To Whom It May Concern,

FuturEnergy Ireland DAC proposes to develop a wind farm north of Manorhamilton in County Leitrim approximately 3 km south of the Northern Ireland border in County Fermanagh. The project will involve the development of a wind farm and all associated infrastructure including turbine foundations, hardstanding areas, borrow pits, access tracks, a 110kV electrical substation and an underground grid connection.

FuturEnergy Ireland DAC have commenced the process of Environmental Impact Assessment (EIA). The proposed wind farm site entrance, layout design and access points through which turbine components and construction deliveries may be made will be refined by the design team in consultation with the relevant planning authority and the local community. Detailed surveys and studies are currently being undertaken at the site and surrounding area and a project website has been established (https://lissinagroaghwindfarm.ie/). A team of technical experts are currently engaged in the process of scoping the environmental assessments for the project.

We invite you to submit any relevant information that you may hold and/or highlight any issues that you feel should be directed to the project team. Please see the enclosed EIA Scoping Document for further information (updated from the previously issued 2021 scoping report). Views/comments on the proposal can be submitted by email or letter to the undersigned as soon as convenient to ensure your views/comments are considered.

We request that submissions are provided before 5pm on Friday 24th January 2025.

Regards,
Brian

Notice of Upcoming Leave from Friday 13th December – 3rd January

Brian McDonnell (BCL)(MSc)
Assistant Project Manager/Environmental Scientist

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2022 Engineers Ireland Awards Winner: CPD Employer of the Year
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2020 Association of Consulting Engineers of Ireland Awards Winner: Project Management
2019 Association of Consulting Engineers of Ireland Awards Winner: Design Excellence (Structures)

2018 Engineers Ireland Excellence Awards Winner: Engineering Project of the Year

TOBIN

Proposed Lissinagroagh Wind Farm

EIAR Scoping Report

FuturEnergy Ireland

BUILT ON KNOWLEDGE

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1.0 INTRODUCTION

1.1 BACKGROUND

FuturEnergy Ireland DAC proposes to develop a wind farm north of Manorhamilton in County Leitrim, comprising approximately sixteen (16) wind turbines, an on-site electrical substation, an underground grid connection and other ancillary development (hereafter referred to as the "proposed project").

The proposed project, is of a prescribed class of development to which the EIA (Environmental Impact Assessment) Directive applies and falls within the list of project types requiring an EIA as set out under 3(i) of Part 2 of the 5th Schedule of the Planning and Development Regulations 2001(as amended), specifically:

Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts.

As the proposed project is anticipated to contain more than five turbines and have an output greater than 5MW, EIA is required.

TOBIN Consulting Engineers (TOBIN) have been engaged by FuturEnergy Ireland DAC to prepare an Environmental Impact Assessment Report (EIAR) in support of a future planning application for the proposed project. This EIAR Scoping Report sets out the information proposed to be contained in the EIAR and the methodology to be used to gather and assess that information, in accordance with the 2022 EPA Guidelines on the Information to be Contained in EIARs (EPA, 2022) and other relevant guidance outlined in Sections 1.2 and 1.3 of this Report.

Given the scale of the proposed project, FuturEnergy Ireland DAC intend to engage with An Bord Pleanála (ABP) under the Strategic Infrastructure Development (SID) consultation process to determine the appropriate planning consenting route. As the proposed project is expected to have an electrical output in excess of 50 MW, it is considered likely that its will be categorised as SID, as development listed in the 7th Schedule of the Planning and Development Act 2000, as amended. As such, the planning application for the proposed wind farm, on-site electrical substation and other associated development will be submitted to ABP in accordance with Section 37(A)(2) of the Planning and Development Act 2000, as amended. The grid connection, which is likely to comprise a 110kV underground cable, is also considered likely to be categorised as SID under Section 182A of the Planning and Development Act 2000, as amended, as development comprising, or for the purposes of, electricity transmission.

The approximate study area is shown in Figure 1.1. below. The location and layout of other associated infrastructure including site access roads, an on-site substation, cable network, grid connection route, is currently at design stage and will be fully assessed within the EIAR. Therefore, the application site boundary is yet to be finalised.

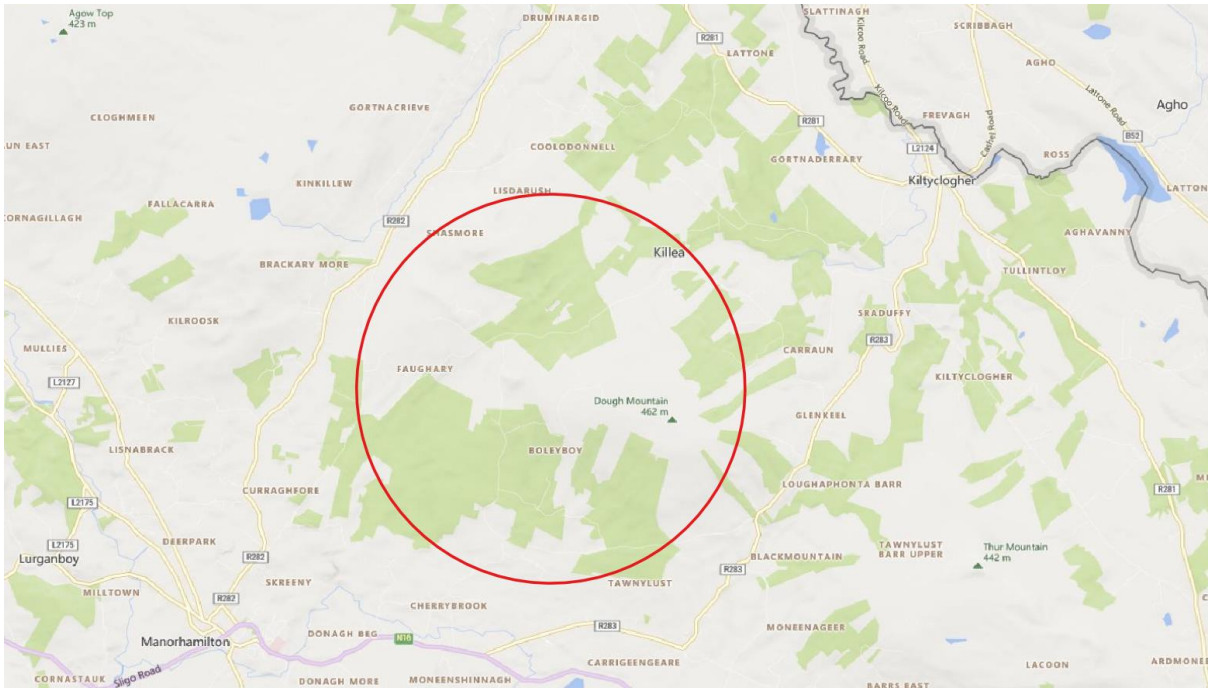

Figure 1-1 –Map showing Approximate Study Area

1.2 NEED FOR AND ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Environmental Impact Assessment (EIA) is an assessment of the potential environmental effects of certain projects and activities. The 2014 EU EIA Directive (2014/52/EU) (hereafter referred to as "EIA Directive"), which amends the 2011 EU EIA Directive (2011/92/EU), prescribes which activities need to be subjected to EIA. The objective of the EIA Directive is to *"ensure that, before development consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects on the environment".*

The obligation to undertake EIA exists for those projects which will likely have a significant effect on the environment. The EIA Directive makes a distinction between projects which are assumed to have a definite significant effect, and those which likely, but not necessarily, have a significant effect. Projects falling under the first category are listed under Annex I to the EIA Directive and always need to be subjected to an assessment. For certain activities under Annex I, a quantitative threshold is provided. For projects falling under the second category, Annex II, Member States have the discretion to determine whether a project shall be made subject to an assessment.

In Ireland, the EIA Directive is transposed into Irish planning legislation by the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended). EIA Directive Annexes I and II are broadly transposed

into planning legislation by way of Schedule 5 Parts 1 and 2 of the Planning and Development Regulations 2001 (as amended).

The relevant EIA threshold for wind farms is contained in Schedule 5, Part 2, Class 3(i) which states:

"Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts"[1].

With an anticipated output of approximately 100-110 MW, the proposed wind farm will exceed the above threshold and therefore it is necessary that the planning application for this project is supported by an Environmental Impact Assessment Report (EIAR).

As such, it is not proposed to provide a report on the screening requirement for an EIA but to proceed on the basis of considering the potential effects of the wind farm through the process of Environmental Impact Assessment. It is proposed to accompany the Planning Application for the wind farm with an Environmental Impact Assessment Report.

The European Commission's "*Guidance on EIA Scoping*" (EC 2017) notes the following in the guidance,

> "*Since the adoption of the first EIA Directive in 1985 (Directive 85/337/EEC), both the law and EIA practices have evolved. The EIA Directive was amended by Directives 97/11/EC, 2003/35/EC, and 2009/31/EC. The Directive and its three amendments were codified in 2011 by Directive 2011/92/EU.*

The codified Directive was subsequently amended by Directive 2014/52/EU. This guidance document focuses on the modifications made to the EIA Directive since 2001, with a particular emphasis on the key changes brought about by the most recent 2014 amendment to the Directive, which Member States have to transpose into their national legal systems by 16 May 2017. The EIA Directive requires that public and private Projects that are likely to have significant effects on the environment be made subject to an assessment prior to Development Consent being given. Development Consent means the decision by the Competent Authority or authorities that entitles the Developer to proceed with the Project. Before Development Consent can be granted, an EIA is required if a Project is likely to impact significantly upon the environment. Article 2(1) of the EIA Directive sets out the Directive's overarching requirement."

> "*Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a*

[1] http://www.irishstatutebook.ie/eli/2010/act/30/section/78/enacted/en/html

requirement for development consent and an assessment with regard to their effects."

Article 8 then requires that

"*The results of consultations and information gathered pursuant to (the EIA procedure) must be taken into consideration in the development consent procedure*".

