

15.0 Population and Human Health

15.1	INTRODUCTION.....	1
15.2	STATEMENT OF COMPETENCE.....	1
15.3	RELEVANT LEGISLATION AND GUIDANCE.....	1
15.4	METHODOLOGY.....	3
15.5	DESCRIPTION OF THE BASELINE ENVIRONMENT.....	3
15.6	STATEMENT OF POTENTIAL IMPACTS.....	13
15.7	CUMULATIVE IMPACTS.....	27
15.8	MITIGATION AND MONITORING IMPACTS.....	28
15.9	RESIDUAL EFFECTS.....	30
15.10	STATEMENT OF SIGNIFICANCE.....	30

15.1 Introduction

This chapter provides an assessment of the environmental impact of the Wind Farm Project from baseline data prior to project construction, project operation through to decommissioning with respect to population and human health associated with the proposed wind farm development in the townlands of Keerglen, Ballinglen and Ballykinlettragh on a site measuring a combined c.81.88ha. This report provides a baseline assessment of the setting of the proposed development in terms of Population and Human Health and discusses the likely and significant effects that the construction, operation and decommissioning of the proposed development will have. Where required, appropriate mitigation measures to limit any identified likely significant adverse impacts to Human health are recommended.

A full description of the proposed development is presented in Chapter 3.

15.2 Statement of Competence

The assessments with this chapter were undertaken by Richard Hamilton MIPI MRTPI (BA, MSc, P.Grad.Dip EMAE). Richard is a Chartered Town Planner with over 28 years' experience in public and private sectors, covering a broad range of practice including major development applications and strategic studies. His experience includes EIAR Screening, Scoping and management of EIAR projects for projects ranging from Dublin Airport's Runway, Metrolink, Off Shore Energy, active travel, as well as road and water infrastructure to residential projects. He has also undertaken a number of and SEAs and Integrated Impact Assessments (UK). Richard holds a BA (Geography and History) from University College Dublin, an MSc in Town and Country Planning from Heriot-Watt University Edinburgh, and a Postgraduate Diploma in Environmental Monitoring, Assessment and Engineering from Trinity College Dublin.

15.3 Relevant Legislation and Guidance

The EPA "Guidelines on the Information to be contained in Environmental Impact Assessment Reports" (EPA, 2022) was the primary document used to describe the effects and impacts of the proposed development. The following legislation and guidance documents were used to inform the writing of this chapter:

- Guidelines on the information to be contained in an EIAR (EPA, 2022)
- Directive 2014/52/EU 'the EIA Directive'
- Environmental Noise Guidelines for the European Region (WHO, 2018)
- Guidance on Monitoring in the Vicinity of Demolition and Construction Sites (IAQM, 2018)

Page 28 of Section 3 of the 2022 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' by the Environmental Protection Agency provides the following guidance for what should be addressed in a Population and Human Health chapter of an EIAR.

Population & Human Health

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

The EPA guidance document states that no guidance for a definition for the term Human health has been issued in the context of the 2014 EIA Directive (2014/52/EU) but the same term has been used in the SEA Directive (2001/42/EC). The Commission provided a guidance document titled 'SEA Implementation Guidance' at the time of publishing the SEA Directive. This document stated: 'The notion of human health should be considered in the context of the other issues mentioned in paragraph (f)'. The relevant paragraph listed environmental factors such as soils, water, and air.

Human Health should be considered through assessment of environmental pathways which have the potential to affect it such as air, water, or soil. The EPA guidance document quotes the 2002 EPA EIS Guidelines on how health should be considered through assessment of the environmental pathways:

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

The EPA document continues:

'In an EIAR, the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed

elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc.. The Advice Notes provide further discussion of how this can be addressed.'

The EPA document states that EIAR Population and Human Health chapters should refer to other assessments without duplicating them such as assessment under the Waste Framework, Water Framework Directive, SEA etc.

The assessment of human health impacts has been based on the Source, Pathway Receptor model. For an impact to occur, all three Source, Pathway, and Receptor elements must occur together. In the absence of any of the three elements no plausible health impact can occur.

Factors affecting human health typically include emissions affecting air quality, water supplies and land, audibility, shadow flicker and traffic. These issues are addressed in Chapters 7, 8, 9, 10, 11, 12, 14, 16, and 17 of the EIAR, which deal with Noise, Shadow Flicker, Ecology, Hydrology and Hydrogeology, Air and Climate and Traffic and Transport. Site stability issues are addressed in Chapter 8 Soils and Geology.

In the case of the Keerglen wind farm project, the Source can be described as the wind farm project development including its construction phase (air quality, noise, water quality, traffic and transport, major accidents and disasters), its operational phase (noise, shadow flicker, visual impact, electric and magnetic field effects (EMF)) and its decommissioning phase (noise, air quality and traffic and transport). The wind farm is in a remote location and the nearest occupied houses are located just over 1.0km from the wind turbines at wind farm site.

15.4 Methodology

The guidelines on the information to be contained in Environmental Impact Assessment Reports by the EPA published in 2022 was used to describe the effects and impacts where they occur. The Ordnance Survey Ireland historic maps were used to assess the land use changes on the subject site and the surrounding areas. CSO Census data was used to gather information on the population and employment in the area. Fáilte Ireland's tourist literature for Ireland, the Wild Atlantic Way (WAW) area and County Mayo specifically was examined along with the websites of relevant tourism assets, locations and amenities in the area.

15.5 Description of the Baseline Environment

A layout for the proposed works and a historic six inch map are shown in Figure 15.1 to Figure 15.3 below. The subject site is in a rural, up-land setting along the Keerglen River. The land on the subject

site comprises of peat bogland and low value agricultural grassland and with sections of the lands still harvested. The majority of the proposed works will be to the south of the Keerglen River. The surrounding lands are predominantly agricultural use with forestry. The neighbouring townlands of Gurran and Ballykinlettrah contain a small number of dispersed bungalows. The nearest dwelling is approx. 1,500m from the turbines.

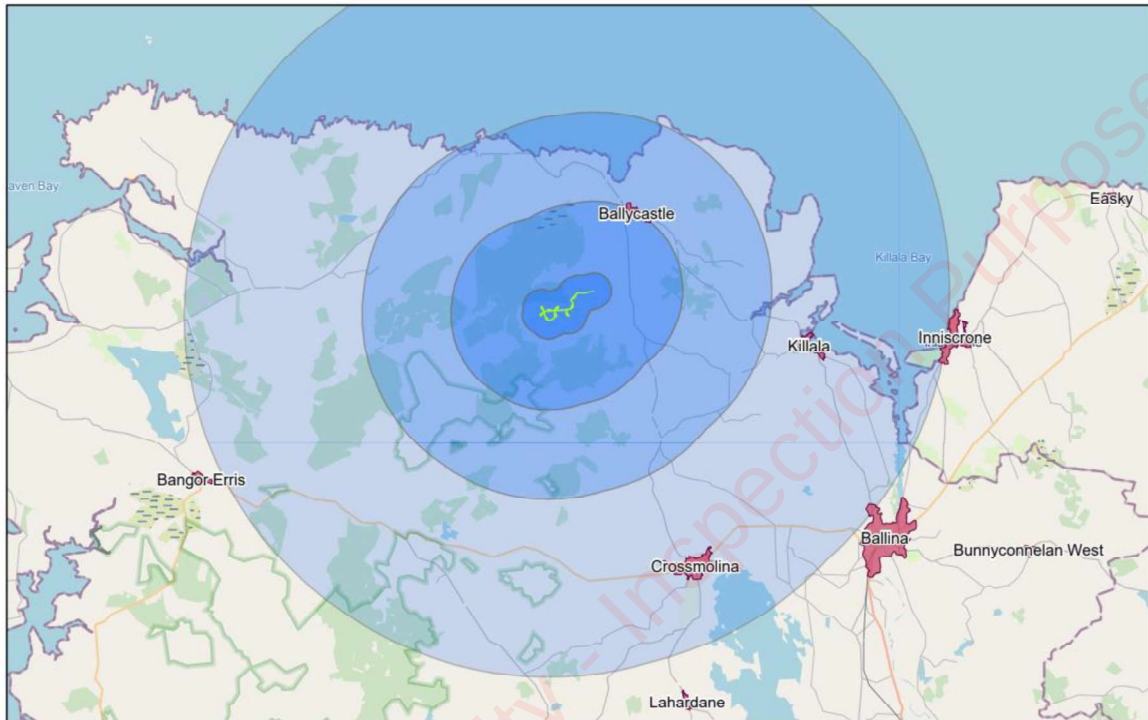


Figure 15.1 Site Location (Source: MDB)



Figure 15.2 Historic 6 Inch First Edition (Source: Geohive)

The proposal includes the installation of cabling along the existing road network which will be ducted. The proposed underground electricity export connection is illustrated in Figure 15.3 below.

