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Acronyms and Abbreviations

ABP	An Bord Pleanála
AWEA	American Wind Energy Association
BAI	Broadcasting Authority Ireland
CAP23	Climate Action Plan 2023
CDP	County Development Plan
CEMP	Construction Environmental Management Plan
CFRAM	Catchment Flood Risk Assessment Management
CSO	Central Statistics Office
DOEHLG	Department of the Environment Heritage and Local Government
EDs	Electoral Divisions
EHSRs	Essential Health and Safety Requirements
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ELF	Extremely Low Frequency
EMF	Electromagnetic Field
EMP	Emergency Response Plan
EPA	Environmental Protection Agency
EPS	Emergency Power Supply
ESB	Electricity Supply Board
EU	European Union
EWC	European Works Council
EWEA	European Wind Energy Association
FWD	Falling Weight Deflectometer survey
FRA	Flood Risk Assessment
GSI	Geological Survey Ireland
GVA	Additional Gross Value
HSA	Health and Safety Authority
HSE	Health Service Executive
HV	High Voltage
IARC	International Agency for Research on Cancer
ICNIRP	International Commission on Non-Ionising Radiation Protection
IFI	Inland Fisheries Ireland
IR	Infra-Red
IW	Irish Water
IWEA	Irish Wind Energy Association

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LVIA	Landscape and Visual Impact Assessment
MCC	Meath County Council
MCDP	Meath County Development Plan
NESC	National Economic and Social Council
OPW	Office of Public Works
PCE	Pre-Connection Enquiry
PCS	Pavement Condition Survey
PPE	Personal Protective Equipment
RESS	Renewable Energy Support Scheme
SAC/cSAC	Special Area of Conservation / Candidate Special Area of Conservation
SEAI	Sustainable Energy Authority of Ireland
SEI	Sustainable Energy Ireland
SLR	SLR Consulting Limited
SWMP	Surface Water Management Plan
TBC	To be Confirmed
TDR	Turbine Delivery Route
WCC	Westmeath County Council
WCDP	Westmeath County Development Plan
WEI	Wind Energy Ireland
WFD	Water Framework Directive
WHO	World Health Organisation

Introduction

Background

- 4.1 This chapter provides an assessment of the potential impacts of the Proposed Development on population and human health. The aim of the assessment is to identify and evaluate the potential effects of the project over its lifetime.
- 4.2 This chapter assesses the Proposed Development in accordance the details outlined in **Chapter 2** in this EIAR. Minimum and maximum hub height and rotor diameter parameters being proposed and all design permutations within that range as set out in **Table 2-1** of **Chapter 2** in this EIAR are being applied for.
- 4.3 The assessment covers a range of factors including changes in population dynamics, potential health impacts due to changes in the environment, and the impact on general wellbeing and quality of life. The chapter is structured to provide a clear understanding of the existing environment, the potential impacts of the Proposed Development, and the proposed measures to mitigate any adverse effects.
- 4.4 The findings presented in this chapter contribute to the overall understanding of the environmental impact of the Knockanarragh Wind Farm project, supporting informed decision-making and ensuring the project's alignment with local and national development goals.
- 4.5 The likely effects arising from the Proposed Development during construction, operation and decommissioning are considered under the following headings:
- Population, Population Density, Household Statistics and Age Structure.
 - Socioeconomics, Employment, Economic Activity, and Investment.
 - Land Use Patterns, Settlement Patterns, Baseline Population and Demographic Trends.
 - Recreation, Amenity and Tourism; and
 - Human Health and Safety.

Statement of Authority

- 4.6 This chapter of the EIAR was prepared by the following individuals in SLR Consulting:
- Edward Goulding (BA, MSc) is a Graduate Town Planner with 2 years of experience in general planning and EIA. He holds a Bachelor of arts degree in Geography, Planning and Environmental Policy from University College Dublin and a master's in science in Planning and Development from Queens University Belfast.
 - Lynn Hassett is an EIA Co-ordinator (BSc, MSc) and has 15 years of experience of Environmental Impact Assessment, project management and planning in the UK and Ireland. She is a Practitioner member of the Institute of Environmental Management and Assessment, which she is a member of since 2001. She is also a Full Member of the Institution of Environmental Sciences, which she joined in 2023. Lynn has written generalist chapters for a large number of EIARs for urban development, wind and quarry projects, including the Introduction, Project Description, Alternatives, Population and Human Health, Material Assets, and Major Accidents and Disasters, co-ordinating with the wider EIA team for input.

- Aislinn O'Brien is a chartered planner and has 15 years' experience in project management, EIA coordination, planning for large scale infrastructure and renewable energy projects and preparing environmental impact assessment chapters and reports for renewable energy and tourism projects.

Summary of Proposed Development

- 4.7 A description of the Proposed Development is provided in **Chapter 2** of this Environmental Impact Assessment Report (EIAR). **Table 2-1** within that Chapter identifies the design parameters of the proposed wind turbines, given that the exact make and model of the turbine will be dictated by competitive tender process.
- 4.8 The assessment of Population and Human Health provides an overview appraisal of the potential impact of a type and scale of development on local residents and communities, therefore the ultimate choice of specific design of wind turbines does not impact on the findings within it. However, where information is obtained from more detailed technical chapters, for example noise, air and landscape, and where there are variations in impacts depending on design parameters, those findings are incorporated into the assessment on amenity and/or human health as appropriate.

Community Consultation

- 4.9 Extensive community consultation has been undertaken since as far back as 2013 and a Community Liaison Officer was appointed when the proposed development was initially proposed as part of a much larger wind development project.
- 4.10 Public consultation specific to the Proposed Development commenced in March 2023 at an early stage in its development process. A Community Liaison Strategy (CLS) was established and set into motion with a newly nominated CLO being appointed for this specific project. The CLS is based on the 'Code of Practice for Wind Energy Development in Ireland Guidelines for Community Engagement'.
- 4.11 Further details of the Community Liaison Strategy are included in **Chapter 1** of this EIAR, as well as in **Appendix 1-4**. The CLS has included two rounds of public consultation through a variety of formats in accordance with the preference of local residents. Options for consultation meetings facilitated by the CLO included house calls, small group meetings and written communication. Opportunities to provide feedback on the proposals were encouraged through the project website and virtual consultation room therein. QR codes linking to the community consultation portal and Knockanarragh website have been provided through project booklets and newsletters.
- 4.12 **Table 4-1** below sets out a summary of the feedback obtained during the two rounds of consultation (March 2023 and August/September 2023). The main areas of apprehension regarding the proposals related to a perception that it would lead to change in the area. The specific concerns regarding changes mostly related to the potential visual change that would occur, potential effects on the area's hydrological system and what a transition to a low-carbon society would mean for families and individuals living locally.
- 4.13 It was generally accepted that the local investment generated from the Community Benefit Fund would mean that people living closest to the development could benefit from it.
- 4.14 Engagement will continue throughout the life of the proposed development, continuing during development and extending into construction and operations when the project comes to fruition. This is considered to be a very positive feature of the proposed development, in line with Institute of Environmental Management and Assessment (IEMA) Guide to Effective

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Scoping of Human Health in Environmental Impact Assessment, published in 2022, which states:

"Engagement can also actively alleviate particular impacts upon mental health, by providing a sense of control, inclusion and participation".

Table 4-1: Summary of the feedback from Consultation

Concern Raised	Summary
Community Benefit Fund and RESS	People were asked how they felt for their comments on how the fund should be administered, including feedback on areas of existing deficiencies. The overwhelming feedback on this was that the community should have an input into how the fund would be administered (for example queries regarding how committee members would be selected). As well as suggestions that the funding could support an amenity trail, help preserve local heritage sites or fund the installation of chargers for electric vehicles, including electric bicycle, the local community expressed a desire that the funds be used to reduce the carbon footprint of local people.
Shadow Flicker	Initial concerns were raised by residents about shadow flicker during the consultation. The CLO was able to advise that the developer is committed to a zero-shadow flicker strategy.
Energy Security	The importance of secure and reliable energy sources to the community is well accepted and many locals are already considering what changes they will need to make in their daily lives to play their part in combatting climate change.
Design and Visual Changes	There was a range of opinions in terms of the potential changes to viewpoints. Generally, the proposed set back of 720m from residences was acceptable and the potential contribution of screening measures to reduce visual impact was accepted by many. The final proposals have incorporated comments provided throughout the process to ensure the most acceptable layout. A commitment to provide photomontages as part of the planning application was given.
Hydrological/Drainage Changes	There was an acceptance that climate change, linked to fossil fuel dependency, will cause worsening associated effects such as flooding. However, there was concern that increased run-off and changed drainage would cause an increase in the water table. The hydrological engineers for the project provided evidence to allay these fears.
Property Devaluation	In response to concerns from local property owners, the CLO cited research to show there is no evidence of any decrease in property values as a result of wind farms.
Health Effects	A small number of residents also asked about any potential negative health impacts of living close to wind farms. The Community Engagement (CE) team reassured those with concerns that there was no evidence of negative physical health effects caused by living in close proximity to a wind farm and that the reduction in CO ₂ in our air as a result of the diminished reliance on fossil fuels will, in fact, bring positive health impacts to the local and wider community.
Substation Location and Traffic Management N52	<p>The Proposed new Substation was confirmed west of Clonmellon, with the grid connection along the N52 using underground cables.</p> <p>The impact of haulage traffic on narrow country roads and on the main N52 road was an issue brought up during consultation. There were concerns that heavy trucks and machinery would leave roads in poor condition, that</p>

Concern Raised	Summary
	the use of the N52 would result on major traffic delays and that subcontractors would use roads outside the predefined and agreed Haulage Route. The CE team assured the residents that 1) All roads used for the development would be reinstated by Statkraft; 2) Subcontractors are not allowed to deviate from the Haul Route as it would be against their contracts; and 3) The names and contact details of the residents that voiced these concerns were recorded and were told that this would be passed on to the dedicated Statkraft CLO for projects in their construction phase who would be in regular contact if the project was granted planning.
Noise	The noise that trucks would cause for residents living on the haul route was also a topic of concern. As above, the names and contact details of these residents were taken to be provided to the dedicated construction phase CLO who would be their point of contact. Residents concerned about the noise coming from the turbines, especially nighttime noise levels, received information and were reassured about national regulations which restrict noise levels to 43 dB(A).

EIA Scoping Consultation

4.15 Consultation responses received during the preliminary EIA Scoping Consultation have been given due consideration during the assessment set out in this chapter. A summary of the responses can be found in the **Table 4-2** below and the full list of the scoping consultees can be found in **Appendix 1-2**.

Table 4-2: List of Consultees and Summary of Response

Consultee	Summary
Department of Housing, Planning, Community and Local Government	No response.
Fáilte Ireland	The consultee forwarded an updated copy of Fáilte Ireland's Guidelines for the Treatment of Tourism in an EIA. The report offers to provide guidance for those conducting Environmental Impact Assessment and compiling an Environmental Impact Assessment Reports, or those assessing EIARs, where the project involves tourism or may have an impact upon tourism. These guidelines are non-statutory and act as supplementary advice to the EPA EIAR Guidelines outlined in section 2."
HSE	No response.
HSA	No response.
Community Consultation	Matters raised in the course of the community consultation process included noise, details of community funding, telecommunication interference, and transport/roads during construction phase. Further details of the Community Engagement are set out in Section 4-9 to 4-11 above, Chapter 1 of this EIAR, as well as in Appendix 1-4

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Consultee	Summary
Health Service Executive Environmental Health Department Meath	No response.
Health Service Executive Environmental Health Department Westmeath	No response.
Minister for Housing, Local Government, Heritage	No response.
Minister for Tourism, Culture, Arts, Gaeltacht, Sport and Media	No response.
Minister for Rural and Community Development	No response.
Co. Westmeath Planning Department	<p>The pre-application meeting with Westmeath County Council covered several key points and concerns. Discussions centered on the specifics of land use and ownership, with queries about the size of the site and the awareness of landowners about the Proposed Development. The Proposed Substation location in Westmeath, with grid connections extending to Meath, was clarified. Each landowner is likely to have one turbine, impacting over ten turbines overall. Environmental and heritage considerations, such as the potential for impact on the Stoneyford river and nearby architectural heritage. The proximity of turbines to residential properties and potential flooding during the construction phase were also highlighted. The need to finalize the scoping report, address topic areas effectively, and consider alternative solutions for grid connections, especially concerning private lands, was highlighted.</p>
Co. Meath Planning Department	<p>Policy: The applicant was advised to consider the relevant policies in the Meath CDP: Chapter 6 Infrastructure Strategy (INF POL 41), Chapter 8 Cultural and Natural Heritage Strategy, Chapter 10 Climate Change Strategy and Chapter 11 Development Management Standards (11.8.1 and 11.8.3 and 11.8.4), CDP Appendices (A.05, A.06, A.09, A.10) and Volume 3 Book of Maps which are associated with the Appendices (including Map 8.6 Views and Prospects, etc.) and other relevant parts of the CDP in the context of their development proposal (e.g. transport, waste management, etc.)</p> <p>At the location of the proposed substation in Co. Meath, a recent planning application – PI. Ref. KA200141 noted the elevated position of the site in the landscape. It is also noted that there is a ringfort – rath adjoining this site immediately to the east. This is visible from the local road and recognisable as a fort. This should inform site selection and/ or micro siting considerations.</p> <p>Landscape: Note viewpoints from localised high points such as Peoples Park (Kells). The LCA for Co. Meath identifies the Character Area in the region of the site as:</p> <p>A ‘Lowland Landscape’ known as the ‘no. 17. South-West Kells Lowlands’ with a ‘moderate value’ and ‘moderate sensitivity’ with localised landscape importance. Noted the key importance and sensitivity of Loughcrew Hills (to the north of the site) and in particular, nos 8 and 11 in potential capacity of this LCA.</p>

Consultee	Summary
	<p>To the south-east (c.5.7km) of the proposed development there is another character area 'Lowland Landscape' known as the 'Central Lowlands' which has as 'high value' and 'moderate sensitivity'.</p> <p>To the north-west (c.5.4km) there is a 'Hills and Uplands Area' which has as 'high value' and 'high sensitivity' known as the Lough Sheelin Uplands.</p> <p>Specifically in relation to Population and Human Health the submission requests that the EIAR considers tourism assets / impacts in the region, including those identified in Failte Ireland's Hidden Heartlands and Ancient East strategies.</p> <p>Land and Soil - advises to avoid placing turbines within a fen peat / annex 1 habitat but states this is to be explored in the NIS.</p> <p>Water: notes that part of the site is within a flood risk area. In addition to stage 3 FRA, OPW CFRAMS and CDP data to be used in assessment.</p> <p>CEMP: requests Surface Water Quality Management Plan, Water Protection and Monitoring Protocol, Site Drainage Management and Emergency Silt Control and Spillage Response Procedures to be incorporated.</p> <p>Air and Climate: requests that a Dust Control Suppression Strategy is included in CEMP and the use of a Windfarm Carbon Assessment Tool.</p> <p>Cultural Heritage: An Archaeological Assessment will need to be carried out.</p> <p>Noise: consideration should be given to noise (max) limits in draft Wind Energy Guidelines 2019</p> <p>Traffic: Traffic / Transportation Management Plan will be required</p>

Assessment Methodology

Evaluation of Likely Effects

- 4.16 There are no published standards that define receptor sensitivity relating to population and human health assessments. Criteria for the determination of sensitivity (e.g. 'high', 'medium', or 'low') or of importance (e.g. 'international', 'national', 'regional', or 'authority area') have been established based on prescribed guidance, legislation, statutory designation and/ or professional judgement in the case of each of the potential identified impacts in this chapter.
- 4.17 The statutory criteria (EPA, 2022) for the assessment of impacts require that likely impacts are described with respect to their magnitude, nature (i.e. negative, positive or neutral), transboundary nature (if applicable), intensity and complexity, probability, duration, frequency, reversibility, cumulation and possibility of reducing the effects). The descriptors used in this chapter are those set out in Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

Likelihood of Effects

- 4.18 This assessment focuses on the probable or likely effects of the Proposed Development, as recommended in the Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

Significance of Effects

Table 4-3: The significance of effects is defined by the EPA Guidelines (2022).

SIGNIFICANCE OF EFFECTS	
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment
Profound Effects	An effect which obliterates sensitive characteristics.

Sensitive Receptors

- 4.19 In recognition of the fact that the potential influence of a large development is not limited to its physical boundaries, a study area of 1km radius of the Proposed Development Site was reviewed for the existence of potentially sensitive receptors. Based on a desktop map and aerial photography, the character of the local community was investigated in terms of dispersal of dwellings, main land uses within the study area, extent and location of community facilities and general connection between the Proposed Development Site and the community. Site visits were undertaken on 15 February 2022 and June 2023 to confirm that there were no additional sensitive receptors not identified through the desktop review.
- 4.20 Local residences are identified within the study area in **Figure 4-3**. Other sensitive receptors (such as hospitals, community facilities, schools) and other less sensitive receptors such as telecommunications masts, amenities, recreation trails, tourism areas were less prominent in the study area.

Desk Based Research

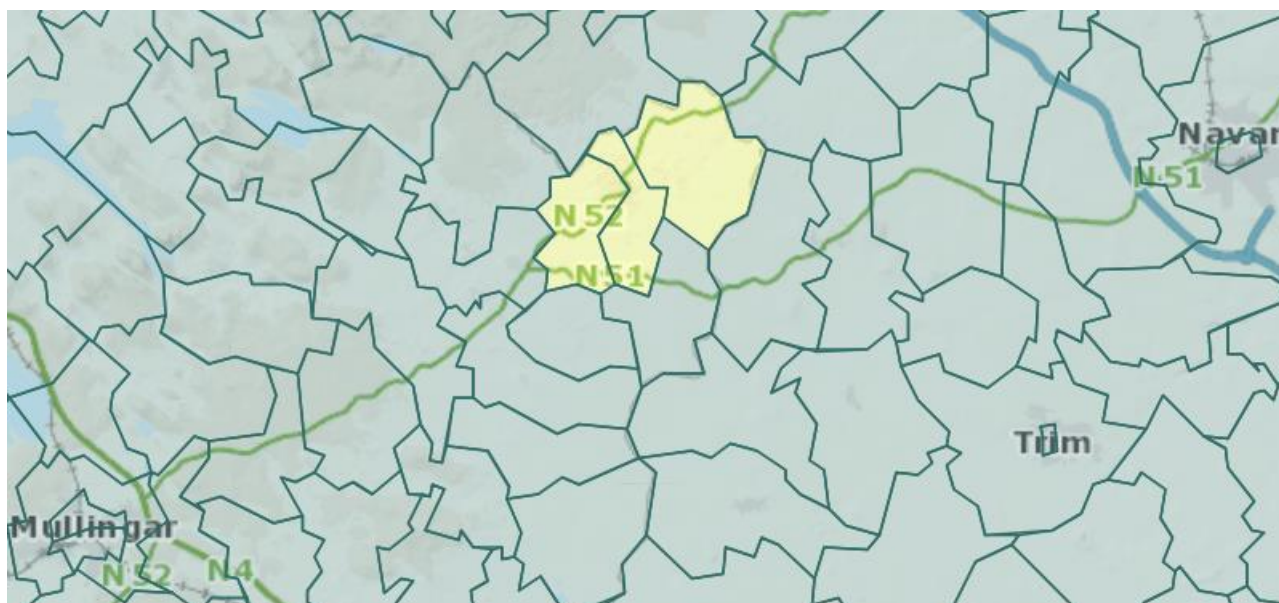
- 4.21 This chapter has been prepared following a review of:
- The National Planning Framework 2040;
 - The Regional Spatial and Economic Strategy for the Eastern and Midland Region;
 - Westmeath County Development Plan 2021 – 2027;
 - Meath County Development Plan 2021 – 2027;
 - Central Statistics Office (CSO);
 - Pobal Profiling GIS Data (<https://maps.pobal.ie/>);
 - Fáilte Ireland’s Guidelines for the Treatment of Tourism in an EIA (updated); and
 - Draft Revised Wind Energy Development Guidelines Ireland 2019.
- 4.22 This chapter has also been carried out in accordance with to the following guidelines:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, August 2022);
 - Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, August 2018);
 - Institute of Environmental Management and Assessment (IEMA) Effective Scoping of Human Health in EIA (2022); and
 - Determining Significance for Human Health in EIA (IEMA, 2022).
- 4.23 Demographic data has been sourced from the Central Statistics Office (CSO)'s Census of Ireland publicly available records. Data relating to the State, County Meath, County Westmeath, and the 'Study Area' has been assessed to establish the existing demographic trends. The lowest level breakdown of demographic data available is at the Electoral Division (ED) level, hence the baseline demographic data described later is based on ED information sourced from each of the three EDs that intersect the 1km study area. The nearby settlement of Clonmellon is represented in the study area. The study area and relevant EDs are illustrated in **Figure 4-2** and **Figure 4-1**, respectively.
- 4.24 A socio-economic profile of the existing environment was established using Census 2022 data to identify existing employment and other conditions in the study area. Land use in the area was examined, using Corine Land Cover data (2018), as shown on **Figure 4-4**, to determine the likely effects on existing land use patterns which may arise as a result of the Proposed Development.
- 4.25 The assessment on human health and safety has had regard to CSO data (2022) and reports published by the Department of Health were examined to establish a baseline health profile of the study area. Peer-reviewed literature was also assessed in considering likely effects on human health.
- 4.26 A monthly desktop-based planning search spanning 10 years within a radius of 20km was also undertaken, to focus on other large scale planning proposals in the wider area. Sources consulted included the EIA portal, An Bord Pleanála, Meath County Council, and Westmeath County Council planning lists. The list was refined by eliminating all single homes from 2km outside the red line boundary of the Proposed Development and focused on planning applications of over 50 houses and planning applications which contained an EIAR or an NIS. The result of this search is the cumulative long list of developments which has formed the basis of the cumulative assessments that have been undertaken by each of the technical specialists contributing to this EIA project. Further discussion on the refinement of this planning search is discussed later in this chapter.