In terms of legislative context, it is considered that the proposed Wind Farm is subject to the requirements set out in the provisions of Part X of the Planning and Development Act 2000, as amended.

"*Where a planning application is made in respect of a development or class of development referred to in regulations under section 176, that application shall, in addition to meeting the requirements of the permission regulations, be accompanied by an environmental impact statement*."

1.3 PURPOSE OF EIA SCOPING

The purpose of the scoping for EIA is to provide a framework for the approach to be taken for the individual specialist's evaluations, to identify environmental topics for which potential significant environmental impacts may arise, to provide a framework for the consultation process to take place with planning and environmental stakeholders as part of the environmental assessment work. The scoping report also sets out a structure for the preparation of the EIA Report to be prepared and the information required to be included therein.

The European Commission's, "*Guidance on EIA Scoping*" (EU 2001) notes the following in Part B of the guidance, as being the benefits of scoping:

- *"It helps ensure that the environmental information used for decision making provides a comprehensive picture of the important effects of the project, including issues of particular concern to affected groups and individuals;*
- *It helps focus resources on the important issues for decision-making and avoids wasted effort on issues of little relevance;*
- *It helps ensure that the environmental information provides a balanced view and is not burdened with irrelevant information;*
- *It stimulates early consultation between the developer and the competent authority, and with environmental authorities, other interested parties and the public, about the project and its environmental impacts;*
- *It helps effective planning, management and resourcing of the environmental studies;*
- *It should identify alternatives to the proposed project and mitigating measures which ought to be considered by the developer;*
- *It can identify other legislation or regulatory controls which may be relevant to the*

project and provide opportunities for the necessary assessment work for different control systems to be undertaken in parallel, thereby avoiding duplication of effort and costs for all concerned;

- *It reduces the risk of delays caused by requests for further information after submission of the development consent application and the environmental information; and*
- *It reduces the risk of disagreement about impact assessment methods (baseline surveys, predictive methods and evaluation criteria) after submission of the environmental information.*

1.4 THE APPLICANT

The Applicant is FuturEnergy Ireland, a joint venture company owned by Coillte and ESB that was launched in November 2021. Combining the nation's strongest assets and expertise in renewable energy development, FuturEnergy Ireland's mission is to maximise the potential of our unique wind and land resources and accelerate Ireland's transformation to a low carbon energy economy.

The ambition is to develop more than 1GW of renewable energy capacity by 2030 and to make a significant contribution to Ireland's commitment to produce 80% of electricity from renewable sources by the end of the decade. FuturEnergy Ireland want to do this by driving the development of the highest quality, locally supported green energy projects in Ireland. FuturEnergy Ireland has a number of proposed wind energy projects currently in the planning system.

1.5 PROJECT TEAM

TOBIN have been engaged by FuturEnergy Ireland DAC to coordinate the Environmental Impact Assessment and prepare the EIAR for the proposed development. The relevant specialists included in the Study Team, who are both experienced and competent in their areas of expertise, are noted here:

- TOBIN staff will provide expertise in relation to Project Direction, Project Management, EIAR Production and expertise in relation to the environmental evaluation of the following topics: Planning, Reasonable Alternatives, Biodiversity, Land, Soils & Geology including Slope Stability Assessment, Hydrology and Hydrogeology, Flood Risk Assessment, Roads and Traffic, Population and Human Health, Shadow Flicker;
- AECOM – Habitat surveys
- MKO and SLR - Ornithology;
- Macro Works – Landscape & Visual Impact Consultants & Production of Photomontages;
- AWN – Noise & Vibration, Air Quality and Climate;
- IAC Archaeology – Cultural Heritage; and
- AI Bridges -Telecommunications and Aviation Assessment

- TLI Group – Substation and Grid Connection Design;
- Collett – Turbine Delivery Route Assessment and Design;
- APEX Geophysics- Geophysics surveys;
- Causeway Geotech and Ground Investigations Ireland – Geotechnical Site Investigations; and
- Western Forestry Co-Op – Forestry.

1.6 SCOPING REPORT STRUCTURE

Individual specialists will undertake their evaluations of the environment including evaluation under following topics:

- Population and Human Health
- Biodiversity
- Ornithology
- Land, Soils and Geology
- Hydrology and Hydrogeology
- Noise and Vibration
- Air Quality and Climate
- Shadow Flicker
- Landscape and Visual
- Cultural Heritage
- Traffic and Transport
- Material Assets
- Interaction of the Foregoing

1.7 PROJECT DESCRIPTION

The proposed project comprises of a development of a wind farm of approximately 16 no. wind turbines and all associated infrastructure including turbine foundations, hardstanding areas, borrow pits, access tracks, an on-site 110kV electrical substation and an underground grid connection to the existing Srananagh ESB substation in Co. Sligo. The proposed project will also comprise facilitating works on the public road network and at private properties to accommodate the delivery of turbine components.

1.8 SITE LOCATION

The study area for the proposed wind farm is north of Manorhamilton in north County Leitrim. The final application site boundary is to be finalised and is likely to include both Coillte owned property and other private landholdings.

The study area is also located in close proximity to the Northern Ireland border in County Fermanagh which is approximately 3km to the north.

The study area ranges in elevation from 170m to 380m AOD, adjoining Dough and Thur Mountains at its upper elevation.

The area is characterised by a number of flashy watercourses in deep ravines, the majority of which have existing crossings in place, as part of existing forest road network.

Access to the proposed wind farm from the regional and local road network in the area is good. Within the existing Coillte landholdings there are forest roads which provide good coverage and are well maintained and in good condition. There are also several local roads both within and adjacent to the proposed wind farm.

1.9 THE PROPOSED DEVELOPMENT

1.9.1 INTERNAL ACCESS ROUTE AND SITE LOCATIONS

The exact number, siting and scheme layout for the turbines will be decided as part of the design and EIA process.

In addition, the internal access route layout, access route types and construction methodologies will be designed and the location of the proposed entrance(s) to the wind farm site will be confirmed. The initial design will be refined by the design team in consultation with the community in 2024/2025.

1.9.2 WIND TURBINE SPECIFICATIONS

The exact rating and design of the proposed turbine, subject to completion of the statutory processes, will be subject to a competitive tender and will be detailed by the turbine manufacturer on award of the contract. However, the proposed turbines will be the typical three bladed, horizontal axis type.

The potential installed capacities for the wind turbines and the wind farm as a whole will be proposed as part of the design process. Based on turbines available at the scale currently under consideration, the output of the wind farm is expected to be in the order of 100-110 MW.

1.9.3 ELECTRICAL/MECHANICAL EQUIPMENT

The main mechanical and electrical components associated with the development include the following:

- Turbine components (tower sections, nacelle, hub, rotor blades);
- 110 kV on-site substation;
- Electrical cable;
- SCADA cable; and
- Main and assist cranes.

1.9.4 FORESTRY OPERATIONS MANAGEMENT

FuturEnergy Ireland DAC will ensure that the Forestry Operations division of the business are involved in the layout design and phasing of the proposed wind farm. In particular, the forestry consultant contributing to the EIAR will liaise with the Forestry Operations division of Coillte to confirm relevant details including details relating to

forestry sections and sub-sections, tree species planted on site, tree planting dates, yield class, thinning and felling regimes and planned felling coupes and schedules.

1.9.5 GRID CONNECTION

FuturEnergy Ireland DAC identified a number of grid connection options for the proposed wind farm, which has been further refined to a singular grid route to be developed as part of this project.

1.9.6 DECOMMISSIONING

The proposed turbine will have a design lifetime of approximately 35 years without replacement of major components. In certain circumstances, FuturEnergy Ireland DAC may wish to replace turbines prior to the end of the design lifetime. Such a decision would be made on the merits of economic and technical factors at the time of assessment and undertaken in consultation with the local authorities.

Turbine design renders the decommissioning process as a straightforward process. In the decommissioning phase, cranes disassemble each turbine section and remove from the site. The upper sections of the foundations projecting above ground will be removed, and the remainder of the foundations will be covered by soils typical of the surrounding environment and then re-seeded or left to re-vegetate according to ecological requirements. Underground cables will be cut back at the turbine termination points and will either be recycled or left buried in situ (de-energised). It is proposed that site routes would remain to allow access through the site either for further alternative development of the site, for ongoing forestry operations and/or for amenity purposes, as considered appropriate at the time.

Site materials will be recycled where practicable or disposed of in accordance with current waste legislation and best practice guidelines. Based on current commodity prices, principally steel and copper, material returns achieved through recycling may exceed current financial costs associated with site decommissioning.

Decommissioning activities are typically similar to construction activities, having similar type risks and sensitive receptors associated with them. The potential impacts of decommissioning activities will be assessed accordingly in the EIAR.

1.9.7 REHABILITATION/CONCURRENT OR FUTURE USE OF THE SITE

The land within the study area are Coillte's own commercial forestry enterprise and the phased use of these areas of the site for the purpose of forestry operations will continue during the operation of the wind farm.

2.0 ENVIRONMENTAL IMPACT ASSESSMENT

2.1 EIA LEGISLATION AND GUIDANCE

In the case of a wind farm development, the final project which will be subject to a planning application will have gone through a number of iterations during the EIA, including changes to design proposals, numbers of proposed turbines and turbine layouts.

It is proposed that the following EIA guidelines will be followed during the process:

- Guidelines on the Information to be contained in Environmental Impact Statements" (EPA, 2002);
- "Advice Notes on Current Practice in the Preparation of Environmental Impact Statements" (EPA, 2003);
- "Draft Guidelines on the Information to be contained in Environmental Impact Statements" (EPA, September 2015);
- "Draft Advice Notes on Preparing Environmental Impact Statements" (EPA, September 2015);
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, August 2017), and;
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

In addition to the Regulations and Guidelines above, the project EIAR will be prepared with cognisance to the "Wind Energy Development Guidelines for Planning Authorities (2006)", the proposed draft revisions to these guidelines (December 2013), the Preferred Draft Approach to these guidelines as announced by the Government in June 2017 and the "Draft Revised Wind Energy Development Guidelines (December 2019)".

