River Quality Surveys: Biological, Hydrometric Area 27 [Accessed: 25/07/2024]

invertebrate community assessment and is divided into status categories ranging from Q1 (Bad) to 4-5 (High).

The latest EPA Q-ratings available for the Moyasta River, Brisla East Stream and Tullagower River downstream of the Project are outlined within **Chapter 7: Aquatic Ecology.**

The natural drainage of the Site is further facilitated by an extensive network of manmade surface water drainage features. These features comprise of several deeply incised drains which flow to the north, draining the cutover bog and the rough agricultural lands which comprise the Site, before discharging into the Moyasta River. Many of these manmade drains are located along existing hedgerows, field boundaries and along existing site access tracks. These drains provide a hydrological connection to the natural watercourses downstream of the Site.

A standalone Site-Specific Flood Risk Assessment (SFRA) has been completed and included as **Appendix 9.1.** Downstream of the Site, close to the Mouth of the Shannon coastal waterbody, lands are identified on the local 6" base mapping as being "liable to flooding". The closest mapped downstream historic flood event is located approximately 2.7km downstream of the Site at Moyasta (Flood ID: 12978). This flood event is dated 1st January 2014 and was associated with coastal/estuarine flooding.

The GSI's Winter 2015/2016 Surface Water Flood Map shows that the nearest mapped flood zones are approximately 1.5km northwest of the Site.
The CFRAM fluvial/coastal mapping shows medium and low probability flood zones are associated with fluvial flooding along the Moyasta River.

Furthermore, surface water ponding/pluvial flooding may occur in some flat areas of the wind farm Site following heavy rainfall due to the low permeability of the local soils/subsoils.

The wind farm Site is not mapped within any groundwater flood zone.
Consultation with the Geological Society of Ireland (GSI) well database indicates there are no mapped wells within the Redline Boundary. Governing industry guidelines (European Union (Good Agricultural Practice for Protection of Waters) Regulations 2017 (S.I. No. 605 of 2017), as amended) stipulate a buffer zone of 250m is required from boreholes used for drinking water abstraction. The closest mapped wells are greater than 250m from the Redline Boundary of the Site with several wells less than 2km from the Redline Boundary

of the Site (EIAR Section 9.3.10). All houses are over 600m from the Site, therefore, can be considered that all household wells are outside the 250m buffer zone distance[25].

Chapter 9: Hydrology and Hydrogeology provides a hydrological assessment for the Project on all potential receptors, including the proposed mitigation measures to prevent potential effects on water quality (see also **Appendix 2.1**). The receptors that have the potential to impact on human health include flooding, drinking water contamination, groundwater quality, surface water quality and wells. These have been assessed in **Chapter 9.** The assessment and evaluation of likely effects is broken down into three main parts or variables;

- Sensitivity of the receptor.
- Magnitude of the effect.
- Significance of the effect.

5.3.6.7 Traffic

It is estimated that during civil construction, approximately 4,207 loads (539 movements) will be delivered to Site or take waste material from the main wind farm site to an EPA licensed waste facility. This breaks down to approximately 54 loads per month. The peak number of deliveries per day will occur during the concrete pour for Turbine Foundation construction. An estimated 75 (assuming a capacity of 8m^3) concrete truck deliveries will be required per Turbine Foundation. Some other materials will also be delivered on such days, so a realistic estimation of peak deliveries is approximately 153 deliveries per day (for at least 4 separate days in the construction programme when the Turbine Foundations will be poured).

A detailed description of the turbine delivery route and enabling works on the public road network is given in **Chapter 16: Traffic and Transportation, Section 4** and **Appendix B** of the **Traffic Management Plan** included in **Appendix 16.2** and are detailed in **Drawings 6778-JOD-MNWF-XX-DR-C-HR-0250-0272** attached as **Appendix 16.4**. The works will include;

- N68 / L6132 Junction – Road widening and strengthening at junction to withstand wheel loading from abnormal load vehicles, relocation of telegraph poles, traffic signs and street furniture.
- L6132 - Temporary road widening in road verge to increase the carriageway width to 4.5m for the transportation of turbine components.

[25] European Union (Good Agricultural Practice for Protection of Waters) Regulations 2017. Available at: https://www.irishstatutebook.ie/eli/2017/si/605/made/en/print [Accessed on: 30/04/2025]

- L6132 - Vertical realignment of an existing crest curve to prevent abnormal vehicles grounding.
- L6132 - Construction of a blade transshipment area with access onto the L6132.
- L2036 - Temporary road widening in road verge to increase the carriageway width to 5.5m for the transportation of turbine components.
- L2034 / L2036 Junction - Construction of overrun area in third party lands to withstand wheel loading from abnormal load vehicles delivering turbine components.

Pedestrian and other vulnerable road users may be affected by the works at the proposed Development entrances, Construction Haul Routes, Turbine Delivery Route enabling works, grid connection works and increased vehicle movements during construction and delivery of turbine components. The construction of the proposed Development entrances and modifications to the public road network at various locations along the Turbine Delivery Route will be carried out under a road opening licence and traffic management plan which will accommodate pedestrians at the works locations. The effect of the works on pedestrian safety is therefore assessed to be medium sensitivity for a short-term duration. Pedestrian facilities may be altered for short periods during the transportation of turbine components. During these periods alternative arrangements will be put in place for pedestrians.

Chapter 16: Traffic and Transportation provides a full description of baseline traffic and transport conditions and an assessment of traffic in relation to the Project. Although no long-term significant effects have been predicted, **Chapter 16** also outlines the proposed mitigation measures which have been incorporated into the design to maintain the highest standard of road safety, minimise delay and disruption to all public road users, and to comply with statutory regulations.

5.3.6.8 Health Impact Studies

There are anecdotal reports of negative health effects on people who live near wind farms, however, there are no peer reviewed scientific research to support these views. Several peer reviewed scientific research publications are outlined below.

The National Health and Medical Research Council (NHMRC), Australia's leading medical research body, have concluded that there is no reliable or consistent evidence that wind farms directly cause human health problems as part of their Systematic Review of the Human Health Effects of Wind Farms published in December 2013. The review was commissioned to determine whether there is a direct association between exposure to wind farms and negative effects on human health or whether the association is casual, by chance or bias.

Objectors to wind farms often refer to 'Wind Turbine Syndrome' as a condition that can be caused by living in close proximity to wind farms. The symptoms include sleep deprivation, anxiety, nausea and vertigo. It has been rejected by the wind industry and is further refuted by a review carried out by the NHMRC that wind turbines cause this sort of symptoms. The review began in late 2012 and included a literature and background review of all available evidence on the exposure to the physical emissions produced by wind turbines. These emissions were noise, shadow flicker and electromagnetic radiation produced by wind turbines. The review concludes that the evidence considered does not support any direct association between wind farms and human health problems and that bias and confounding could be possible explanations for any reported association.