Study Area

- 4.27 The Proposed Development Site predominantly consists of a mixture of agricultural land, primarily grazing, and forestry. Some of the forestry is on land that was previously used for peat extraction. The Proposed Development Site is generally flat with some gently undulating terrain and levels ranging from c. 85m AOD to 106m AOD.
- 4.28 For the purposes of identifying sensitive receptors, a study area has been defined by a 1km buffer zone from the site boundary. As shown on **Figure 4-1**, three Electoral Divisions (EDs) are represented within this buffer zone. These are the EDs of Rosmead, Ballinlough, and Killua. These EDs incorporate the townlands of Clonmellon, Kilrush Upper, Kilrush Lower, Newtown, Ballinlig, Carnybrogan, Cavestown and Rosmead in County Westmeath and the townland of Galboystown in Co. Meath.

Figure 4-1: Electoral divisions (CSO, 2022)



Community Benefit Scheme

- 4.29 An important means of incentivising support for wind farm development is the Community Benefit Scheme. The main benefits of the scheme include support for local community groups and support for local educational funds. The concept of directing benefits from wind farms to the local community is promoted by the Department of Environment, Climate and Communications (DECC), the Sustainable Energy Authority of Ireland (SEAI), the National Economic and Social Council (NESC) and the Wind Energy Ireland (WEI) among others.
- 4.30 As set out in the terms of the Renewable Energy Support Scheme (RESS), all renewable energy projects must establish a Community Benefit Fund prior to commercial operations of the Proposed Development. RESS requires a contribution of €2/MWh for all projects. Furthermore, the Community Benefit Fund will provide a minimum payment of €1,000 to all dwellings located within a one-kilometre radius from the project and sets out that a minimum of 40% of the funds shall be paid to not-for-profit community enterprises, whose primary focus or aim is the promotion of initiatives towards the delivery of the UN Sustainable Development Goals. Knockanarragh Wind Farm supports and endorses this approach to the delivery of community benefit funding and endeavours to work with local communities in a proactive and engaging way to deliver early and tangible benefits for the local areas.
- 4.31 At the earliest stages of the development process, Statkraft seek to obtain positive engagement from the community in terms of considering what associated Community Benefit funds could mean to the area. Given that local people understand the needs and requirements of the local community best, consultation with those in the local community on the form that the community benefit package should take has formed an integral part of developing this proposal. As detailed in **Chapter 2**, public consultation and engagement with the local community and businesses began at a very early stage in the development process and feedback was actively sought on ideas regarding the form the community benefit fund should take and how best to achieve maximum potential benefit from the available funding.
- 4.32 During public consultation, the local community clearly expressed a strong view that part of this fund should be ring-fenced to provide support to the residences in closest proximity to the Proposed Development through initiatives including the provision of a Near Neighbour

scheme and support for adopting low carbon technologies which would reduce household energy usage and bills. Details of how the funds would be allocated would be developed in line with the RESS requirements which require community involvement in the decision-making processes.

Predicted Fund Value

- 4.33 The total fund per annum will depend on the power output of the Proposed Development overall which may vary due to the installed turbine output and the number of permitted/constructed turbines.
- 4.34 The Community Benefit Fund for the local area, assuming the export capacity will be approximately 52.8- 57.6 MW (based on the proposed layout and working assumptions) which if developed under RESS will be approximately €300,000 per year for the local area for the duration of the scheme. To put this in perspective, €1.5 million would become available within the first 5 years of operation and €3 million within 10 years with a total funding allocation of in the region of €4.5 million being delivered within 15 years of operation. The value of this fund will be directly proportional to the energy output of the wind farm, on the project being successful in securing RESS support and the duration of that support. It should be noted that the funding available through the Community Benefit Fund has the potential to increase based on the MW output of the Proposed Development.
- 4.35 The development of renewable energy to replace conventional fossil fuels is considered essential and represents a positive move for Ireland given the role that it plays in effective climate action. The Developer also believes that it is important to provide the positive benefits of renewable energy to local communities. The Proposed Development Community Benefit Fund will provide a meaningful new investment into the local community directly targeting and passing on the benefit of renewable energy development to those in the immediate locality.

Population, Population Density, Household Statistics and Age Structure

- 4.36 Population relates to the people living in an area. Assessing the demographic makeup of an area can reveal relevant information to help guide environmental assessments of a Proposed Development. This section provides a comprehensive overview of the population profile of the study area and compares these with corresponding topics within the administrative area of Westmeath and Meath Counties and the State. This is required to create a baseline demographic profile of the receiving environment and identify likely effects on demographic trends arising as a result of the Proposed Development.

Existing Environment

Population

- 4.37 In the years between the 2016 and 2022 Census, the population of Ireland increased by 8.1%. During this time, the population of Meath County grew by 10.2% to 214,907 persons, and the population of Westmeath County grew by 8.4% to 96,221 persons. For the purposes of demographic baseline data, the study area comprises the combined Electoral Divisions of Rosmead, Ballinlough, and Killua. In the period between the 2016 and 2022 Census, the population of the study area showed an increase from 1,521 to 1,633, a growth of 7.4%.

Table 4-4: Population 2016 v 2022

AREA	2016	2022	% CHANGE
State	4,761,865	5,149,139	8.1
Meath County	195,044	214,907	10.2
Westmeath County	88,770	96,221	8.4
Study Area	1,521	1,633	7.4

- 4.38 The population growth rate of the study area varied across its Electoral Divisions (EDs) between the 2016 and 2022 Census years. Ballinlough and Killua experienced similar growth rates of 9.2% and 9.3% respectively. This growth rate is slightly higher than the growth rates for the State (8.1%), and Westmeath County (8.4%) between 2016 and 2022 but slightly lower than Meath County (10.2%) in this same period. In contrast, Rosmead experienced the exact same population figure of 312 people between the 2016 and 2022 Census with a 0% growth rate.
- 4.39 **Figure 4-3** shows the identified sensitive residential receptors as those 1km of the Proposed Development. The closest of these receptors in each location have been selected as representative locations for the prediction of potential air and noise impacts. The assessments of general disturbance to the local community in this chapter have been based on those technical assessments.

Population Density

- 4.40 The population densities recorded within the State, Meath County, Westmeath County, and the study area during the 2016 and 2022 Census are set out below. The population density of the State increased slightly from 2016 to 2022. The population density of Meath and Westmeath County also increased in the same period, but at a much higher rate.
- 4.41 For the Study Area, which comprises the combined Electoral Divisions of Rosmead, Ballinlough, and Killua, the data for the 2016 and 2022 Census are set out below. In 2022, Rosmead’s population density of 26 persons was unchanged from 2016 to 2022. Ballinlough saw a slight increase in population density from 18 persons per square kilometre in 2016 to 20 persons per square kilometre in 2022, while Killua experienced the highest increase in population density from 52 persons per square kilometre in 2016 to 59 persons per square kilometre in 2022.

Table 4-5: Population Density 2016–2022 (Source: CSO)

AREA	YEAR	POPULATION DENSITY (PERSONS PER SQUAERE KILOMETER)	% CHANGE
State	2016-2022	70 to 71.2	1.7
Meath County	2016-2022	83 to 88.5	6.5
Westmeath County	2016-2022	48 to 52	8.5
Study Area	2016-2022	32.9 to 35.3	7.3

- 4.42 This indicates that while the study area has seen a small increase in population density, it still maintains a lower density compared to the broader regions. This context is important in understanding the potential impacts of the proposed development on the local population and infrastructure.

Household Statistics

4.43 The number of households and average household size (in persons) for the State, Meath County, Westmeath County, and the study area for 2016 and 2022 are set out in **Table 4-6** below:

Table 4-6: Number of Household and Average Household Size 2016–2022 (Source: CSO)

AREA	2016	AVERAGE	2022	AVERAGE
	Avg. Size (persons)	No. of Households	Avg. Size (persons)	No. of Households
State	2.7	1,697,665	2.7	1,751,399
Meath County	2.8	67,497	2.8	73,178
Westmeath County	2.7	34,899	2.7	37,358
Study Area	2.9	523	2.9	555

4.44 The total number of households within the study area increased from 523 in 2016 to 555 in 2022, a growth of 6.1%, while Meath County experienced the largest increase in terms of total number of households at 8.4%, followed by Westmeath County at 7.1%, and the State at 3.2%. With respect to average household size in persons, that of the study area is slightly higher than the aforementioned comparators at 2.9 persons per household.

Age Structure

4.45 The age structure of the study area recorded in 2016 and 2022 is largely in line with that of the national age structure and age structure of Meath and Westmeath as detailed in **Tables 4-7 and 4-8**. In 2016, the study area was composed of a higher percentage of persons in the 45 - 64 age cohort, at 25.6%, compared to that of the State, Westmeath and Meath recorded at 23.8%, 24.5% and 22.9% respectively. It was also higher in 2022 at 29.5% in comparison to the State, Westmeath and Meath at 25.1%, 25.3% and 25.4% respectively.

4.46 Compared to the other three age cohorts, as highlighted in **Table 4-7 and 4-8** below, in 2016 the Study Area was consistent and slightly higher with a percentage of persons in the 15-24 age cohort, at 12.3% compared to that of the State, Meath, and Westmeath, recorded at 12.1%, 11.4%, and 12.1% respectively. In 2022 this slightly increased to 14.5% in the study area which was higher than the State, Meath and Westmeath which were 12.5%, 12.8% and 12.3% respectively.

4.47 The study area was also composed of a slightly lower percentage of persons in the 25-44 age cohort, at 23.1%, compared to that of the State, Meath, and Westmeath, recorded at 27.6%, 26.8%, and 26.9% respectively.

4.48 However, it should be noted that the population of the study area is far less than that of the State, Meath, and Westmeath in absolute numbers, as highlighted in **Tables 4-7 and 4-8**. The proportion of individuals aged 65 and over in the study area is roughly the same as Westmeath and the State, but is higher than in Meath, suggesting a slightly older population in the study area compared to Meath but not younger than Westmeath and the State.

Table 4-7: Population Distribution by Age Category 2016 (Source: CSO)

AREA	0-14	15-25	25-44	45-64	65+
State (2016)	1,006,788	576,642	1,405,722	1,134,927	637,786
Meath (2016)	49,931	23,366	60,817	47,015	23,915
Westmeath (2016)	19,775	11,996	31,657	24,238	11,335
Study Area (2016)	362	187	406	390	176

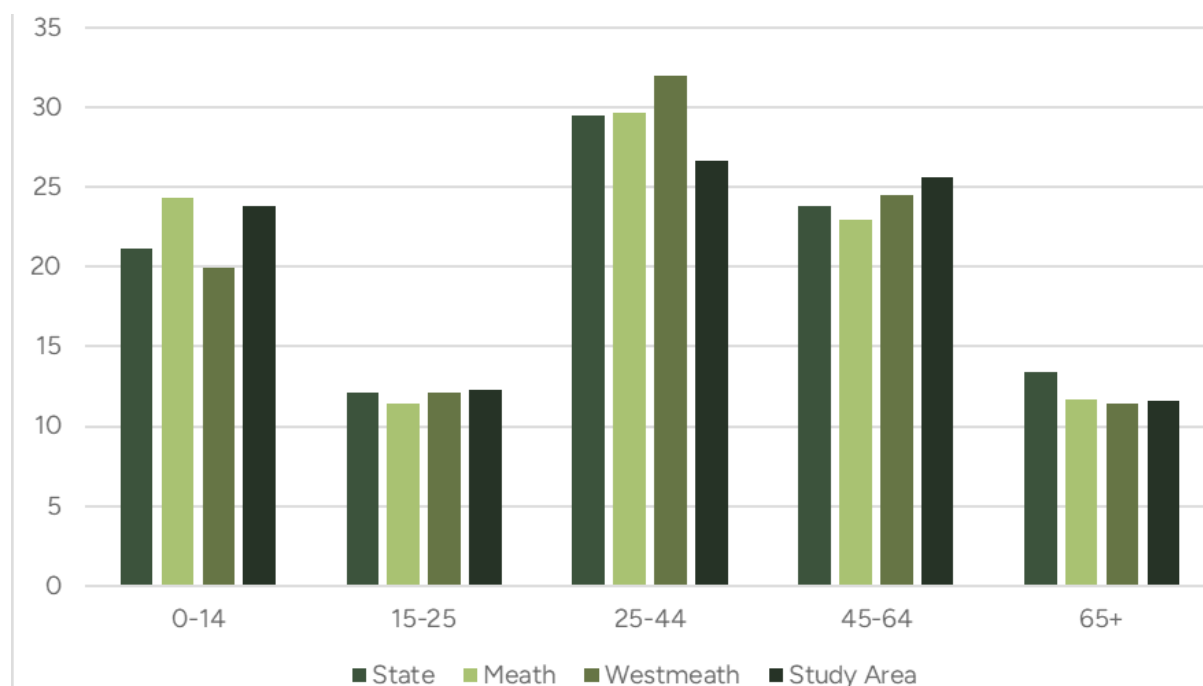


Plate 4-1: Population Distribution by Age Category in Percentage Terms – 2016 (Source: CSO)

Table 4-8: Population Distribution by Age Category 2022 (Source: CSO)

AREA	0-14	15-24	25-44	45-64	65+
State (2022)	1,012,287	644,771	1,422,424	1,293,342	776,315
Meath (2022)	50,232	28,230	59,151	56,154	27,059
Westmeath (2022)	19,779	11,853	25,850	24,370	14,369
Study Area (2022)	310	237	377	481	228

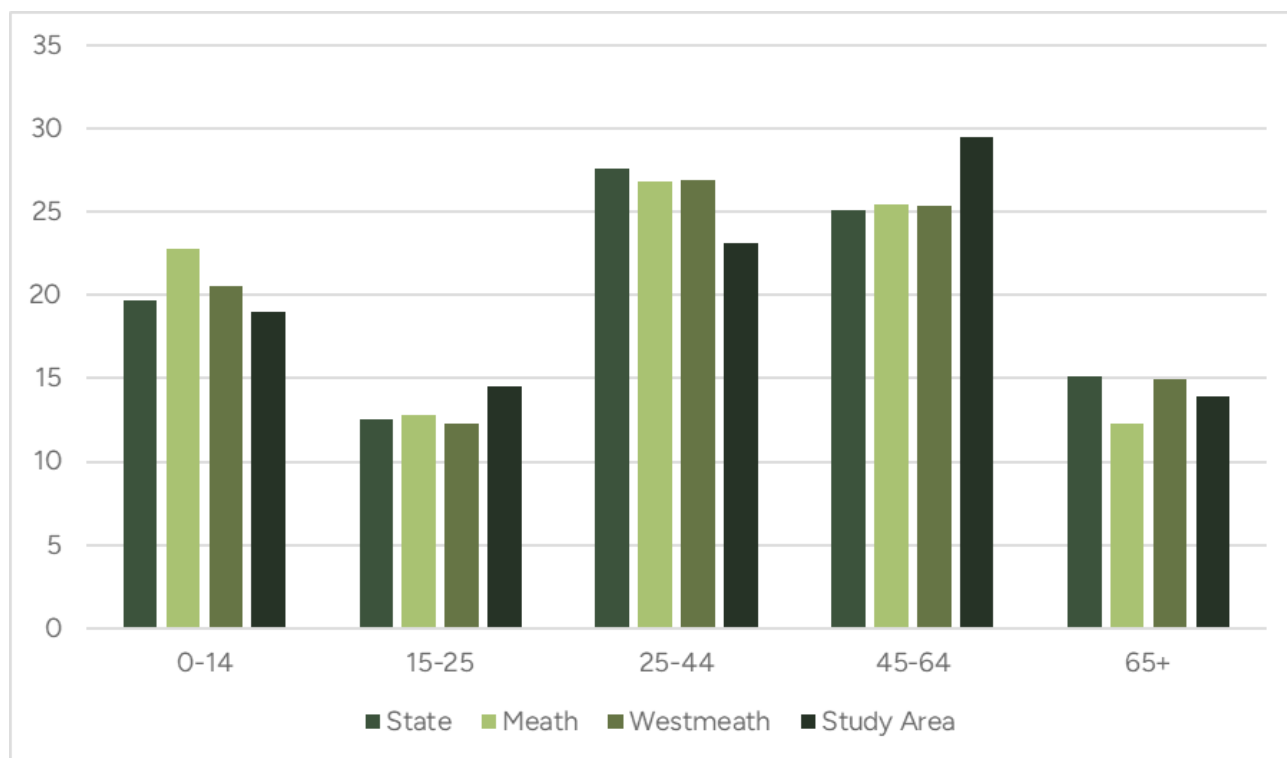


Plate 4-2: Population Distribution by Age Category in Percentage Terms – 2022 (Source: CSO)

4.49 In summary, it is noted that the population growth rate and increase in population density over the last period of census data has been relatively high within the study area as a whole. The increase in household numbers in the study area was higher than the national rate but in line with Meath and Westmeath trends, and the average household size remained slighter larger than those at County and national level. The higher percentage of persons in both the 15-24 and 45 - 64 age cohort in the study area, which both increased further from 2016 to 2022, is noteworthy.

Potential Effects- Construction

Wind Farm and TDR

4.50 The potential effects on population and demographic trends arising from the Proposed Development during its construction phase relate to potential population increase or decrease.

4.51 During the construction phase of the Proposed Development and turbine delivery route, it is likely that many of the workers travelling to the site will do so from outside of the study area.

4.52 It is expected that workers from within the study area will be employed at the Proposed Development Site. However, the relatively low population available in the study area, combined with a high percentage of employed persons, see below, indicates that there is a limited available work force in the study area and therefore many workers employed at the construction site are likely to travel from the surrounding towns and city.

4.53 **Table 2-1 of Chapter 2** of this EIAR sets out a range of turbine and hardstanding dimensions associated with the Proposed Development. This assessment considers the effects of the range between these dimensions: Hub Heights of 97.5m to 99m, rotor

POPULATION AND HUMAN HEALTH 4

diameters of 155m to 162m and a MW output between 6.6MW to 7.2MW. Additionally, it considers the permutations of the turbine foundation and hardstand dimensions: 21.5m and 28.4m in diameter respectively for both turbine types and 50mx20m and 82m x 30m.