A Screening for Appropriate Assessment (AA) and a Natura Impact Statement (NIS) will be prepared for the proposed wind farm project. The purpose of the AA/NIS will be to inform the Consenting Planning Authority in its undertaking of an 'Appropriate Assessment' of the project, as required under Article 6(3) of the EU Habitats Directive (92/43/EC). This is an assessment of the potential for significant or adverse effects resulting from the project, both individually and in-combination with other activities, plans and projects, on European Site(s) as designated under the EU Habitats Directive and the conservation objectives for their qualifying species and habitats.

2.2 THE SCOPING PROCESS

This report will form the basis for the scoping process to be undertaken by FuturEnergy Ireland DAC with the Consenting Planning Authority and the prescribed Statutory Bodies.

The scoping process will provide all relevant planning and environmental stakeholders with the opportunity to provide information, data or additional guidance to facilitate the

iteration of the design and EIA process, to determine what the main potential significant effects might be and what sub-topics the EIAR should focus upon.

2.3 BASELINE ASSESSMENT

Following an introduction to the EIAR, the following information will also be presented:

- Description of the Existing Environment – a detailed description of the existing environment to allow the baseline conditions to be understood and existing areas of sensitivity to be recorded (as per the EPA EIAR Guidelines).
- Description of the proposed development, including site layout and infrastructural details, construction procedures and the materials required, the operational and maintenance phases in addition to the decommissioning and rehabilitation phases.
- Consideration of Reasonable Alternatives – This provides a detailed assessment of alternatives considered in the selection of site location and site layout.

2.4 ASSESSMENT METHODOLOGY

In the case of each of the environmental topics, it is proposed that the following elements will be evaluated, and that the format of the EIAR will follow the standard methodology and be presented in accordance with the above-mentioned legislation and guidelines. Individual chapter topics are discussed further below in this section. Other legislation and guidance relevant to individual chapters may be included where applicable. The wind farm will be assessed and described within each environmental topic in terms of:

- **Introduction -** includes a background to the assessment and describes the study methodology employed in carrying out the assessment.
- **Existing Environment –** Describes and assesses the existing environment in the context of the relevant environmental categories. This section also takes account of any other proposed and existing developments in the vicinity.
- **Potential Effects** - Provides the description of the potential specific direct, indirect and cumulative effects, associated with the development. This is done with reference to the existing environment and characteristics of the proposed development, while also referring to the magnitude, duration, consequences and significance of the effect associated with the construction and operation and decommissioning of the development. This section also considers cumulative effects with other proposed or permitted developments.
- **Mitigation Measures** - A description of any remedial, or mitigation measures that are either practicable or reasonable having regard to the potential effects. It will also outline, where relevant, monitoring proposals to be carried out should consent be granted in order to demonstrate that the project in practice conforms to the predictions made.

- **Residual Impacts -** Provides the description and assessment of the predicted residual impact associated with the development on the surrounding environment.
- **Conclusion –** Provides a summary of the salient points of the assessment chapter.

2.5 ASSESSMENT OF EFFECTS

As stated in the "Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022), an assessment of the likely significant effects of a proposed development is a statutory requirement of the EIAR process. The criteria for the presentation of the characteristics of potential significant effects will be described with reference to the magnitude, spatial extent, nature, complexity, probability, duration, frequency, reversibility, cumulative effect and transboundary nature (if applicable) of the effect.

The classification and description of effects in the project EIAR will follow the terms provided in Table 3.4 of the EPA Guidelines (2022) referenced above (and duplicated in Table 2.1 below for information purposes).

According to the Guidelines, the relevant terms listed in the table below can be used to consistently describe specific effects, but all categories of terms do not need to be used for every effect.

The use of standardised terms and methodologies for the classification of effects will ensure that the EIAR employs a systematic approach, which can be replicated across all disciplines covered in the EIAR. The consistent application of terminology and methodology throughout the EIAR will facilitate the assessment of the proposed development on the receiving environment. Some variation in the guidance adopted in specific EIAR chapters may occur in consultation with specialist authors.

Table 2.1: Descriptions of Effects (as per Table 3.4 of the 2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports).

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Describing the Significance of Effects 'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance*).	**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.

Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur – so that the CA can take a view of the balance of risk over advantage when making a decision.	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes
	Brief Effects Effects lasting less than a day
	Temporary Effects Effects lasting less than a year
	Short-term Effects Effects lasting one to seven years
	Medium-term Effects Effects lasting seven to fifteen years
	Long-term Effects Effects lasting fifteen to sixty years
	Permanent Effects Effects lasting over sixty years
	Reversible Effects Effects that can be undone, for example through remediation or restoration

	Frequency of Effects Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do-Nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	`Worst case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

2.6 POTENTIAL MITIGATION

Appropriate mitigation guidance decided by the author in alignment with best practice will be applied within each specialist chapter. The mitigation hierarchy evidenced below will be implemented where appropriate:

- *By Avoidance*
  When no impact is caused (often through consideration of alternatives).
- *By Prevention*
  When a potential impact is prevented by a measure to avoid the possibility of the impact occurring.
- *By Reduction*
  When an impact is lessened.
- *By Remedy/Offsetting*
  When an adverse impact is resolved by a remedial action or balanced by a positive impact.

2.7 NON-TECHNICAL SUMMARY AND CONSTRUCTION ENVRIONMENTAL MANAGEMENT PLAN

The Non-Technical Summary (NTS) provides an overview and summary of the main EIAR using non-technical language. It is a standalone document which presents a clear and concise summary of the existing environment, characteristics of the proposed development, a clear outline of the potential significant impacts/effects which could result from the proposed development and mitigation measures adopted into the design of the development to minimise impacts on the surrounding environment.

A standalone Construction Environmental Management Plan (CEMP) will also be prepared which will set out the details of proposed construction compounds, construction methodologies, environmental mitigation measures and proposed reinstatement measures. The CEMP will incorporate the relevant construction phase mitigation measures which will have been integrated into the project, EIAR and AA.

3.0 REASONABLE ALTERNATIVES

As set out in the EIA Directive, the EIAR is required to provide a description of the reasonable alternatives studied by FuturEnergy Ireland DAC, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3.1 ALTERNATIVE SITES

In respect of consideration of alternative sites, the EIAR will set out the reasonable alternative sites available to FuturEnergy Ireland DAC which will include consideration of suitable land banks held in ownership by Coillte. Details on the assessments carried out to identify the proposed site location as appropriate for this project will be provided.

3.2 ALTERNATIVE DESIGN

In the context of alternative design (incorporating scale and size), this section of the EIAR will set out the processes and assessments that were followed to arrive at the proposed turbine layout, turbine envelope and infrastructure layout. This section will be informed by comprehensive site surveys and ground investigations.

3.3 ALTERNATIVE TECHNOLOGY/ ALTERNATIVE PROCESSES

The proposed wind energy development will support European and National policy in decarbonising electricity generation and contribute to Ireland's target to generate 80% of the country's electricity from renewable sources by 2030. There are a number of different renewable energy technologies available on the market, however not all will be viable at the proposed development location. This section will consider the various renewable energy alternatives (such as solar) and will assess the alternative wind turbine technologies available.

4.0 POLICY, PLANNING AND DEVELOPMENT CONTEXT

The proposed wind farm will contain. wind turbines. Given the scale of the project, FuturEnergy Ireland DAC will engage with An Bord Pleanála under the Strategic Infrastructure Development (SID) consultation process to determine the consenting route for the project.

Within the EIAR, the planning assessment will include a review of relevant European, national and local planning policy documentation, planning legislation, strategies and plans and set the local context of the project.

At an International and European level, this will include:

- The European Green Deal 2019;
- Europe 2020 Climate and Energy Framework;
- Europe 2030 Climate and Energy Framework;
- Energy Roadmap 2050; and
- Renewable Energy Directive 2009/28/EC & Recast Directive 2018/2001/EU.

At a National level this will include:

- National Energy and Climate Plan (NECP) 2021-2030;
- Climate Action Plan 2024;
- Ireland 2040 - Our Plan (National Planning Framework) [2018];
- National Development Plan 2021-2030;
- Government White Paper – Ireland's Transition to a Low Carbon Energy Future 2015-2030;
- National Renewable Energy Action Plan 2010;
- National Wind Energy Guidance Documents including:
    - Wind Energy Development Guidelines 2006;
    - Draft Revised Wind Energy Development Guidelines – December 2019;
    - Interim Guidelines for Planning Authorities on Statutory Plans, Renewable Energy, and Climate Change (2017);
    - Code of Practice for Wind Energy Development in Ireland on Guidelines for Community Engagement (DCCAE, 2016).

At a Regional level, the assessment will consider the Regional Spatial and Economic Strategy (RSES) for the North West Region. Figure 4.1 illustrates the operational windfarms in the NWRA region. In addition, Table 4.1 identifies the Regional Policy Objectives which are relevant to wind energy and wider renewable energy projects.