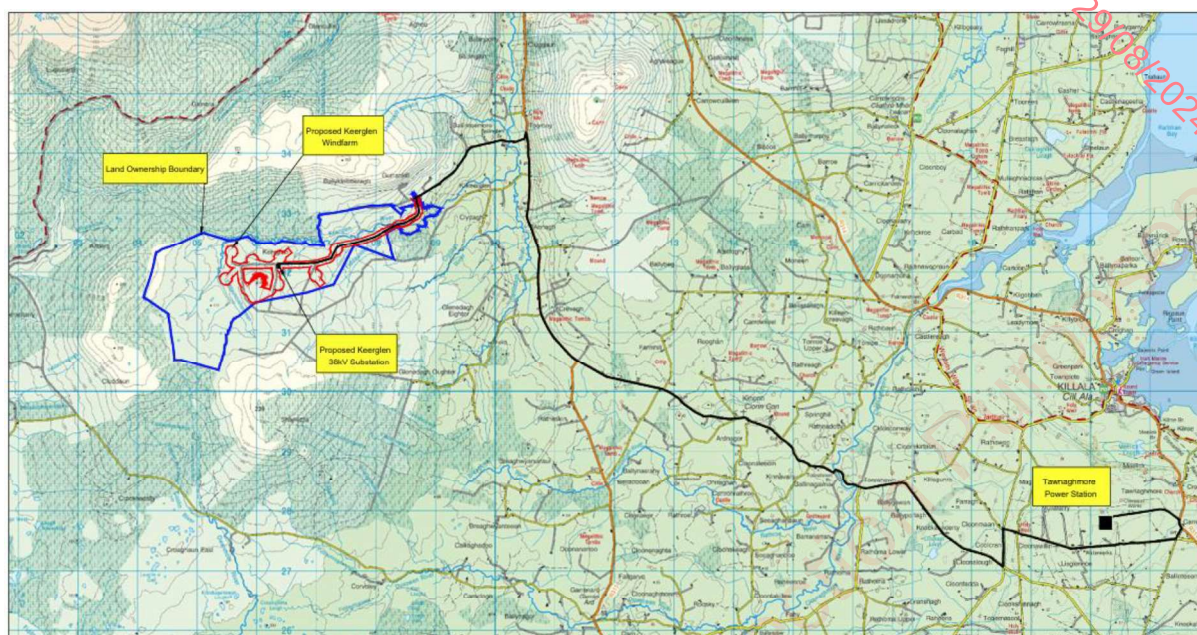


Figure 15.3 Underground Electricity Export Connection Proposal (Source: ABO Energy)

15.5.1 Population

An analysis of the population and changes is provided in this section. Data was derived from the 2016 and 2022 Census results.

Table 15.1: Population Trends – Demographics

Period	ROI	Mayo County	Kilfian West, 29023	Ballycastle, 29011	Beldergmore, 29013	Killala, 29025
Population 2011	4,588,252	130,638	134	659	175	1,310
Population 2016	4,761,865	130,507	109	578	157	1,256
Population 2022	5,149,139	137,970	109	585	150	1,325
2011-2016 % change	+4%	-0.01%	-23%	-14%	-12%	-4%
2016-2022 % change	8%	6%	0%	1.2%	-4.4%	5.5%

The population of County Mayo has grown by 6% between April 2016 and April 2022. This amounts to 7,463 people. The national population increased by 8% over the same period.

The subject site is located in the Electoral Division of Kilfian West, Co. Mayo. The population was measured at 109 in the 2022 Census. This was unchanged from the 2016 Census. In 2022 and in 2016,

there were 65 permanent dwellings within the ED with 44 being occupied on both census nights. 3 were unoccupied holiday homes and 18 were otherwise vacant. The subject site is in a remote location with no new dwellings built within the ED between both Census nights.

Three neighbouring ED's were also analysed for population data. These were Ballycastle, Beldergmore, and Killala. All of the ED's analysed saw minor population change. It is notable that the Killala ED is relatively large in area and contains Killala town. Killala town is a Tier III Self-Sustaining Town in the Mayo County Development Plan 2022-2028 and is located to the far east of the ED. This is approximately 12 km from the subject site.

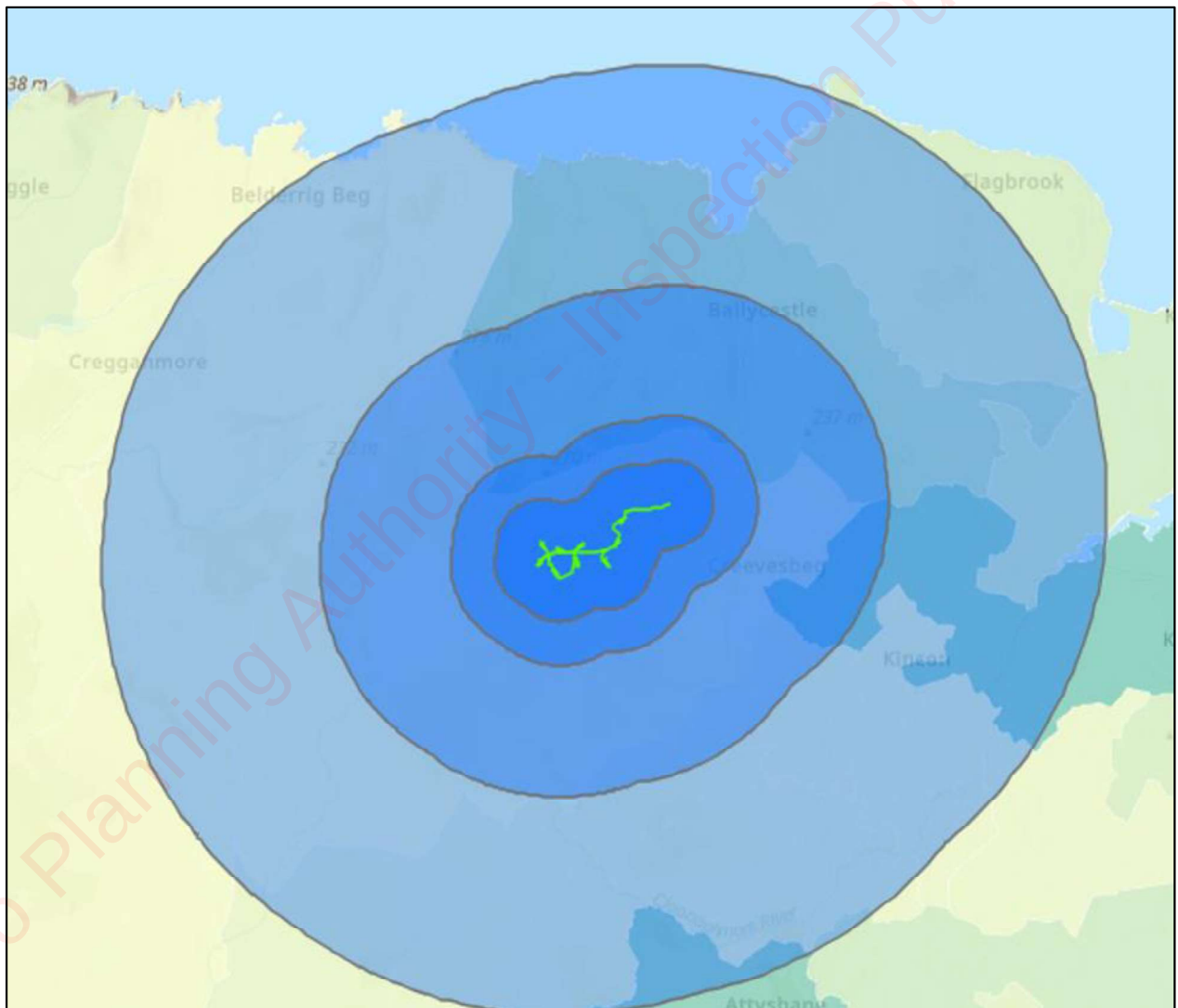


Figure 15.4 The subject site with 1 km, 2 km, 5 km, and 10 km boundaries, overlays on the Electoral Division's (Source: Geohive)

Employment

In Kilfian West ED 42 people of the 109 in the ED in 2016 were described as at work. The neighbouring ED Ballycastle had 57 people at work. Béal Deirg Mór had 57 people at work and Killala had 501 at work. The breakdown of the sectors which the population was employed is detailed in the table below.

Of the 109 people in the Kilfian West ED in the 2016 census, 42 were at work, 10 were unemployed, 6 were students, 16 were looking after the family, 21 were retired, 5 were permanently sick or disabled. 7 of these people were working in professional occupations, 2 were in associate professional and technical occupations, 4 were in administrative and secretarial, 28 were skilled trades, 3 were working in caring, leisure and other services, 3 were in sales and customer service, 1 worked in process, plant and machine, 1 was in elementary occupations, and 3 were not stated. 2022 census data is not yet available for employment status.

Table 15.2: Population Trends – Employment

Period	ROI	Mayo County	Kilfian West, 29023	Ballycastle, 29011	Beldergmore, 29013	Killala, 29025
Population at work 2016	2,006,641	51,439	42	217	57	501
Agriculture, forestry and fishing	-	-	16	44	19	57
Building and construction	-	-	4	11	4	41
Manufacturing industries	-	-	3	15	6	89
Commerce and trade	-	-	7	21	3	82
Transport and communications	-	-	1	7	3	23
Public administration	-	-	2	18	3	23
Professional services	-	-	7	49	7	103
Other	-	-	2	52	12	83
Population 2022	2,3000,000	58,334	115	580	157	1,317

58,334 people (aged 15 and over) in County Mayo were at work in 2022. This was an increase of 13% or 6,895 people over the 2016 Census. The national increase was measured to be 313,656 additional people or 16%.