The international scientific journal "*Frontiers in Public Health*" published a study[26] in 2014 on the subject of wind turbines and human health. This review completed a bibliographic-like summary and analysis of the science around this issue, specifically in terms of noise (including audible noise, low-frequency noise, and infrasound), EMF, and shadow flicker. The study concluded as follows:

"The available scientific evidence suggests that EMF, shadow flicker, low-frequency noise, and infrasound from wind turbines are not likely to affect human health; some studies have found that audible noise from wind turbines can be annoying to some. Annoyance may be associated with some self-reported health effects (e.g., sleep disturbance) especially at sound pressure levels >40 dB(A). Because environmental noise above certain levels is a recognized factor in a number of health issues, siting restrictions have been implemented in many jurisdictions to limit noise exposure. These setbacks should help alleviate annoyance from noise. Subjective variables (attitudes and expectations) are also linked to annoyance and have the potential to facilitate other health complaints via the nocebo effect. Therefore, it is possible that a segment of the population may remain annoyed (or report other health impacts) even when noise limits are enforced." Based on the findings and scientific merit of the research conducted to date, it is our opinion that the weight of evidence suggests that when sited properly, wind turbines are not related to adverse health effects. This claim is supported (and made) by findings from a number of government health and medical agencies and legal decisions".

Considering the setback distances specified in the Draft Revised Wind Energy Development Guidelines from December 2019, which mandate a setback distance for visual amenity

[26]National Institute of Health. L. D. Knopper, et al. (2014) Wind turbines and human health. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4063257/ [Accessed at: 01/12/2024]

purposes of four times the tip height of the relevant wind turbine with a mandatory minimum of 500 meters from any residential property, alongside the current Wind Energy Development Guidelines (2006) indicating that noise impacts are generally not significant if the nearest turbine is more than 500 meters away from any noise-sensitive property, A minimum separation distance of 600m from all occupied sensitive receptors has been used with the Project design. This requirement is based on the proposed turbine, which has a tip height of 150m. The closest inhabited dwellings are (H2 and H3) located 609m from the nearest turbine. There is one property (H1) located less than 600m from the proposed turbines. H1 is an old cottage that is being used as a tack-room and is not considered a sensitive receptor in this EIAR. In light of the foregoing, it is considered that the separation distances between the proposed turbines and residential dwellings complies with both the current Wind Energy Guidelines (2006) and the Draft Revised Wind Energy Development Guidelines 2019, ensuring that the project adheres to established standards for minimising impact on neighbouring properties regarding noise and visual impact.

5.3.6.9 Turbine Safety

The Department of the Environment, Heritage and Local Government (DoEHLG)'s '*Wind Energy Development Guidelines for Planning Authorities 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 DoEHLG Guidelines state that there is a very remote possibility of injury to people from flying fragments of ice or material from a damaged blade. However, most blades are composite structures with no 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 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.

5.3.7 Property Value

There are currently no Irish studies undertaken to assess the impact of wind farms on property prices. However, a number of studies have been undertaken in the United Kingdom (UK), with findings set out in **Table 5.4**.

The largest study of the effects of wind farms on property prices was conducted in the USA by Hoen *et al*[27] for the US Department of Energy. This study in the USA used data from 7,500 of homes located within 10 miles (c.16km) of 24 existing wind farms in nine States over a 10-year study period. The findings are drawn from eight different pricing models, together with repeat sales and sales volume models. None of the models found conclusive evidence of the existence of widespread effects on property values of properties surrounding wind farms. The study also found that neither the view of the turbines or the distance of the property to the turbines had any consistent, measurable and statistically significant effect on property prices in that area. The article does state that the analysis cannot dismiss the possibility that individual properties, or small numbers of properties could potentially be negatively affected, although if there are such properties, they are either too small or too infrequent to result any widespread, statistically observable effect.

The study outlined above was updated in 2013[28] where data was collected from 50,000 house sales in 27 counties in nine states across the USA. The properties were within 10 miles (16km) of 67 wind farms. Of these, 1,198 sales were of properties within one mile (1.6km) of a wind turbine. The data covers the period from before wind farms were consented in the areas to after their construction and into the operation phase. The authors used Ordinary Least Squares (OLS) and spatial process difference-in-difference hedonic models to make an estimation of the effects on house prices from wind farms. Regardless of the model used, the study found no statistical evidence that property prices near turbines were affected in the pre-planning/pre-construction or post construction periods. The research suggests that the effects of wind turbines on property prices is likely to be small, if there is any effect at all.

A study undertaken in 2014 by the Centre of Economics and Business Research for Renewable UK found that house prices were driven by the property market and not the presence or absence of wind farms[29]. The study analysed house prices at 7 sites across

[27] ResearchGate. Available at:https://www.researchgate.net/publication/242582095_The_Impact_of_Wind_Power_Projects_on_Residential_Property_Values_in_the_United_States_A_Multi-Site_Hedonic_Analysis [Accessed: 01/12/2024]
[28] Energy Technologies Area. Available at: https://eta-publications.lbl.gov/sites/default/files/lbnl-6362e.pdf [Accessed: 01/12/2024]
[29] RenewablesUK. Available at:https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/publications/reports/ruk-cebr-study.pdf [Accessed: 01/12/2024]

England and Wales at either planning, construction or post construction. The report concluded that:

"We can conclude that local house price growth at these sites is best explained by variations in the county level property market. When homebuyers came to purchasing a property in areas within 5km of wind farm sites, it appears that other factors that determined demand for property, such as the supply of new housing and the condition of the local economy, were more influential than the fact that a wind farm was located nearby. This resulted in properties on average retaining their value."

Another study was undertaken in 2014 by the London School of Economics and it did find the presence of wind farms negatively impacted property values within 2km of very large wind farms[30]. In 2016, following on from the contrasting results of the 2014 studies ClimateXChange carried out their own research in Scotland. The ClimateXChange study found no significant effect on the change in price of properties within 2km or 3km of studied wind farms and found the property values trended in a positive direction in most cases[31]. The ClimateXChange study also found that some wind farms can provide economic and amenity benefits to an area.

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.

In addition to this, the additional energy security, community benefits (EIAR Section 1.7.2) and creation of jobs throughout the construction, operational and decommissioning phases of the proposed development will contribute to the sustainable growth of property values.

Table 5.4: Summary of research finding between wind farms and property values

Year	Country	Research Group	Finding
2009 and 2013	USA	LBNL	Analysed nearly 7,500 home sales near wind farms and found no consistent negative impact on property prices.