Figure 4-1 – Windfarms in RSES Spatial Area

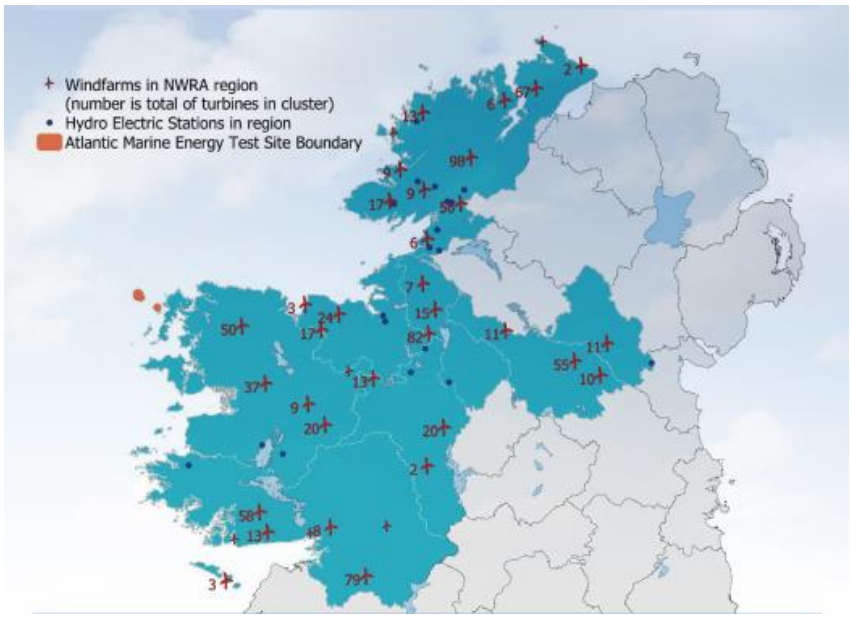

Table 4.1: RSES Regional Policy Objectives (Wind & Renewables)

Regional Policy Objective	Description
RPO 4.16	The NWRA shall co-ordinate the identification of potential renewable energy sites of scale in collaboration with Local Authorities and other stakeholders within 3 years of the adoption of the RSES. The identification of such sites (which may extend to include energy storage solutions) will be based on numerous site selection criteria including environmental matters, and potential grid connections.
RPO 4.17	To position the region to avail of the emerging global market in renewable energy by: • Stimulating the development and deployment of the most advantageous renewable energy systems • Supporting research and innovation • Encouraging skills development and transferability • Raising awareness and public understanding of renewable energy and encourage market opportunities for the renewable energy industry to promote the development and growth of renewable energy businesses. • Encourage the development of the transmission and distribution grids to facilitate the development of renewable energy projects and the effective utilization of the energy generated from renewable sources having regard to the future potential of the region over the lifetime of the Strategy and beyond.

RP0 4.18	Support the development of secure, reliable, and safe supplies of renewable energy, to maximise their value, maintain the inward investment, support indigenous industry, and create jobs.
RPO 4.19	Support the appropriate development of offshore wind energy production through the adequate provision of land-based infrastructure and services, in line with national policy and in a manner that is compatible with environmental, ecological and landscape considerations.
RPO 5.1	The Assembly will support through Climate Change Action Plans (CARO) and Local Authorities the preparation and implementation of Local Climate Strategies which will, inter alia, address vulnerability to climate risks and provide prioritised actions in accordance with the guiding principles of the National Adaptation Framework.

In addition, at Local level all relevant planning and wind energy development policies included in the Leitrim County Development Plan (CDP) 2023 - 2029 and any emerging County Development Plan will be considered. It should be noted that the CDP states that wind farm development that can clearly demonstrate, to the satisfaction of the Planning Authority, that they would not have a significant adverse impact on the amenities of a dwelling or a building occupied, or capable of being occupied, by people, or would not compromise the integrity of an environmentally sensitive area, will be 'Open for Consideration'.

Table 4.2 identifies the policies relating to renewables, wind and electrical grid infrastructure.

Table 4.2: CDP Policies (Renewables, Wind & Electrical Grid Infrastructure)

CDP Policy / Objective	Description
RE POL 1	To encourage and facilitate the production of energy from renewable sources, such as from wind, solar, bioenergy, hydroelectricity, and geothermal, subject to compliance with proper planning and environmental considerations.
RE POL 2	To promote and support developments and actions that assist in achieving the national targets for energy from renewable resources and reducing greenhouse gas emissions associated with energy production.
RE OBJ 1	• To seek to achieve a minimum of 200 MW of renewable electricity in the county by 2030, by facilitating renewable energy developments, including micro-generation renewable technologies incorporating solar, wind, hydro-electric and bioenergy.

WE POL 1	To acknowledge the importance of wind energy in Co. Leitrim as a renewable energy source which can play a vital role in achieving national targets in relation to reductions in fossil fuel dependency and therefore greenhouse gas emissions
WE POL 2	To encourage the development of wind energy in suitable locations and in an environmentally sustainable manner to ensure the security of energy supply, in accordance with Government policy and the Leitrim County Renewable Energy Strategy (2021).
WE POL 3	To ensure that the assessment of wind energy development proposals will have regard to the following: • sensitivities of the county's landscapes • visual impact on protected views, prospects, designated landscapes, as well as local visual impacts • impacts on nature conservation designations, archaeological areas, county geological sites, historic structures, public rights of way and walking routes • local environmental impacts, including those on residential properties, such as noise and shadow flicker • visual and environmental impacts of associated development, such as access roads, plant and grid connections from the proposed wind farm to the electricity transmission network • scale, size and layout of the project and any cumulative effects due to other projects • the impact of the proposed development on protected bird and mammal species
WE POL 6	To have regard to the principles and planning guidance set out in Department of Housing, Planning and Local Government publications relating to 'Wind Energy Development' and the DCCAE Code of Practice for Wind Energy Development in Ireland and any other relevant guidance which may be issued.

The Leitrim County Renewable Energy Strategy (RES) forms Appendix IX of the CDP and has been developed to help enable the vision for Leitrim of encouraging and supporting the transition to a carbon neutral county through community engagement, energy efficiency and the sustainable development of renewable energy.

The RES also sets out the 'Available Areas' for new wind farm development which is based on a sieve mapping and technical analysis process. The proposed project is

located within lands considered 'Available Areas' for new wind farm development as shown in Figure 4-1 below.

The central aim of the sieve mapping and technical analysis undertaken was to highlight areas of the county with the potential to accommodate wind energy development identified as 'Available Areas' in Figures 6.3 and 6.3b of the County Leitrim Renewable Energy Strategy, subject to significant landscape/visual constraints amongst other environmental considerations. Moreover, it is accepted that that minimum setback distances from sensitive receptors (i.e. dwellings) can be relaxed where wind energy project developers can demonstrate the written consent of affected landowners and householders and which can be taken into consideration in the assessment of any planning application for wind energy development where this arises.

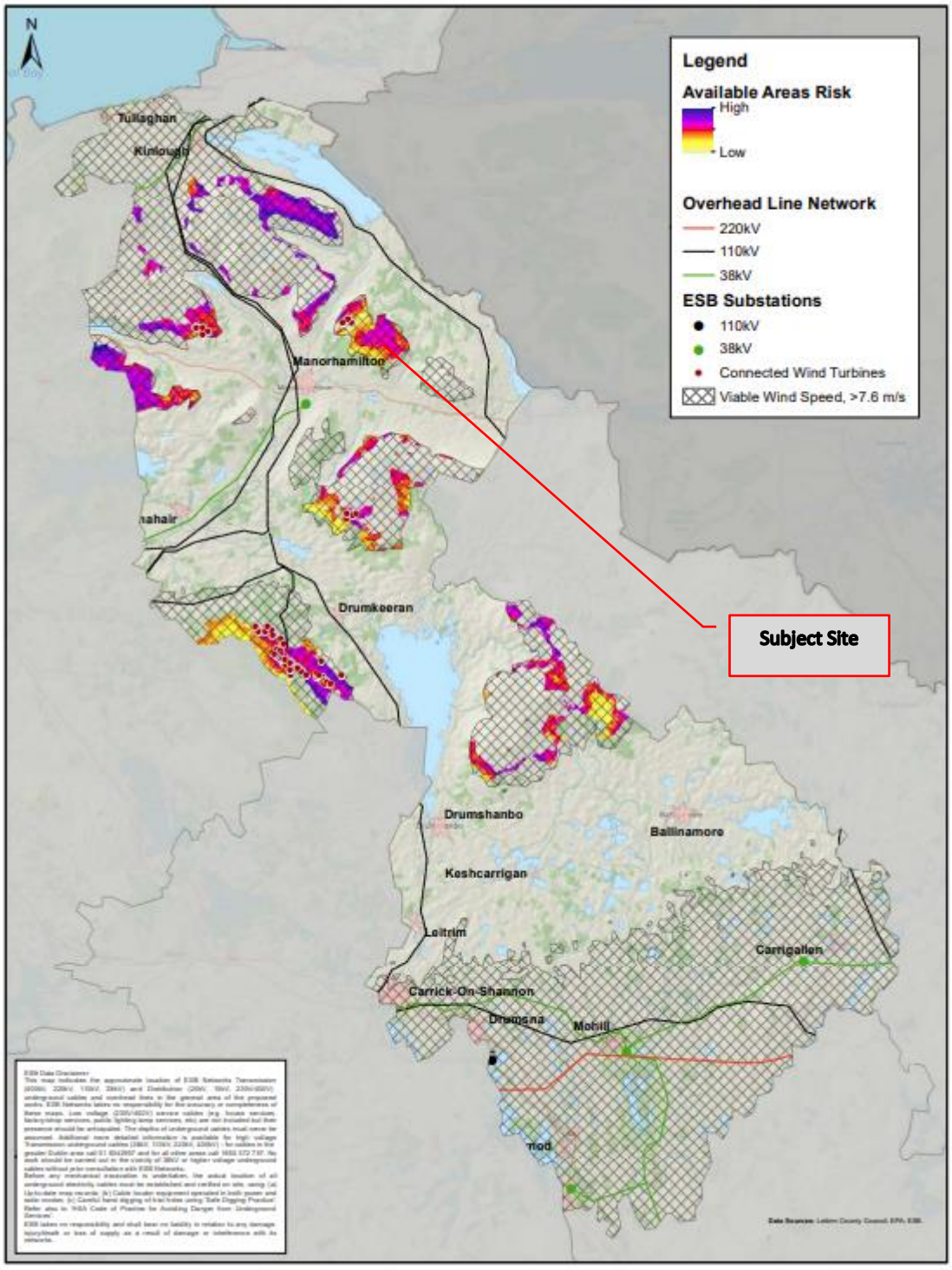

Figure 4-1 Wind Opportunities and Constraints Map

5.0 POPULATION AND HUMAN HEALTH

5.1 INTRODUCTION

A review of the current census data will be completed. The existing local population will be described and the projected change in the population, if any, will be assessed. This

section will address, in particular, the effects of the proposed wind farm on nuisance and residential amenities in the surrounding area. Any impacts on recreational activities as a result of the wind farm will be discussed in this chapter. In addition, the positive economic impacts will be examined, as employment will be created during the construction an operational phase of the wind farm. The wind farm will also generate a community benefit fund and create investment opportunities for the local community. This section will also consider public access, adjacent landowners / dwellings and local services such as existing electricity lines / masts on site. The Human Health assessment will be prepared in accordance with the relevant guidelines produced by the Environmental Protection Agency (EPA), as detailed in Section 5.4. Aspects examined in this section of the chapter will primarily relate to impacts from the wind farm on socio-economic activities, tourism and on local community health.