According to the CSO, Industry excluding construction is the largest contributor to Gross Value Added (GVA) in the Western region, in which Mayo is located. In 2021, Industry contributed to 42.5% of the GVA of the western region¹. Public admin, education and health was the second largest contributor to GVA at 15.4%. When looking at total numbers employed by sector, public admin, education and health was the largest employer. At 27.9% and industry is the third largest employer at 16.5%. Distribution, transport, hotels & restaurants is the second largest employer at 22.7%.

Examples of major employers in the surrounding area of the proposed wind farm, include Ballina Beverages which employs c. 400 people. Hollister is also located in Ballina town and employs c. 700 people. Both employers are involved in industry, manufacturing goods for export to global markets. O'Donnell Meat Distributors are located to the north east of the town. Michael Carr Foods is a meat wholesaler to the south of the town. Joseph Murphy is a building materials supplier to the south of the town.

In Crossmolina town, there are several businesses in the distribution, transport, hotels & restaurants employment category. These include the Dolphin Hotel which includes Mulhearns Bar & Restaurant inside. The town also has Hiney's Pub and the Old Post Office Coffee Shop & Bakery. To the east of the town the Reel Deal Brewery is also manufacturing and distributing craft beers across the country.

Killala town has several businesses in the distribution, transport, hotels & restaurants employment category. These include the Old Deanery Holiday Cottages, the Village Inn, Arch Bar and the Restaurant Killala. To the north of Killala town is the Homeland Agri agricultural cooperative. This is a cooperative wholesaler of farming, fuel and hardware goods. A seafood wholesaler, Ireland West Seafare, is also located to the north of the town. There is a fish market to the north of the town Carr & Sons Seafod.

¹ CSO (2024) County incomes and regional GDP 2021, Economic Sectors by Region County Incomes and Regional GDP 2021 - Central Statistics Office. Available at: <https://www.cso.ie/en/releasesandpublications/ep/p-cirgdp/countyincomesandregionalgdp2021/economicsectorsbyregion/> (Accessed: 25 June 2024).

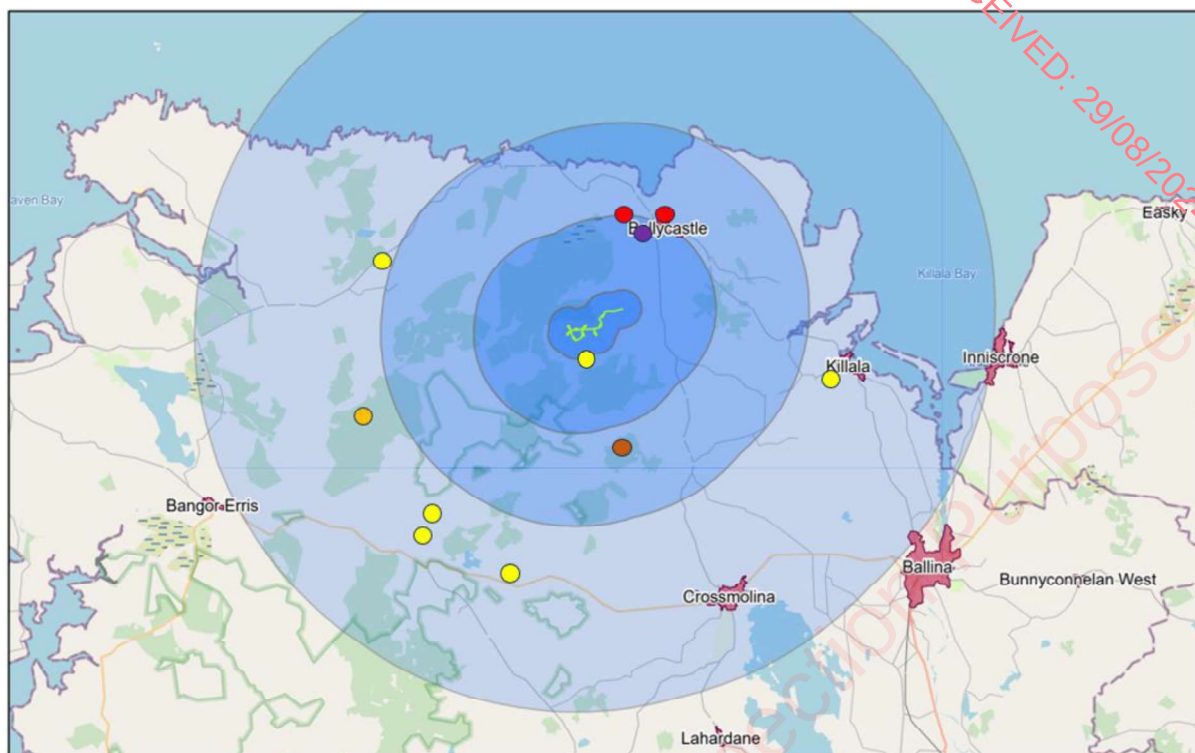


Figure 15.5 Site with 1 km, 2km, 5 km, 10 km and 20 km buffer. Schools are shown in red, Community centre in purple, walking trail in brown, existing/proposed wind farms in yellow and a wind farm under the control of ABO Energy commenced is shown in orange

The Keerglen area is not an employment destination in the context of the region. The Blanemore Forest walking trail is located approximately 6 km to the south of the site. In 2023 the trail was upgraded by Coillte. This included installation of signage and picnic area. There is currently one existing operating wind farm, Oweninny 1; within 10 km of the subject site. There are an additional two wind farms permitted and three wind farms proposed currently within 10 km of the subject site.

Ballycastle contains two schools, Scoil Naomh Brid and St Patricks College which are within 5km of the subject site. There is one community hall in Ballycastle.

Tourism

Specific research has been conducted by Fáilte Ireland with respect to the interaction between visitor attitudes on perception of wind farms and the environment² and Mintel Ireland³. This is considered further at section 15.6.2 below.

² Fáilte Ireland and the Northern Ireland Tourist Board - 'Visitor Attitudes on the Environment: Wind Farms – Update on 2007 Research' (2012)

³ Mintel Ireland - 'Wind farms and Offshore Wind farms' (2011)

According to CSO Ireland, tourism activity in the country is associated with over 4% of the nation's overall Gross Value Added (GVA)⁴. In 2023, some 6.3 million foreign visitors came to Ireland, with a total estimated expenditure of €7.3 billion (CSO 2024)⁵. These visitors stayed an average of 8.2 nights (CSO, 2024). Domestic tourism in the west of Ireland saw 1,866,000 trips in 2022, with a total estimated expenditure of €459 million. The average length of stay was 2.7 nights. However, the Wild Atlantic Way (WAW) region has generally seen a decrease in their overall business since 2023.

The Fáilte Ireland (2024) Tourism barometer findings on regional business in 2024 highlights that the sector is facing a number of challenges. It notes that year to date performance is mixed, with some sectors so far struggling to match last year's visitor volumes. Tour operators, DMCs, attractions and activity providers have fared better than other sectors. Accommodation sectors have struggled so far. Dublin has fared much better than the other regions to date this year. Both the domestic and overseas markets have helped bring stability to Dublin, whereas both markets are said to be significantly down for the other three regions.

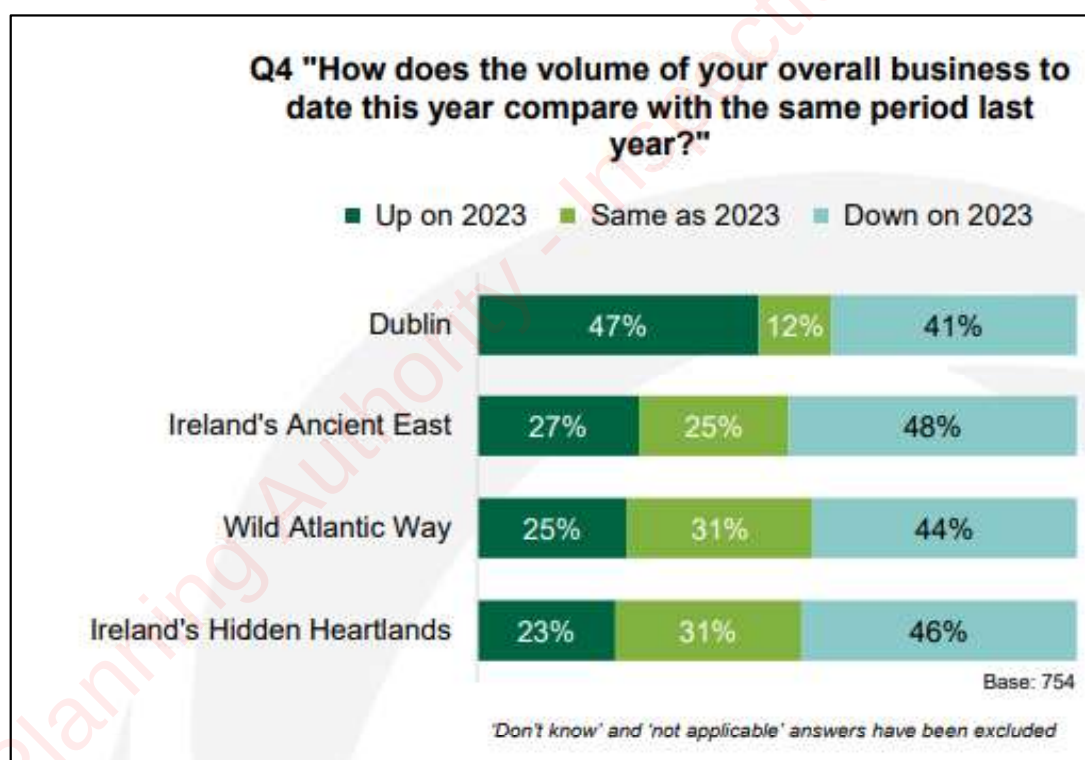


Figure 15.6 Tourism barometer findings on regional business in 2024 (Fáilte Ireland, 2024)