[30]SERC. Available at: http://eprints.lse.ac.uk/58422/1/__lse.ac.uk_storage_LIBRARY_Secondary_libfile_shared_repository_Content_SERC%20discussion%20papers_2014_sercdp0159.pdf [Accessed:01/12/2024]

[31] Heblich, D. S., Olner, D. D., Pryce, P. G. & Timmins, P. C., 2016. *Impact of wind turbines on house prices in Scotland,* Scotland: ClimateXChange. Available at: https://www.climatexchange.org.uk/media/1359/cxc_wind_farms_impact_on_house_prices_final_17_oct_2016.pdf [Accessed:01/12/2024]]

Year	Country	Research Group	Finding
			They found no statistical evidence of wind farms affecting home prices before or after construction.
2014	UK	Centre of Economic Research	In summary the analysis found that country-wide property market drives local house prices, not the presence or absence of wind farms; and The econometric analysis established that construction of wind farms at the sites examined across England and Wales has not had a detectable negative impact on house price growth within a 5km radius of the sites.
2014	UK	London School of Economics	There was an average reduction in the value of houses (based on 125,000 house sales between 2000 and 2012) of between 5% and 6% within 2km of very large wind farms.
2016	UK (Scotland)	ClimateXChange	Following a wide range of analyses, including results that replicate and improve on the approach used in the 2014 study by London School of Economics, the study did not find a consistent negative effect of wind turbines or wind farms when averaging across the entire sample of Scottish wind turbines and their surrounding houses. Most results either show no significant effect on the change in price of properties within 2km or 3km or find the effect to be positive. Some wind farms offer economic and leisure benefits, such as community funds and improved access to rural areas through tracks for cycling, walking, and horse riding. These developments can also boost local

Year	Country	Research Group	Finding
			economies through job creation and support for local businesses while contributing to community projects and environmental initiatives.

5.3.8 Natural Disasters and Major Accidents

A wind farm is not a recognised source of chemical pollution. Should a major accident or natural disaster occur, the potential sources of pollution onsite during both the construction and operational phases are limited. Sources of pollution with the potential to cause significant environmental pollution and associated negative effects on health include bulk storage of hydrocarbons or chemicals and storage of wastes. The Site is not regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations[32] i.e., "*SEVESO sites*" due to there being none of these sites in proximity of the Project, therefore there is no potential effect envisaged from this source.

5.3.8.1 Natural Disasters

There is limited potential for significant natural disasters to occur at the Site. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited to peat-slide, flooding and fire. The risk of peat-slide is addressed in **Chapter 8: Soils and Geology**. This chapter comprehensively assesses all elements of the Project. The potential effects that could arise from the Project during the construction, operational and decommissioning phases relate to the soil quality, soil contamination, change of land use, loss of natural materials and alteration of the natural soil profile.

The potential effects are considered to range in significance from slight to significant. Many of the effects are temporary and following remediation works these are reversible. However unmitigated effects can potentially be long term to permanent. While these effects are generally localised when considering the land, soil and geological environmental receptors. There is the potential for secondary and indirect effect on other sensitive receptors including surface water and habitats.

[32] S.I. No. 209/2015 - Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015.Available at: https://www.irishstatutebook.ie/eli/2015/si/209/made/en/print [Accessed 01/12/2024]

Providing the prescribed mitigation measures outlined in this report are fully implemented and best practice is followed on Site, the risk of any potential significant effects will be reduced or avoided.

The unavoidable residual effects on the land, soils and geology environment as a function of the Project is that there will be a change in ground conditions at the Site with natural materials such as peat, subsoil and bedrock being replaced by concrete, subgrade and surfacing materials.

The Site lies within probable flood zones and on-site risks. A portion of the Development lies within a low and medium probability flood plain, classified as Flood Zone A & B. Turbine T1 and associated hardstand and approach access track are positioned in these flood zones. The design of the proposed hardstand and the associated portion of site access track will be done in line with the requirements of appropriate guidelines, as presented in **Appendix 9.1**. Strategically designed drainage systems will manage water flow, preventing prolonged water accumulation.

These measures, including allocating space for flood capacity absorption and installing culverts to facilitate water movement, are particularly targeted at a section of the new site access track and a new watercourse crossing. The project is committed to using the latest best practice guidance to mitigate flood risk within or downstream of the site, aiming for a neutral impact at minimum. Detailed considerations of flood risk are extensively addressed in **Chapter 9: Hydrology and Hydrogeology**, with a Stage 1 and 2 Flood Risk Assessment included as **Appendix 9.1** to the Environmental Impact Assessment Report (EIAR).

It is considered that the risk of significant fire occurring, affecting the Project and causing the Project to have significant environmental effects is limited. As described earlier, there are no significant sources of pollution associated with the Project with the potential to cause environmental or health effects. Also, the spacing of the turbines and distance of turbines from any properties limits the potential for impacts on human health. The issue of turbine safety is previously addressed in **Section 5.3.6.9**.

In relation to earthquake risk, there are several fault lines across East-Clare with none documented in West-Clare; the Site is not located on any fault line[33]. There are no historical records of any earthquake causing serious damage in County Clare, the surrounding counties or on the Island of Ireland.

[33] Geological Survey Ireland (2023) Geological Survey Ireland Spatial Resources. Accessed:03/02/2023. Available online at: https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 [Accessed:01/12/2024]

Current legislation relating to the Health and Safety are designed to assist in the management of risks associated with the construction, operation, maintenance and decommissioning phase of windfarm projects.

As required under the Safety, Health, and Welfare at Work (Construction) Regulations 2013 as amended, the Client shall appoint a Project Supervisor for the Design Process (PSDP) and a Project Supervisor for the Construction Stage (PSCS). The PSDP shall compile a Preliminary Safety and Health Plan (PSHP), which details general information about the project and envisaged health and safety risks. The PSHP shall be made available to the PSCS. The PSCS shall develop a Construction Stage Health and Safety Plan (CSHSP) which incorporates the information contained in the PSHP and details how safety and health will be managed during the construction of the project. The PSCS may also develop the following documents for the construction stage:

- Construction and Environmental Management Plan
- Emergency Response Plan
- Detailed Traffic Management Plan

These documents will be submitted along with the application.

Accidents to Infrastructure

The PSDP shall ensure the General Principles of Prevention are taken into account for all designs relating to the project.

On very rare occasions, the structural integrity of wind turbines has failed. This is an extremely rare occurrence and, given that the turbines will be designed and installed by an experienced turbine contractor and are located well away from public roads and dwellings in line with the DoEHLG Draft Revised Wind Energy Development Guidelines (2019), it is not considered that, in the unlikely event of an accident of this type, any significant impacts to population or human health would result.

Potential accidents, such as a risk of incident during haulage, a fire on site or the risk of a turbine structural failure is assessed to be a **slight, negative, long-term effect.**

5.3.8.2 Major Accidents

The duties on designers and manufacturers of machinery including wind turbines are set out in the Machinery Directive, which has been transposed into national law by the 2008

European Communities (Machinery) Regulations as amended[34]. Properly designed and maintained wind turbines and associated infrastructure are a safe technology. A suitable separation distance from turbines and other key infrastructure to properties has been embedded in the Project design. These outlined measures will minimise the risk to humans. Overall impacts associated with weather, including extreme winds, lightning strikes, ice-throws, heat waves and structural failure have been removed or reduced through built turbine mechanisms in modern machinery and have been scoped out of the assessment. Potential health impacts are therefore related to Decommissioning/construction related impacts and operational impacts on residential amenity.

5.4 ASSESSMENT OF POTENTIAL IMPACTS

5.4.1 Population and Settlement Patterns

The Project does not contain a housing or services element and is not considered to have any direct Positive or Negative impact on the local or regional population levels during construction, operation or Decommissioning of the Project.