- 4.54 With respect to the potential construction impacts of the Proposed Development on population density, household statistics and age structure, construction works will give rise to brief/short term population growth in the study area during working hours. It is unlikely that workers will take up residence in the study area, however, it is possible that some workers will stay in accommodation within the study area. Workers may also stay in accommodation in the Meath and Westmeath County areas during the construction phase resulting in potential temporary population increases in these areas. This is associated with the direct employment of construction workers, trades people, labourers and specialised contractors.
- 4.55 According to the European Wind Energy Association's (EWEA) Report 'Wind at Work' (2009), 1.2 jobs per MW are created during installation of wind energy projects¹. The Institute for Sustainable Futures document (2015) estimates a higher rate of 3.2 job per MW of wind energy development during the construction and installation phase². For the construction phase therefore, job creation can be estimated to range from 1.2 to 3.2 direct jobs per megawatt (MW). For a wind farm with a capacity between 52.8MW and 57.6MW, using the lower estimate of 1.2 jobs/MW, the project might create approximately 63 jobs at 52.8 MW and using the higher estimate of 3.2 jobs/MW, the project might create approximately 184 jobs at 57.6 MW. Thus, a wind farm in Ireland with a capacity of 52.8MW to 57.6MW could result in the creation of approximately 63 and 184 jobs during its construction phase.

Table 4-9: Economic Status of the Total Population Aged 15+ in Percentage terms - 2022 (Source CSO)

ECONOMIC STATUS	STUDY AREA	MEATH	WESTMEATH	STATE
At work	58.8%	59.3%	55.1%	56.1%
Looking for first regular job	1.8%	0.8%	1.0%	0.8%
Short term unemployed	1.6%	1.6%	1.7%	
Long term unemployed	1.6%	2.3%	3.0%	4.3%
Student	10.7%	11.3%	10.6%	11.1%
Looking after home/family	5.3%	7.2%	7.1%	6.6%
Retired	15.2%	13.2%	15.8%	15.9%
Unable to work due to permanent sickness or disability	4.2%	3.7%	5.0%	4.6%
Other	0.9%	0.6%	0.8%	0.7%

¹ https://www.ewea.org/fileadmin/files/library/publications/reports/Wind_at_work.pdf

² <https://opus.lib.uts.edu.au/bitstream/10453/43718/1/Rutovitzetal2015Calculatingglobalenergysectorjobsmethodology.pdf>

- 4.56 The population of the study area, as recorded in the 2022 Census, was 1,633 persons. The construction phase of the Proposed Development is estimated to create between 63 to 184 direct jobs. This influx of workers could potentially increase the population of the study area by between 4% and 11% during working hours.
- 4.57 However, this increase is expected to be short term and limited to the construction phase, with the population returning to normal levels outside of working hours. Given the short term nature of the construction work, it is unlikely that workers will take up permanent residence in the study area. However, it is plausible that some workers may choose to stay in temporary accommodation within the study area or in the wider Meath and Westmeath County areas, potentially leading to short term population increases in these areas as well.
- 4.58 The age structure of the study area may also see a slight increase in the 20-55 age bracket due to the influx of construction workers. However, this effect is expected to be slight and short term, lasting only for the duration of the construction phase.
- 4.59 In summary, the construction phase of the Proposed Development is likely to result in a slight, short term increase in population, primarily during construction hours and in the 20-55 age bracket. However, these effects are expected return to baseline levels following the completion of the construction phase.

Construction of Substation and Grid Route

- 4.60 The construction works associated with the substation and grid route for the Knockanarragh Wind Farm project will be undertaken on a rolling basis with short sections being developed for short periods before moving onto the next section. It is expected that these works will be conducted over a 12-month period, and the actual number of construction workers can be assumed to be included in the general construction workforce detailed above. The population of the Study Area along the grid route will receive a slight increase in population numbers during working hours. However, given the transient nature of the grid route works and the limited geographic scale of works, this is assessed as falling within the slight, short-term population increase of the study area predicted above through the overall construction works.
- 4.61 The construction phase of the project is expected to create between approximately 63-184 jobs, which could lead to a temporary increase in the local population. However, as these jobs are temporary, this increase in population and economic activity is likely to be short term. However, it is unlikely that a permanent impact on the population in the study area will occur, in terms of changes to population trends, density, household size, or age structure as a result of the construction phase.
- 4.62 Overall, while the construction works may bring about temporary changes in the local population dynamics, these impacts are expected to be minimal and short-lived. The project team is committed to minimizing these impacts as much as possible and will continue to engage with the local community throughout the construction phase to address any concerns and provide updates on the progress of the project.

Potential Effects- Operational

Wind Farm and TDR

- 4.63 Once constructed, it is envisaged that there will be direct and indirect employment associated with the operational phase of the Proposed Development. According to the European Wind Energy Association's (EWEA) Report 'Wind at Work' (2009, see earlier reference), 0.4 long-term jobs are created per MW of total installed capacity.

- 4.64 A study carried out by the Institute for Sustainable Futures (2015, see earlier reference) estimates that the operational and maintenance job output for a wind farm is 0.3 jobs per MW of total installed capacity based on an average of 6-7 studies.
- 4.65 It is expected that the operational phase of the Proposed Development could create approximately 15-23 long term jobs (with an installed capacity of 52.8- 57.6 MW). These jobs include operations and maintenance, back-office support and indirect jobs created by other activities related to installed turbines including IPP/utilities, consultancy firms, research institutions, universities and financial services.
- 4.66 Although only a small proportion of these jobs are likely to be based in the study area, the operational phase will give rise to a slight population increase in population within the study area during working hours as a result of operations and maintenance. This effect is expected to be slight and long term.

Construction of Substation and Grid Route

- 4.67 As grid route and substation will become part of the permanent national electricity infrastructure, there are no potential population effects envisaged during the operational period.

Potential Effects – Decommissioning

Wind Farm and TDR

- 4.68 The decommissioning phase of the Proposed Development is described in **Chapter 2** of this EIAR and provides for the removal of turbines and associated infrastructure from the Proposed Development Site. The potential impacts associated with the decommissioning phase in relation to population and demographics will be similar to those associated with construction phase but of a reduced magnitude.
- 4.69 A construction crew will be required for dismantling and decommissioning the infrastructure. As the decommissioning of the Proposed Development is expected to be less intensive than the construction phase, it is likely that less construction workers than the 63-184 construction jobs noted in the construction section will be required for this phase. During the decommissioning phase, the population of the study area will increase daily during working hours and return back to normal outside of working hours.
- 4.70 As removal works will be of relatively short duration, it is unlikely that workers will take up residence in the study area, however, it is possible that some workers will stay in accommodation within the study area. Workers may also stay in accommodation in the Westmeath and Meath County area during the decommissioning phase resulting in potential temporary population increases in these areas also.
- 4.71 The decommissioning phase is therefore likely to result in a slight, temporary increase in population within the study area, producing a slight temporary effect on population trends. It is not likely that the decommissioning phase will result in any permanent impact to population in terms of changes to population trends, density, household size, or age structure. The permutation of sizes between the turbine types, foundations and turbine hardstandings will have no measurable effect on population, population density, household statistics or age structure. The higher output turbine of 7.2MW would only represent a very slight increase in workers attending the site over the lower 6.6MW type (1.2 -3.2 jobs per MW range as set out earlier).

Substation and Grid Route

- 4.72 The Grid route and Substation element of the Proposed Development will be in situ on a permanent basis. There is no expected impact on population trends, density, household size, or age structure associated with the Proposed Substation and grid route as a result of the decommissioning phase.

Mitigation Measures

Wind Farm and TDR

- 4.73 As there will be no significant effect on population trends, density, household size or age structure, no mitigation measures are required.

Construction of Substation and Grid Route

- 4.74 As there will be no significant effect on population trends, density, household size or age structure, no mitigation measures are required.

Residual Effects

Wind Farm and TDR

- 4.75 The residual effects of the Proposed Development with respect to population are associated with operation and maintenance jobs during the operational phase of the Proposed Development. This is likely to result in a temporary, slight population increase in the study area during working hours. As per the assessment of operational effects, any impact to the population of the study area in terms of changes to population trends, density, household size, or age structure will be imperceptible and long term. It is therefore unlikely that long term residual effects will occur to population and demographic trends as a result of the Proposed Development.

Socioeconomics, Employment and Economic Activity

- 4.76 This section provides a comprehensive overview of the socio-economic, employment and economic activity associated with the receiving environment ('Study Area'), Meath and Westmeath County, and the State, in order to provide an understanding of the overall socio-economic profile of the receiving environment and the potential effects arising from the Proposed Development.

Existing Environment

Employment and Economic Activity

- 4.77 Socio-economic grouping divides the population into categories depending on the level of skill or educational attainment required. **Plate 4-3** illustrates the percentages of those employed in each socio-economic group in the State, Westmeath, Meath and the study area, as per the 2022 Census.

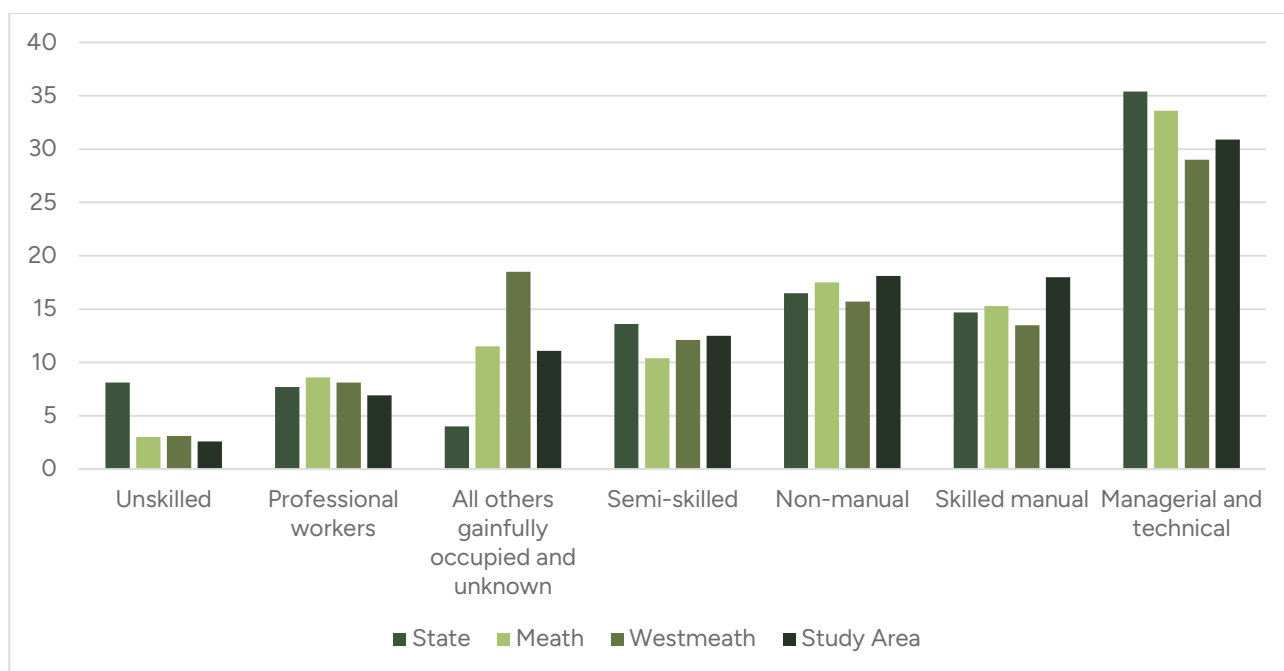


Plate 4-3: Percentages employed in each socio-economic group in the State, Westmeath, Meath and the Study Area (2022 Census)

- 4.78 In the study area, the largest employment group is the Managerial and Technical group, making up 30.9% of the total employment. This is closely aligned with Westmeath and slightly lower than within Meath and the State.
- 4.79 Non-manual and Skilled Manual workers make up the next largest groups in the study area, both of which are slightly higher represented here than within Meath, Westmeath, and the State.
- 4.80 Semi-skilled workers account for the fourth largest group of total employment in the study area, with a slightly lower rate than within Westmeath and the State, but slightly higher than Meath.
- 4.81 Professional workers make up a smaller proportion of the total employment in the study area, and a slightly lower proportion than within Meath, Westmeath and the State.
- 4.82 The smallest group in the study area is unskilled workers, with similar rates to those observed in Meath and Westmeath, but much lower than the State.

Employment and Investment Potential in the Irish Wind Energy Industry

- 4.83 The Sustainable Energy Authority of Ireland (SEAI) estimates, in their *Wind Energy Roadmap 2011-2050*³, that onshore and offshore wind could create 20,000 direct installation and operation/maintenance jobs by 2040 and that the wind industry would also have an annual investment potential of €6-12 billion by the same year.

³Sustainable Energy Authority of Ireland (2011) *Wind Energy Roadmap to 2050*, Available at: https://www.seai.ie/publications/Wind_Energy_Roadmap_2011-2050.pdf

- 4.84 A 2014 report titled *The Value of Wind Energy to Ireland*⁴, published by Pöyry, stated that growth of the wind sector in Ireland could support 23,850 jobs (construction and operational phases) by 2030. If Ireland instead chooses to not develop any more wind, by 2030 the country will be reliant on natural gas for most of its electricity generation, at a cost of €671 million per annum in fuel import costs.
- 4.85 Siemens, in conjunction with the WEI, published a report in 2014 titled *An Enterprising Wind: An economic analysis of the job creation potential of the wind sector in Ireland*⁵, which concluded, “a major programme of investment in wind could have a sizeable positive effect on the labour market, resulting in substantial growth in employment.”
- 4.86 The report considers the three potential types of direct employment created, as a result of increased investment in wind energy, to be:
- Wind Energy Industry Employment
 - Installation.
 - Development.
 - Planning.
 - Operation and Maintenance
 - Investor activity
 - Electricity Grid Network Employment
 - Potential Wind Turbine Manufacturing Employment
- 4.87 Wind Energy Ireland (WEI) released a report in March 2021 *Our Climate Neutral Future Zero by 50*⁶ in light of the Government’s announcement of new, ambitious energy targets in the same month. The report outlines the potential for 50,000 jobs to be created in the renewable energy industry in order to meet the build out requirements to achieve net-zero carbon emissions by 2050. The report estimates that at least 25,000 jobs will be in the onshore and offshore wind energy sector.
- 4.88 KPMG released a report with WEI in April 2021 titled *Economic impact of onshore wind in Ireland*⁷ which states that the wind sector currently supports 5,130 jobs (not including employment in grid development) and further emphasises that this includes “a strong foothold in rural Ireland”. It states that through its direct and indirect activities and employment, the sector supports payment of labour incomes totalling €225 million.

Economic Value

- 4.89 A 2009 Deloitte report in conjunction with the Irish Wind Energy Association (now Wind Energy Ireland, WEI) titled ‘Jobs and Investment in Irish Wind Energy – Powering Ireland’s

⁴Poyry Management Consulting (2014) *The Value of Wind Energy to Ireland*: A report to Irish Wind Energy Association 2014. Available at: <https://windenergyireland.com/images/files/9660bd6b05ed16be59431aa0625855d5f7dca1.pdf>

⁵Siemens, IWEA (2014) *An Enterprising Wind: An economic analysis of the job creation potential of the wind sector in Ireland*. Available at: <https://www.esri.ie/system/files/media/file-uploads/2015-07/BKMNEXT250.pdf>

⁶Wind Energy Ireland, MaREI (2021) *Our Climate Neutral Future Zero by 50*. Available at: <https://windenergyireland.com/images/files/our-climate-neutral-future-0by50-final-report.pdf>

⁷ KPMG, Wind Energy Ireland (2021) *Economic impact of onshore wind in Ireland*. Available at: <https://windenergyireland.com/images/files/economic-impact-of-onshore-wind-in-ireland.pdf>

Economy’ states that the construction and development of wind energy projects across the island of Ireland would involve approximately €14.75 billion of investment from 2009 up to 2020, €5.1 billion of which would be retained in the Irish economy (€4.3 billion invested in the Republic of Ireland and €0.8 billion in Northern Ireland).

- 4.90 The report also states that increasing the share of our energy from renewable sources will deliver significant benefits for the electricity customer, the local economy and society. It estimates that between 25 and 30% of capital investment is retained in the local economy. This typically flows to companies in construction, legal, finance and other professional services. The report states:
- 4.91 “...the framework acknowledges the need to put the energy/climate change agenda at the heart of Ireland’s economic renewal. Every new wind farm development provides a substantial contribution to the local and national economy through job creation, authority rates, land rents and increased demand for local support services. More wind on the system will also result in lower and more stable energy prices for consumers while helping us achieve our energy and emissions targets.”
- 4.92 A 2022 report by Baringa, ‘Bridging the Gap: Towards a Zero-Carbon Power Grid’⁸, has analysed the financial impact for end consumers of the deployment of wind generation in Ireland over the period 2022-2030. The report calculates how the costs and benefits for consumers would have differed if no wind farms had been built. The analysis indicated that the deployment of 5 GW of wind generation capacity (and 3 GW solar) in Ireland between 2022-2030 will result in a total net cost saving to consumers of €600 and exceed the 2 million tonnes of CO₂ displacement set out in the Climate Action Plan 2021. As such, the economic benefit of renewable energy to consumers is greater than what would have been if Ireland did not invest in wind power.
- 4.93 The April 2021 KPMG report⁹ introduced above states that by 2030, the onshore wind industry along will bring an Additional Gross Value (GVA) of €550million per annum to the Irish economy, will contribute €305million total payment in incomes across the supply chain and has the potential to contribute approximately €100million to local authority rates, if 2030 targets are reached. Furthermore, it is estimated that €2.7billion in capital would be invested in the country through to 2030 if Climate Action Plan targets are reached.

Energy Targets

- 4.94 In March 2021, the Government of Ireland approved the Climate Action and Low Carbon Development (Amendment) Bill 2021 which aims for net-zero emissions by 2050 and an Interim Target of 51% reduction to be reached by 2030, relative to a baseline of 2018. The Government is required to adopt a series of economy-wide five-year carbon budgets, with the first two five-year carbon budgets correlating to the Interim Target. The Bill also provides the framework for Ireland to meet its international and EU climate commitments and to become a leader in addressing climate change. The Bill states that Local Authorities must prepare individual Climate Action Plans which will include both mitigation and adaptation measures and must be updated every five years. Local Authority Development Plans must align with their Climate Action Plan.

⁸ Baringa (2022). Bridging the Gap: Towards a Zero-Carbon Power Grid. Online. Available at: <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://windenergyireland.com/images/files/bridging-the-gap-a4-report-final.pdf>. Date Accessed 30/1/2023

⁹ KPMG (2021). Economic Impact of Onshore Wind in Ireland. Wind Energy Ireland. Available at: <https://windenergyireland.com/images/files/economic-impact-of-onshore-wind-in-ireland.pdf>. Date Accessed 31/01/2023

- 4.95 The Climate Action Plan 2023¹⁰ (CAP23) is the second update to the original 2019 plan and the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021. CAP23 is a progress report on achieving the initial targets set out in CAP19, with more specific targets outlined following on with the progress report. Key targets from now to 2030 of relevance to the Proposed Development include:
- 75% reduction in emissions through large scale deployment of renewable energy by 2030
 - 45% commercial / 40% residential reduction in emissions via increasing energy efficiency in existing buildings / building new zero emissions buildings by 2030
 - 50% reduction in travel related emissions
- 4.96 Among the most important measures in the plan is to increase the proportion of renewable electricity to up to 80% by 2030 and a target of 9 GW from onshore wind, 8 GW from solar, and at least 5 GW of offshore wind energy by 2030.