The study area is located along in an area defined as North Mayo Mountain Moorland under the Mayo County Development Plan 2022-28 (see detailed analysis in Chapter 10). In a tourism context the region

4 CSO Frontier Series: Irish Tourism Sector 2019 (Tourism Satellite Account) released July 21, 2023

5 [Key Findings Inbound Tourism Annual 2023 - Central Statistics Office](#) (19 June 2024)

includes several notable tourism and recreational features. Several of these are scenic driving, cycling and hiking routes. In proximity to the subject site is the Eurovelo 1 Atlantic Coast Route, an 11,000km cycling trail that follows the coastline of several countries along Europe's western coast that passes less than 1.5km northeast of the site. The WAW scenic driving route is located just over 1.5km northeast of the nearest turbine and follows a similar route to the Eurovelo 1 (see chapter 10.6.7.3 for further details). The Bellacorrick to Ballycastle section of the Western Way long distance walking trail traverses through the northeastern extents of the site, less than 2.5km from its northern border. Downpatrick Head is a scenic coastal walk located along the WAW with views of the Dún Briste sea stack. It is some 6km northwest of the nearest turbines in the proposed array. Other walking trails include the Blanemore Forest Archaeological Walk, Kilcummin Loop Walks, the Ballycastle Loop Walk, and the Moygownagh Loop Walk.

The remnants of Rathfran Abbey, founded in 1274, are located along the coastline on the southwestern extent of Killala Bay and some 12 km east of the nearest turbine. This is a free attraction located near the mouth of the Cloonaghmore River. Several other notable heritage features accessible to the public are also located throughout the study area, several of which are contained along the Monasteries of Moy Greenway and include Moyne Abbey and Rosserk Friary.

The Céide Fields visitor centre lies 9km away from the site and is considered to be the most extensive stone age field system in Europe. The opening of the new immersive visitor centre in 2022 was predicted to attract over 7,500 additional visitors by year 5 (2026) resulting in a total yearly figure of 38,000. The visitor centre is located off the R314 and features a viewing platform over the Atlantic Ocean.

Several campsites and other accommodation facilities can be found within the 20km buffer zone, many of them along the stretch of the R314 and R315 between the Céide Fields and Blanemore Forest.

Health

At the county level. In 2022, 83% of people in Mayo stated that their health was good or very good compared with 86% in 2016. This is a similar trend to the national figures, which showed a 4% decrease in the good/very good categories from 87% to 83%.

15.5.2 Biodiversity and Habitats

The subject site does not contain any designated sites. It has been used for peat extraction in the past. The nearest Natural Heritage Area is the Ummerantarry Bog NHA (**Site Code 001570**). This designated site is abutting the red line for the proposed wind farm to the immediate west. The site synopsis for the NHA by the National Parks and Wildlife Services states that grazing, and forestry are active land uses

on site and large-scale peat extraction are taking place which risk damaging the designated site⁶. It is noted that the Site Synopsis for the NHA was completed in 2004.

The nearest Special Area of Conservation is the Glenamoy Bog Complex SAC (**Site Code 000500**). This is c. 750 metres to the north of the subject site boundary. The site synopsis from the NPWS highlights the characteristics of the SAC. It is a Blanket Bog which is a priority habitat under Annex 1 of the EU Habitats Directive. The NPWS describes it is an extreme oceanic form of lowland blanket bog and is one of the most extensive tracts of bog in the country. The following is a list of Qualifying Interests for the SAC:

- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
- Humid dune slacks [2190]
- Machairs (* in Ireland) [21A0]
- Natural dystrophic lakes and ponds [3160]
- Northern Atlantic wet heaths with *Erica tetralix* [4010]
- *Juniperus communis* formations on heaths or calcareous grasslands [5130]
- Blanket bogs (* if active bog) [7130]
- Transition mires and quaking bogs [7140]
- Depressions on peat substrates of the *Rhynchosporion* [7150]
- *Salmo salar* (Salmon) [1106]
- *Petalophyllum ralfsii* (Petalwort) [1395]
- *Saxifraga hirculus* (Marsh Saxifrage) [1528]
- *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]

The Site Synopsis states the SAC experiences grazing by sheep and cattle. Overgrazing has caused soil erosion which has damaged parts of the bog. Peat cutting is also widespread. The region in general has been heavily afforested.

⁶ NPWS (no date) Ummerantarry Bog NHA, Ummerantarry Bog NHA | National Parks & Wildlife Service. Available at: <https://www.npws.ie/protected-sites/nha/001570> (Accessed: 20 June 2024).

15.6 Statement of Potential Impacts

15.6.1 Construction Stage Impacts

Construction stage impacts for this chapter considers how the population within the vicinity or catchment of the windfarm experience affects arising from the development of the site itself or services, traffic or utility connections arising. The characteristics of population is assessed in terms of employment, Settlement/land use patterns, demographics and amenity. Human health (considered with reference to other headings, such as water and air) impacts are assessed in Table 15.3 Construction Stage Impacts on Human Health.

Construction activity typically gives rise to disturbance impacts that potentially affects daily activity. This includes construction traffic for workers, and delivery of materials (i.e. concrete pouring for the foundations of the wind turbines and delivery of major components (i.e. blades)). The connection to the grid or large energy user will be undertaken along the local road network to the existing Tawnaghmore ESB Substation or a Large Energy User at Killala Business Park. It is considered that the population will experience Moderate Negative and Temporary Impacts arising from disturbance.

The development does not contain a residential component therefore will not have any direct permanent increase in the general population or settlement patterns. The impact on population is considered to be moderate, positive and temporary.

The proposed wind farm will generate employment in the area. As noted in Traffic and Transport Chapter 14 of this EIAR, there will be approximately 30 no. site operatives on the site of the wind farm during the construction stage on a daily basis. Other construction workers will be in the area during the trenching works for the underground electricity export connection for the wind farm. This is assumed to be 4 crews working in separate locations for c. 6 months. These employees will potentially frequent local shops and need accommodation in nearby towns supporting local business. In terms of employment and economy the impact is considered to Positive Significant and Temporary.

Construction stage impacts on tourism are considered unlikely and any slight negative impact is temporary and short-lived. The majority of touristic sites, trails and routes are located along the coast, mainly on the R314. Construction traffic as a result of the development is not considered significant as the most direct route from Ballina to the subject site diverts from the main road less than 6km outside of the town. The grid connection will also follow the same local roads, avoiding the WAW entirely. Other potential routes to the site coming from further inland are not considered relevant for tourism purposes.

Access to nearby hiking trails will not be impeded by the construction of the wind farm as they do not intersect with the boundaries of the site. Based on a distance of over 2.5km between the trail and

subject site these effects will be within the noise guideline values for the project. They will be confined to within permitted construction hours and are considered slight and short-term.

A working paper was published by International Renewable Energy Association in 2012 which considers wind farm developments include four key components. The turbine itself which is the biggest component consisting of approximately 64% of the overall cost with others arising from Civil works, underground electricity export connection and other capital such as buildings, control systems and project consultancy costs. The construction sector is relatively labour intensive according to the IREA report. Significant adverse impacts on the population (human health) are not expected to occur.