This will lead to the region becoming more attractive to business with the subsequent benefit of increased employment opportunities in the region. A renewable, green energy supply could potentially be attractive for companies looking to develop in County Clare and be located in the vicinity of the Site. While non-local construction workers may temporarily relocate to the area, primarily during the construction and decommissioning phases, this could result in minor, Short-term changes to local population dynamics. However, the overall impact on population dynamics is anticipated to be **Negligible** and **Not significant.** During the construction phase there is the potential for limited impacts on the residential amenity of the local population. These would be **short-term** impacts relating primarily to an increase in construction traffic causing noise, dust, and an increase in traffic volume. These potential effects are assessed in EIAR **Chapter's 10**, **12** and **16**: **Noise and Vibration**, **Air Quality and Climate** and **Traffic and Transport** respectively. The levels have been defined as **Slight, Negative** in the construction and decommissioning phases and **Imperceptible i**n the operational phase.

While this is not likely to result in a marked increase in settlement in the area, or a change in social patterns in the area, it should ensure the provision of a secure, renewable energy source which would prove attractive to industry. This benefit would accrue to the region in terms of the ability to provide electricity to industry and business in a high-quality supply

[34] European Communities (Machinery) Regulations (2008) Statutory Instrument (S.I.) No. 407 of 2008 as amended by S.I. 310 of 2011 and S.I. 621 of 2015. Available at: https://www.irishstatutebook.ie/eli/2008/si/407/made/en/print [Accessed:01/12/2024]

during operation. This is dependent on national and global economic conditions, as well as the types of industry which may locate in the region.

Following the assessment in **Section 5.3.1** the overall impact of the construction phase is predicted to be **Slight, Positive and Short-term** in nature should construction workers relocate to the area for the duration of these phases. The overall impact is predicted to be **Slight, Positive** at the local level in terms of settlement patterns where increased business is attracted to the area during the operational phase.

5.4.2 Economic Activity

During the construction phase, economic effects would arise from expenditures related to Site preparation, access road development, and the purchase and delivery of materials, equipment, and components. Based on the Developer's experience with other wind farms, it is estimated that the Project will have approximately 35 construction workers during the construction phase, increasing to 50 at peak construction. Some of these workers will be sourced from the local labour market in Study Area 2. However, professional and skilled personnel may be required to be sourced from areas inclusive of Study Area 4 or even further afield.

During the initial Construction and decommissioning phases, job opportunities are expected to be created. Local employment will be generated, along with opportunities at local, national, and international levels, both directly and indirectly. Throughout the project's lifetime, employment will not only be created but also sustained across local, regional, national, and international sectors.

There will be a strong emphasis on prioritising local sourcing to support the regional economy and reduce transportation impacts. This approach aims to not only ensure a reliable supply of materials but also to promote sustainability and community engagement throughout the Project. Material imported to site, as outlined in **Section 15.8** of Material Assets, will be sourced from a local quarry(s), such as one of those identified in **Chapter 2: Project Description**, **Table 2.5**: **Local Quarries and Concrete Suppliers**. Ready-mix concrete and crushed stone will also be obtained from a local supplier, contingent on authorisation and the availability of quality and quantity.

Employees involved in the construction of the Project will most likely use local shops, restaurants and hotels/accommodation. Therefore, overall, there will be a **Slight, Positive**

Impact on employment in the Study Areas. Employees also involved in the subsequent operation of the Development will use local shops, restaurants and hotels/accommodation.

Clare County Council will benefit from payments under both the Development Contribution Scheme and from the annual rate payments. The Developer is committed to a '*Community Benefit*' package in accordance with the Community Benefit Guidelines set forth by the Sustainable Energy Authority of Ireland (SEAI).

This package will be advertised annually and managed by the local community, or an independent body appointed by the local community. The purpose of the community fund is to enable the local community to share in the benefits of the Project. The Developer's community benefit funds typically support local projects, with funds allocated to projects from all aspects of the community.

The overall impact is predicted to be a **Moderate, Positive, Short-term** impact during the construction phase of the Project and **Moderate, Positive and Long-term** during the operational phase.

5.4.3 Employment

The employment effects that are attributable to the Project can be outlined as direct, indirect and induced.

Direct (35-50 workers): Employment and other economic outputs that are directly attributable to the delivery of the Project. These include any new jobs that are created to manage and supervise the construction phase, operational and decommissioning phases of the Project and that are filled by employees of the Developer or the appointed contractor (or sub-contracted employees).

Indirect: Employment and additional outputs generated by companies and organisations providing services to the Project, such as procurement of construction materials and equipment and other supply chain activities. Most manufactured materials, including towers, blades, and subcomponents, are expected to be imported, with an import dependency of approximately 66%. Major infrastructure will be delivered through Foynes Port in County Limerick, resulting in fewer indirect manufacturing jobs being created domestically in Ireland.

Induced: Additional jobs and other economic outputs that are created in the wider economy, as a result of the spreading of employee incomes and other ripple effects that occur as a result of the direct and indirect effects of the Project.

The Proposed Development will create local employment opportunities throughout the construction, operational and decommissioning phases. These opportunities include local contractors being employed, local suppliers being sourced when possible, and the use of hotels and other services.

In 2014, Siemens[35] published a report analysing the job creation potential of the wind sector in Ireland in conjunction with the Irish Wind Energy Association. The report states that:
'*A major programme of investment in wind could have a sizeable positive effect on the labour market, resulting in substantial growth in employment.'*
Direct employment identified in the report includes Installation, Development, Planning, Operation and maintenance, Investor Activity, Grid network employment and potential Turbine Manufacturing employment.

The 2021, Wind Energy Ireland report; Economic Impact of Onshore Wind in Ireland, notes that the onshore wind sector employed approximately 5,130 people in 2020, not including employment in grid development. This includes significant employment in rural communities. The majority (62%) of income generated is in the sectors supply chain, showing that the sector acts as a catalyst for wider employment. In the SEAIs Wind energy Roadmap 2011-2050[36], it is estimated that onshore and offshore wind could have an investment potential of €6 billion to €12 billion by 2040 and create 20,000 direct installation and operation/maintenance jobs.

In terms of its capacity to capture capital investment domestically, Ireland has strong indigenous feasibility, planning, foundations and engineering expertise, with the skills and knowledge base to potentially supply niche markets in controls and instrumentation, albeit the bulk of heavy manufacturing (blades, towers) is imported. Similarly, the Irish supply chain is very well positioned in all the preliminary design and operational aspects of the electricity grid, providing a significant boost to local employment. However, some manufactured materials such as cables, underground pipes, insulators and conductors are sourced from abroad. According to SEAI, there are approximately 0.34 new long-term jobs

[35] Siemens. (2014). An Enterprising Wind. https://www.esri.ie/publications/an-enterprising-wind-an-economic-analysis-of-the-job-creation-potential-of-the-wind. [Accessed: 01/12/2024]
[36] SEAI. (2011). Wind Energy Roadmap 2011-2050 https://www.seai.ie/publications/Wind_Energy_Roadmap_2011-2050.pdf [Accessed: 01/12/2024]

per MW, which falls in line with European Wind Energy Association (EWEA) estimates for direct employment in Europe. In the case of the Proposed Development, this translates to 6 new long-term jobs for the 15 MW wind farm.