Potential Effects - Construction

Wind Farm and TDR

- 4.97 The site preparation and installation of the Proposed Development will provide employment for technical consultants, contractors and maintenance staff.
- 4.98 **Table 2.1 of Chapter 2** of this EIAR sets out a range of turbine and hardstanding dimensions associated with the Proposed Development. This assessment considers the effects of the range between these dimensions: Hub Heights of 97.5m to 99m, rotor diameters of 155m to 162m and a MW output between 6.6MW to 7.2MW. Additionally, it considers the permutations of the turbine foundation and hardstand dimensions: 25m in diameter for both turbine types and 50mx20m and 82m x 30m.
- 4.99 As set out earlier, 1.2 to 3.2 jobs per MW are estimated to be created during installation of wind energy projects from general trends within Ireland. Using this figure, a projection of approximately 63 - 184 jobs could be created as a result of the construction of the Proposed Development (for an installed capacity of 52.8- 57.6MW.).
- 4.100 Therefore, it is considered that between approximately 63-184 staff/contractors could be employed during the construction phase of the Proposed Development. The employment of tradespeople, labourers, and specialised contractors for the construction phase will have a direct short term, positive impact on the local economy, bringing significant benefits to local service providers and businesses with a direct and indirect financial benefit to the local community and local businesses / service providers.
- 4.101 It is likely that there will be direct employment for people living in the study area who may be qualified for construction related roles. Materials will also be sourced in the locality where possible. This will assist in sustaining employment in the local construction trade. As a result, the construction phase of the Proposed Development will have a beneficial albeit slight and short term effect on the employment profile of the area and a short term, slight effect on local businesses and services in the study area and in nearby towns located in County Meath and Westmeath.

¹⁰ Government of Ireland (2023). Climate Action Plan 2023: Changing Ireland for the Better. (online). Available at: <https://www.gov.ie/pdf/?file=https://assets.gov.ie/243585/9942d689-2490-4ccf-9dc8-f50166bab0e7.pdf#page=null>. Date Accessed 31/1/2023

- 4.102 The permutation of sizes between the turbine types, foundations and turbine hardstandings will have no measurable effect on Socio-economics, Employment and Economic Activity during the construction phase. However, the variance in output of the turbines whether 6.6MW or 7.2MW selected may have only a very slight increase in workers attending the site as noted above.
- 4.103 The turbine delivery route will undergo targeted works along the route to facilitate the delivery of turbines and substation components. Once all components are delivered to the Proposed Development Site, these works will be reinstated where available. The potential effect on socioeconomics in terms of increased employment and economic activity, are considered to be beneficial albeit slight and short term.

Substation and Grid Route

- 4.104 As stated above, the construction works associated with the substation and grid route for the Knockanarragh Wind Farm project will be undertaken on a rolling basis with short sections being developed for short periods before moving onto the next section. It is expected that these works will be conducted over a 12-month period. The construction employment associated with the substation and grid works has been included within the overall 63-184 figure for the Proposed Development.

Potential Effects - Operational

Wind Farm and TDR

Economic Value and Employment Potential

- 4.105 The proposed development will contribute to achieving Ireland's energy target as set out in the Climate Action Plan 2023, which has a target of 80% renewable electricity for the country by 2030. With a target increase in onshore wind capacity of up to 9GW by 2030, the Proposed Development has the potential to substantially contribute to these ambitious targets.
- 4.106 Once the Proposed Development is constructed, it is envisaged that there will be direct and indirect employment associated with the operational phase of the Proposed Development. Opportunities for mechanical-electrical contractors and craftspeople to become involved with the operation and maintenance of the Proposed Development will arise.
- 4.107 The assumptions and references used to estimate job creation associated with the construction and operational stages of the Proposed Development have been set out earlier in the estimation of population likely to be generated by it.
- 4.108 Although only a small proportion of these jobs are likely to be directly taken by occupants in the study area, it is likely that the indirect jobs that the operational phase will support, such as consultants, research institutions, universities and financial services, will provide an indirect benefit the economy of Westmeath and Meath County. It is likely that there will be direct employment available for people living in the study area who may be qualified for jobs associated with operation and maintenance. There may be opportunities for local residents that may otherwise have left the study area to train / retrain in order to take local employment associated with the Proposed Development. It is therefore considered that the operational phase of the Proposed Development has potential for a slight positive indirect impact on employment in the study area, County Meath and Westmeath for all permutations listed in **Table 2.1 of Chapter 2** of this EIAR.
- 4.109 Rates and development contributions paid by the developer will provide a substantial amount of funds to both Meath and Westmeath County Councils. These funds will be used to enhance the services available to the residents of the counties.

- 4.110 All of the proposed wind turbines are situated within County Westmeath. The County Development Contribution Scheme 2022 includes a specific category for renewable energy installations generating greater than 0.5 MW, with a contribution rate of €1,375.02 per 0.1MW (with rates effected from 1st January 2024 adjusted for indexation). This suggests that a significant Development Contribution of between €726,000 and €792,000 (based on an installed capacity of 52.8MW to 57.6MW) will be made payable by the applicant prior to construction. Business rates will also contribute significantly to the local authority's revenue.
- 4.111 The 2024-2029 Meath County Development Scheme is effective from 1 January 2024. The off-site substation is to be located within this jurisdiction. Consultation will be undertaken with Meath County Council in relation to the relevant development contribution to be made given that it is a non-standard development.
- 4.112 Development contributions paid on the Proposed Development will benefit various general council services such as road maintenance, fire services, environmental protection, street lighting, and footpath works. They will also support local community initiatives and provide assistance to landowners through lease agreements and wayleave agreements associated with the Proposed Development.

Proposed Community Benefit Scheme

- 4.113 An important part of renewable energy development is its Community Benefit Scheme. The concept of directing benefits from renewable energy developments to the local community is promoted by the National Economic and Social Council (NESC) and the Irish Wind Energy Association (IWEA) among others.
- 4.114 As set out in the terms of the third Renewable Energy Support Scheme for 2023 (RESS), all renewable energy projects applying for RESS will require a Community Benefit Fund prior to commercial operations of the Proposed Development. The contribution for RESS 3, the third renewable energy auction under the support program, requires a contribution of €2/MWh for all projects. Furthermore, as part of RESS 3, the Community Benefit Fund will provide a minimum payment of €1,000 to all dwellings located within a distance of 1 kilometre radius from RESS 3 projects and a minimum of 40% of the funds shall be paid to not-for-profit community enterprises, whose primary focus or aim is the promotion of initiatives towards the delivery of the UN Sustainable Development Goals. The characteristics of the Community Benefit Fund are not expected to change significantly in future RESS auctions.
- 4.115 As detailed in **Chapter 2** of this EIAR, public consultation with the local community began at an early stage in the development process, with engagement commencing during the initial feasibility and scoping stages of the Proposed Development. Through this process, feedback was actively sought on ideas regarding the form that the Community Benefit Scheme should take and how best to achieve maximum potential benefit from the available funding. This will pave the way for the establishment of a local committee to ensure dispersal of the fund throughout the community.
- 4.116 Assuming that the export capacity of the Proposed Development will be approximately 52.8 MW to 57.6MW and is contracted under the RESS, it is anticipated that the community benefit fund for the Proposed Development could deliver approximately €300,000 per year (based on the 7.2MW output per turbine scenario) for the duration of the Renewable Energy Support Scheme which is expected to be for the first 15 years following the commissioning of the Proposed Development. It should be noted that the funding available through the Community Benefit Fund has the potential to increase based on the MW output of the Proposed Development.
- 4.117 Following public consultation, it was made clear that part of this fund should be ring-fenced to provide support to the residences in closest proximity to the Proposed Development, a

Near Neighbour scheme. The extent of the overall benefit fund to be allocated to the Near Neighbour scheme and the distribution of the balance of community benefit funds is to be further discussed and agreed with the community in future engagement. The total fund per annum will depend on the power output of the Proposed Development overall which may vary due to the installed turbine output and the number of permitted/constructed turbines.

- 4.118 The permutation of sizes between the turbine types, foundations and turbine hardstandings will have no measurable effect on Socio-economics, Employment and Economic Activity during the operational phase of the Proposed Development. However, the output of 6.6-7.2MW per turbine has the potential to increase the export capacity of the Proposed Development, resulting in increases to the contributions to the Community Benefit Fund as noted above.
- 4.119 The Proposed Development Community Benefit Fund will provide a meaningful new investment into the local community directly targeting and passing on the benefit of renewable energy development to those in the immediate locality. This effect will be long-term and have a significant beneficial effect for the community.

Substation and Grid Route

- 4.120 Once complete, the substation and grid connection will form an integral part of the national electricity grid and is considered to represent a long term slight positive economic effect given its contribution to the adapting electricity infrastructure need of the country.

Potential Effects – Decommissioning

Wind Farm and TDR

- 4.121 The potential impacts associated with the decommissioning phase in relation to socio-economics, employment and economic activity will be similar to those associated with the construction phase but of a reduced magnitude.
- 4.122 A construction crew will be required for dismantling the infrastructure and carrying out remediation where necessary. As the decommissioning of the Proposed Development is expected to be less intensive than the construction phase, it is likely that less construction workers will be required for this phase. During the decommissioning phase employment opportunities will be available in the study area and outlying areas of County Meath and Westmeath. The influx of construction workers to the study area will have an indirect impact on local businesses and services contributing to the local economy, similar to that of the construction phase but of lesser magnitude.
- 4.123 The permutation of sizes between the turbine types, foundations and turbine hardstandings will have no measurable effect on Socio-economics, Employment and Economic Activity during the decommissioning phase of the Proposed Development. The variation in output of 6.6-7.2MW per turbine has the potential to increase the export capacity of the Proposed Development, which may result in a very slight increase in the size of the construction crew responsible for decommissioning works.
- 4.124 There will be a slight, positive short term impact to socio-economics, employment and economic activity in the study area associated with the employment of construction workers within the vicinity of the development during the decommissioning phase.
- 4.125 The Turbine Delivery Route will have been reinstated during the decommissioning phase of the Proposed Development. Therefore, no impacts are foreseen in relation to socio-economics, employment and economic activity.

Mitigation Measures

- 4.126 Given that the potential impacts of the Proposed Development at construction, operation and decommissioning phases are predominantly positive, and there are no significant adverse effects, in respect in respect of socio-economics, employment and economic activity, no other mitigation measures are considered necessary for the Proposed Development.

Residual Effects

- 4.127 The residual effects of the development with respect to socio-economics is considered to be slight positive impact with respect to employment. This is as a result of the employment opportunities associated with the operation and maintenance of the development. There will also be an imperceptible positive economic effect from income spent by construction and operations workers in the local area.
- 4.128 The community benefit fund associated with the Renewable Energy Support Scheme (RESS) will provide a long-term significant positive impact to the study area and wider community. As set out in the terms of the second RESS auction (RESS 3, 2023), the Community Benefit Fund provides for payments to near-neighbours of the RESS 3 projects and will provide funding to benefit the surrounding community as a whole, in support of UN Sustainable Development Goals, in particular education, energy efficiency, sustainable energy and climate action initiatives.
- 4.129 Overall, it is considered that the effects of the Proposed Development on Socio-Economics, Employment and Economic Activity in terms of the Community Benefit Fund are considered to be long-term and have a beneficial residual effect for the community in terms of the Community Benefit Fund.
- 4.130 Rates payments and development contributions have potential to improve service provision throughout County Meath and Westmeath and in the local area. This is considered a significant positive residual effect. The provision of the substation and grid connection to it will form an integral part of the national electricity grid and is considered to represent an insignificant positive economic effect given its contribution to the adapting electricity infrastructure need of the country.
- 4.131 In accordance with the EPA Guidelines (2022), these long terms investments are considered to have a moderate effect 'An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends'.

Landuse, Settlement Patterns Baseline Population and Demographic Trends

- 4.132 This section assesses the compatibility of the proposed use with the current land use at the Proposed Development Site. The determination of the potential effects on the existing land use is assessed for the construction, operation and decommissioning phases of the Proposed Development.

Existing Environment

- 4.133 The Proposed Development is located in an area that is generally flat to gently undulating, with a very gradual slope from west to east. The highest point is located approximately 780m southeast of turbine location T3. The Proposed Development Site is characterized by

several eskers running through the area, some of which show signs of having been locally used for sand and gravel extraction.

- 4.134 It covers an area of approximately 115.81 hectares, consisting of a mixture of primarily grazing agricultural land and forestry (79.11 hectares). Some of the forestry is on land that was previously used for peat extraction. There is also a quarry adjacent to the Proposed Development Site, immediately to the south of proposed turbine location T3. The quarry, its access road, and associated lands cover approximately 18.6 hectares and are excluded from the Proposed Development site. Much of the site comprises commercial coniferous forestry. There are 4 turbines located within forestry and consequently, tree felling will be required as part of the project.
- 4.135 There is an overhead network of low and medium voltage electricity transmission lines throughout the surrounding local area, predominantly running along the public road network and a high voltage overhead line which crosses the Proposed Development Site to the north in an east-west direction close to the N52.

Potential Effects - Construction

Wind Farm and TDR

- 4.136 The existing land-uses in proximity to the Proposed Development will remain broadly unchanged during the construction phase of the Proposed Development. However, some land use in close proximity to the site (>500m) may be temporarily disrupted during the construction phase of the Proposed Development. This is likely to occur on agricultural and forestry lands. The small proportion of agricultural lands supporting access tracks and turbine hardstands will result in a slight, short term negative impact to this land use as access may be restricted to areas of the land for all permutations of turbine options and their associated hardstandings.
- 4.137 The turbine foundations will be gravity-based, consisting of a reinforced concrete base between 21.5 to 28.4m in diameter. Piles can be used where the underlying strata does not meet the criteria for gravity-based foundations. However, based on site investigations carried out to date, it is considered that all turbine foundations shall be shallow gravity base types and founded on either rock or glacial till.
- 4.138 Each turbine will have a turbine hardstanding area constructed at the base of them to provide a solid area for the main installation crane that will be used to erect the turbine and for the assembly of the turbine. The hardstand areas will consist of a minimum 500 mm hardcore placed on top of a geotextile separator membrane. The dimensions of the hardstand areas will be 50m x 20m for Turbine Type 1 and 82m x 30m for Turbine Type 2.
- 4.139 The Proposed Development will require tree felling as part of the project. It is likely that between 19.62ha and 20.09ha of forestry will be lost during the construction stage, mostly Sitka spruce conifer plantation. Under the 2014 Forestry Act, the planting of alternative land(s) is stipulated, although this is for infrastructure felling (e.g., where trees are felled to make way for infrastructure associated with the Proposed Development such as turbine bases) and turbulence felling.
- 4.140 The construction phase of the Proposed Development is likely to create the greatest land use impacts due to the number of Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs) required to transport the materials onsite. As such, there would be traffic impacts associated with the communities and roads along the delivery routes.
- 4.141 The construction activity that will be involved will represent a change of land use during the short term. The majority of forestry to be lost is of a commercial nature, which is readily replaceable. Replanting will be provided for replanted as per Forest Service Felling and

Reforestation Policy. Forestry practices will also benefit from the upgraded access tracks left in situ throughout the Proposed Development Site following the creation of the TDR.

Construction of Substation and Grid Route

- 4.142 The construction of the Proposed Substation could potentially cause short term disturbances to the electricity network in the area. **Chapter 13** of this EIAR has further information on the potential impacts to service users.

Potential Effects - Operation

Wind Farm and TDR

- 4.143 Once the Proposed Development is operational, the prevailing land use type will be restored to agriculture and the built aspect of the development (in particular hardstanding) will represent a relatively small proportion. Areas of forestry that have been felled will be replanted. Turbine delivery may impact on land use temporarily due to the transportation of oversized loads on the public road. This is likely to have a slight temporary adverse impact on residential land-use due to noise nuisance as a result of machinery. The impact of noise is further considered in **Chapter 10**. The impact of traffic is further considered in **Chapter 14**.

Construction of Substation and Grid Route

- 4.144 A small area of greenfield agricultural land to the west of Clonmellon will be changed to an area of artificial hardstanding / electricity infrastructure. However, the area is of a small scale, particularly given the extent of alternative agricultural land available in the wider area. The grid route will be underground and will not have a long-term adverse impact.

Potential Effects- Decommissioning

Wind Farm and TDR

- 4.145 The decommissioning phase of the Proposed Development is described in **Chapter 3** of this EIAR and provides for the removal of turbines and associated infrastructure from the site. The potential effects associated with the decommissioning phase in relation to land use will be similar to those associated with construction phase but of a reduced magnitude.
- 4.146 Decommissioning works will include removal of all above ground structures including the turbines, mountings and fencing. Substations are likely to be taken in charge by EirGrid or ESB and become part of the national grid and will therefore remain in situ. The turbine foundations will be covered over and allowed to re-vegetate naturally if required and access tracks will be left in situ. These works will require a construction crew on-site and may cause temporary disruption to surrounding land uses. Removal of infrastructure from the Proposed Development Site may temporarily impact on forestry practices. During decommissioning works forestry access tracks may be in use by construction crews which may temporarily prohibit access to certain areas of forestry. These effects are considered to be short term, slight and temporary.
- 4.147 Following decommissioning, areas of the site cleared of forestry may be replanted if suitable. Forestry practices will also benefit from the upgraded access tracks left in situ throughout the Proposed Development Site resulting in a minor, positive impact on the forestry industry in the local area.

- 4.148 The underground cable route will remain in situ following decommissioning and form part of the national grid and the above ground land use will remain as agricultural.

Construction of Substation and Grid Route

- 4.149 The substation will remain in situ following decommissioning and form part of the national grid. Therefore no significant effects on land use associated with this element during the decommissioning phase.
- 4.150 The underground cable route will remain in situ following decommissioning and form part of the national grid. Therefore no significant effects on land use associated with this element during the decommissioning phase.

Mitigation Measures

Wind Farm and TDR

- 4.151 The Proposed Development will alter the land use of undeveloped land where proposed works will take place. Mitigation measures for land use have been incorporated at preliminary design stage, through avoidance / prevention of unnecessary or inappropriate ground works or land use alterations to occur. The construction footprint has been kept to the minimum necessary to avoid effects on existing land uses in so far as possible.
- 4.152 Several designed-in measures will be considered to reduce the potential for impact on sensitive receptors. These will evolve over the design process in response to consultation. Measures adopted are likely to include: Avoiding sensitive areas of soils and the water environment, ensuring essential infrastructure is outside the part of the Proposed Development Site that is situated within areas of identified flood risk (see **Chapter 7** of this EIAR), minimising the number of watercourse crossing points and taking account of climate change predictions in design.
- 4.153 The construction and decommissioning works will be planned and controlled by a Construction and Environmental Management Plan (a CEMP has been included in **Appendix 2-2** found in Volume III of this EIAR but may be amended by the contractor prior to construction), which provides details on day to day works and methodologies. As part of these works, the public and other stakeholders will be provided with updates on construction activities which may impact on their properties or agricultural practices. This will be communicated to members of the public through a community liaison officer.
- 4.154 Prior to the cable route installation works within public roads, it is proposed that all access points (domestic, business, farm) are considered when finalising the temporary road closures and diversions, to maintain local access as much as possible and avoid impacts on various land uses. All proposed works and deliveries along the TDR route will also be controlled by a Construction and Environmental Management Plan to avoid undue impact to adjacent land uses.
- 4.155 As it is proposed to fell approximately 19.62ha to 20.09ha of largely coniferous forestry for the Proposed Development, replant lands of the same area are required.

Construction of Substation and Grid Route

- 4.156 Mitigation measures will be agreed in close consultation with Eirgrid and/or ESB Networks, see **Chapter 13** of this EIAR for further information.
- 4.157 In terms of environmental mitigation, the main potential impacts from the construction of the Proposed Development, including the substation, have been identified as the generation of turbid runoff during construction that could enter the water environment. Several designed-

in measures will be considered to reduce the potential for impact on sensitive receptors. These will evolve over the design process in response to consultation. Measures adopted are likely to include avoiding sensitive areas of soils and the water environment, ensuring essential infrastructure is outside flood risk areas, and minimising the number of watercourse crossing points. **Chapter 7** of this EIAR contains further information on mitigation measures proposed to protect the water environment.