Table 15.3 Construction Stage Impacts on Human Health

Source	Potential Pathway and Receptor	Impact Assessment
Air pollution from dust during site excavations and site construction	The most important air pollutant that could impact human health is airborne dust, especially PM ₁₀ as these can the lungs and cause respiratory problems. The potential impact depends largely on the distance to the receptor, the size and scale of the construction site and the area upon which the site is located, along with weather conditions and the potential for the pollutant to disperse through the air which is dependent on wind speed and direction.	As indicated in previous chapters, the nearest occupied dwelling is 1.5km away from the nearest turbine. The entrance to the wind farm is c. 280 metres from any human receptors. Based on the Institute of Air Quality Management's guidelines, the risk of airborne dust or dust deposition on human receptors is negligible and no significant impact will occur during construction of the proposed wind farm. The nearest construction location for the underground electricity export connection is located c. 15m from the nearest occupied dwelling and construction will be for a very short duration with limited excavation and earth moving at a small site. The impact from dust arising from construction of the line would therefore be of negligible risk and no significant impact is likely to occur on population and human health.
Air Pollution from Combustion emissions from construction equipment	Internal combustion engines will produce emissions such as nitrogen oxide and sulphur oxides at high concentrations can impact human health causing respiratory problems.	Exhaust emissions from construction vehicles and delivery vehicles will be localised at the individual construction sites. These

		emissions will quickly disperse into the atmosphere. Given the nearest dwelling is 1.5km away from the nearest turbine site, the distance will result in no significant impacts during the construction phase. The nearest construction location for the trenching for the grid connection will be c. 15 metres from the nearest dwelling. No significant impacts will occur as the noise levels will be temporary and will be below 70 dBA. No significant impact is likely to occur on population and human health.
Pollution of surface water quality by sediment and hydrocarbons from the site	Pollution from surface water runoff from the wind farm site can cause health impacts during the construction phase if the water can make its way into drinking water supply. Hydrocarbons and sediment could be carried into drinking water. The water treatment process could be interfered with.	The Hydrology chapter assessed construction activities showed that suspended solids can enter surface watercourses and increase sediment load within downstream waterbodies. This can impact the quality of the water abstracted from these watercourses. This can reduce the quality of drinking water. <i>"The Magnitude of the impact from the proposed works on groundwater receptors is considered to be 'Small Adverse' in nature. The importance is considered to be 'Medium'. The rating of these potential impacts, prior to mitigation, is considered to be of Slight significance. The Impact Classification is negative, permanent, direct and will have likely effects."</i> A Construction Environment Management Plan (CEMP) will be prepared for the proposed project pre-development. The CEMP will be developed at the construction stage, on the appointment of the main contractor to the project to address the requirements of any relevant

		planning conditions, including any additional mitigation measures that are conditioned and shall be submitted to the planning authority. The CEMP will detail all of the mitigation measures that will be implemented during the construction of the wind farm. In order to minimise erosion of mineral subsoils stripping of peat will not take place during extremely wet periods (to prevent increased silt rich runoff). Drainage systems will be required to limit runoff impacts during the construction phase and therefore there will be no impacts on population human health.
Pollution of groundwater quality by hydrocarbons from the site	Groundwater can also be used as a source for drinking water. Pollution due to accidental release of hydrocarbons on human health could arise from drinking this contaminated water. This could arise from contaminant load or through interference with the water treatment process.	The hydrology chapter provided a detailed assessment on groundwater and the potential impact of hydrocarbon spills. The potential impact was assessed as slight to moderate and negative on the local environment, and brief. This is throughout the construction phase and, following mitigation measures, will be not significant with regard to impact on population or human health.
Pollution of surface and groundwater from wastewater generated by site facilities	Temporary sanitary facilities are to be provided on site during the construction to facilitate the workforce. Contamination from this sanitary waste that is untreated could enter the surface water or ground water. This contamination has the potential to pollute the source of drinking water.	The hydrology chapter assessed the potential impacts of wastewater. The assessment concluded that without appropriate mitigation of the potential impacts from discharging untreated wastewater from the facilities would be slight to moderate but brief on the environment throughout the construction phase. Appropriate mitigation measures such as holding tanks and portable toilet facilities will be provided therefore there will be no significant impact on population or human health.

Construction equipment Noise & Vibration	Construction related noise usually occurs during normal working hours and for short periods. Excessive noise can seriously harm human health, increasing risk of cardiovascular disease amongst other effects, according to the World Health Organisation⁷	An assessment of the noise effects on noise sensitive locations within 3km of the Keerglen wind farm site that are likely to be generated during the construction phase by construction equipment and construction activities such as rock breaking is presented in the noise chapter. A summary is presented here. <i>"No significant construction noise effects have been identified. Therefore, no specific mitigation measures are required. However, general guidance for controlling construction noise through the use of good practice given in BS 5228 will be followed. Construction and Decommissioning of the Development shall be limited to working times given and any controls incorporated in any planning permission.</i> <i>During the Decommissioning phase of the Development, noise levels are likely be no more than predicted in Table 12.10, however, it is envisaged that decommissioning will be of shorter duration. Any legislation, guidance or best practice relevant at the time of decommissioning will be complied with. Construction and decommissioning are a temporary day time activity."</i> The assessment for vibration indicates that due to the distance of the proposed construction works from sensitive locations significant vibration impacts would be imperceptible. They will be
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⁷ Environmental noise guidelines for the European Region (2019) World Health Organization. Available at: <https://www.who.int/europe/publications/i/item/9789289053563> (Accessed: 21 June 2023).

		significantly below the levels where structural damage would occur. Borrow pit blasting is expected to be slightly negative and temporary in nature. Audible noise from construction of the underground electricity export connection will be slightly negative and temporary in nature. No significant impact on population or human health is expected to occur during the construction period from noise or vibration.
Construction related workplace accidents	Construction workplaces by their nature present many health and safety hazards, such as moving heavy equipment, delivery loads, open excavations, electricity supply, uneven ground, working at heights, confined spaces, working with caustic materials (concrete) and others. Incidence can occur which can result in impact on the health and wellbeing of the workforce and people accessing the construction site. Construction workplaces must be operated in accordance with Irish Legislation relating to Health Safety and Welfare at Work.	Construction related incidents can occur which would result in injury to workers on site and/or members of the public. Appropriate mitigation measures will be put in place. To mitigate against serious accident and health impact the site will operate under Health & Safety Plans which will be periodically revised and updated as different aspects of the construction will be undertaken (e.g. civil works would differ from wind turbine erection). In the absence of a dynamic Health & Safety Plan potential risk for incidents to effect human health would be high. With appropriate Health and Safety Plans in place, likely incidents will be negative, slight in nature and temporary in duration. Key mitigation contained in the Health & Safety Plans included attending safety courses, briefings, speed limits etc No significant impact is likely to occur on population and human health.
Traffic and Transport	Traffic and transport are major drivers of urban air pollution and also transport associated noise where the concentration of such activities, such as major cities, is high. This would not be the case in the rural area of Keerglen but other	An assessment of potential impacts from Traffic and Transport is provided in the relevant chapter. The potential impacts relate to expected increases to traffic on the roads,

	potential health risks could occur such as a lack of safe walking and cycling networks and traffic injuries also pose a significant burden to public health.	upgrading of existing roads leading to the wind farm, bridges and some new road construction on the site. Disruption of road use is likely to occur during wind turbine blade delivery necessitating specialist vehicles. No significant impacts on public health are expected with minor delays to road users of a temporary nature for a short period of time. No significant impact is likely to occur on population and human health.
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15.6.2 Operational Stage Impacts

Operational Impacts on population are considered in terms of resident population, visiting population and economic population parameters. The proposed development will not give rise to any increase or decrease in population or characteristics of the populations (i.e. age, gender, social needs etc.). Due to the remote location of the wind farm it is not considered to give rise to disturbance / severance in local activities of the population. Overall, the impact on population is considered to be Neutral and Permanent.

The proposed wind farm will not result in alteration of the function or closure of any of the touristic sites surrounding the proposed development. Other potential impacts are related to changes of the landscape and scenery. It should be noted that the site will not be visible from the Céide Fields or much of the coast to the north of the site and visibility from the WAW is limited to a short section of the route. Based on the position of Ireland's scenery as a cornerstone of international tourism marketing campaigns, the maintenance of this character is deemed important. However, Fáilte Ireland research has shown that 70% of visitors perceive wind farms to have either a neutral or positive impact on the landscape while it is those who have not seen a wind farm while visiting who are more likely to hold a negative view. Research on public perceptions of windfarms and the associated impact on tourism potential are noted in Table 15.4 below.

Table 15.4: Review of Tourism research Studies

Study	Brief Summary
BiGGAR Economics – 'Wind Farms and Tourist Trends in Scotland' (2016)	Examines the link between onshore wind energy development and the sustainable tourism sector in Scotland. The results do not identify a direct relationship between tourism and the wind energy sector. It is concluded that employment in the sustainable tourism industry in Scotland is not negatively affected by an increase in wind farm development.

Fáilte Ireland and the Northern Ireland Tourist Board - 'Visitor Attitudes on the Environment: Wind Farms – Update on 2007 Research' (2012)	The original study surveyed tourists' perceptions in relation to wind farms in the Irish landscape. The updated research provided further positive results, with 80% of tourists considering the presence of wind farms to have no or a positive impact on their sightseeing.
IWEA – 'Wind Energy Ireland Public Attitudes Monitor' (2022)	This study reported on the perceptions and attitudes of adults about wind energy in Ireland, finding that 80% are in favour of wind power. This is the highest level of favourable attitude since the study's commencement.
Mintel Ireland - 'Wind farms and Offshore Wind farms' (2011)	Researched the potential impact of both on and offshore wind farms on tourism in Ireland. Responses to the survey show that only 5% of NI tourists and 3% of ROI tourists would avoid returning to an area that contained wind farms.