5.2 STUDY AREA

The study area for the "Population and Human Health" assessment will include County level data in relation to Electoral Divisions. In addition, the study area for residential receptors will include an area within 1km of the proposed wind farm site boundary.

5.3 SENSITIVE RECEPTORS

All properties in close proximity to the proposed wind farm will be mapped as potential sensitive receptors. Properties will include residential dwellings, commercial properties, derelict buildings, agricultural buildings and pre-planning infrastructure (including houses submitted for planning permission). All properties will then be reviewed by ground-truthing and further desktop assessment (in the case of planning applications) to identify potential sensitive receptors in the vicinity of the development. In addition, as part of the initial turbine layout design process, a minimum 750m buffer will be extended from the location of any proposed turbines to sensitive receptors. This will inform the turbine layout and for the current proposed turbine tip height of 185m, exceeds the proposed minimum set-back requirement of four times tip height.

5.4 DESKTOP AND FIELD SURVEYS

The following information sources and references are of relevance in relation to the desktop study for the Population and Human Health assessment;

- Information to be contained in Environmental Impact Assessment Reports, (EPA, 2022);
- Revised Guidelines on the Information to be contained in Environmental Impact Statements, Draft September 2015 (EPA, 2015);
- IWEA Best Practice Guidelines for the Irish Wind Energy Industry 2012;
- IWEA Best Practise Principles in Community Engagement and Community Commitment 2013;

- OSI mapping and Aerial Photography to identify land use and possible amenity sites;
- Leitrim County Development Plan 2023-2029;
- Central Statistics Office (CSO) information;
- Fáilte Ireland Information in relation to tourism amenity in conjunction with websites of relevant tourism sites and amenities for the area;
- Health Impact Assessment Resource and Tool Compilation (US EPA, 2016);
- Guidelines for Community Noise (WHO,1999);
- Health in Environmental Impact Assessment - A Primer for a Proportionate Approach (IEMA, 2017);
- Health Impact Assessment (Institute of Public Health Ireland, 2009);
- Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011);
- Air Quality Guidelines (WHO, 2005);
- British Standard (BS) 5228-1:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise;
- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA, 2016); and
- WHO Environmental Noise Guidelines for the European Region 2018.

The Population and Human Health impact assessment evaluates the receiving environment/land use and includes analysis of local population patterns. The assessment also includes a review of appropriate demographic documentation and incorporates Census Reports and Electoral Division Information, Land use, Population, Employment and Planning Permissions. In addition, the evaluation will provide details of FuturEnergy Ireland DAC Community Benefit proposals and any consultation with regard to the same.

There are separate health profiles available for all local authority areas. The most recent profile published for Leitrim will be used to establish a community health profile for the proposed wind farm. The assessment of human health for the proposed development, in terms of health protection, will follow the approach set out in the EPA 2022 Guidelines, Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).

5.5 CUMULATIVE EFFECTS

The potential cumulative impact of the proposed wind farm with other relevant projects in the area on the local community and human health will also be addressed. This may include other wind farm developments, other renewable energy projects or any proposed project which could have the potential to have a cumulative impact.

6.0 BIODIVERSITY

6.1 INTRODUCTION

Potential impacts on the biodiversity from the wind farm will be addressed in line with the requirements of the Environmental Impact Assessment Directive 2011/92/EU as amended by Directive 2014/52/EU and the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296/2018), which implements EU Directive 2014/52/EU in planning law. Due regard will be had to published guidelines and best practice including:

- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.
- DEHLG (2006) Wind Energy Development Guidelines and Draft Revised Wind Energy Development Guidelines (December 2019).
- NRA (2009) Guidelines for Assessment of Ecological Impacts of National Roads Schemes.
- IWEA (2012) Best Practice Guidelines for the Irish Wind Energy Industry.
- Accepted specific best guidance for assessing wind farm impacts on birds, bats and other sensitive ecological receptors.

To date, a significant amount of desk study and field survey has been undertaken, commencing in September 2020 with surveys currently undergoing, to gather information on the biodiversity of the study area and surrounds. This information will be used to inform the draft design of the wind farm.

6.2 STUDY AREA

The study area is the site of the proposed wind farm and the surrounding environs. Where required, the study area is being expanded to take into account sensitive receptors that may be within the zone of influence of the project. The zone of influence depends on the particular sensitivities of receptors and the ecological pathways along which impacts may be transmitted.

6.3 SENSITIVE RECEPTORS

A number of sensitive ecological receptors have been identified by desk study and ecological surveys carried out to date. These include designated sites, and protected fauna and flora.

There are no NATURA 2000 sites, i.e., Special Areas of Conservation (SAC) or Special Protection Area (SPA), within the proposed wind farm site, however the site is in proximity to three NATURA 2000 sites; Lough Gill SAC (IE001976), Lough Melvin SAC (IE000428) and Lough Melvin SAC (UK0030045).

It should also be noted that the Dough/Thur Mountains Natural Heritage Area (NHA) is located adjacent to the eastern boundary of the wind farm site. This NHA contains an extensive area of upland blanket bog, with associated upland heath and grassland.

Nature conservation sites designated for birds within 20 km include: Sligo / Leitrim Upland SPA (chough and peregrine) and Donegal Bay SPA (great northern diver, light-bellied brent goose, common scoter and sanderling) in the Republic of Ireland; and Pettigoe Plauteau SPA (golden plover and Greenland white-fronted goose) in Northern Ireland.

6.4 DESKTOP AND FIELD SURVEY

6.4.1 DESKTOP SURVEY

Desktop surveys have been carried out, and the results for potentially sensitive receptors have been outlined above. The primary data sources for the desktop surveys were:

- National Biodiversity Data Centre records
- NPWS rare and protected species records
- Bat Conservation Ireland database records
- Irish Cave Database
- Coillte sub-compartment (tree species and planting date) data
- Coillte Biodiversity Areas
- NPWS designated area boundary data
- NPWS site-specific conservation objectives shapefiles
- National Survey of Native Woodland sites
- National Fen Database sites
- EPA water quality data
- Aerial photography
- Irish Wetland Bird Survey data;
- Bird Atlases;
- National hen harrier survey data; and
- BoCCI 4.

6.4.2 FIELD SURVEYS

To date, the following field surveys have been carried out:

- Habitat Survey and mapping: .Detailed protected fauna surveys key infrastructure locations.
- Aquatic Fisheries Surveys
- Bat Autumn Mating/Swarming Surveys
- Bat static detector surveys

- Bat Winter Hibernation Survey
- Habitat survey of potential grid connection routes
- Additional field work that has been programmed includes:
  - Bat Spring Mating/Swarming Surveys
  - Bat Summer Roost Surveys
  - Aquatic Surveys

All surveys have been undertaken following methodologies outlined in relevant guidelines.

The need for additional survey work to address any information gaps has been and will be reviewed on an ongoing basis.

6.5 CUMULATIVE EFFECTS

Cumulative impacts with other developments, including but not limited to other wind farms, will be assessed for all sensitive receptors. Interactions with other environmental disciplines, especially hydrology and climate, will also be assessed as set out in Section 17.

6.6 APPROPRIATE ASSESSMENT

A Natura Impact Statement (NIS) will be prepared and submitted to assess potential effects on the integrity of Natura 2000 sites within the zone of influence of the project. The NIS will be prepared with due regard to the European Commission's (2020) Guidance document on wind energy developments and EU nature legislation. In line with best practice, the NIS will be a separate document to the EIAR.

7.0 LAND, SOILS AND GEOLOGY

7.1 INTRODUCTION

The principal objectives of the Soils, Geology and Hydrogeology Chapter of the EIAR will be to identify and mitigate potential issues of the proposed wind farm to ensure that the impact on the environment is minimised.

A desk study shall be undertaken to acquire all available topographic, geological, geotechnical and hydrogeological data (including geotechnical and site stability data) for the proposed wind farm and surrounding area. The desk study will include a geotechnical risk assessment to identify and mitigate potential issues that may arise during the construction stage (including geohazard, geomorphology features). The land cover is currently a mixture of wetlands, peat bogs, forest and semi natural areas, scrub and/ or herbaceous vegetation, coniferous forest and moors and heathlands.

7.2 STUDY AREA

The EIAR study area of the soils, geology and hydrogeology will primarily focus on the wind farm site. In addition, the assessment will consider the lands adjacent to the site boundary, environs downstream of the site area to an appropriate extent as well as proposed forestry replacement lands off-site.

7.3 SENSITIVE RECEPTORS

There are currently several geological sensitive receptors identified at the outset of the scoping process and prior to site investigation.

A number of karst features have been identified within the bedrock limestone formation in the study area.

Blanket peat has been identified in the vicinity of the study area.

Sites designated for nature conservation within 15 km of the proposed wind farm, in addition to the above NHA include Lough Macnean Upper (pNHA), Corratirrim (pNHA/ SAC), Boleybrack Mountain (pNHA, SAC), O'Donnell's Rock Wood (pNHA), Bonet River (SAC), Glenade Lough (SAC), Lough Gill (SAC), Crockauns/ Keelogboy Bogs (NHA), Ben Bulben, Gleniff and Glenade Complex (SAC), Sligo/ Leitrim Uplands (SPA), Arroo Mountain (SAC), Aghavoghill Bog (NHA), Lough Melvin (SAC) and Kinlough Wood (pNHA).