Residual Effects

- 4.158 The permutation of sizes between the turbine types, foundations and turbine hardstandings will have no measurable effect on Landuse, Settlement Patterns, Baseline Population and Demographic Trends.
- 4.159 Other infrastructure that will remain in situ includes turbine foundations and hardstands which will be covered over and vegetated. The substation is likely to be taken in charge by EirGrid or ESB and the cable route will remain in situ and likely become part of the national grid. Following short term disruption of existing land uses during construction and decommissioning, the vast majority of existing land uses will be restored at the Proposed Development Site during the operation and post-decommissioning phase. Therefore, the significance is assessed as imperceptible.

Recreation, Amenity and Tourism

Existing Environment

- 4.160 This section provides an overview of the recreation, amenity and tourism value for the study area, Counties Meath and Westmeath and the State in order to assess the likely effects arising from the Proposed Development. As 2020 - 2022 have experienced an unprecedented negative impact on international tourism due to the COVID-19 pandemic, this section focuses on statistics from 2018 and 2019 as a reasonable scenario for tourism in County Meath and Westmeath. This section had regard to Fáilte Ireland's Guidelines on the Treatment of Tourism in an Environmental Impact Statement in accordance with the recommendations of the scoping response received.
- 4.161 Of note from Fáilte Ireland's Guidelines in respect of the assessment of potential effects arising from a Proposed Development on tourism, the following has been considered:
- Indicate the numbers of premises and visitors likely to be directly and indirectly affected by the Proposed Development;
 - Identify and quantify, where possible, their potential receptors of impacts, noting in particular transient populations, such as drivers, walkers, seasonal and other non-resident groups;
 - Describe any significant trends evident in the overall growth or decline of these numbers, or of any changes in the proportion of one type of activity relative to any other; and
 - Indicate any commercial tourism activity which is likely to be directly affected, with resultant environmental impacts.
- 4.162 Tourism is one of the major contributors to the national economy and is a significant source of full time and seasonal employment. During 2019, total tourism revenue generated in Ireland was approximately €9.5 billion, an increase on the €9.1 billion revenue recorded in 2018. Overseas tourist visits to Ireland in 2019 grew by 0.7% to 9.7 million ('Key Tourism

Facts 2019, Fáilte Ireland, March 2021). Ireland is divided into seven tourism regions. The study area is located within the Mid-East/Midlands Region which comprises counties Kildare, Louth, Laois, Longford, Meath, Offaly, and Westmeath. **Table 4-10** provides total revenue and breakdown of visitor numbers for the region during 2019.

Table 4-10: Tourism Revenue and Numbers (Source: Key Tourism Facts 2019, Fáilte Ireland, 2021)

MID-EAST / MIDLANDS		
MARKET	NUMBERS (000'S)	REVENUE (€m)
Britain	411	117
Mainland Europe	335	136
North America	153	68
Other Areas	55	28
All Overseas	954	348
Northern Ireland	170	52
Domestic	1,513	240

- 4.163 Section 4.2.4 Tourism of the Meath County Development Plan 2021-2027 states that the County has much to offer as a tourist destination, in particular its rich heritage, quality rural landscape, attractive towns and villages, and its appealing coastline. It is detailed that Fáilte Ireland has started work on the 'Ancient' Visitor Experience Development Plan (AVEDP) which aims to develop world-class experiences focused on the region's rich ancient heritage.
- 4.164 This destination development plan will be implemented over the next five years and will be based primarily around Brú na Bóinne and the greater Boyne Valley areas. It is designed to be a roadmap for enhancing the existing Ancient visitor proposition to achieve the objectives of addressing seasonality, increasing visitor numbers, and improving dwell time and visitor dispersion across the destination. The plan will provide a destination wide tourism development focus, harnessing existing plans and examining new projects to create a world class destination, using Ancient as the core theme.
- 4.165 With respect to Westmeath County development Plan 2021-2027 it is noted Westmeath is a county with considerable heritage and cultural assets, along with a scenic and rich natural environment. Coupled with our vibrant towns and villages and easily accessible location, it is evidently a county of high potential for tourism. Historical Fáilte Ireland and CSO visitor research has included County Westmeath as part of the Midlands region, which has not experienced a growth in visitor numbers commensurate to our coastal counterparts.
- 4.166 The county itself however has been outperforming some of our neighbouring counties, due to a number of strong visitor attractions and a critical mass of visitor services concentrated in the towns of Athlone and Mullingar. Fáilte Ireland's figures indicate that in 2018, Westmeath welcomed 1% of the 9,609 million overseas tourists who came to Ireland, spending 1% of the €5,217bn overseas tourism expenditure in Ireland. Irish residents took 238,000 trips to Westmeath (2% of the 10,918 million domestic trips in 2018) spending €27m (1% of domestic tourist spend).
- 4.167 Key tourism and amenity related policies from the Meath County Development Plan 2021 – 2027, include:

OBJ 13

To promote the development of high-quality tourism, leisure and complementary activities that can build on and complement the existing attractions in the area which include Carton House and Demense, the town of Maynooth and Maynooth University to provide a destination venue of national significance.

ED OBJ 22

To seek to maximise the tourism potential of the significant tourism hub within the Boyne Valley region which includes the UNESCO World Heritage Site of Brú na Bóinne, the Battle of the Boyne Site at Oldbridge, the Boyne River, and the coastal area of East Meath stretching from Mornington to Gormonston whilst ensuring the environmental protection of sensitive and protected coastal habitats and landscape.

ED OBJ 41

To encourage the development of Kells and Trim as a tourism cluster with improvement in the connectivity between both centres. Each town to develop a strategy for niche tourism as integral part of their overall development strategy e.g. culinary tourism, regional food hub, creative industries, etc. Continue the ongoing protection of the intrinsic built and natural heritage of Kells and Trim and their promotion as a basis of tourism.

4.168 Section 6.2.2 of Chapter 6 Tourism within the Westmeath County Development Plan 2021-2027 details how the county itself however has been outperforming some of our neighbouring counties, due to a number of strong visitor attractions and a critical mass of visitor services concentrated in the towns of Athlone and Mullingar. Fáilte Ireland's figures indicate that in 2018, Westmeath welcomed 1% of the 9,609 million overseas tourists who came to Ireland, spending 1% of the €5,217bn overseas tourism expenditure in Ireland. Irish residents took 238,000 trips to Westmeath (2% of the 10,918 million domestic trips in 2018) spending €27m (1% of domestic tourist spend).

4.169 Key tourism and amenity related policies from the Westmeath County Development Plan 2021 – 2027, include:

CPO 6.1

Engage and collaborate with key stakeholders, relevant agencies, sectoral representatives and local communities to develop the tourism sector in Westmeath, to ensure that the economic potential of the tourism sector is secured for the local economy.

CPO 6.2

Promote the development and strengthening of the overall value of Westmeath as a tourist destination by encouraging the enhancement and development of sustainable and high-quality visitor attractions, activities and infrastructure, enabling an increase in the overall capacity and long-term development of the county's tourism industry, subject to appropriate siting and design criteria and the protection of environmentally sensitive areas.

CPO 6.3

Continue to work closely with Fáilte Ireland to maximise the benefit of national and regional initiatives for the county, with a particular emphasis on initiatives which will increase the economic benefit from tourism, support local business development and encourage new enterprise opportunities.

CPO 6.4

Identify all opportunities for funding, including LEADER, National and European funding schemes and seek to maximise the benefit of such funding opportunities to the county.

CPO 6.17

Continue to support the promotion of Athlone and Mullingar as urban tourism destinations, providing memorable and high-quality visitor experiences in their own right and providing services for visitors to the range of attractions and activities in the surrounding region.

CPO 6.21

Encourage the celebration of the unique attributes of towns and villages in the design and delivery of all visitor interpretation, signage and public realm schemes in order to provide tourists with a strong 'Sense of Place' and a more memorable visit.

Tourism Infrastructure

- 4.170 Section 4.27 Tourist Infrastructure of the 2021-2027 Meath County Development Plan states that The Council will endeavour to facilitate new tourist attractions which are sensitive to the rural character and heritage of the area, such as the opening of historic houses or gardens to the public, farm visits, museums and interpretative centres.

ED POL 42

To facilitate the development of tourism infrastructure such as accommodation, restaurants, car and coach parking and toilet facilities in the designated hubs throughout the County.

ED POL 43

To promote the development of sustainable tourism and encourage the provision of a comprehensive range of tourism facilities, subject to satisfactory location, siting and design criteria, the protection of environmentally sensitive areas and areas identified as sensitive landscapes in the Landscape Character Assessment for the County. (Refer to Chapter 8 Cultural Heritage, Natural Heritage, Landscape and Green Infrastructure and Appendix 5 Landscape Character Assessment).

ED POL 44

To support the development of new tourist facilities or upgrading/ extension of existing tourist facilities at tourist sites within the County such as the Hill of Tara, Loughcrew and Trim Castle in conjunction with OPW and DCHG in accordance with the National Monuments Acts 1930 to 2014 and with proper Planning and sustainable development principles. These facilities should avail of shared infrastructure and services where possible and will be designed to the highest architectural and design standards.

ED POL 45

To encourage new and high-quality investment in the tourism industry in the County with specific reference to leisure activities (including walking, cycling, angling, equestrian and family focused activities) and accommodation in terms of choice, location and quality of product.

ED POL 46

To work with all relevant stakeholders and Fáilte Ireland to facilitate the erection of standardised signage for tourism facilities and tourist attractions as part of National and Regional initiatives.

Culture & Heritage

- 4.171 Section 4.28.4 Culture & Heritage states that The Boyne Valley is identified as the birthplace of Ireland's Ancient East and the County is the gateway to this destination, with its unique collection of pre-historic sites and monuments in particular the Brú na Bóinne UNESCO

World Heritage Site. It is recognised that there is a need for improved and new tourist facilities within the County in particular at Loughcrew, Hill of Tara, Trim Castle, Newgrange, Knowth and Hill of Slane. It is the policy of the Council:

ED POL 60

To support the development and improvement of tourist facilities at historical sites in the County only in instances where the development does not damage the resource or prejudice its future tourist value in any way, particularly in and proximate to the Brú na Boinne and Hill of Tara areas to be undertaken in conjunction with OPW and DCHG.

- 4.172 It is stated in Section 6.6 of the Westmeath CDP that Westmeath is steeped in heritage and already has a strong foundation in the provision of world-class heritage tourism attractions. Section 6.6 of the CDP acknowledges the opportunities generally in the county for visitors targeted under the 'Hidden Heartlands' tag to attune to nature. Heritage and cultural assets which are of significant importance and value and are already open to the public include Athlone Castle Visitor Centre, Belvedere House, Gardens and Park, the Luan Gallery, The Hill of Uisneach, Tullynally Castle Gardens, Kilbeggan Distillery and Fore Abbey, many of which are specifically promoted in Failte's Hidden Heartlands and Ancient East marketing campaigns. Increased investment and support are required in order to increase revenue generated to the local economy from these attractions, both directly and indirectly.

CPO 6.36

Promote the enhancement and development of Belvedere House, Gardens and Park and Athlone Castle Visitor Centre as world-class visitor attractions, enabling visitors to have an enjoyable and engaging experience, while protecting the cultural heritage, natural environment and landscape value.

CPO 6.38

Support the conservation of estates and demesnes by way of facilitating appropriate development that contributes to their economic viability.

CPO 6.41

Support sustainable initiatives and projects that enable visitors to enjoy and connect with our natural heritage, including walking or cycling trails, viewing points, facilities for bird-watching and angling, tours and events, subject to the requirements of the Habitats Directive.

CPO 6.42

Support enhanced access to state and semi-state lands such as National Parks, Forest Parks, Waterways, etc., together with Monuments and Historic Properties, for recreation and tourism purposes. Access should be planned and managed in a sustainable manner that protects environmental sensitivities, ecological corridors, and the ability of local infrastructure to support increased tourism.

CPO 6.43

Continue to engage with the NPWS, Coillte, ESB, Bord Na Mona and other stakeholders and agencies with regard to tourism related uses of cut-away bogs and support the development of peatways at appropriate locations.

CPO 6.44

Support the diversification and innovation of our tourism offerings with opportunities arising for the development of new tourism offerings such as nature tourism.

- 4.173 It is important to note that main tourism hub, that being of the Boyne Valley in County Meath along with other heritage sites such as the Hill of Tara and Trim Castle are 42 km and 21km from the Proposed Development Site respectively. Similarly Athlone Castle Visitor Centre, Belvedere House, Gardens and Park, the Luan Gallery, The Hill of Uisneach, Tullynally Castle Gardens, Kilbeggan Distillery and Fore Abbey at a significant distance from the Proposed Development, as outlined below.

Table 4-11: Distance of main tourism sites to Proposed Development

Distance of main tourism sites to Proposed Development in km	
Hill of Tara	42km
Trim Castle	21km
Athlone Castle visitor Centre	86km
Belvedere House, Gardens and Park	31km
the Luan Gallery	85km
The Hill of Uisneach	42km
Tullynally Castle Gardens	23km
Kilbeggan Distillery	48km
Fore Abbey	13km

- 4.174 It is important to note that an unclassified castle is located within the site, approximately 300m to the southeast of Turbine 1. It is situated on a low rise overlooking Newtown Lough, and it is possibly the site of Newtown Castle.
- 4.175 Another potential post-medieval earthwork is located approximately 450m to the southeast of Turbine 7. The earthwork is depicted on Larkin's 1808 Map of County Westmeath, however, no remains are now visible, and the location is in an area of forestry plantation. Rosmead House, a partially dismantled building, is an 18th-century country house located within the southern end of the Proposed Development Site, which comprises the central focal point of the Rosmead. **Chapter 12** considers the impact of the Proposed Development on these assets.

Potential Effects- Construction

- 4.176 The cultural heritage assessment that has been undertaken as part of this EIA (see **Chapter 12** of this EIAR) has examined the potential for the Proposed Development to impact on culturally important assets in the vicinity. Rosmead House, which is a Protected Structure but in ruins located within the southern end of the Proposed Development Site is the closest such feature that may have some tourist potential. There will be no likely significant direct or indirect construction phase or decommissioning phase effects on the recorded archaeological, architectural and cultural heritage resource."

Potential Effects - Operational

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

"Wind Energy developments are not incompatible with tourism and leisure interests, but care needs to be taken to ensure that insensitively sited wind energy

developments do not impact negatively on tourism potential. The results of survey work indicate that tourism and wind energy can co-exist happily”

- 4.178 The Draft Revised Wind Energy Development Guidelines (2019) also maintain that wind energy development “can co-exist happily” with tourism and go on to detail the survey results also cited in the 2006 guidelines. The survey work referred to in the guidelines is the Sustainable Energy Ireland’s (SEI’s) Attitudes towards the Development of Wind Farms in Ireland (2003). The SEI (now SEAI) report found that the overall attitude towards wind farms is positive.

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

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

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

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

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

- 4.182 The SEAI have recently published new insights on the attitudes towards commercial wind and solar energy farms in Ireland titled ‘Irish National Survey of Households Near New Commercial Wind and Solar Farms¹¹’ in May of 2023. Key findings from their research are demonstrated in **Plate 4-4** and summarised below.

¹¹ <https://www.seai.ie/publications/SEAI-RESS-National-Survey.pdf>



Plate 4-4: People's Attitudes Towards Wind Farms (Source: SEAI¹²)

4.183 This study is part of a greater long term socio-economic study on the effects of RESS on communities. The SEAI conducted in person interviews across Ireland, surveying 1,764 households in rural communities who live within 10km of one of 50 new solar or wind farm projects across Ireland. Other key findings are set out in **Table 4-12** and **Table 4-13**.

Table 4-12: People's Attitudes Towards Wind Farms (SEAI 2023)

SURVEY STATEMENT	AGREE	DISAGREE	DON'T KNOW
If I want, I can have a say in the planning process of a local wind project.			
Less than 1km	71%	24%	5%
1-5km	53%	33%	14%
Project developers and the planning authorities take account of the opinions of communities close to wind projects.			
Less than 1km	63%	30%	7%
1-5km	45%	40%	15%

¹² <https://www.seai.ie/publications/SEAI-RESS-National-Survey-Key-Findings.pdf>

4.184 The SEAI also examined people’s opinions on the Community Benefit Fund, noting that attitudes towards community benefit funds are highly positive, especially among those closest to a project. This is shown in **Table 4-13**.

Table 4-13: People's Attitudes to Community Benefit Funds (SEAI, 2023)

DISTANCE	POSITIVE	NEUTRAL	NEGATIVE	DON'T KNOW
Less than 1km	84%	7%	7%	2%
1-5km	77%	11%	7%	5%
Less than 10km	78%	10%	8%	4%
Overall	78%	10%	8%	4%

4.185 In relation to Policy 6.43 and the need for engagement with the NPWS, Coillte, ESB, Bord Na Mona and other stakeholders and agencies with regard to tourism related uses of cut-away bogs, it is considered that the Proposed Development Site is segmented and not conducive to the development of peatways. There may, however, be opportunities for future development through investment from the Community Benefit Fund.

4.186 Recent independent research conducted by BiGGAR Economics in 2016 entitled ‘Wind Farms and Tourism Trends in Scotland’, assessed the relationship between wind farm developments and the tourist industry in Scotland. An analysis was carried out on eight local authorities which had witnessed a higher increase in wind energy developments than the Scottish average. Of the eight local authorities, five also witnessed a greater increase in sustainable tourism employment than that of the National Average with just three witnessing less growth than the Scottish average.

4.187 The research concluded that at local authority level, no detrimental impact occurred on the tourism sector as a result of wind energy development, rather that, in the majority of cases, sustainable tourism employment performed better than other areas.

4.188 Fáilte Ireland conducted research titled “Visitor Attitudes on the Environment”, which was first published in 2008 and updated in 2012. The research surveyed both domestic (25%) and overseas (75%) holidaymakers to Ireland to determine their attitudes to wind farms. The survey results indicated that most visitors were broadly positive towards the idea of building more wind farms on the island of Ireland. A minority (one in seven) were negative towards wind farms in any context.

4.189 Updated research was undertaken by Fáilte Ireland in 2018¹³ to assist it, in its capacity as a prescribed body under planning legislation, to understand how much the visual impacts from development affect visitors impressions of the quality of the landscape. Detailed research was undertaken, involving a range of specialists in market research, visual impact analysis, landscape architecture, environment, planning and impact assessment. The research was designed to avoid prompting responses is considered to have led to bias by respondents in previous studies. One of the main findings of the research was that the majority of visitors did not appear to notice the majority of development – even very large and visually prominent structures such as wind turbines and powerlines. For example, the percentage of visitors reporting that they noticed substantial wind development around the tourist attraction of Gougane Barra was less than 5%.

¹³ Fáilte Ireland (2018) Report on Visitor Awareness and Perceptions of the Irish Landscape

- 4.190 Further research has been undertaken in Scotland in 2011 by Visit Scotland who have produced a Wind Farm Consumer Research report which showed that 83% of those surveyed said a wind farm would not affect their decision about where to stay when on a holiday or short break in Scotland. Also, against a backdrop of increased wind farm deployment, Visit Scotland's statistics showed the number of visits to Scotland last year and the amount of spending by visitors both increased while their 'Scotland National Visitor Survey 2011' made no mention of the issue of wind farms affecting tourism in Scotland.
- 4.191 Renewable energy projects have also proven to be visitor attractions. Since opening in September 2009, the visitor centre at Whitelee Wind Farm in Scotland, the largest on-shore wind farm in the United Kingdom, attracts 200,000 visitors per year (Scottish Power, 2019).
- 4.192 From a review of literature as detailed above, it is concluded that the majority of tourists surveyed had a generally positive view on wind energy development in the landscape.
- 4.193 The Proposed Development Site is located within a Landscape Character Area defined as Character Area 3 River Deel Lowlands. This area is characterized by low-lying pasture punctuated with small lakes flanked by scrub and wet woodland. The River Deel and the Stonyford River, which form part of the River Boyne and Blackwater cSAC complex, typify this landscape character area. The area east of Delvin and running south along the Meath Border is characterized by cutover, cutaway bogs, and small tracts of intact bog.
- 4.194 The Proposed Development Site is in proximity to other landscape character areas, such as the 'South-West Kells Lowlands' to the north-east and the 'Central Lowlands' and 'Lough Sheelin Uplands' to the south-east and north-west, respectively. These areas have varying levels of value and sensitivity, which could potentially influence the development of the wind farm.
- 4.195 The Zone of Theoretical Visibility (ZTV) study, which extends 20km around the site, was also factored into the design. This study, which represents a worst-case visibility scenario, informed the selection of viewpoints for the Landscape and Visual Impact Assessment (LVIA). These adjustments align with the Westmeath County Development Plan's guidelines to minimize landscape and visual impacts and harmonize the wind turbines with the landscape. This is detailed in **Chapter 10** of this EIAR.
- 4.196 The cultural heritage assessment predicted a long-term, reversible, slight effect on the setting of heritage assets of the Rosmead Country House and Estate ruins and Ballinlough Castle (NIAH building ca. 1km to the northwest) due to the intrusion of turbines within the views from the features during the operational phase of the Proposed Development. These are not considered to represent a significant impact in terms of tourism.
- 4.197 **Chapter 10** of the EIAR sets out the potential landscape and visual impacts of the Proposed Development and describes the setting of the Proposed Development Site in relation to tourism features such as Fore Abbey. The assessment concludes that there will be no significant impacts and consequently it is considered that there will be no significant tourism impacts.