Based on generally positive visitor perceptions of visible wind farms and the region's touristic functions being maintained, no significant operational stage impacts on tourism were found.

Consideration of the operation of the windfarm on Population (human health) are considered in Table 15.5. below.

Table 15.5: Operational Stage Impacts on Human Health		
Period	ROI	Mayo County
Air	The operation of the wind farm will generate renewable electricity displacing fossil fuel greenhouse gas generation contributing towards a stabilisation/reduction in global temperature rise and climate change effects. The displacement of fossil fuel will also see a reduction in transboundary gases such as SO _x , NO _x , NMVOC and a reduction of emission related dust pollutants entering the air. Poor air quality can give rise to health impacts such as stroke heart disease, lung cancer, respiratory ailments and, according to the EPA "Air Quality in Ireland 2021" report, is estimated to contribute to 1,300 premature deaths in Ireland. Elevated summer temperatures resulting from climate change can also give rise to premature mortality rates.	The operational impacts on air quality are described in the relevant chapter. The project will not give rise to adverse air quality impacts and will provide a beneficial effect in providing for energy without emissions through displacement of fossil fuel electricity production with clean renewable energy. The air quality chapter describes the impacts on transboundary gas emissions, predicting an annual reduction of Nitrogen oxides, carbon monoxide, Sulphur Oxides and dust (PM_{2.5}). Considering that the WHO and the EPA regard NO_x and particulate matter (dust) as key air pollutants for human health a reduction in these

		emissions can be seen as a moderately positive benefit in the medium term. Climate change impacts are described in chapter 17. The project will generate circa 112,128 MWh of renewable electricity annually displacing circa 36,410 tCO₂eq annually from thermal electricity generation. The effect on climate change will be positive of moderate significance and medium in term. Overall, a positive impact on human health during the operational period of the wind farm will occur.
Turbine Noise	Continuous wind turbine noise can give rise to potential negative health impacts. Tones or amplitude modulation have an extensive body of literature. Wind farm noise can occur throughout the day and vary depending on wind conditions such as speed and direction, in terms of its perception at noise sensitive locations, such as where people reside. The World Health Organisation has published noise guidance for Europe and states that excessive noise can seriously harm human health. The guidance document includes recommendations for average noise exposure for wind turbines. Noise levels from wind turbines should be below 45 dB Lden. Noise levels above this have been associated with adverse health effects. Recommendations for noise exposure levels at night are absent.	Noise impacts were assessed in previous chapter. The assessment predicted noise levels would not exceed any levels at noise sensitive locations. This assessment considered noise criteria curves derived from the Draft Revised Wind Energy Development Guidelines published by the Department of Housing, Planning and Local Government in December 2019 and the Wind Energy Development Guidelines published in 2006. The predicted operational noise effects are indicated as being negative, slight and long term at the closest noise sensitive locations to the site. The noise chapter refers to compliance monitoring measures and concludes that the site will operate comfortable within relevant day time and nighttime noise criteria. The noise assessment indicates that the levels of noise will be within the noise limits set out in the 2006 wind energy guidelines and are predicted to have no significant impact on human health. Predicted noise levels were also compared to the limits proposed in the Draft Wind Energy Development

		Guidelines 2019 and were found to be in compliance with the guidelines. Therefore, no impact on population or human health will occur.
Shadow Flicker	Shadow flicker is caused when a rotating turbine blade casts a shadow through the windows of a neighbouring property. The effect occurs periodically. This can give rise to a loss of residential amenity but can give rise to health effects such as photosensitive epilepsy depending on the operating frequency of the wind farm. Shadow flicker guidance has been published in the UK. "Update of UK Shadow Flicker Evidence Base" by the Department of Energy and Climate Change. "The frequency at which photosensitive epilepsy may be triggered varies from person to person but generally it is between 2.5 and 30 flashes per second (hertz). Most commercial wind turbines in the UK rotate much more slowly than this, at between 0.3 and 1.0 hertz. Therefore, health effects arising from shadow flicker will not have the potential to occur unless the operating frequency of a particular turbine is between 2.5 and 30 hertz and all other pre-conditions for shadow flicker effects to occur exist."	An assessment of shadow flicker has been provided in Chapter 11. It is standard for a shadow flicker assessment to be carried out on all properties within 10 rotor diameters of the wind turbine. The rotor diameters for the Keerglen wind farm are 150m. For this rotor size, the limit of ten rotor diameters for shadow flicker impact corresponds to 1,500m. Shadow flicker is generally imperceptible beyond 10 rotor diameters as is the general rule of thumb within industry. There are no occupied properties within 1 kilometre of any of the turbines. However, there is one house c. 1.5km from the nearest proposed turbine and the assessment indicated that the shadow flicker effect at this location would be within the allowable values as set out in the 2006 Wind Energy Guidelines. The shadow flicker durations at the sensitive receptor location H002 are all within the limits of 30 hours per year and 30 minutes per day (worst and real case). There are no exceedances of the limits at any sensitive receptor locations, whether in the worst case nor in the real case/expected scenario, the shadow flicker duration limit of 30h per year is largely kept. Shadow flicker durations can readily be eliminated by equipping the wind turbines with a shadow flicker control system, which stops them at appropriate times. Accordingly, the operation of the installed shadow flicker control measures will ensure that there will be no impact from shadow flicker on residential buildings.

		Overall, there are no anticipated significant impacts on population or human health to occur during the operational phase of the wind farm.
Visual Impact	Visual annoyance impact arising from the continuous view of the wind farm.	An assessment of the landscape and visual effects of the project has been undertaken and presented in chapter 10. In summary, the visual effects arising from the development of the Keerglen wind farm in the landscape range from imperceptible to moderate. No impact on population or human health will occur.
Electric and magnetic fields	Potential adverse health impacts of some electric and magnetic fields that are well known are heating of body parts and stimulation of nerves. The general public have raised concerns about the risk of cancer through exposure to telecommunication masts, mobile phones, and high voltage electrical transmission systems. Little evidence exists to support the latter. EMF around wind farms can originate from underground electricity export connections, underground cables, the wind turbine generators, and the electrical transformers.	Electric fields reduce in strength rapidly with distance from the source. EMF from underground cables is lower than from overhead lines. This has been covered in Chapter 9 of this EIAR. The current ICNIPR (International Commission on NonIonising Radiation Protection (https://www.icnirp.org/), a non-governmental organisation which is recognised by the World Health Organization) Guidelines for electric fields are 5kV/m and for magnetic flux density are 100uT. The maximum electrical field strength that will be on site will be directly over the underground cables. The levels will be well below the ICNIRP guidelines as is the magnetic flux density of 0.1uT. Based on the ICNIRP Guidelines on exposure to EMF, the typical electric and magnetic fields on the transmission line and distance of human receptors from the source of these fields, no impact on population or human health is predicted to occur.
Major Accidents and Disasters	Due to the nature of the Wind Farm Site <i>i.e.</i> sloping terrain with peat covered slopes, the primary risk of an accident is associated with a peat slide. However, a comprehensive Geotechnical and Peat Stability Report (FT 2024) (Appendix 8.1) has been undertaken for all	An assessment of the potential impacts of these activities concluded a range from not significant/imperceptible to slight with the drainage effect on groundwater being described as moderate and positive. Mitigation

	proposed development infrastructure locations, and it concludes that with the implementation of the proposed control (mitigation) measures, the residual risk of a landslide occurring is determined to be negligible/none. Maintenance would include maintenance and repair of the turbines, substation, and access tracks, cables and ducting improvements, drainage improvements and forestry.	measures will be implemented which will include continued monitoring and instrumentation of the site with geotechnical supervision of maintenance works and site inspections, maintenance and repair of infrastructure and drainage improvement and maintenance. The findings of the Geotechnical and Peat Stability Report showed that the proposed development has an acceptable margin of safety, is suitable for the proposed wind farm development and is considered to be at low risk of peat failure provided appropriate mitigation measures, such as using founded roads, and implementing and maintaining an appropriate drainage system are implemented.
Pollution of groundwater by wastewater.	Untreated wastewater would have the potential to contaminate groundwater with harmful bacteria and other potential pathogens.	The wind farm will provide sanitary facilities on site for the use of maintenance staff. The wastewater from this facility will be treated using a proprietary wastewater treatment system with treated water subsequently discharged to ground. No significant impact on groundwater will occur and hence no significant impact on population or human health from this source and pathway will occur.
Ice Throw	In cold climates or high altitudes, ice can build up on the turbines blades or other parts of the turbine. This occurs when the turbine is not in operation and when the ambient air temperature is low. Ice build up can cause a dynamic imbalance on the rotating blades. This would result in an automatic shut down of the turbine. Occasions of ice throw have occurred at high	To minimise the potential risk from falling ice, the design of the wind farm ensured that turbines are located a safe distance from potential receptors. A study on wind energy production in cold countries⁸ provided a formula for calculating a safe distance: $1.5 \times (\text{hub height} + \text{rotor diameter})$