The GSI's Landslide Susceptibility Mapping was used to assist in the identification of areas which are subject to landslides and is measured from low to high. The southern part of the study area has been identified to be low in landslide susceptibility. The central and northern part of the study area have been identified as moderate to high.

7.4 DESKTOP AND FIELD SURVEY

A desk study has been undertaken to acquire all available topographic, geological, geotechnical and hydrogeological data (including geotechnical and site stability data) for the proposed wind farm and surrounding area. The desk study will include a geotechnical risk assessment to identify and mitigate potential issues that may arise during the construction stage (including karst risk and geomorphology features).

Consultations will be undertaken and feedback requested from a number of statutory bodies, including:

- The Geological Survey of Ireland (GSI). Well data will be sourced and information on proposed Natural Heritage Areas (pNHAs), County Geological Sites (CGS) and any recorded Landslide Events (from the historical landslide database) in the region of the study area will be requested;
- Irish Peatland Conservation Council;
- Inland Fisheries Ireland (IFI);
- The Environmental Protection Agency (EPA);
- The Local Authority (Leitrim and Fermanagh) Environment Officer; and
- Scoping of geotechnical aspects of the EIA for peat sites will be agreed in conjunction with the multidisciplinary team, including but not limited to Geotechnical Engineer, Hydrogeologist, Hydrologist, Ecologist and the requirements of any and all of the design team as necessary e.g. Engineering designers deciding on access route types and construction methodologies.

The evaluation will include:

- Desk study of soils, subsoils, bedrock, geological, groundwater vulnerability, groundwater resources maps and aerial photography;
- Geomorphology assessment and mapping will be undertaken of geomorphological features;
- Aquifer assessment, in terms of the underlying aquifer and shallow groundwater system within the peat;
- Impact assessment on water schemes/ water supplies within 2km radius;
- Surface water and groundwater interaction (if existent);
- Desk top assessment for the identification of potential karst features or landforms;
- Site Investigation works will be completed in conjunction with the requirements of the designers to provide detail on soils, geology, peat types and depths and potential requirements for water management and drainage. The works may include:
    - Borehole drilling
    - Trial pitting;

  - Gouge auger/peat probing;
  - In-situ Standard Penetration Test (SPT) testing and sampling; and
  - Groundwater monitoring well installation.

- The nature and requirements of the potential peat management will be informed by the information from the site investigation, site surveys and visits and the evaluations undertaken by the multi-disciplinary team;
- Development of Geotechnical Risk register;
- Design of appropriate erosion and sediment control measures; development of erosion and sediment control procedures for implementation on site;
- Design and installation of monitoring wells, piezometers and surface hydrometric structures where required;
- Conduct preliminary geotechnical site investigations to inform the following:
    - Identify the depth of peat across the site & any required specialist peat parameters e.g., shear vane strength etc;
    - Access routes construction methodology;
    - Cable route construction methodology;
    - Foundation construction methodology;
    - Borrow Pits / quarry potential;
    - Earthworks and Material Balance calculations (rock won on site in relation to rock fill required during construction of roads, hardstands, crane pads etc.);
    - Peat Management Works;
    - Groundwater management, as required;
    - Drainage Design;
    - Overburden (Soils/Peat) Storage and management;
    - Temporary works design; and
    - Site Reinstatement, to be aligned with the existing site rehabilitation plan (including erosion control).
- Geohazard Mapping and Risk Assessment, verifying landslide hazards and associated risk if identified; and
- Interpretation and reporting of all geological, hydrogeological & geotechnical data collected from preliminary site investigations, with reference to data within the Geotechnical & Soil Stability Report.

7.5 CUMULATIVE EFFECTS

Based on the site investigation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction, operation and decommissioning of the proposed wind farm.

8.0 HYDROLOGY AND HYDROGEOLOGY

8.1 INTRODUCTION

The principal objectives of the Hydrology and Hydrogeology Chapter of the EIAR will be to identify and mitigate potential issues of the proposed wind farm to ensure that the impact on surface water and groundwater is minimised.

8.2 STUDY AREA

The EIAR study area of the Hydrology and Hydrogeology assessment will extend outside the final site boundary and will include watercourses which will receive surface water from within the proposed wind farm site.

8.3 SENSITIVE RECEPTORS

The study area is located in a number of river catchments including the Cornavannoge to the south east. Tributaries of the Owenmore River to the south which forms part of the Lough Gill SAC, the Owenbeg River to the west which flows into the Lough Gill SAC. Tributaries of these rivers also provide potential connectivity to the Dough/Thur Mountains NHA. The Ballagh River to the north west also flows to Lough Melvin SAC.

8.4 DESKTOP AND FIELD SURVEYS

A desk study shall be undertaken to acquire all published hydrological data for the proposed wind farm and surrounding area, including flood data and surface water quality data.

Consultations will be carried out with a number of statutory bodies including:

- The Geological Survey of Ireland (GSI). Well data will be sourced and information on Natural Heritage Areas (NHAs), County Geological Sites (CGS) and any recorded Landslide Events (from the historical landslide database) in the region of the study area will be requested;
- The Local Authority Environment Officer;
- Inland Fisheries Ireland (IFI); and the
- Environmental Protection Agency (EPA).

8.5 HYDROLOGICAL ASSESSMENT

As part of the EIAR, TOBIN will establish baseline/existing hydrological conditions, identify potential impacts and proposed appropriate mitigation measures. TOBIN will also:

- Identify the existing surface water drainage characteristics of the wind farm (including any natural or man-made drainage). A surface water feature survey/catchment assessment of the study area will be carried out to record all streams, rivers and lakes within the wind farm boundary and surrounding area; and

- Establish baseline water quality across the wind farm site. Any historical water quality for this area will be reviewed and existing EPA water quality data will also be examined as part of the study including any available data relating to the river catchments in this area. Where required, surface water samples will be collected in order to provide a baseline set of water quality results for the area. Biological assessments of the rivers will also be carried out, if required.

TOBIN will also assess the potential for siltation as a result of the proposed wind farm, particularly during the construction phase and propose mitigation measures for associated pollution control. Any existing siltation management practices will be reviewed as part of this assessment.

8.6 WATER QUALITY ASSESSMENT

TOBIN will complete the following as part of the EIAR:

- Conduct water sampling (surface water and groundwater where possible) in accordance with industry standards;
- Interpret and identify surface and groundwater linkages through specific water quality parameters;
- Establish baseline/existing conditions, identify potential impacts and propose appropriate mitigation measures.

8.7 FLOOD RISK ASSESSMENT

The OPW's National Flood Risk Assessment (PFRA) mapping and Flood Maps were reviewed. A past flood event has been identified approximately 1.5 km south of the study area at Munakill More Lough. The past flood event has been recorded as recurring river flooding, the report states that the cause was likely the blockage of a swallow hole or underground outlet. Local knowledge indicates the lough water levels fluctuate seasonally as a turlough. There are no recorded flood events in the immediate vicinity of the current study area, however two rivers sourced from the site have downstream potential flood areas, approximately 1.5 to 2 km from the closest turbines as indicated on the Flood Maps. Recurring past flood events have also been identified at Owenmore tributary stream at Tawnymanys and Bonet River at Srabrick bridge, approximately 4 to 5 km downstream of the proposed wind farm. The risk of fluvial flooding (rivers and streams) is high, the risk of pluvial flooding from new hardstand areas and infrastructure will be considered.

The Flood Risk Assessment for this project will include the following works:

- Review of available information, planning guidelines and historical flooding records;
- Topographical survey of site, including survey of smaller water courses;

- Assessment of hydrometric data (water levels and flows) for adjacent water bodies; and
- Assessment to take cognisance of climate change and the 1 in 100 year to 1 in 1000-year flood events.

The Flood Risk Assessment will be completed as part of the EIAR. This assessment shall include undertaking the following tasks:

1. A visual Inspection of site and watercourses by hydrologist;
2. Site topographical survey;
3. Site survey of watercourses for hydraulic modelling;
4. A review of existing information and planning guidelines;
5. An assessment of historical flooding;
6. Estimation of the 100 and 1000 MRFS (Mid-Range Future Scenario) design flood events at the proposed development site, as recommended by *'The Planning System and Flood Risk Management Guidelines'* (OPW, 2009). The hydrological assessment of the site may include:
    i. Statistical estimation of design flood flow from available hydrometric data;
    ii. Analysis of watercourses using the OPW's Flood Studies Update Portal; and
    iii. Estimation of design flood flow from catchment descriptors and rainfall.
7. Hydraulic Modelling, using HEC-RAS or similar, of watercourses for the 100- and 1000-year design flood events. Where possible, the model shall be calibrated against historical and gauged flow data if available from the OPW and EPA hydrometric station network in the vicinity of the site;
8. Modelling and assessment of one flood risk solution proposed by the design team; and Floodplain Mapping for the 100 and 1000-year MRFS design flood events for the watercourses.

8.8 CUMULATIVE EFFECTS

Based on the evaluation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction of the proposed wind farm.

9.0 AIR QUALITY

9.1 INTRODUCTION

The purpose of the Air Quality assessment will be to assess the potential impacts of the proposed wind farm on the Air environment. The development of renewable energy is identified as having the potential to be a clean form of energy production and as such a potential net beneficial effect on Air Quality.

These impacts will also be assessed cumulatively in conjunction with other construction phase off-site activities including turbine haul routes, quarrying and borrow pits. The assessments will include the impact of the proposed windfarm development during the construction phase and associated GHG emissions during construction and operation.

9.2 POLICY AND PLAN CONTEXT

The assessment of air quality will be conducted with consideration of the relevant legislation and guidance including the following EPA guidelines:

- *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)* (EPA, 2003);
- *Draft Advice Notes for Preparing Environmental Impact Statements* (EPA 2015a); and
- The EPA EIAR Guidelines (2022).