Potential Effects– Decommissioning

- 4.198 The decommissioning phase of the Proposed Development is described in **Chapter 2** of this EIAR and provides for the removal of turbines and associated infrastructure from the Proposed Development Site. The potential effects associated with the decommissioning phase in relation to recreation, amenity and tourism will be similar to those associated with construction phase but of a reduced magnitude.

Mitigation Measures

- 4.199 Mitigation measures for recreation, amenity and tourism are primarily related to the preliminary design stage of the Proposed Development, which has allowed for the prevention of development to occur that would adversely affect any recreational or tourist amenity. In designing the Proposed Development, careful consideration was given to the potential impact the proposed turbines may have on the of value landscape.
- 4.200 The final proposed layout embeds design-based mitigation to avoid disturbance of known cultural heritage assets. The closest heritage feature to these plans is Turbine 5, located approximately 40m from the unclassified ringfort within the Proposed Development Site (WM00529).

Residual Effects

- 4.201 While there is potential for a slight, short term impact to recreation, amenity and tourism due to the intermittent closure of existing forestry tracks during the construction and decommissioning phases of the Proposed Development, the significance of impacts to recreation, amenity and tourism in the surrounding area as a result of the Proposed Development are assessed as imperceptible. The predicted significance of the effect applies to all permutations with the range.
- 4.202 The cultural heritage and landscape and visual assessments found that the development of the wind farm would have a slight impact on setting of heritage assets Ballinlough Castle (15400906) within Ballinlough Estate or Rosmead Country House (15400921), the Triumphant Arch (15400904) and the Rosemead estate curtilage buildings, and the series of Ringforts across the landscape. The potential impact to recreation, amenity and tourism are considered to be imperceptible.

Human Health

- 4.203 This section provides a comprehensive overview of the health profile of the receiving environment and the State, in order to provide for the assessment of potential effects of the Proposed Development may have on human health. An assessment of peer reviewed literature has been carried out to provide a sound, scientific basis for the potential impacts arising from the Proposed Development. In relation to accidents and safety, this section of the chapter should be read in conjunction with **Chapter 15** of this EIAR.

Existing Environment

- 4.204 This section provides the health profile of the receiving environment, in comparison with Meath and Westmeath County and the State, in order to provide for the assessment of likely effects on human health that may arise as a result of the Proposed Development.
- 4.205 Human health in relation to this assessment refers to the nature and possibility of adverse health effects on humans. In the context of existing human health, the most recent update from the Department of Health in Ireland regarding the 'Health in Ireland, Key Trends' report¹⁴ was published on December 1, 2022, and last updated on December 6, 2022. The 2022 edition of the report provides summary statistics on health and health care over the past 10 years. The report highlights selected trends and topics and includes data from newly available sources.

¹⁴ <https://www.gov.ie/en/publication/fdc2a-health-in-ireland-key-trends-2022/>

- 4.206 Ireland has the highest self-perceived health status in the EU, with 82.1% of people rating their health as good or very good. The number of people reporting a chronic illness or health problem is also better than the EU average, at around 29% of the population.
- 4.207 Generally speaking, Ireland has a high level of good/very good health demonstrated in self-evaluation statistics included in Census data, which has been provided below in **Table 4-14**. The data below shows the self reported health status of individuals within the study area to be slightly better than within County Meath as a whole. Health status reported as being bad or very bad is almost identical across the study area, Westmeath, Meath and the State.

Table 4-14: Self-perceived health status in Ireland (CSO, 2022¹⁵)

AREA	VERY GOOD	GOOD	FAIR	BAD	VERY BAD	NOT STATED
State	59.4%	27.6%	8.0%	1.3%	0.3%	3.3%
County Westmeath	52.1%	30.2%	8.8%	1.4%	0.3%	7.2%
County Meath	57.1%	29.6%	7.6%	1.2%	0.3%	4.3%
Study Area	55.7%	30.3%	8.4%	1.0%	0.6%	4.0%

- 4.208 With respect to health and safety, the Health and Safety Authority of Ireland monitor fatal workplace injuries throughout Ireland. In relation to construction activities, in the past 10 years (2010 to 2019) an average of 8.1 fatal workplace injuries have occurred per year throughout Ireland. It is likely that there is a reduction in reported incidents 2020 and 2021, largely due public health measures introduced as a result of the COVID-19 pandemic, therefore incidents pertinent to 2020 and 2021 were not considered.
- 4.209 This is above average in relation to other economic sectors. The average number of fatal workplace injuries throughout all economic sectors over the same period in Ireland has been 4.5 fatal workplace injuries per year. This indicates the above average danger levels which workers are exposed to on construction sites.

Potential Impacts - Construction

Wind Farm and TDR, Construction of Proposed Substation and Grid Route

- 4.210 The construction phase of the Proposed Development has potential to create health and safety hazards for both construction workers and the general public. This is as a result of construction activities and the associated impacts including increased traffic, transport of heavy or bulky materials, noise emissions, dust emissions, construction on public roads, excavation and general site-safety. Aspects of the construction works that may present health and safety issues, are as follows:
- General construction site safety (e.g., slip/trip, moving vehicles etc.);
 - Lifting of heavy loads overhead using cranes;
 - Working with electricity during commissioning;
 - Working at heights;

¹⁵ <https://visual.cso.ie/?body=entity/ima/cop/2022>

- Working in confined spaces;
 - Ground conditions and soil stability;
 - Substation construction;
 - Road safety due to increased traffic numbers and transport of oversized loads to the Proposed Development Site along turbine delivery routes and proposed haul routes;
 - Pedestrian and recreation user safety;
 - Installation of electrical cables on-site and in the public road corridor; and
 - Potential emissions impacting air quality and noise.
- 4.211 The works proposed as part of the Proposed Development will pose a risk to construction workers on-site especially during adverse weather conditions. This has potential to cause significant impact on human health if proper construction and safety protocols are not followed.
- 4.212 At the time of preparation of this chapter, the COVID-19 virus continues to represent a risk to human health. Similar to any construction site, potential for spread of the virus during the construction phase of the Proposed Development may occur due to potential transmission from worker to worker due to construction activities and potential for close quarter working conditions. Up to date HSE guidance will be consulted regularly in line with HSA recommendations and all reasonable on-site precautions will be taken if COVID-19 remains a significant health issue during the construction phase.
- 4.213 Potential health and safety hazards may occur on public roads and adjacent land uses including agricultural lands and forestry lands and associated recreation uses (forestry tracks). Existing forestry tracks within the Proposed Development Site will be intermittently closed to the public during the construction stage which may cause confusion for recreation users. Construction works taking place on the public road and the delivery of heavy/bulky goods (TDR) and machinery on narrow roads may lead to temporary limited access to farmlands and forestry lands creating a potential hazard. This may cause a potential moderate, short term impact on public safety.
- 4.214 The delivery of turbines will require transport of heavy/bulk goods from Dublin port with delivery of the wind turbine components (WTCs) along one distinctive route. The turbine delivery route will leave Dublin port and join with the M50 motorway via the Dublin Port Tunnel. The transport will continue on the M50 to the junction with the M4, where the transport will travel through the junction to head west along the M4 to the N4. At junction 16 of the N4 close to Mullingar the transport will exit the N4 to head north east along the N52 towards the Proposed Development Site.
- 4.215 Due to the abnormal size of the turbine components, there are potential human safety risks associated with their delivery including traffic safety and pedestrian safety at special manoeuvring points. This has potential for significant effects to human safety if unmitigated and is addressed in **Chapter 15** of this EIAR.
- 4.216 Potential impacts on air quality, which can have implications for human health, have been assessed. Energy production from wind turbines does not directly emit pollutants, but the construction phase of the proposed development could lead to minor short term or indirect emissions, including vehicular and fugitive dust emissions.
- 4.217 There have been no significant impacts identified on air quality with regard to the emissions of construction-related traffic. The impact on air quality due to emissions from construction works (construction machinery) has been classified as negligible. As a result, the construction phase of the Proposed Development is not expected to have a significant impact on air quality.

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- 4.218 Given the considerable distance between the Proposed Development and the nearest receptor, the impact on air quality at nearby dwellings is expected to be imperceptible. This indicates that the proposed development, even during its construction phase, will not adversely affect the air quality experienced by residents in nearby dwellings.
- 4.219 The carbon resources required for the construction of the Proposed Development and the savings achieved by displacing fossil fuel-generated electricity suggest a net positive impact on air quality in the long term.
- 4.220 The construction and operation of the wind farm are not expected to significantly impact air quality. The production of energy from wind turbines does not directly emit pollutants, unlike fossil fuel-based power generation. Some minor, short term emissions may occur during construction, such as dust and vehicle emissions, but these are considered negligible. The impact on air quality at nearby dwellings is expected to be imperceptible due to the distance between the source of emissions and the receptors. The wind farm's operation will not contribute to air pollution, further ensuring that local air quality remains unaffected.
- 4.221 Construction works associated with the cable route have potential to impact on nearby dwellings with regard to air quality. Due to the nature of construction along the proposed cable route, which works as a “rolling” construction site, meaning that these works will not be concentrated in any one area of the route, these effects are considered to be short term, and slight.
- 4.222 An analysis of the likelihood of climate hazards, the sensitivity of the proposed development to climate hazards, and mitigation measures related to climate change adaptation has been conducted. No significant effects on air quality due to the Proposed Development have been identified during the construction phase.
- 4.223 The potential impacts from noise during the construction phase of the wind farm and TDR are expected to be short term and dependent on various factors such as the final site programme, equipment types used for each process, and the operating conditions that prevail during construction. However, with mitigation measures in place, the construction noise levels would be below the relevant noise limit of 65 dB LAeq,1hr for operations exceeding one month, and therefore, the noise impacts are not considered to be significant.
- 4.224 Vibration is generated by construction activities such as rock breaking and passing heavy goods vehicles. However, the nearest noise-sensitive locations are sufficiently distant, over 500m, that vibration will not be perceivable by residents at their dwellings and building damage will not occur from construction incurred vibration.
- 4.225 The potential effects on human health associated with land, soils, and geology during the construction phase of the wind farm are primarily related to the possibility of soil erosion and sedimentation, which can lead to the contamination of surface water bodies. This can occur due to the removal of vegetation and the disturbance of soil during construction activities. However, with the implementation of appropriate mitigation measures such as the use of silt fences and sedimentation ponds, these impacts can be effectively managed and minimized.
- 4.226 Furthermore, the construction activities could potentially lead to the exposure and spread of contaminated soil, if present. However, the preliminary site investigations did not identify any significant contamination from past uses of the Proposed Development Site. In the unlikely event that contaminated soil is encountered during construction, appropriate measures will be taken to manage and dispose of the contaminated soil in accordance with regulatory requirements.
- 4.227 In terms of geology, the construction activities could potentially lead to slope instability and landslides, particularly in areas with steep slopes or weak geological formations. However, the Proposed Development Site is located in an area with relatively flat terrain and stable

geological conditions, and the risk of landslides or slope failure is considered to be low, see **Chapter 15**.

- 4.228 While there are potential effects on human health associated with land, soils, and geology during the construction phase, these effects are expected to be effectively managed and minimized through the implementation of appropriate mitigation measures and good construction practices. Therefore, the impact on human health during the construction phase is expected to be negligible.
- 4.229 Potential impacts on human health associated with hydrology during the construction phase are primarily related to the possibility of water contamination due to soil erosion and sedimentation. This can occur due to the removal of vegetation and the disturbance of soil during construction activities. However, with the implementation of appropriate mitigation measures such as the use of silt fences and sedimentation ponds, these impacts can be effectively managed and minimized.
- 4.230 Construction activities could also potentially lead to changes in the local hydrological regime, including changes in surface water flow patterns and groundwater levels. However, the design of the project includes measures to manage stormwater runoff and to prevent the contamination of surface water and groundwater resources.
- 4.231 Therefore, the impact on human health from hydrological impacts during the construction phase is expected to be negligible.
- 4.232 Overall, if unmitigated, the construction phase of the Proposed Development has potential for significant impact to human health and safety for construction workers and members of the public in proximity to the Proposed Development Site, if proper construction safety protocols and traffic management are not applied. This applies to all permutations with the range. Mitigation measures to prevent potential impact to human health and safety are set out below.

Potential Impacts - Operational

Site Access and Usability of the Lands

- 4.233 The Proposed Development is designed to last a minimum of 35 years. During the operational period, there are potential impacts to human health and safety if appropriate mitigation measures are not put in place.
- 4.234 Under normal conditions, turbines do not pose a threat to public safety or the safety of animals. With respect to safety aspects, Section 5.7 of the Wind Energy Development Guidelines (2006) state the following:
- “There are no specific safety considerations in relation to the operation of wind turbines. Fencing or other restrictions are not necessary for safety considerations. People or animals can safely walk up to the base of the turbines. There is a very remote possibility of injury to people or animals from flying fragments of ice or from a damaged blade.”*
- 4.235 Potential human safety issues can occur due to the falling ice as a result of the icing of turbine blades in cold weather conditions. This is unlikely to present safety problems as wind turbines will be fitted with anti-vibration sensors. These sensors detect any imbalance caused by the icing of the blades. The sensors will cause the turbine to shut down until the blades are de-iced prior to beginning operation again.
- 4.236 Appropriate site safety measures will be utilised during the operational phase by all permitted employees. High visibility clothing, hard hats and safety boots will be worn at all

times to avoid potential injury. Access to the turbines inner structure will be locked at all times and only accessed by licenced employees for maintenance.

- 4.237 Considering the inherently low risk of fire associated with the Proposed Development, and the quality and extent of the proposed facility and fire suppressions system, the potential risk posed to public safety and air emissions is considered negligible.
- 4.238 There are no expected works to take place along the cable route or TDR during the operational phase of the Proposed Development. If maintenance works are required in these areas or bulk equipment is required to be delivered, proper safety protocols will be put in place in line with the mitigation measures set out in the Mitigation Measures section outlined in this chapter.

Health and Safety Standards and Procedures

- 4.239 Rigorous statutory and engineering safety checks imposed on the turbines during design, construction, commissioning and operation will ensure the risks posed to humans are negligible. 24-hour remote monitoring and fault notifications are included as standard in the Turbine Operations and Maintenance Contracts. In addition to scheduled maintenance, the maintenance contracts will allow for call out of local engineers to resolve any issues as soon as they are picked up on the remote monitoring system.
- 4.240 Equipment within high voltage substations presents a potential hazard to health and safety. The proposed substation will be enclosed by palisade fencing and equipped with intruder and fire alarms in line with ESB and EirGrid standards.
- 4.241 Potential impacts to the safety of operation and maintenance staff are associated with working at heights, working at steep gradients or uneven ground, moving vehicles and machinery and working with high-voltage electricity. Properly qualified staff will be employed at the wind farm site and safety protocols will be followed at all times.
- 4.242 As part of the human health assessment of the Proposed Development, an analysis of peer-reviewed literature on potential health impacts arising from wind energy projects was undertaken. Anecdotal reports were identified of negative health impacts in people living in close proximity to wind turbines, however, the literature review demonstrates that peer-reviewed research has not supported these statements.
- 4.243 The review of literature did not find any published, credible scientific sources that link wind turbines to adverse health effects. The key documents that have been taken into consideration with respect of potential effects on human health are as follows:
- 'Wind Turbine Syndrome – An independent review of the state of knowledge about the alleged health condition', Expert Panel on behalf of Renewable UK, July 2010.
 - 'Wind Turbine Sound and Health Effects - An Expert Panel Review', American Wind Energy Association and Canadian Wind Energy Association, December, 2009.
 - 'A Rapid Review of the Evidence', Australian Government National Health and Medical Research Council (NHMRC) Wind Turbines & Health, July 2010.
 - 'Position Statement on Health and Wind Turbines', Climate and Health Alliance, February 2012.
 - 'Wind Turbine Health Impact Study - Report of Independent Expert Panel' – Massachusetts Departments of Environmental Protection and Public Health, 2012.
 - 'Wind Turbines and Health, A Critical Review of the Scientific Literature Massachusetts Institute of Technology', Journal of Occupational and Environmental Medicine, Vol. 56, Number 11, November 2014.

- ‘Wind Turbine Noise and Health Study’, Health Canada, 2014.
- ‘Wind Turbines and Human Health’, Front Public Health, 2014
- ‘Position paper on wind turbines and public health’, Health Service Executive, February 2017.

4.244 An Expert Panel undertook a review on behalf of Renewable UK in July 2010 to assess the available scientific evidence relating to infrasound generated by wind turbines. This report was entitled ‘Wind Turbine Syndrome – An Independent Review of the State of Knowledge about the Alleged Health Conditions’. This report followed a previous negative publication by Dr. Pierpont entitled ‘Wind Turbine Syndrome’ in 2009. The 2010 report assesses the impact of low-frequency noise from wind turbines on humans. The principle conclusions drawn by this expert panel are:

“The scientific and epidemiological methodology and conclusions drawn (in the 2009 book) are fundamentally flawed;

The scientific and audiological assumptions presented by Dr. Pierpont relating infrasound to ‘wind turbine syndrome’ are wrong; and

Noise from Wind Turbines cannot contribute to the symptoms reported by Dr. Pierpont’s respondents by the mechanisms proposed”

4.245 ‘Infrasound’ has been cited as a cause of potential health impacts as a result of wind turbine development. This is discussed in detail in **Chapter 9**. It states that infrasound is noise occurring at frequencies below that at which sound is normally audible, that is, less than about 20 Hz, due to the significantly reduced sensitivity of the ear at such frequencies. In this frequency range, for sound to be perceptible, it must be at very high amplitude, and it is generally considered that when such sounds are perceptible then they can cause considerable annoyance. However, wind turbines do not produce infrasound at amplitudes capable of causing annoyance.

4.246 Research was published in 2020 by the Finnish Government aimed at assessing whether wind turbine infrasound has harmful effects on human health. The study found that scientific evidence on the potential association or studies focusing directly on the health effects of wind turbine infrasound are lacking. The study included a questionnaire, sound measurements, and provocation experiments. The study found that participants who had previously reported wind turbine infrasound related symptoms were unable to perceive infrasound in noise samples and did not find samples with infrasound more annoying than those without previous wind turbine infrasound related symptoms. Further, wind turbine infrasound exposure did not cause physiological responses in either participant group (Maijala et al, 2020).