⁸ Tammelin, B. et al. (2019) *Wind energy production in Cold Climate (WECO)*, Welcome to DTU Research Database. Available at: <https://orbit.dtu.dk/en/publications/wind-energy-production-in-cold-climate-weco> (Accessed: 27 June 2023).

	altitude in cold climates presenting a safety hazard for people in the vicinity, where ice was thrown from the surface of the blade and covered a considerable distance.	In the case of the Keerglen wind farm, the turbines have a maximum overall dimension of 180 m and a maximum safe distance requirement of 438m m (1.5 x (112 + 180)). All potential receptors are located well in excess of this calculated safe distance from the turbines at Keerglen Wind Farm an no impact on population or human health is likely to occur.
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15.6.3 Decommissioning Stage Impacts

The decommissioning of the wind farm will involve the following:

Table 15.6 : Decommissioning Stage Impacts on Human Health		
Source	Potential Pathway and Receptor	Impact Assessment
Air pollution from dust arising from decommissioning activities	Decommissioning of the wind farm, is described in detail in Chapter 3. Decommissioning of the wind farm will involve the dismantling of the wind turbines and meteorological mast. The reinforced concrete turbine bases; site access tracks crane, , site drainage network; and underground cables will all be left in-situ. On-site peat repository/storage areas from the construction stage; and borrow pits will also be left in-situ. The decommissioning operations will give rise to dust generation to a limited extent, with potential to impact on air quality and thus on human beings.	As it is not intended to remove structure foundations and to confine decommissioning to above ground structures the potential for generation of dust related emissions will be low and confined mainly to the wind farm site. Given the distances to the nearest occupied dwellings (circa 1.5km) the risk of air borne dust or dust deposition on human receptors is negligible and no significant impact will likely occur during the decommissioning phase of the wind farm site. The nearest dwelling to the Keerglen site is located circa 1.5km from the site. The potential risk of dust impact on the nearest dwelling is therefore negligible and no significant impact will occur on population or human health.
Air pollution from equipment emissions during decommissioning.	There will be limited number of vehicles involved in the decommissioning of the wind farm. Exhaust emissions will occur such as nitrogen oxides and sulphur oxides from equipment used in the decommissioning. These will contribute to greenhouse and transboundary gases nationally but on a very minor level.	Exhaust emissions from decommissioning will be localised and short term at any given location and will quickly disperse in the atmosphere. Given that the nearest occupied dwellings to the wind farm site (over 2km) no significant impact will likely occur. The nearest dwelling to the Wind Farm site is located circa 1,500m from the site, no significant impact will likely occur.

		There will be no significant impact on population or human health from decommissioning operations.
Noise and Vibration from equipment used during decommissioning	Noise and vibration associated with the operation of decommissioning equipment could give rise to direct impact in the audible range and to annoyance disturbance.	Noise and vibration impact from decommissioning are described in a previous chapter and are considered to be comparable to the construction noise. As such potential noise effects from decommissioning will be negative, slight and temporary in nature. No vibration effects on population or human health will occur.
Pollution of surface water quality by sediment and hydrocarbons from the site	Decommissioning of the project will have the potential to result in contaminated surface water in the absence of mitigation which could flow to the Keerglen River.	An assessment of the impacts from decommissioning is referred to in a previous chapter with the effect described as a slight, temporary adverse impact on water quality. Mitigation measures are described which will minimise the potential impact of decommissioning activities on the Keerglen river. There will be no impact on population or human health from this aspect of the project decommissioning.
Pollution of groundwater by sediment and hydrocarbons from the site.	Ground disturbance during decommissioning could give rise to contamination of groundwater with sediment and hydrocarbons which could impact on groundwater abstraction sources in the area.	As stated in Chapter 8, no subsurface structures will be removed during decommissioning and all foundations will be left in-situ. No impact on groundwater will occur and hence no potential impact on population or human health will occur.
Pollution of groundwater by wastewater	Untreated wastewater would have the potential to contaminate groundwater with harmful bacteria and other potential pathogens.	The wastewater treatment facilities will remain in place until final decommissioning and will be supplemented by suitable mobile sanitary facilities as appropriate to ensure no contamination of groundwater from this source. No impact on population or human health will occur.
Major accident or disaster	The primary works that are likely to be carried out on the site during decommissioning that could have an impact on soils, geology and land include de-energising the substation and electrical cables, dismantling the turbines, substation and anemometers and transporting the components off-site, demolition of the control building and transporting the demolition waste off-site for disposal. These could give rise to direct impacts on land, soils and geology which could give rise to site instability and peat movement, which could impact on human health. Ducts and cables will be left in the ground, therefore no potential impacts during decommissioning stage are likely to occur.	The assessment of effects of stability impacts is provided in Chapter 8 of this EIA and states in Section 8.7.4 that during the decommissioning stage there are no potential impacts likely to occur. Additionally, in Appendix 8.1, a Geotechnical and Peat Stability Report accompanies the EIA. The Geotechnical and Peat Stability Report concludes that the findings of the peat assessment showed that the proposed development has an acceptable margin of safety, is suitable for the proposed wind farm development and is considered to be at low risk of peat failure provided appropriate mitigation measures, such as using founded roads, and implementing and maintaining an appropriate drainage system are implemented. The findings include recommendations and mitigation/control measures for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety.. With the implementation of

		mitigation measures no impact on population or human health will occur.
Construction related workplace accidents	Similar to the construction period, workplace accidents could occur on the project site during decommissioning as the health and safety hazards would be similar (moving heavy equipment, delivery loads, electricity supply, uneven ground, working at heights, confined spaces, and others. Incidence can occur which can result in impact on the health and wellbeing of the workforce and people accessing the construction site. Construction workplaces must be operated in accordance with Irish Legislation relating to Health Safety and Welfare at Work.	ABO Energy operates a Safety Management System (SMS) which meets the requirements of OHSAS 18001 and this will continue to be implemented throughout the decommissioning period. ABO Energy also operates an emergency procedure. The emergency procedure will be maintained throughout the lifetime of the wind farm Decommissioning will be carried out in accordance with legislation and best practice with respect to Health and Safety. This will involve site inductions, risk assessment and method statements. No significant impact is likely to occur on population and human health.
Traffic and Transport	Localised air pollution could occur from fossil fuel combustion emissions. Potential impacts could occur such as a lack of safe walking and cycling networks and traffic injuries.	Decommissioning effects on Traffic and Transport have been assessed in Chapter 14. In summary, there will be temporary, significant, negative impacts on the surrounding local road network and temporary, imperceptible, negative impacts on the national road network and no significant impacts on population or human health are likely to occur.

15.7 Cumulative Impacts

Based on consideration of the receiving environment the projects which may be considered relevant for cumulative effects assessments are set out in Section 15.6 above and potential cumulative impacts on human health arising from these projects are assessed below.

15.7.1 Other wind farms in the surrounding area

There are three operational wind farms within 20km of the subject site in addition to three in pre-planning, three permitted, three proposed and one in the decommissioning phase, though it is still operational (see Table 10.7). The most recent wind farm to be commissioned was the Oweninny Wind Farm which was commissioned in 2023. The proximity of these wind farms to the proposed Keerglen wind farm can be seen in the figure below. The two other recently commissioned wind farms in the surrounding area were both commissioned in 2019. These include the Killala Wind Farm and a second wind farm also known as the Oweninny Wind Farm.

An Bord Pleanála are currently considering an application for the development of the Glenora Wind Farm approximately 600m north of the proposed site. The construction programme proposed in the Glenora Wind Farm application was examined to confirm that the construction phases of the two

proposed developments will not overlap and give rise to cumulative impacts. Other potential cumulative impacts on population and human health include landscape and visual, air and climate, shadow flicker, noise and traffic and transportation. These potential cumulative impacts are assessed individually within the relevant EIAR Chapter.