According to the Institute for Sustainable Future Documents (2015)[37], 3.2 jobs are created per MW of wind energy development during the construction and installation phase, the report assumes a 2-year construction period. Using this figure, a projection of between 26 – 32 jobs could be created as a result of the construction phase of the Project (for an installed capacity of 12 – 15MW and a construction phase period of 1 years). It is estimated that approximately 35 construction workers will be employed on-site with this number increasing to up to 43 during the peak period of Turbine Foundation construction.

The SEAI' 2015 report '*A Macroeconomic Analysis of Onshore Wind Deployment*'[38] puts direct construction jobs from wind farm developments at 1.07 jobs per MW based on 1 year of construction. Using this figure, a projection of between 17 and 21 jobs could be created as a result of the construction of the Project (for an installed capacity between 12- 15 MW and a construction period of 1 years). Therefore, considering the minimum and maximum figures, it is estimated that between 17 and 32 direct and indirect jobs could be created during the construction phase of the proposed project. It is not expected that all of these jobs will be based at the wind farm Site, however, the employment of tradespeople, labourers, and specialised contractors for the construction phase will have a direct, short-term significant, positive impact on employment in the Study Area.

An estimated breakdown of the potential construction employment is as follows:

[37] Institute for Sustainable Futures, Calculating Global Energy Sector Jobs – 2015 Methodology Update, 2015.Available at: https://opus.lib.uts.edu.au/bitstream/10453/43718/1/Rutovitzetal2015Calculatingglobalenergysectorjobsmethodology.pdf [Accessed: 01/12/2024]

[38] Sustainable Energy Authority Ireland (SEAI) (2015), A Macroeconomic Analysis of Onshore Wind Deployment to 2020. Available at: https://www.seai.ie/publications/A-Macroeconomic-Analysis-of-Onshore-Wind-Deployment-to-2020.pdf [Accessed: 01/12/2024]

Table 5.5: Estimated Employment breakdown during the construction phase of the Project

Occupation/Task	No. of People	Employment Period
Foundation team	8	12 weeks
Tracks & Hardstands (truck drivers)	8	36 weeks
Plant drivers	4	45 weeks
Foreman	1	50 weeks
Engineer	1	50 weeks
Engineer	2	10 weeks
Electrical Substation (Civils)	10	10 weeks
Electrical Substation (Electrical)	16	16 weeks
Foreman	2	16 weeks
Turbine Delivery, Installation and Commissioning	11	8 -10 weeks
Turbine Commissioning	3	8 weeks
General operatives	3	45 weeks

Approximately 25-43 persons will be employed during the peak of the construction phase during the civil engineering of site access tracks, Turbine Hardstands, Turbine Foundations, and Electrical Substation construction. These numbers will be somewhat less for the turbine delivery, assembly, commissioning and Decommissioning activities. A mixture of skills will be required, including unskilled/semi-skilled/skilled manual (construction labour and machine operators), non-manual (administration roles), managerial and technical (civil, electrical, mechanical technical and engineering) and professional roles (legal, business and accounting). The manual roles will be site-based with the other roles being predominately office-based, with site visits as and when required. During construction, personnel will be at the Site over a number of months and during these times will likely use local accommodation and restaurants and other facilities.

Anecdotal evidence received by the Developer on other wind farm construction projects shows that local businesses such as accommodation providers welcome the enhanced level of occupancy that is achieved due to the construction contractors using their accommodation on a year-round basis, including periods of the year that are traditionally considered *'low season*'.

The benefits of increased business, although temporary, can allow businesses to invest in improvements that would not otherwise be affordable, leading to a long-term enhancement.

The Project will create approximately two full-time jobs during the operational phase. In addition to these jobs, various personnel will be required for the successful and continued operation of the wind farm. During the operation phase of the wind farm, the operation and reliability, maintenance (turbines, civil works and electrical infrastructure) finance, ongoing compliance with permissions and permits, safety, security, community relations and benefits and land-owner agreements must be continually managed. These requirements are widely distributed over various employment sectors and are an integral part of the ongoing operation of the Development and will provide continuous employment for the lifetime of the wind farm. A general outline of the employment associated with the operational phase of the wind farm is outlined in **Table 5.6.**

Table 5.6: Stakeholders involved during the operational phase[39]

Maintenance Contracts	Financial and Services Contracts	Other Stakeholders
Project Manager	Lenders	Local Community
Asset Management	PPA Provider	Local Authority (incl. rates payments)
Turbine Contractor • Transport Companies • Crane Hire • Plant and Vehicle Hire • Site Facilities	Landowner Agreements	Construction and Maintenance material suppliers: • Local shops • Food providers • Accommodation providers
	Insurance	Plant Hire companies
	Accountancy	Telecom provider
	Safety Consultants	
	Community Liaison Officer	
Electrical Works Contractor	Environmental Monitoring • Noise • Ornithology • Habitat Management	
Civil Works Contractor		
Utility		

[39] Irish Wind Energy Association (2019) *Life-cycle of an Onshore Wind Farm.* Ionic Consulting. Available at: https://windenergyireland.com/images/files/iwea-onshore-wind-farm-report.pdf [Accessed: 01/12/2024]

Individuals fulfilling these roles may reside and work anywhere in Ireland, visiting the Site as needed to operate and maintain the plant and equipment. During major service operations, personnel may spend several days on-site and utilise local accommodations and restaurants.

Overall, this will result in a Slight Positive Short-term impact on employment in the area.

Additionally, the Project is expected to contribute Significantly to local finances through rates paid over its lifetime. This income can support the Local Authority and create further employment opportunities as it is reinvested into community services and infrastructure. Furthermore, the community fund expenditure may also generate local economic activity, albeit to a lesser extent, by supporting local initiatives and projects.

Therefore, overall, there will be a **Slight Positive Short-term** impact on employment in the area.

5.4.3.1 Embedded measures

The Developer has a proven track record of developing renewable energy development and operation. The company has played a key role in the development of over 150MW of renewable energy projects in Ireland.[40]. The Developers experience from previous wind farm construction projects is that expenditure in local goods and services is widely spread and makes a difference to existing businesses. The Developer is committed to employing good practice measures with regard to maximising local procurement and will adopt measures such as those set out in the Renewables UK Good Practice 2014: *'Local Supply Chain Opportunities in Onshore Wind*' (Renewables UK, 2014).

The Developer will work with a variety of contractors who will be actively encouraged to develop local supply chains throughout the local area, and work with subcontractors to invest in training and skills development.

At this phase in the Project process, it is not possible however, to quantify economic benefits in respect of individual supply chain companies, as contracts would not be let until consent is granted. However, it is evident from the Developer's recent experience that local and regional suppliers of a wide range of goods and services will benefit from such a Project (in this case, County Clare, Limerick and Ireland as a whole).

[40] https://greensource.ie/

5.4.4 Land Use and Topography

Chapter 8: Soils and Geology concludes that pre-mitigation likely effects of land take during the construction phase are described as direct, adverse, of moderate significance and short to long-term (temporary or permanent land take). There is no likely significant effect to temporary or permanent land take on the Site.