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set. The statutory ambient air quality standards in Ireland are outlined in S.I. No. 180 of 2011 Air Quality Standards Regulations 2011 (hereafter referred to as the 'Air Quality Regulations'), which incorporate the ambient air quality limits set out in Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (hereafter referred to as 'the CAFE Directive'), for a range of air pollutants.

The assessment of air quality will be conducted with consideration of the relevant legislation and guidance including:

- *Guidance on the Assessment of Dust from Demolition and Construction V1*. (IAQM, 2016);
- *A Guide to The Assessment of Air Quality Impacts on Designated Nature Conservation Sites* (Version 1.1) (IAQM, 2020);
- The *TII Air Quality Guidelines* (TII, 2011);

- German VDI (2002) *Technical Guidelines on Air Quality Control – TA Luft*;
- *Guidelines for Assessment of Ecological Impacts of National Roads Schemes* (hereafter referred to as the 'TII Ecological Guidelines') (TII, 2009);
- *Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report* (European Commission, 2017);
- United Kingdom (UK) Department of Environment Food and Rural Affairs (DEFRA) Part IV of the Environment Act 1995: *Local Air Quality Management Policy Guidance (PG16)* (hereafter referred to as LAQM (PG16)) (DEFRA, 2016);
- Part IV of the Environment Act 1995: Local Air Quality Management Technical Guidance (TG16) (hereafter referred to as LAQM (TG16)) (DEFRA, 2018);
- UK Highways Agency (Highways England) *Design Manual for Roads and Bridges (DMRB) – LA 105 Air Quality* (hereafter referred to as 'LA 105 Air Quality') (Highways England, 2019);
- World Health Organization (WHO) *Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulphur Dioxide Global* (Update 2021) (hereafter referred to as the 'WHO Air Quality Guidelines') (WHO, 2021); and
- Local Authority air quality and planning guidance.

9.3 SENSITIVE RECEPTORS

Measurement results from the air monitoring stations in Sligo Town, Cavan Town and Letterkenny will be reviewed and evaluated in order to assess the current environment in relation to sensitive (residential) receptors.

9.4 DESKTOP AND FIELD SURVEY

The climate assessment within the EIAR will consist of a general overview of the climate for the North-West Region. Specific meteorological data for the proposed wind farm will be obtained from the nearest meteorological and synoptic stations (data from Met Éireann). This information will provide historical and existing baseline information for the regional climate in this area.

A desktop review of available baseline air quality data within the study area will be undertaken. Assessment criteria for the impact of dust during the construction phase are set out in the TII guidelines (TII, 2011) and the Institute of Air Quality Management (IAQM) guidelines (IAQM, 2014). These are used to assess the impact of dust emissions from construction and demolition activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. It is important to note that the predicted impacts associated with the earthworks and construction phases of the proposed development are short term and temporary in nature.

The following data sources will be referred to during the air quality assessment:

- EPA National Ambient Air Quality Monitoring Data Archive;
- EPA Air Quality in Ireland 2022 Report and previous reports (1997 – 2021);

- EPA Geo Portal Data and Mapping; and
- EPA Integrated Pollution Control Licences.

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality, the *Air Quality Monitoring Annual Report 2022* (EPA, 2022), details the range and scope of monitoring undertaken throughout Ireland. A review of existing baseline levels of NO_2, PM10 and PM2.5 based on extensive long-term data from the EPA are well below ambient air quality limit values in the vicinity of the proposed wind farm.

The positive effects that wind farm developments have on climate will also be discussed in this chapter, as well as a CO_2 balance calculation for the proposed construction, operation and decommissioning of the development as well as the production and transport of turbine components to the site.

This air quality assessment will include the findings of a desk-based air quality assessment using available data from the Environmental Protection Agency in consideration of the Air Quality Standards Regulations, 2002 (SI No. 271 of 2002) and the EU Air Framework Directive.

9.5 CUMULATIVE EFFECTS

The air quality and climate assessment will also consider the potential cumulative impacts of other developments in the area including the cumulative contribution to decarbonisation strategies and national greenhouse gas reduction targets.

10.0 CLIMATE

10.1 INTRODUCTION

The purpose of the Climate assessment will be to assess the potential impacts of the proposed wind farm on the Climate environments. The development of renewable energy is identified as having the potential to be a clean form of energy production and as such to have a potential net beneficial effect on the Climate environments.

The climate impact assessment will consider the targets and objectives of the latest Climate Action Plan (2024) and how the project will contribute to achieving these targets. The assessment will also consider the direct and indirect effects of the project on climate change in the context of the current and proposed land use and consideration of national objectives on forestry development.

10.2 POLICY AND PLAN CONTEXT

In order to reduce the risk due to climate change, National and European statutory bodies have set targets for future greenhouse gas (GHG) emissions. Ireland has signed up to the Climate Action Plan 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030. This plan specifically targets delivery of up to 80% renewable electricity by 2030.

The assessment of Climate will be conducted with consideration of the relevant legislation and guidance relating to climate which are set out in the following sections. In addition to specific climate guidance documents, the following guidelines were considered and consulted in the preparation of this Chapter:

- *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)* (EPA, 2003);
- *Draft Advice Notes for Preparing Environmental Impact Statements* (EPA, 2015); and
- The EPA EIAR Guidelines (EPA, 2022).

The assessment of climate will be conducted with consideration of the relevant legislation and guidance including:

- Climate Action and Low Carbon Development Act (Act. No. 46 of 2015) (hereafter referred to as the "Climate Act");
- Department of Communications, Climate Action & Environment (DCCAE) *National Mitigation Plan* (DCCAE, 2017a);
- Climate Action Plan 2024 (hereafter referred to as the CAP) (DECC, Dec 2023);
- Department of Transport, Tourism and Sport (DTTAS) *Transport – Climate Change Sectoral Adaptation Plan* (DTTAS, 2019);

- *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013);
- General Scheme of the Climate Action (Amendment) Bill 2019 (hereafter referred to as the General Scheme) (DECC, 2021);
- *European Commission 2030 Climate and Energy Policy Framework* (European Commission, 2014);
- Transport Infrastructure Ireland (TII) *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (TII, 2011);
- Design Manual for Roads and Bridges (DMRB): *LA 114 – Climate* (UKHA, 2019);
- Institute of Environmental Management & Assessment (IEMA) *Assessing GHG Emissions and Evaluating their Significance* (IEMA, 2022);
- *IEMA EIA Guide to: Climate Change Resilience and Adaptation* (IEMA, 2020a);
- *IEMA GHG Management Hierarchy* (IEMA, 2020b);
- *Technical guidance on the climate proofing of infrastructure in the period 2021-2027* (European Commission, 2021a);
- *Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change* (European Commission, 2021b);
- Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (hereafter referred to as the "2021 Climate Act"); and
- Local Authority's climate and planning guidance.

10.3 SENSITIVE RECEPTORS

Measurement results from the relevant air monitoring stations will be reviewed and evaluated in order to assess the current environment in relation to sensitive (residential) receptors.

10.4 DESKTOP AND FIELD SURVEY

Climate is defined as the average weather over a period of time, whilst climate change is a significant change to the average weather. Climate change is a natural phenomenon but in recent years human activities, through the release of GHGs, have impacted on the climate (Intergovernmental Panel on Climate Change (IPCC), 2022). The release of anthropogenic GHGs is altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This effect is causing an increase in the atmosphere's heat trapping abilities resulting in increased average global temperatures over the past number of decades. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the creation of this 'Greenhouse Effect'. The most significant GHGs are CO_2, methane (CH_4) and nitrous oxide (N_2O).

For the purposes of this assessment, the definition outlined in Council Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently

repealing Directives 2001/77/EC and 2003/30/EC (European Union 2009) for GHGs has been used. In 'Annex V, C. Methodology Point 5' the relevant GHGs are defined as CO_2, CH_4 and N_2O. In 2022, CO_2 accounted for 60.4% of total GHG emissions in Ireland, while CH_4 and N_2O combined accounted for 38.4%. Agriculture is the single largest contributor to the overall emissions, at 38.4% (EPA, 2023).

10.5 CUMULATIVE EFFECTS

The climate assessment will also consider the potential cumulative impacts of other developments in the area including the cumulative contribution to decarbonisation strategies and national greenhouse gas reduction targets.

11.0 SHADOW FLICKER

11.1 INTRODUCTION

The purpose of the Shadow Flicker assessment will be to assess the potential impacts of the proposed wind farm to sensitive receptors in the surrounding environment.

11.2 STUDY AREA

The study area will incorporate all sensitive receptors which have the potential to be impacted by shadow flicker from the proposed wind farm.

The shadow flicker assessment will be carried out using windPRO modelling software and in accordance with the guidelines set out in the 2006 Wind Energy Guidelines as well as the Draft Revised Wind Energy Guidelines (December 2019). Consideration will also be given to relevant UK guidance including *"Update of UK Shadow Flicker Evidence Base"* carried out by Parsons Brinckerhoff in 2011.

11.3 SENSITIVE RECEPTORS

The envelope within which sensitive receptors will be evaluated will be determined by the size, scale and layout of the final wind farm. The current Wind Energy Guidelines (2006) outline that at distances greater than ten rotor diameters from a turbine, the potential for shadow flicker is very low, therefore the assessment will initially consider all sensitive receptors within 1.65 km of the proposed turbines. This will be revised as necessary to identify all potential receptors. The design will also be completed to have full regard to the Draft Revised Wind Energy Development Guidelines (December 2019) and any subsequent updates.

11.4 DESKTOP AND FIELD SURVEY

The extent and impact of Shadow Cast Analysis and Shadow Flicker depends on the relative positions and orientation of nearby houses and wind turbines, the presence of windows facing on to the proposed wind farm, the absence/presence of vegetation or other obstructions between the houses and the wind farm etc. This will be assessed as part of the EIA.