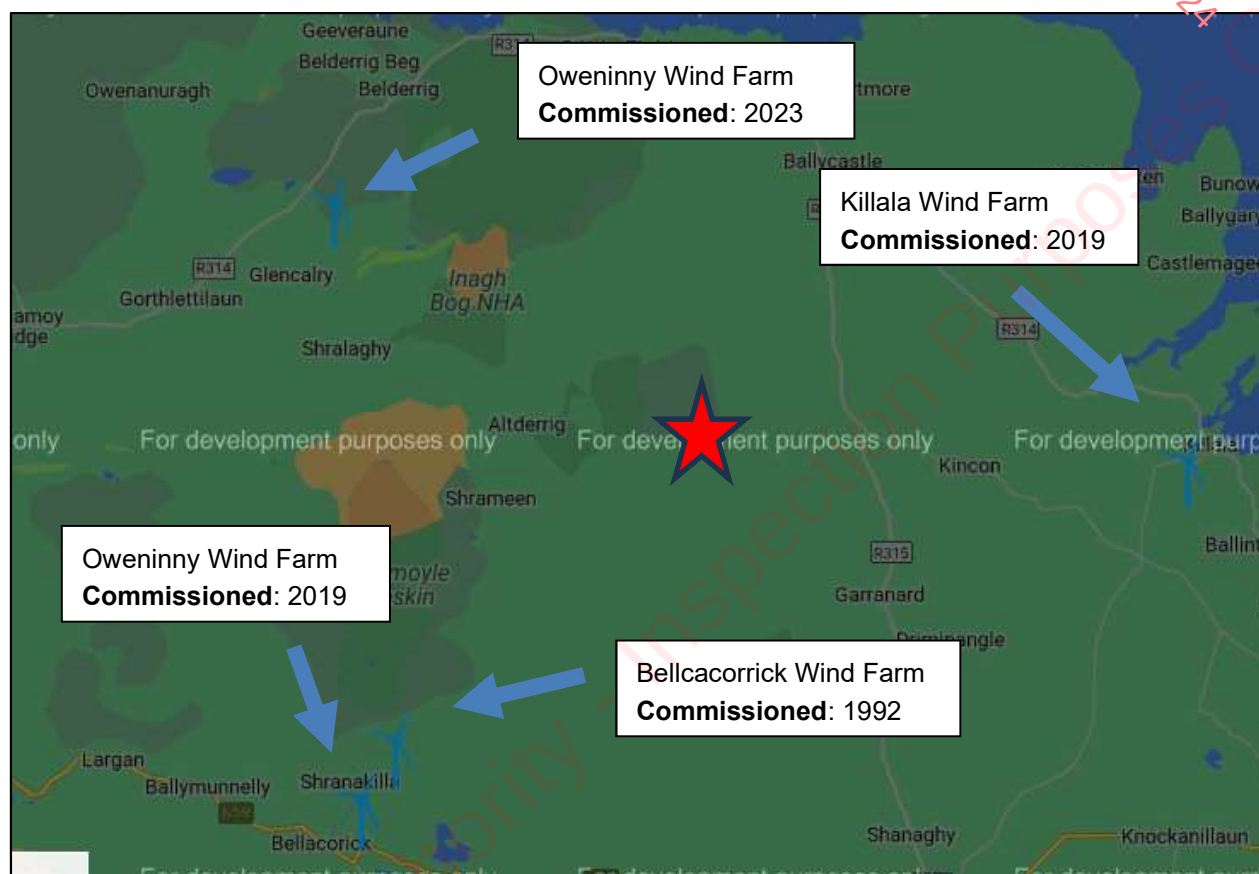


Figure 15.7 Wind Energy Ireland map of existing wind farms with proposed wind farm in red

15.8 Mitigation and Monitoring Measures

15.8.1 Construction Stage

The implementation of the CEMP will mitigate disturbance impacts on the local population during construction. No significant effects on sensitive receptors regarding human health have been identified therefore no specific mitigation measures are required.

15.8.2 Operational Stage

No significant effects on sensitive receptors regarding human health have been identified therefore no specific mitigation measures are required. Chapter 12 of this EIAR deals with noise and the chapter details how the development has been designed to comply with the 2006 noise Guidelines and noise limits attached as conditions to recent 2021 An Bord Pleanála decisions including ABP. Ref. No. 309306. The operational noise emissions are predicted to be compliant and well within these guidelines with no special mitigation required apart from fitting rotors with STE which is now considered best practice. Therefore, any potential affects to sensitive receptors regarding human health during the operation stage of the proposed development will not occur.

15.8.3 Decommissioning Phase

The operational life of the wind farm is expected to be 30 years after which it is likely to be decommissioned. The impact of the decommissioning phase is considered to be similar in nature to but normally less than the construction phase. Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant. Some of the impacts associated with reinstatement of the site. site (excavation of turbine bases, access tracks etc.) will be avoided by leaving these in place where possible. The Irish Wind Energy Association (now Wind Energy Ireland) (WEI)) (2012) states that when decommissioning a wind farm “the concrete bases could be removed, but it may be better to leave them under the ground, as this causes less disturbance”.

It is proposed to leave the access tracks in-situ at the decommissioning stage. WEI also state that “it may be best” to leave site tracks in-situ depending on the size and geography of the development. Turbine bases will be covered with overburden material to allow for re-vegetation of the proposed development site. It is proposed that the internal site access tracks and hard standings will be left in place and the land reinstated at these locations. Certain elements of underground apparatus may be left in place while tower sections and blades are likely to be dismantled to eliminate the requirement for abnormal load vehicles.

It is envisaged that the decommissioning phase of the proposed development will be shorter than the construction phase. Any legislation, guidance or best practice relevant at the time of decommissioning will be complied with. Construction and decommissioning are a temporary day time activity.

15.9 Residual Effects

Residual effects represent the analysis of potential impacts incorporating any proposed mitigation measures. The population aspect includes the people living within the vicinity of the proposed wind farm, the people visiting the area, and the employment in the area. The Human Health aspect has been covered in previous tables within this EIAR chapter.

The potential impacts on the population living in the area will be most significant during the construction phase of the project. In terms of population, local disturbance, traffic and transport effects arising from development of the site are considered to be moderate, negative and temporary. There will be no significant negative impacts on population or human health.

The proposed wind farm will increase employment in the area. This will consist of the site operatives, the construction worker crews working on the underground electricity export connection for the wind farm, and the delivery drivers travelling to the site. These personnel will be visiting local shops, accommodation and expenditure in the local area. This will be significant, positive and temporary in nature on population and human health (for employment).

The potential effects on human health have been reviewed in Table 15.3 and Table 15.5 of this chapter. Proposed mitigation measures to protect human health include the installation of silt traps which will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner. This will prevent contamination of drinking water sources. No significant construction noise effects have been identified. Therefore, no specific mitigation measures are required. However, general guidance for controlling construction noise through the use of good practice given in BS 5228 will be followed. Construction and Decommissioning of the Development shall be limited to working times given and any controls incorporated in any planning permission. No significant effects on population or human health will occur due to the mitigation measures proposed.

15.10 Statement of Significance

This Section has assessed the significance of the potential effects of the proposed development during operation, construction and decommissioning.

Regarding Tourism and Amenity, the proposed site location is located in Mountain Moorland location close to the coastal zone and includes several notable tourism and recreational sites in its vicinity. However it does not interact with, or interfere with tourism or recreational amenity sites and the overall impact on Tourism is therefore considered to be neutral. The site continues to be used for turf cutting

in sections. The site is not proximate to any settlements and the addition of the wind turbines to the Keerglen area will not have any material impact on any settlements.

Regarding Residential Amenity, this relates to the human experience of one's home, derived from the general environment and atmosphere associated with the residence. The quality of residential amenity is influenced by a combination of factors, including site setting and local character, land-use activities in the area and the relative degree of peace and tranquillity experienced in the residence.

The wind farm site is located on a site mainly consisting of agricultural pasture and cutover bog, with some sections of the subject site continuing to be harvested with other section is no longer in use for such activities. The nearest property to the wind turbines are located 1.5km away. The underground electricity export connection for the wind farm will involve the digging of trenches for power lines. The nearest properties to the trenching works is c. 15m.

When considering the amenity of residents (human health) in the context of a proposed wind farm, there are three main potential impacts of relevance are Shadow Flicker, Noise, and Visual Amenity. Detailed shadow flicker and noise modelling have been completed as part of this EIAR. A comprehensive Landscape and Visual Impact Assessment has also been completed as part of this EIAR.

The shadow analysis assessment found no significant effects on sensitive receptors due to the distance of the proposed wind farm development to the sensitive receptors. The effects of the proposed development regarding shadow flicker are not significant.

The effects of noise from the operation of the development have been assessed using 2006 Guidelines with the methodology described in ETSU-R-97 and the IOA Good Practice Guide. Noise levels during operation of the proposed development have been predicted using the best practice of calculation technique. They have been compared with the noise limits in the 2006 Guidelines and recent 2021 An Bord Pleanála limits and found to be compliant. The noise levels predicted at the nearest receptors are orders of magnitude below the level at which risk of hearing damage and no significant impacts on human health are likely to occur.

Noise during construction of the development and decommissioning will be managed to comply with best practice, legislation and guidelines current at that time so that effects are not significant and no significant impacts on human health are likely to occur.

The visual impact on sensitive receptors will not be significant and no significant impacts on human health are likely to occur.

Regarding Employment and Investment, the proposed wind farm will create employment in the short term to construct the wind farm. A small increase in employment in the short term will be created during the decommissioning of the wind farm. This will not have a significant impact on employment in the area and no significant impacts on human health are likely to occur.

Regarding Air Quality and Dust, Chapters 12 and 16 of the EIAR deals with Noise and Air Quality. The construction stage will consist of the site taking delivery of the turbine blades and the delivery of ready-mix concrete and other materials. This will marginally increase the vehicle emissions on the roads to the site. This will not be significant and will be temporary in duration. Due to the proximity of the site to sensitive receptors the air pollution generated during the construction stage and decommissioning stage of the wind farm will not be significant. No significant impacts on human health are likely to occur.

Chapter 14 of this EIAR addresses Traffic and Transport. Those working on the construction phase of the proposed development will travel daily to the site from the wider area. The construction and decommissioning phase will have no impact on the population of the area in terms of changes to population trends or density, household size or age structure. No significant impacts on human health are likely to occur.