Chapter 12: Material Assets concludes that any effects on land-use will be temporary in nature.

No significant adverse residual effects are predicted on agricultural or forestry land use within the Site, nor are any significant effects expected on commercial forestry outside the Site.

5.4.5 Tourism

Fáilte Ireland were consulted in the scoping process of this Project and their guidelines '*EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects'*, which describes the effects of projects on tourism, were considered in this assessment. Many of the issues covered in the report are similar to those covered in this EIAR, for example, scenery is assessed in **Chapter 11: Landscape and Visual Amenity**.

Additionally, **Chapter 11: Landscape and Visual Amenity** (**Section 11.4.5.5**) concludes that it is not considered that the Development will generate significant visual impacts in respect of tourism, recreational & heritage features.

The 2017 BiGGAR Economics study revealed that sustainable tourism in areas surrounding wind farms outperformed tourism in the broader local authority area. This indicates that wind farms may attract visitors interested in eco-friendly experiences, enhancing the region's appeal and supporting a more vibrant tourism sector.

Fáilte Ireland published a study on '*Visitor Attitudes on the Environment'* in 2012[41] to assess the perceived impacts of wind farms on potential future visits to an area. The study found that 12% of those surveyed, responded that wind farms would have 'a strong positive impact' on their decision to visit Ireland, with 27% responding it would have a 'slight positive impact', whilst 38% said it would have 'no impact'. 7% of respondents stated it would have a 'strong negative impact' and 15% stated it would have a 'slight negative impact'. The

[41] Fáilte Ireland (2012) Visitors Attitudes on the Environment – Wind Farms - https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/WindFarm-VAS-(FINAL)-(2).pdf?ext=.pdf [Accessed: 01/12/2024]

survey also found that wind farms were noted as more favourable than other forms of development such as housing, mobile phone masts or electricity pylons.

Attitudes to wind power were found to be 54% strongly in favour in November 2018. While favourability towards wind continued to consolidate (compared to 47% in October 2017), the total number in favour remained steady at just over 4 in 5, there was a 7% shift in Irish adults from 'tending to favour' wind power into being 'strongly in favour'. [42]

Based on the findings of the collective Tourism and Economics studies referenced in **Section 5.5 and 5.3.2**, it is considered that the Project will not give rise to any significant effects on tourism resource potential. Overall effects of the Project with regards to tourism are considered to be, **Slight, Negative** during the construction, operational and decommissioning phases.

5.4.6 Human Health

5.4.6.1 Electromagnetic fields

On a daily basis, people are exposed to extremely low frequency ("ELF") Electromagnetic fields (EMF) as a result of using electricity. National and international health and scientific agencies have reviewed more than 35 years of research including thousands of studies. None of these agencies has concluded that exposure to ELF-EMF from power lines or other electrical sources is a cause of any long-term adverse effects on human, plant, or animal health. The International Commission on Non-Ionising Radiation Protection (ICNIRP) Guidelines give a limit of 100μT for sources of AC magnetic fields. This compares to 0.13μT that arises from a 110kV underground cable when directly above it.

Based on the assessment of electromagnetic interference in Chapter 13, the electromagnetic fields from wind farm infrastructure, including the Grid Connection to the Tullabrack 110kV substation, are very localised and are considered to be **Imperceptible, Long-term** impact.

In light of the assessment and conclusions in **Chapter 13: Shadow Flicker and EMI**, no likely significant effects on population/human health arise as a result of electromagnetic fields.

[42] IWEA Public Attitudes Monitor 2018, Irish Wind Energy Association. Available online: https://windenergyireland.com/images/files/iwea-report-2018.pdf [Accessed: 01/12/2024]

5.4.6.2 Shadow flicker

The shadow flicker assessment in **Chapter 13: Shadow Flicker** has identified the potential for shadow flicker to affect 99 no. out of 183 no. receptors within the shadow flicker Study Area. It is proposed that a shadow control system will be installed to eliminate the potential for shadow flicker from the Project. This assessment has identified that by installing a blade shadow control system on the proposed turbines, there will be no significant direct or indirect residual effects. Given that only effects of significant impact or greater are considered "significant" in terms of the EIA Directive the potential effects of the Project as a result of shadow flicker, when mitigated, are considered to be not significant. The Project has been assessed as having the potential to result in **neutral**, **imperceptible, long-term effects** overall with regards to shadow flicker. Therefore, the effects of the Project on Shadow Flicker are considered **Not Significant**. There are no predicted significant adverse cumulative effects.

This assessment has identified the potential for shadow flicker to effect 69 No. out of 89 No. receptors within the shadow flicker Study Area. It is proposed that a shadow control system be installed to eliminate the potential for shadow flicker from the Project.
The assessment has not identified any likely significant effects from the Project on Electromagnetic Interference. As the potential effects are localised and considered to be imperceptible in the long term, it is not necessary to implement mitigation measures. Residual effects will not occur.

Chapter 13: Shadow Flicker and EMI provides an impact assessment of the potential for shadow flicker effects from the Project incorporating pre and post mitigation assessment conclusions in further detail.

In light of the assessment and conclusions in **Chapter 13: Shadow Flicker and EMI**, no likely significant effects on population/human health arise as a result of shadow flicker.

5.4.6.3 Noise

For the noise assessment which is fully outlined in **Chapter 10: Noise and Vibration** the assessment was made of the predicted operational noise levels from the Development based on the limits described in the 2006 Guidelines and taking into consideration recent An Bord Pleanála decisions.

The predicted noise levels at all receptors are lower than the noise limits in all cases, at all wind speeds, and are therefore compliant with the noise limits and are not significant in

terms of EIA. **Table 10.19** in **Chapter 13** outlines the margin between Predicted Noise Levels and Noise Limit of 43dBA.

There is likely to be some noise and vibration from traffic within the vicinity of the Turbine Delivery Route and the Construction Haul Route which may cause disturbance to residents. However, the effects are not predicted to be significant. This is detailed in EIAR **Chapter 10: Noise and Vibration.**

Operational noise, designed to meet the limits in the 2006 Wind Energy Development Guidelines will have a residual effect within the guideline limits and can be described as **Not Significant**. This is detailed in EIAR **Chapter 10: Noise and Vibration.**

Noise effects during decommissioning of the Project are likely to be of a similar nature to that during construction but of shorter duration. This is detailed in EIAR Chapter 10: Noise. Existing site access tracks and Turbine Foundations (excluding plinths) will be left in place and naturally vegetated over. Any legislation, guidance or best practice relevant at the time of decommissioning will be complied with.

In light of the assessment and conclusions in **Chapter 10: Noise and Vibration**, no likely significant effects on population/human health arise as a result of noise.

5.4.6.4 Air Quality

Chapter 12: Air Quality and Climate: The main potential source of air quality effects during construction is dust, which could be generated from activities such as excavations, construction of access tracks, turbine hardstands, and cable ducting trenches. Dust could arise from earth-moving equipment, transport of materials, and vehicle movements over dry surfaces.