4.247 The UK Department of Trade and Industry study, ‘The Measurement of Low Frequency Noise at Three UK Wind farms’¹⁶, concluded that:

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

¹⁶ Hayes, Malcolm D. (2007). The measurement of Low Frequency Noise at Three UK Wind Farms. (Online). Available at: <https://windfarmrealities.org/wp-content/uploads/wfr-docs/hayes-measurement-low-freq-3-farms.pdf>

- 4.248 It goes on to state that, based on information from the World Health Organisation, *‘there is no reliable evidence that infrasound below the hearing threshold produce physiological or psychological effects’ and that ‘it may therefore be concluded that infrasound associated with modern wind turbines is not a source which may be injurious to the health of a wind farm neighbour’.*
- 4.249 Health Canada published findings of a study in 2014 titled: ‘Wind Turbine Noise and Health Study’¹⁷. The study considered physical health measures that assessed stress levels using hair cortisol, blood pressure and resting heart rate, as well as measures of sleep quality. More than 4,000 hours of wind turbine noise measurements were collected and a total of 1,238 households participated. The results of the study did not support a link between wind turbine noise and illness or chronic conditions. No association was found between the multiple measures of stress and exposure to wind turbine noise. However, an association was found between increased levels of wind turbine noise and individuals reporting being annoyed.
- 4.250 The HSE published a report in 2017 titled ‘Position paper on wind turbines and public health’¹⁸. The paper discusses case studies which describe a range of health effects that have been associated with wind turbine development as a result of shadow flicker, noise and electromagnetic radiation. The paper highlights the lack of high-quality scientific evidence to support adverse impacts on health as a result of wind turbine development, and states that current scientific evidence connecting wind turbines to health impacts is weak, inconsistent or absent. The paper recommends appropriate set-back distances and meaningful community engagement to mitigate against potential health impacts, in line with the Wind Energy Development Guidelines 2006.
- 4.251 The Proposed Development has been designed in compliance with the Wind Energy Development Guidelines (2006). We note that the Draft Revised Wind Energy Development Guidelines (2019) is currently at draft stage and has not yet been formally adopted by the government. However, the design and assessment of the Proposed Development has had regard to the draft guidelines and has provided for key elements as set out in the guidelines such as the provision of 4-times the tip height setback distance between turbines and the nearest point of curtilage of nearby residential properties. The Wind Farm provides a minimum 720m setback between turbines and dwelling structures allowing for 4-times the tip height of the proposed turbines and additional distance to allow for curtilage. Extensive community engagement was also conducted as recommended by the HSE report and is detailed in **Appendix 1-4. Chapter 9** sets out mitigation measures to maintain appropriate noise levels and avoid potential impact to human health at nearby receptors.
- 4.252 With regards to turbine infrastructure, the Department of the Environment, Heritage and Local Government’s Wind Energy Development Guidelines for Planning Authorities, 2006 identifies no specific safety considerations in respect of the operations of wind turbines. The DoEHLG’s Guidelines note a limited possibility for injury arising from flying ice fragments or a damaged blade. Turbine technology will prevent the infrastructure from operating in the event that ice is present or in the event that a blade is damaged, minimising the potential for possible injury.

¹⁷ Health Canada (2014). Wind Turbine Noise and Health Study. (Online). Available at: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/noise-bruit/turbineeoliennes/pamphlet-brochure-eng.pdf

¹⁸ HSE (2017). Position Paper on Wind Turbines and Public Health. (Online). Available at: <https://www.lenus.ie/bitstream/10147/621467/3/HSE+PHMEHG+Wind+Final+PP+Feb+2017.pdf>.

- 4.253 In terms of perceived effects from shadow flicker, a shadow flicker assessment has been conducted and is included in **Chapter 11** of this EIAR. In relation to shadow flicker, zero-shadow flicker approach will ensure that there will be no impact to receptors. The turbines will be programmed to shut down on specific dates at specific times when the sun is bright enough, there is sufficient wind to rotate the blades and the wind direction is such that nuisance shadow flicker could occur. In terms of noise, operational wind farm noise levels meet the derived night and daytime noise limits at all residential properties surrounding the Proposed Development.
- 4.254 In line with the Health Service Executive's Emergency Planning recommendations, any incident which may occur at the Proposed Development 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 require.
- 4.255 Following a review of literature regarding the potential impact of operational wind farms on human health, it is concluded that there is no scientific consensus to support an association between negative health impacts and responsible wind turbine development. With respect to safety, only trained and licenced employees will be permitted to access the turbines. Appropriate training will be provided for potential emergencies; therefore, the operational phase of the Proposed Development will have a negligible impact on public health and safety.

Potential Health and Safety Impacts from Proposed Cables and Electromagnetic Interference

- 4.256 Wind turbines, like all electrical equipment, produce electro-magnetic radiation. The provision of underground electricity cables similar to the proposed capacity is however commonplace throughout Ireland and the installation to the required specification does not give rise to health concerns. The following research outlines the potential for health impacts caused by electromagnetic interference.
- 4.257 In 2020 the International Commission on Non-Ionising Radiation Protection (ICNIRP) issued guidelines for 'Limiting Exposure to Electromagnetic Fields'¹⁹. Table 2 (pg. 491) in this document sets out the basic restrictions for Electromagnetic Field Exposure (from 100kHz to 30 GHz).
- 4.258 To ensure such adverse effects do not occur, the WHO (World Health Organisation) monograph recommended that policy-makers establish guidelines for ELF-EMF exposure for both the general public and workers, and that the best source of guidance is the ICNIRP guidelines.
- 4.259 The ICNIRP defines high-power radiofrequency EMFs as those emitting greater than 100 V m⁻¹ within the frequency range 100 kHz to 100 MHz at their source (p. 500).

¹⁹ International Commission on NonIonising Radiation Protection (2020). ICNIRP Guidelines for Limiting Exposure toElectro9magnetic Fields. (Online). Available at: <https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf>

- 4.260 The EirGrid document ‘EMF & You: Information about Electric & Magnetic Fields and the electricity transmission system in Ireland²⁰’ provides information on studies which have been carried out on the health impact of electromagnetic fields (EMF). This report notes that since 1979, many scientific studies have been carried out on the possible effects of EMF on people. Agencies include the World Health Organisation (2006), the National Radiological Protection Board of Great Britain (2004), and the International Agency for Research on Cancer (IARC) (2002).
- 4.261 The EirGrid (2014) report notes that:
- “These agencies concluded that exposure to only very strong DC magnetic fields can cause biological effects. The exposures required to produce such effects, however, are extraordinarily high relative to levels of DC magnetic fields produced by common sources.”*
- 4.262 The EirGrid (2014) report concludes that exposure to extremely low frequency (ELF)-EMF from power lines or other electrical sources is not a cause of any long-term adverse effects on human, plant, or animal health. A 2019 Eirgrid report titled ‘The Electricity Grid and Your Health’ states that: “The consensus from health and regulatory authorities is that extremely low frequency EMFs do not present a health risk.”
- 4.263 These magnetic fields are attributable to low voltage sources such as wiring, appliances, and distribution circuits (Mastanyi et al, 2007). In dwellings and other properties with electricity, the levels will not exceed the ICNIRP guidelines by a significant margin.
- 4.264 There will be no impact on residential properties at any distance from the Proposed Development as the ICNIRP guidelines are not exceeded at all relevant distances including directly above the cables. The magnetic field associated with an underground 110kV cable is 0.13 μT directly above ground (ESB, 2017), significantly below the ICNIRP Guidelines levels of 100 μT . The ESB state that exposure to electrical fields associated with underground cables are considered negligible (ESB, 2017).
- 4.265 The HSE, in their 2017 report ‘Position paper on wind turbines and public health’ state the following with regard to Electromagnetic radiation:
- “There is no direct evidence from which to draw any conclusions on an association between electromagnetic radiation produced by wind farms and health effects. Extremely low-frequency electromagnetic radiation is the only potentially important electromagnetic emission from wind farms that might be relevant to health. Limited evidence suggests that the level of extremely low-frequency electromagnetic radiation close to wind farms is less than average levels measured inside and outside suburban homes.”*
- 4.266 EU Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks from EMFs was transposed into Irish law on 1st July 2016 by the Safety, Health and Welfare at Work (Electromagnetic Fields) Regulations 2016 (S.I. No. 337 of 2016). The regulations impose a number of duties on employers to maintain safety during work procedures. This includes the carrying out of risk assessment, avoiding and reducing risk, employee information, training and consultation and health surveillance where appropriate. The Proposed Development will comply with both EU and Irish law and will result in a negligible impact to human health on employees at the Proposed Development. This applies all design permutations as set out in **Chapter 2** of this EIAR.

²⁰ Eirgrid (2014). EMF & You: Information about Electric & Magnetic Fields and the Electricity Transmission System in Ireland. (Online). Available at: <https://www.eib.org/attachments/registers/126630877.pdf>

Potential Impacts – Decommissioning

- 4.267 The decommissioning phase of the Proposed Development is described in **Chapter 2** of this EIAR provides for the removal of turbines and associated infrastructure from the Proposed Development Site. The potential effects associated with decommissioning phase in relation to human health will be similar to those associated with construction phase as detailed above.
- 4.268 Decommissioning works will include removal of above ground structures including the turbines, mountings, and fencing. The proposed substations will likely be taken in charge by EirGrid or ESB following decommissioning. During the decommissioning works there is potential for significant impact to human health and safety as with the construction stage. Potential impacts to human health and safety on-site will be prevented through best practice methods and will include staff training and knowledge of the site-specific decommissioning plan. Once mitigation measures and best practice construction site methods are followed, potential impact on human health and safety is expected to be minor and short term.
- 4.269 During the decommissioning works there is potential for impact on health and safety of the public. Similar to construction, impacts are associated with the presence of a construction crew, increased traffic, presence of heavy goods vehicles and machinery, potential obstructions on the public road and potential obstruction to recreation and amenity trails. Potential impact to public health and safety during the decommissioning phase is minor and short term. However, Phase 4 (Demobilisation) of the Construction and Environmental Management Plan (or subsequent Decommissioning Plan required prior to commencement) for decommissioning works will be followed, clear signage will be utilised on public roads and walkways and the community will be informed of works prior to commencement to avoid any potential impact to public health and safety. Once good practice is followed, the potential for impact on public health and safety is expected to be short term and non-significant.

Mitigation Measures

Health and Safety Mitigation Measures – Construction & Decommissioning

- 4.270 To maintain safety and avoid health impacts on construction workers and the general public, best practice site safety and environmental management will be maintained. The Proposed Development will be designed, constructed, operated and decommissioned in accordance with the following:
- Safety, Health & Welfare at Work (Construction) Regulations 2013 (as amended)
 - Safety, Health & Welfare at Work Act 2005 (as amended)
 - Safety, Health & Welfare at Work (General Applications) Regulations 2007 (as amended)
- 4.271 The following mitigation measures will be implemented:
- All construction staff will be adequately trained in health and safety and will be informed and aware of potential hazards. Furthermore, a Construction and Environmental Management Plan will be implemented and is included in **Appendix 2-2** found in Volume III of this EIAR, will be circulated to all construction workers which will detail safety protocol and methodology. Furthermore, site investigation has been completed and mitigation has been proposed as detailed in **Chapter 6** and **Chapter 7**.

- A site-specific Safety and Health Management Plan has been prepared for the Proposed Development in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 and is included in the CEMP contained in **Appendix 2-2** of Volume III of this EIAR. The Safety and Health Management Plan will be implemented in accordance with this plan following the appointment of the contractor for the main construction works. The contractor may add to it, or it may be revised with approval from the local authority. Similarly, a site-specific Safety and Health Management Plan will be prepared for the decommissioning works.
- All hazards will be identified, and risks assessed as set out in the CEMP found in **Appendix 2-2** of Volume III of this EIAR. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the Proposed Development.
- Safe Pass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required.
- The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety & Health Management Plan.
- Up to date HSE guidance will be consulted regularly in line with HSA recommendations and all reasonable on-site precautions will be taken to reduce the spread of COVID-19 on construction sites if COVID-19 remains a significant health issue during the construction phase.
- Public safety will be addressed by restricting access to the public in the vicinity of the site works during the construction stage. Appropriate warning signs will be posted at the construction site, directing all visitors to the site manager. Appropriate signage will be provided on public roads approaching site entrances and along haul routes. Extra safety measures will be employed when large loads are being transported, for instance, Garda escort will be requested for turbine delivery and a comprehensive turbine delivery plan will be utilised to avoid potential impact to human safety for road users and pedestrians.
- For the installation of the cable route in the public road, a detailed traffic management plan will be developed in discussion with locals who will be directly impacted by the works. and the local authority. Public consultation will be conducted along the cable route to inform local residents ahead of construction works. A Construction Traffic Management Plan has been prepared and is found in **Appendix 14-3** of Volume III of this EIAR.
- Appropriate safety measures, traffic management, signage and communication with the public will be utilized to maintain safety and mitigate against potential danger. A traffic and transport assessment has been completed and is detailed in **Chapter 14**.
- Once mitigation measures and health and safety measures are followed to all permutations, the potential for impact on human health for members of the public during construction and decommissioning of the Proposed Development is expected to be not significant and temporary.

Health and Safety Mitigation Measures – Operational

- 4.272 For operation and maintenance staff working at the Proposed Development, 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.
- 4.273 Access to Coillte lands will remain open to the general public during the operational phase, however, access to the towers and the substation compound will be restricted to approved and appropriately trained personnel. The substation and battery storage area will be enclosed by palisade fencing and will be remotely monitored and equipped with intruder and fire alarms, in line with ESB and EirGrid standards.
- 4.274 Adequate clearance of structures from overhead lines will be provided. All on-site electrical connections are carried by underground cable and will be marked out above ground where they extend beyond the track or hardstanding surface. Details of cables installed in the public road will be available from ESNB.
- 4.275 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.
- 4.276 Turbines will be fitted with ice detection systems which will stop the turbine from rotating if ice is forming on a turbine blade. This aims to prevent ice throw which can cause injury.

Human Health Mitigation Measures - Operational

- Rigorous statutory and engineering safety checks imposed on the turbines during design, construction, commissioning and operation will ensure the risks posed to humans are negligible. 24-hour remote monitoring and fault notifications are included as standard in the Turbine Operations and Maintenance Contracts. In addition to scheduled maintenance, the maintenance contracts will allow for call out of local engineers to resolve any issues as soon as they are picked up on the remote monitoring system.
- All maintenance work will only be carried out by people with the appropriate training and qualifications for the task at hand. All maintenance and operations work will be carried out in accordance with the relevant health and safety legislation with the appropriate planning and preparation.
- Regular visual inspections and testing of battery system equipment will be incorporated into the Proposed Development's operation and maintenance schedule as per the battery storage manufacturers' requirements.
- Fire safety measures and equipment in the battery storage facility will be kept in effective working order. This includes all fixtures and fittings such as fire doors, fire detection and alarm systems, fire-fighting equipment, notices and emergency lighting. Regular checks, periodic servicing and maintenance shall be carried out. Any defects will be put right as quickly as possible.
- A nominated competent person will carry out checks and routine maintenance work to ensure the reliability and safe operation of fire-fighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be kept on site at all times.
- Shadow flicker detection systems will be installed on all turbines in order to achieve zero shadow flicker on nearby receptors. This is further detailed in **Chapter 11**.

- In certain wind conditions, turbines will run at reduced modes of operation in order to maintain appropriate daytime and night-time noise levels so as not to impact on residential amenity, as required. Details of these measures are set out in **Chapter 9**.
- The wind farm system will include a kill switch that can be operated at any time with an overriding manual shutdown system in case of an emergency.
- In line with the Health Service Executive's Emergency Planning recommendations, any incident which may occur at the Proposed Development 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 Proposed Development has considered the susceptibility to natural disasters. The proposed site drainage will mitigate against any potential flooding with the use of swales as described in **Chapter 7**.

4.277 Long-term positive residual impacts will occur due to the provision of clean, renewable electricity. It is estimated that the operation of the Proposed Development will displace 1,834,432 tonnes of CO₂eq will be displaced over the proposed thirty five-year lifetime of the wind farm (Vestas turbines). By way of contrast, the Siemens Gamesa turbine 1,678,665 tonnes CO₂eq over the 35 year lifetime of the wind farm. If the Proposed Development was not built, this carbon would otherwise be emitted through the burning of fossil fuels.

Residual Impacts

Wind Farm and TDR, Construction of Substation and Grid Route

- 4.278 Through various aspects of the design process for the Proposed Development, the identified significance of potential residual impact on human health is expected to be imperceptible. This is due to the setback distance from nearby dwellings, elimination of shadow flicker on neighbouring dwellings and noise control measures to reduce potential impacts on nearby receptors. Furthermore, the mitigation measures as set out throughout the EIAR will prevent any potential significant impacts on human health during the construction and decommissioning phases.
- 4.279 Long-term positive residual impacts will occur due to the provision of clean, renewable electricity. If the Proposed Development was not built, there would be further reliance on the burning of fossil fuels with its associated health impacts.

Do-Nothing Scenario

- 4.280 In the event that the Proposed Development does not proceed, the existing land use will continue for agricultural and forestry purposes for the foreseeable future.
- 4.281 In the absence of renewable energy development, it is possible that there will be a continuance of excessive greenhouse gas emissions and consumption of fossil fuels.
- 4.282 The opportunity to harness the wind energy capacity of County Westmeath would be lost, further constraining the State from achieving its renewable energy targets of 80% by 2030.

The displacement of CO₂eq over the lifetime of the Proposed Development will not be achieved.

- 4.283 It is also envisaged that if the Proposed Development does not proceed, there will be no employment opportunities relating to the construction, operation and decommissioning of the Proposed Development, resulting in a net loss of economic activity in County Westmeath and County Meath. No rates or development contributions will be made payable to the Local Authorities by the developer and no Community Benefit Fund Scheme will be put in place in the locality.

Cumulative Effects

- 4.284 For the assessment of cumulative effects, any other permitted or proposed and unbuilt projects in proximity to the Proposed Development Site (wind energy or other) have been considered where they have the potential to generate an in-combination or cumulative impact with the Proposed Development.
- 4.285 The long list of all proposed and permitted developments within vicinity of the Proposed Development Site, as well as the rationale for their selection for review, is presented in **Appendix 1-1** 'Projects Considered in the Cumulative Assessment' found in Volume III of this EIAR. The short list of these projects which are included as part of this assessment are set out in **Table 4-15** below. These projects were selected for two reasons: 1) they are wind farms within 20km of the Proposed Development or 2) they utilise the same road networks as the Proposed Development.

Table 4-15: List of Cumulative Projects within 20km of the Proposed Development

Applicant / Development Name	Development Type	Reg. Ref.	Distance to Development
Bracklyn Wind Farm Ballagh (Mullingar Rural E.D.), Billistown, Ballynacor, and Bracklin, County Westmeath; and Coolronan, Co. Meath	SID - 9 no. Turbines	ABP REF. PA25M.311565	5.0 km south
Bord na Móna Powergen Ltd. Lisclogher Great, Cockstown, Clonmorrill, Clonleame, Bracklin, Craddanstown, Killagh, Grange More and Riverdale in County Westmeath and the townlands of Clondalee More, Derryconor, Clonycavan, Robinstown, Coolronan, Doolystown and Moyfeagher in County Meath	SID - 26 no. Turbines	ABP REF. PA25M.316212	4.8 km south
Coole Wind Farm Limited Camagh, Carlanstown, Coole, Clonrobert, Clonsura, Doon, Monktown, Mullagh, Newcastle, Boherquill, Corralanna, Culvin, Joanstown, Mayne, Fearmore (Fore by), Newtown (Fore by), Simonstown (fore by), Ballinealoe, Shrubbywood, Clonava, Lackan (Corkaree by), Soho, Ballynaclonagh, Abbeyland, Rathganny, Ballindurrow,	SID - 15 no. Turbines	ABP REF. PA25M.309770 Pending approval by ABP	< 20 km northwest

Applicant / Development Name	Development Type	Reg. Ref.	Distance to Development
Cullendarragh, Culleenabohoge, Ballynafid, Knightswood, Portnashangan, Culleen More, Farranistick, and Irishtown (Moyashel by), Co. Westmeath.			
Reforce Energy Ltd, Dryderstown, Delvin		12/2054	
Raymond Oliver, Corbetstown, Kilucan		00/197	

- 4.286 Despite their distance from the Proposed Development, if not appropriately controlled, there is the potential for cumulative impacts between it and the identified proposed and committed developments. The area with most potential for cumulative is increases in traffic from multiple projects using the same road infrastructure. **Chapter 14** of the EIAR identifies the likely vehicular trips and routes to be used for these cumulative projects so that any potential conflicts can be planned for.
- 4.287 In line with best practice and given the scale of the proposals involved, it is expected that each of the proposals will have a Construction Traffic Management Plan in place and that there will be consultation with the respective local planning authorities in appropriate management of routes, times and loads. Providing the mitigation measures for all proposals are implemented, there will be no significant cumulative effects on traffic and associated air, noise and general disturbance. Given the distances of proposals from the Proposed Development general construction noise, air and other amenity issues are not considered likely.
- 4.288 The nature of the Proposed Development and other energy developments within 20 kilometres are such that, once operational, they are not expected to be emission generators and the potential for cumulative impacts is low.
- 4.289 With regards to landscape and visual impacts, the scale of wind farm development proposed in the wider area will contribute to some wider cumulative impacts due to their close proximity to one another, however, it is not considered to be a significant impact on population and human health.
- 4.290 In terms of climate and carbon, the Proposed Development will act cumulatively with other renewable energy projects in reducing CO₂ emissions by displacing fossil fuel in the production of electricity, resulting in a moderate positive effect on climate change mitigation.