The impact of dust is dependent on terrain, weather conditions (e.g., dry and windy), and proximity to receptors. While cement dust could cause ecological damage if it reaches watercourses, ready-mix concrete will be used to avoid on-site batching, mitigating this risk.

Dust effects are considered to be a slight, negative, short-term impact during the construction phase. Friable dust typically travels short distances depending on particle size and weather conditions. Larger particles generally settle within 100 m, while smaller particles can travel up to 1 km.

Sensitive receptors, such as nearby dwelling houses, are located more than 600 m from the main dust-generating areas, which include turbine foundations, hardstands, and access tracks. Vegetation, like trees and hedgerows, will help reduce airborne dust. Any dust effects on vegetation will be short-term and slight.

If unmitigated, dust from mud on public roads could cause nuisance issues for residents. This would be a short-term, slight, negative impact on sensitive receptors.

Chapter 12: Air and Climate and **Appendix 2.1: Construction Environmental Management Plan** include details of proposed mitigation measures relating to dust.

As discussed in **Section 5.3.6.5** the main source of air pollution from the receiving environment is likely to be from dust generation during construction and dust generation associated with high traffic movement. During the operational phase, only a small number of light vehicles will access the site, resulting in minimal and sporadic dust generation resulting in an imperceptible negative effect. The Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 40-year lifespan of the Project. The Project will assist in reducing carbon dioxide (CO_2) emissions (8,389 tonnes per annum at the lower range or 10,487 tonnes per annum at the higher range) that would otherwise arise if generated by conventional fossil fuel plants. This is a long-term, moderate, positive effect on the climate. The Decommissioning phase would be expected to last approximately 3-6 months, and any air quality effects would be predicted to be imperceptible. **Chapter 12**: Air Quality and Climate provides an assessment of air quality, climate related effects resulting from the Project and the mitigation measures included to prevent a signification effect to human health. The assessment concluded that the Project has the potential to result in slight, negative, temporary/short-term effects during construction.

In light of the assessment and conclusions in **Chapter 12: Air and Climate**, no likely significant effects on population/human health arise as a result of air quality.

5.4.6.5 Water Contamination

A discussed in **Section 5.3.6.6** the receptors that have the potential to impact on human health have been assessed. **Chapter 9 Hydrology and Hydrogeology** provides an assessment of the hydrological effects in relation to the Project, including the potential for water contamination. The conclusion is referenced at **Section 9.6** and states that the Project as a whole, including the Turbine Delivery Route and Grid Connection Route are not likely to significantly affect groundwater quantities, quality or availability. Implementation

of the control measures outlined in this EIAR will result in a robust environmental management plan which will target and mitigate likely sources and pathways of contaminants arising at the Site.

In light of the assessment and conclusions in **Chapter 9: Hydrology and Hydrogeology**, no likely significant effects on population/human health arise as a result of water contamination.

5.4.6.6 Traffic

Chapter 16 Traffic and Transport provides an assessment of the traffic effects in relation to the Project. The conclusion is referenced at **Section 16.7** and states that the Project has generally been assessed as having the potential to result in effects of a negative, slight/moderate, direct, short-term, high probability effect or lower during the construction and decommissioning phase only. After mitigation, the residual effects have been assessed as imperceptible/slight, negative and short-term in nature.

In light of the assessment and conclusions in **Chapter 16: Traffic and Transport**, no likely significant effects on population/human health arise as a result of traffic.

5.4.6.7 Accidents/Disasters (incorporating Health & Safety)

As with any Project of this type, there is the potential for accidents to occur. In the context of human health and safety, these will be addressed under two main headings, accidents to personnel and accidents to plant and equipment ('infrastructure').

Accidents to Personnel

Risks present during the construction, operation and Decommissioning 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

Accidents to Infrastructure

Potential risk to infrastructure, again for the construction, operation and decommissioning phases 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.
- Falling from height causing damage to property
- 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.

The above health and safety risks are addressed within the CEMP (**Appendix 2.1**). Emergency response protocols are also set out within the CEMP documentation. In terms of significance of effects, the risk potential for accidents and disasters on site has been evaluated in **Section 5.3.8** and is further addressed within Section **5.5.7** below and in Chapter 15: Material Assets. With mitigation measures in place is considered unlikely that the impacts on population and human health (from a pollution perspective, environmental hazards or visual amenity) would be significant.

5.4.7 Property Value

The effects to Property values have been reviewed and assessed within **Section 5.3.7.** Based on the evidence from a number of these published studies, the operation of a wind farm at the Site is considered to not significantly affect property values in the area. The Project will have a **Medium-long-term, Imperceptible impact** on property values.

5.4.8 Do-Nothing Scenario

If the Project was not to proceed, the existing uses of the Site for agriculture and forestry use would continue. There would be no short-term impact to Population and Human Health in relation to potential increases in noise, increased traffic and minor traffic disruption.

However, if the Project were not to proceed, the opportunity to generate renewable energy and electrical supply to the national grid would be lost, as would the opportunity to further contribute to meeting Government and EU targets for the production and consumption of electricity from renewable sources and the reduction of greenhouse gas emissions and

compliance with the Climate Change and Low Carbon Emissions Act 2015-21 would be impeded.

5.5 MITIGATION MEASURES AND RESIDUAL EFFECTS

Although no negative impact of significance has been established, there are a number of measures, which may be implemented for the safety of workers and the public during the construction, operational and decommissioning phases. Mitigation measures are additional to the standard / design measures (embedded mitigation) which are considered as part of the initial assessment of significance.

5.5.1 Embedded Mitigation

The Project, as described in **Chapter 2: Project Description**, incorporates good practice measures for limiting the adverse effects of the construction works. The principal potential effects arising from works relate to construction traffic affecting the use of National Roads, local primary roads and access roads by the general public. Measures are set out in **Chapter 10: Noise and Vibration,** and **Chapter 16: Traffic and Transport** relating to how construction work and delivery of materials, goods and services would be managed to minimise impacts. Embedded mitigation measures have also been developed for both the operational and decommissioning phase of the project and outlined in the referenced chapters. The proposed mitigation measures have been included in the assessment chapters of this EIAR and further developed in the CEMP (**Appendix 2.1**) and **Appendix 17.1 Schedule of Mitigation Measures**.

5.5.2 Population and Settlement Patterns

Given that no significant effects have been identified, no mitigation measures are proposed.

5.5.3 Economic Activity

Allowing for the implementation of embedded mitigation, no significant effects have been identified in respect of socio-economic receptors arising from the construction of the Project and therefore no mitigation measures are required to reduce or remedy any adverse effect.

5.5.4 Employment

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

5.5.5 Land Use and Topography

Given that no negative impacts have been identified, no mitigation measures are proposed (other than embedded mitigation of minimising land take).

5.5.6 Tourism

Allowing for the implementation of embedded mitigation, no significant effects have been identified in respect of tourist receptors arising from the construction of the Project and therefore no mitigation measures are required to reduce or remedy any adverse effect.

5.5.7 Human Health

5.5.7.1 Accidents/Disasters (incorporating Health & Safety)

Accidents to Personnel

Potential risks to personnel are discussed in **Section 5.4.6**.

Accidents to Infrastructure

The PSDP shall see that the General Principles of Prevention, outlined under the safety design advice provided by the Health and Safety Authority (HSA) are taken into account for all designs relating to the project.

On very rare occasions, the structural integrity of wind turbines has failed. This is an extremely rare occurrence and given that the turbines will be designed and installed by an experienced turbine contractor and are located well away from public roads, the closest receptor (tack room – H1) having a separation distance of 490 metres from T1 and is not considered a sensitive receptor in this EIAR. Inhabited dwellings have a distance greater than 600 metres in line with the Wind Energy Development Guidelines (2006), it is not considered (in the unlikely event of an accident of this type) that it would result in any significant impacts to population or human health.

5.5.7.2 Operation

For operation and maintenance staff working at the proposed wind farm, 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 Personal Protective Equipment (PPE) to prevent injury.

Equipment within high voltage substations presents a potential hazard to health and safety. The proposed Electrical Substation will be enclosed by palisade fencing and equipped with intruder and fire alarms in line with ESBN and EirGrid standards.

All electrical elements of the proposed Development are designed to ensure compliance with electro-magnetic fields (EMF) standards for human safety.

Lightning conductors will be installed on each turbine as all structures standing tall in the sky require this protection. Turbines specifically require this to prevent power surges to electrical components. Turbines will be fitted with ice detection systems which will stop the turbine from rotating if ice is forming on a turbine blade and this helps to prevent ice throw.

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 Development's 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.

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

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

The design of the Project has considered the susceptibility to natural disasters. The proposed Site drainage (detailed in **Appendix 2.1**) will mitigate against any potential flooding risk due to run off with the use of Sustainable Drainage Systems (SuDS). Construction drainage will be left in-situ for the lifespan of the Project through to Decommissioning. Also flood compensation measures have been designed on site and are

detailed in **Chapter 9 Hydrology and Hydrology** – **Section 9.4.6** and **Appendix 9.1 Flood Risk Assessment**.

The Contractor's fire prevention/management plans will be reviewed and updated on a regular basis. A nominated competent person shall carry out checks and routine maintenance work to ensure the reliability and safe operation of firefighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be always kept on Site.

Detection systems and turbine control software will be installed on all turbines to (i.e. permit remote shutdown as necessary) prevent shadow flicker on nearby receptors.

The wind farm system shall include a system over-ride switch that can be operated at any time, to facilitate manual shutdown in case of an emergency.

5.5.7.3 Decommissioning

The mitigation measures set out for the construction phase will be implemented during the Decommissioning phase and are also detailed in **Appendix 2.1: Construction Environmental Management Plan**, in its **Decommissioning Plan**.

5.5.7.4 Residual Risk

Once the mitigation established for the construction, operation and decommissioning phases of the project, as detailed in this Chapter of the EIAR and other EIAR chapters, namely Chapter **10 (Noise and Vibration)**, **12 (Air Quality and Climate)**, **13 (Shadow Flicker and EMI**), **15 (Material Assets)** and **16 (Traffic and Transport)** are taken into account, the residual effects on population and human health is assessed to be an **imperceptible, long-term** effect and can therefore be considered to be not significant.

5.5.8 Cumulative Effects

Appendix 1.2 contains a list of projects for cumulative assessment.

The nearest operational wind farm to the Project is Moanmore Wind Farm, which has 7 turbines and is located 1.7km north-west. The next nearest is Tullabrack Wind Farm, with 6 turbines situated 2.2km north-east.

The Project, along with other wind farms and other Irish renewables generation, is considered a fundamental change in the climate effects of Ireland's energy supply. They

are an important, positive effect that is significant under the EIA Directive and will contribute to Ireland's legally binding CO_2 emission reduction targets.

The Project will also contribute to the offset of burning of fossil fuels which has the potential to positively impact human health.

Human health was assessed in **Section 5.5.7** for the Project during the various phases of the Project. **Chapter 10: Noise and vibration**, **12: Air Quality and Climate**, **13: Shadow Flicker and EMI**, **15: Material Assets**: and **16: Traffic and Transport** include specific assessments which include the assessment of cumulative effects. These EIAR chapters also conclude the cumulative effects of the Project is considered to be **not significant**.

Noise

An assessment of the cumulative effects of noise from the Development together with both the nearby six turbine operational Tullabrack Wind Farm, seven turbine operational Moanmore Wind Farm, and recently submitted four turbine Ballykett Wind Farm located west-northwest and east of the Development has been undertaken. The assessment was made with predicted operational noise levels from the Development against noise limits in the Wind Energy Development Guidelines 2006. All predicted noise levels are within the noise limits. A negative margin indicates that the predicted noise levels are within the lower fixed 43dBA limit, which means the levels are within the day and nighttime limits. Further detail of the cumulative noise assessment can be found in **Section 10.12 Chapter 10.**

The Landscape and Visual Impact Assessment is contained in **Chapter 11: Landscape and Visual Amenity.** Based on the reasons outlined in **Section 11.4.6**, it is considered that the Development will contribute to cumulative impacts in a very minor way at the scale of the Study Area where turbines are already a familiar feature and the Development represents marginal intensification. Within the central Study Area, there is a greater potential for cumulative impacts with the two existing and the single in-planning wind farm developments. However, there is a reasonable degree of cohesion between these modest scale developments where they either appear as a single larger entity or a series of discrete smaller developments, but seldom with clutter or scale confusion or a strong sense of being surrounded by turbines. Overall, the magnitude of cumulative impact is deemed to be consistent with a Medium-low effect based on the criteria contained in **Table 11.5.**This confirms that the cumulative effects of the Project in terms of visuals and tourism are considered to be **Not Significant**. The cumulative effects of the Project can be predicted to be a **Small, Short-term, Negative** impact on overall tourism and amenity during

construction. There is predicted to be a **Short-term, Moderate, Positive** effect in terms of employment from the Project.

It is not predicted that the cumulative effect of this Project will have an impact on population or settlement patterns, nor will it have a significant impact on industry sectors in the three study areas.

5.6 SUMMARY OF SIGNIFICANT EFFECTS

The significant effects of all aspects of the construction, operation and decommissioning of the Proposed Development (Wind Farm Site, TDR and GCR) on the receiving environment in terms of Population and Human Health, namely, economic activity, employment, land use, tourism and human health (EMI, noise, shadow flicker, air quality, water contamination and traffic) has been assessed individually and cumulatively, with respect to the sensitive receptors. Sensitive receptors are defined as dwellings and amenities/ communities (181 dwellings, 1 No. school and 1 cottage that is being used as a tack-room and is not considered a sensitive receptor in this EIAR) within 1km of a proposed turbine location and within 100m of GCR works. The assessment has not identified any likely significant effects or residual likely significant effects from the Proposed Development on population and human health.

5.7 STATEMENT OF SIGNIFICANCE

This chapter has assessed the significance of potential effects of the Project on population and human health. The Project has been assessed as having the potential to result in effects of a **Slight Positive, Long-term impact** overall. Cumulative effects are predicted as unlikely.

Based on the above assessment, residual effects from the Project on population and human health are considered to be **not significant**.