Conclusion

- 4.291 The assessment of Population and Human Health has established the existing environment of the study area and compared it to County Westmeath, County Meath and the State to establish a baseline for the impact assessment. Potential impacts were considered for the construction, operational and decommissioning phases of the Proposed Development as well as potential cumulative impacts. Mitigation measures have been proposed where relevant. The Population and Human Health chapter has been subdivided into the following topics for the purpose of the assessment:
- Population and Demographics;
 - Socio-Economics, Employment and Economic Activity;
 - Land Use;
 - Recreation, Amenity and Tourism; and

- Human Health.

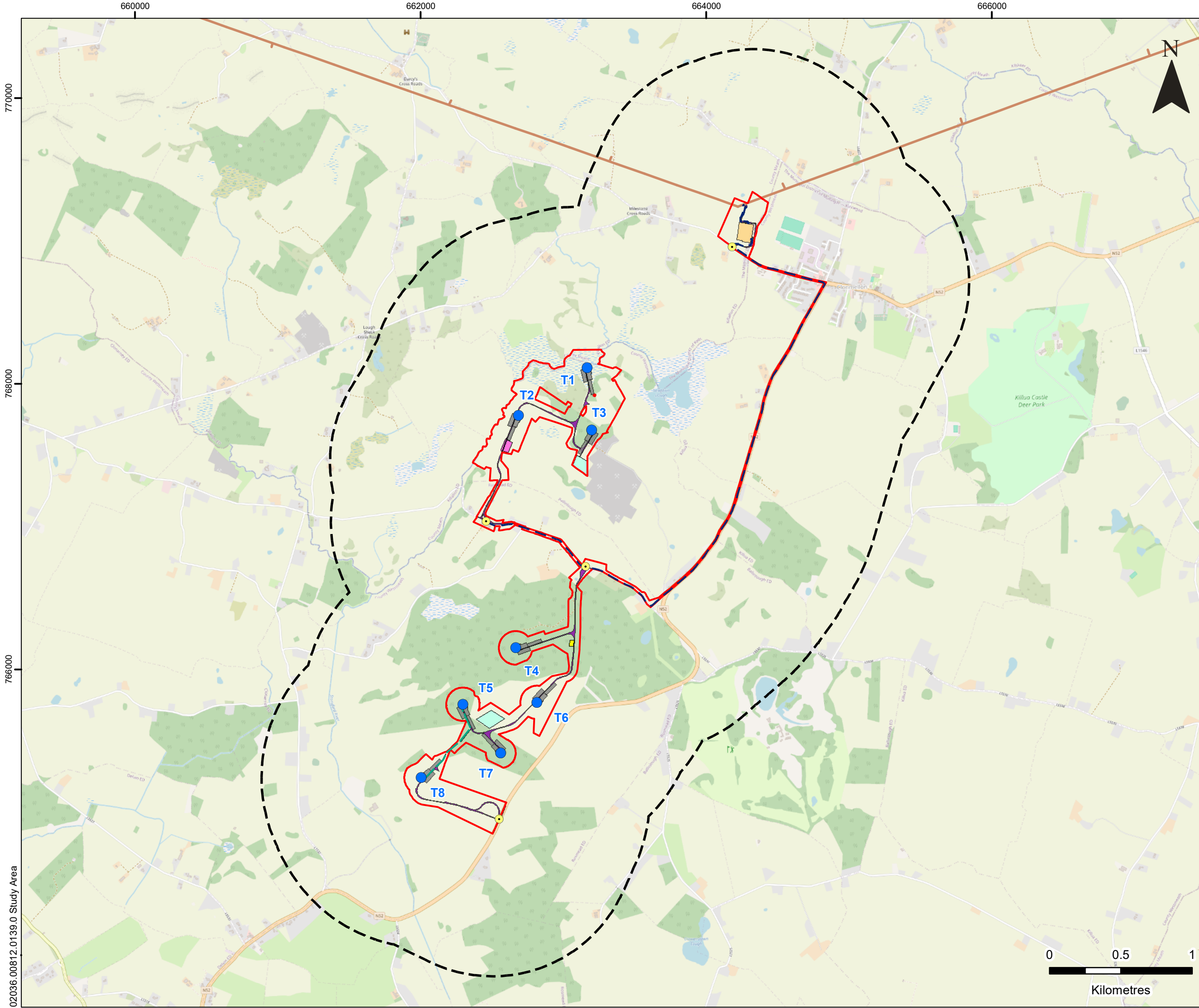
- 4.292 The population of the study area was found to be low density and dispersed. Short-term slight temporary population growth was identified due to the introduction of construction workers during the construction and decommissioning phases. However, permanent impact on the population of the study area is considered unlikely as a result of the Proposed Development due to the temporary nature of the construction and decommissioning works.
- 4.293 The operational phase of the Proposed Development has been identified as having a positive economic and social impact on the study area with the provision of a Community Benefit Fund which will contribute to social infrastructure in the area and financially benefit those in closest proximity to the Proposed Development. Other positive economic benefits as a result of the operational phase of the Proposed Development includes reducing the State's reliance on fossil fuels which support the national need to transition to 80% electricity generation from renewable sources by 2030.
- 4.294 Land use in the study area will be disturbed temporarily during construction and, to a lesser extent, decommissioning of the Proposed Development. Once operational, the Proposed Development is not expected to have a significant negative impact on agricultural or forestry practices. With respect to Recreation, Amenity and Tourism, the Proposed Development is not expected to have an impact on any cultural assets that could contribute to tourism in the area.
- 4.295 Potential impacts on human health and safety have been identified for both construction workers and the general public as a result of the construction and decommissioning of the Proposed Development. Best practice construction methods and improved safety measures on public roads have been identified as measures to prevent potential accidents during the construction and decommissioning works.
- 4.296 Peer reviewed literature regarding potential health impacts as a result of operational wind turbines have been assessed. It was concluded that there is no scientific consensus to support the association between negative health impacts and wind energy developments with particular regard to noise and electromagnetic interference.
- 4.297 In conclusion, once mitigation measures set out throughout this EIAR are implemented, no significant negative effects on population or human health will occur as a result of the Proposed Development.

Figures

Figure 4-2: Study Area

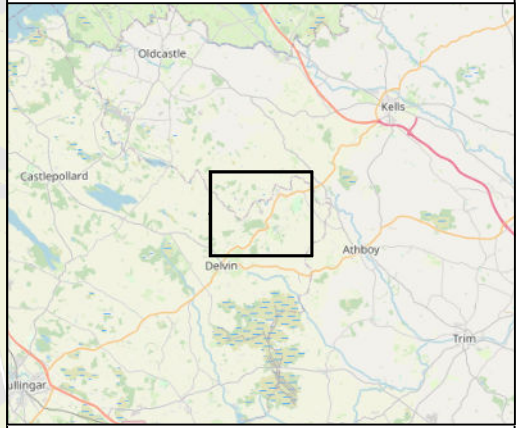
Figure 4-3: Residential Receptors within 1km of the Proposed Development

Figure 4-4: Corine Landcover



LEGEND

- Proposed Development Site Boundary
- Proposed Development Site Boundary 1 km Buffer
- Proposed Turbine Location
- Proposed Site Access
- Proposed Internal Collector Cable
- Proposed Cable Route
- Proposed Access Track
- Proposed Temporary Construction Compound
- Proposed Operational Compound
- Proposed Substation Location
- Proposed Borrow Pit
- Proposed Crane Hardstanding
- Existing High Voltage Transmission Line



KNOCKANARRAGH WIND FARM LIMITED

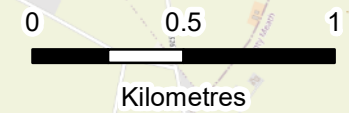
7 DUNDRUM BUSINESS PARK
 WINDY ARBOUR
 DUBLIN D14 N2Y7
 IRELAND
 T: 0129 64667
www.slrconsulting.com

**KNOCKANARRAGH WIND FARM
 ENVIRONMENTAL IMPACT
 ASSESSMENT REPORT**

POPULATION & HEALTH

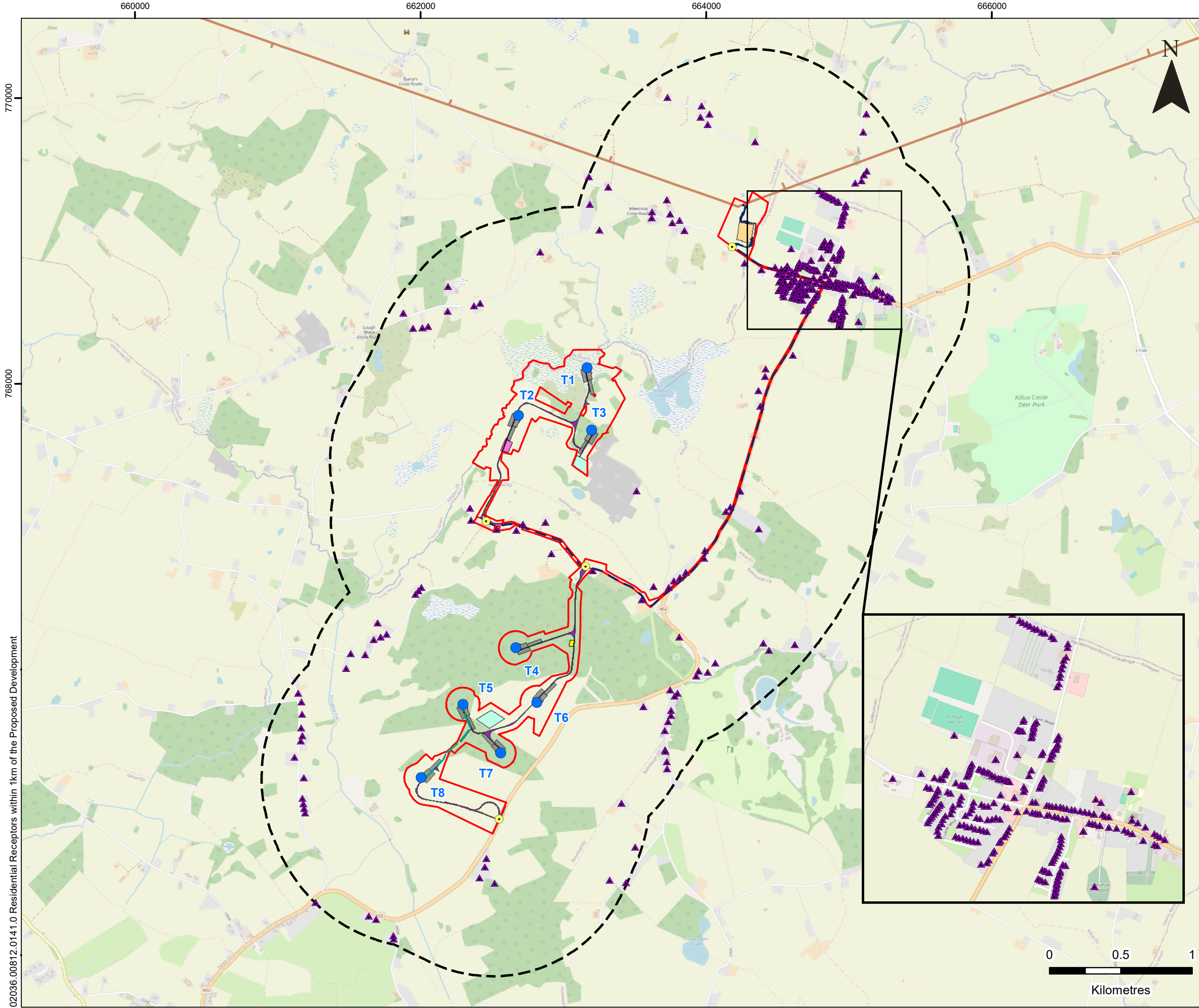
STUDY AREA

FIGURE 4-2

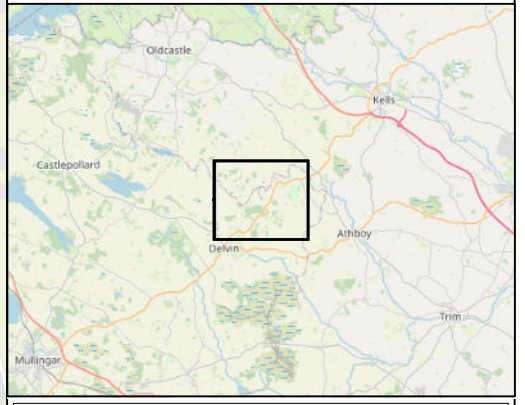


Scale 1:25,000 @ A3 Date MARCH 2024

02036_00812_0139.0 Study Area



- LEGEND**
- Proposed Development Site Boundary
 - Proposed Development Site Boundary 1 km Buffer
 - Proposed Turbine Location
 - Proposed Site Access
 - Proposed Internal Collector Cable
 - Proposed Cable Route
 - Proposed Access Track
 - Proposed Temporary Construction Compound
 - Proposed Operational Compound
 - Proposed Substation Location
 - Proposed Borrow Pit
 - Proposed Crane Hardstanding
 - Existing High Voltage Transmission Line
 - ▲ Residential Receptor



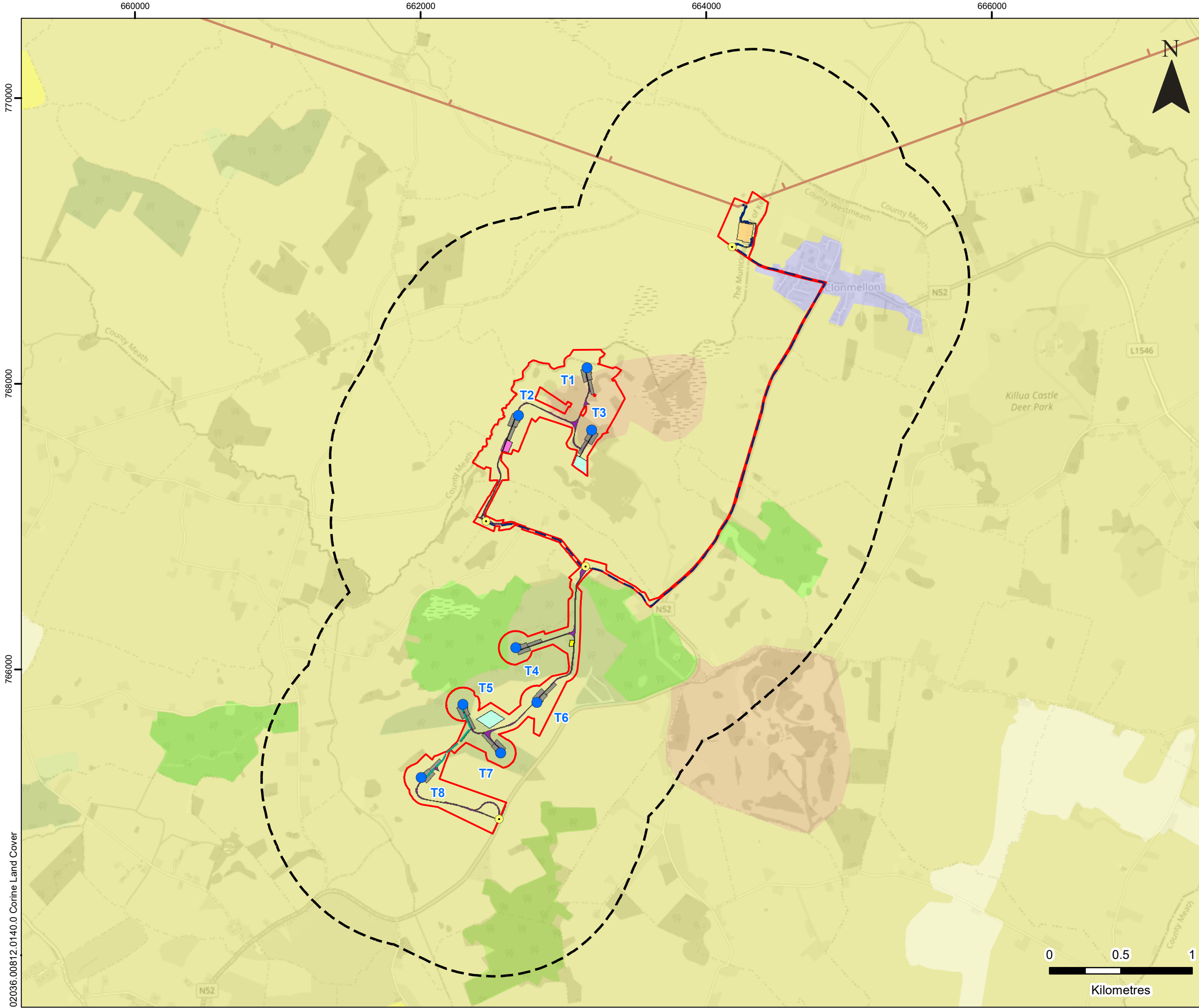
KNOCKANARRAGH WIND FARM LIMITED

7 DUNDRUM BUSINESS PARK
 WINDY ARBOUR
 DUBLIN D14 N2Y7
 IRELAND
 T: 0129 64667
 www.slrconsulting.com

**KNOCKANARRAGH WIND FARM
 ENVIRONMENTAL IMPACT
 ASSESSMENT REPORT**
 POPULATION & HEALTH
**RESIDENTIAL RECEPTORS
 WITHIN 1 KM**
FIGURE 4-3

Scale 1:25,000 @ A3 Date MARCH 2024

02036.00812.0141.0 Residential Receptors within 1km of the Proposed Development



- LEGEND**
- Proposed Development Site Boundary
 - Proposed Development Site Boundary 1 km Buffer
 - Proposed Turbine Location
 - Proposed Site Access
 - Proposed Internal Collector Cable
 - Proposed Cable Route
 - Proposed Access Track
 - Proposed Temporary Construction Compound
 - Proposed Operational Compound
 - Proposed Substation Location
 - Proposed Borrow Pit
 - Proposed Crane Hardstanding
 - Existing High Voltage Transmission Line

- Corine Land Cover (2018)**
- 211 Non-irrigated Land
 - 231 Pastures
 - 242 Complex cultivation patterns
 - 243 Land Principally Occupied by Agriculture with Areas of Natural Vegetation
 - 311 Broad-leaved Forest
 - 313 Mixed Forest
 - 324 Transitional Woodland Scrub
 - 423 Intertidal Flats

Note
 Error on Corrine Land Cover data for Clonmellen. From site experience should be classified as 118 Artificial Surface.

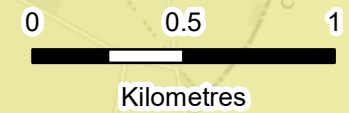


KNOCKANARRAGH WIND FARM LIMITED

7 DUNDRUM BUSINESS PARK
 WINDY ARBOUR
 DUBLIN D14 N2Y7
 IRELAND
 T: 0129 64667
 www.slrconsulting.com

KNOCKANARRAGH WIND FARM ENVIRONMENTAL IMPACT ASSESSMENT REPORT
POPULATION & HEALTH
CORINE LAND COVER
FIGURE 4-4

Scale 1:25,000 @ A3 Date MARCH 2024



02036_00812_0140_0 Corine Land Cover