WindPRO Computer Modelling software will be employed, for this element of the assessment, through the use of the shadow module. This facilitates calculation and documentation of flickering effects in terms of hours per year during which a specific receptor or an area would be exposed to flickering from nearby turbine rotors.

For each receptor identified, maximum minutes of potential shadow flicker per day are calculated. The software can calculate the worst-case results (sun always shining in daytime, turbines always rotating and wind direction "worst case") or the "real expected values", based on assumptions on solar statistics and operating hours divided by wind direction. Typically, calculations are made in a worst-case scenario assuming that each

sensitive receptor location has windows on all sides (i.e., glasshouse effect) but can also allow for user defined windows on properties.

Results will be presented in the form of calendars, cumulated hours with flicker or, for the area calculation, as maps of flicker hour isolines.

11.5 CUMULATIVE EFFECTS

Cumulative impacts of shadow flicker from existing operational or consented wind farms will also be included in the assessment. The configuration of existing or consented wind farms can be added to the model and is particularly relevant to consider properties which may experience low levels of shadow flicker from one or more wind farms on their own but may be significantly impacted by adjacent wind farms.

12.0 MATERIAL ASSETS

12.1 INTRODUCTION

This chapter will detail the material assets relevant to the proposed development. For proposed wind farm developments, the following material assets are typically considered: Telecommunications, Aviation, Electrical Infrastructure, Water Supply and Wastewater Infrastructure.

Any telecommunications links that cross the site and the surrounding area will be mapped and the possibility of interference occurring to telecommunications and radio transmissions as a result of the proposed wind turbines will be assessed as well as potential impacts for commercial/private aviation authorities and associated communications. In terms of electrical assets, overhead and underground cables on or near the site will be mapped and will need to be accounted for in the wind farm design, particularly any proposed electrical cabling and appropriate exclusion corridors specified. Mains water supply pipes and foul wastewater pipes and treatment infrastructure on or near the site will be identified and assessed.

12.2 STUDY AREA

The Telecommunications and Aviation Consultants will identify operators of telecommunications and aviation assets and determine, through consultation with them, whether there is potential interaction or interference with the assets within the study area as a result of the potential development. Uisce Eireann and ESB Networks will be contacted in relation to electrical and water/wastewater infrastructure.

12.3 SENSITIVE RECEPTORS

As part of the study of potential impact to material assets by the proposed development, identified stakeholders will be approached with project details and asked to revert with any potential impacts on their communications and flight management infrastructure. An initial list of telecommunications consultees has been prepared and will be added to as necessary throughout the project.

12.4 DESKTOP AND FIELD SURVEY

The Television and Radio Impact Assessment will include:

- Identification of sources of local TV and radio reception;
- Identification of local telecommunications transmitters;
- Site surveying of telecommunications infrastructure including a microwave link survey;
- Determining if the turbines are in the path between the receptors and transmitter;
- Liaison with RTÉ as required to assess impacts and address any queries or issues should they arise;

- Carrying out a baseline interference assessment; and
- Providing recommendations for pre and post construction monitoring.

The Radar, Telecommunications and Aviation Impact Assessment will include:

- Identification of local telecommunications and aviation microwave links;
- Desktop assessment of all identified aviation infrastructure and aviation routes which could potentially be impacted by the proposed development (airports, airfields aerodromes & associated flight paths etc);
- Liaison with all relevant Radar, Telecommunications and Aviation operators to assess impacts and address any queries or issues should they arise;
- Determining if the turbines are in the path between the receptors and transmitter;
- Examining the interference scenario;
- Identification of predicted impacts;
- Mitigation Studies;
- Measurement of existing electromagnetic environment and statement regarding future compliance to relevant regulations; and
- Providing recommendations for pre and post construction monitoring.

12.5 CUMULATIVE EFFECTS

The potential for cumulative impacts is low because the interference that is generated from a wind turbine is directly related to the presence of that turbine in the path of television or communication link signal and less likely to be generated from multiple cumulative reflections. However, consideration will be given to other wind farm developments and relevant infrastructure as part of this assessment.

13.0 NOISE AND VIBRATION

13.1 INTRODUCTION

The Noise and Vibration Chapter of the EIAR will assess the potential impacts of the proposed development on sensitive receptors in the surrounding environment during the construction, operational and decommissioning phases. The principal objectives of the Noise and Vibration assessment will be to specify appropriate limit values and mitigation measures to ensure that the impact on the noise sensitive receptors is minimised to an acceptable level.

13.2 STUDY AREA

The study area for the operational phase will cover at least the area predicted to exceed 30 dB L_{A90} when all existing and proposed turbines are at their maximum output noise level and will include all identified Noise Sensitive Locations (NSL's) that are within this area.

For the construction phase, all properties within 500m of the proposed construction activities or the nearest NSL if greater than 500m will be considered in the assessment.

Potential NSL's will include residential dwellings, commercial properties, derelict buildings, and pre-planning infrastructure (including relevant properties with planning permission). All properties will then be reviewed by ground-truthing and further desktop assessment (in the case of planning applications) to identify potential sensitive receptors in the vicinity of the development.

13.3 RECEIVING ENVIRONMENT

Initial iterations of the noise model will be developed and expected noise levels predicted at the nearest noise sensitive locations. This initial exercise will be used to inform the selection of appropriate baseline noise monitoring locations in the vicinity of the wind turbines.

13.3.1 BACKGROUND NOISE SURVEY

A background noise monitoring survey will be completed at several NSL's in the vicinity of the proposed wind farm. All measurements will be conducted in accordance with the IoA document "*A Good Practice Guide to the Application of ETSU-R-97 for The Assessment and Rating of Wind Turbine Noise*" (GPG) and the associated supplementary guidance notes.

13.4 ASSESSMENT OF IMPACTS

The baseline work will characterise the noise climate existing in the area and facilitate the quantification of potential noise impact which may arise from the proposed development. The potential noise and vibration impacts will be considered for the following phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

13.4.1 CONSTRUCTION PHASE

Construction noise levels associated with various elements of the proposed development will be predicted at the facades of the closest noise-sensitive locations in the vicinity of the development by developing detailed construction calculations. All predictions will be conducted in accordance with the guidance contained in ISO 9613:1996: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. Source noise levels will be obtained from BS 5228 2009 +A1 2014 Code of practice for noise and vibration control on construction and open sites.

Vibration during construction will also be considered regarding the potential impact of residential amenity and structural damage to buildings.

13.4.2 OPERATIONAL PHASE

We will predict noise levels at all the identified noise sensitive locations. All predictions will be free field and done in accordance with appropriate guidance using a proprietary noise modelling package. The use of a computer-based noise model lends itself to ongoing evaluation of proposal and provides output that is detailed and extensive. Noise contour maps will be generated for the site noise models illustrating noise levels in the vicinity of the proposed turbines.

We will use the results obtained from the prediction calculations to assess the likely noise impact of the operation of the proposed turbines. This will include appropriate downwind assessments at various noise sensitive locations. Where necessary and possible, we will consider noise control measures. Discussion of other issues will be undertaken where appropriate (e.g., tonality, low frequency noise/Infrasound, amplitude modulation etc.).

The potential noise impact associated with road traffic movements and other ancillary parts of the development including the substation and any other permanent source of noise will be assessed and included as part of the noise chapter.

13.5 CUMULATIVE EFFECTS

A cumulative assessment considering existing and permitted windfarms will be undertaken with regards to cumulative noise and vibration effects. Guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction of the proposed wind farm.

14.0 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

14.1 INTRODUCTION

The purpose of this section of the Scoping Report is to describe the scope of work and methods to be applied in the identification and assessment of landscape and visual impacts associated with the proposed Wind Farm.

14.2 STUDY AREA

The current 2006 Wind Energy Development Guidelines specify different radii for examining the Zone of Theoretical Visibility of proposed wind farm projects ('ZTV'). The extent of this study area is influenced by turbine height as follows:

- 15 km radius for blade tips up to 100 m;
- 20 km radius for blade tips greater than 100m; and
- 25 km in order to incorporate features of national or international renown.

In the case of this project, the blade tips will be over 100 m high and, thus, the minimum ZTV radius required is 20 km from the outermost turbines of the proposed development.

Consideration will also be given to the guidelines set out in the Draft Revised Wind Energy Guidelines (December 2019) and various Scottish Natural Heritage (now known as NatureScot) wind farm guidelines in respect of landscape and visual impact.

14.3 SENSITIVE RECEPTORS

Sensitive landscape and visual receptors will be identified during baseline studies and fieldwork and will consist of both designated (highly sensitive landscape zoning / scenic views in the CDP) and non-designated receptors.

Wind Energy within the Leitrim County Development Plan is dealt with in section 4.11.5. The CDP identifies a number of environmentally sensitivity areas which include 'Areas of Outstanding Natural Beauty', 'Areas of High Visual Amenity', 'Outstanding Views and Prospects' and 'Areas of Archaeological Importance' to name but a few.

The Leitrim Landscape Character Assessment identified the wind farm within B3 – Dough Mountain 'Area of High Visual Amenity (HVA)'. The nearest 'Area of Outstanding Natural Beauty (AONB)' is located c.4km to the south of the current study area and is known as 'A6 – O'Donnells Rock Boleybrack. Other nearby HVA's include 'B4 – Thur Mountain' and 'B5 – Lough McNean Upper and environs' to the east of the study area and 'B2 – Lough Melvin, Glenaniff River and Environs' to the northwest of the study area. Other notable AONB designations, all of which occur in the western half of the study area, include 'A2 – Lough Melvin North', 'A3 – Aroo, Glenade, Truskmore, Glenacar and Environs' and 'A5 – Benbo'.

Whilst the development is wholly located in County Leitrim, it is important to consider wind energy policy/designations in the adjoining counties, as the proposed development may have the potential to influence these landscapes areas. Wind Energy Development in Northern Ireland's Landscapes identifies the sensitivity of each of the Northern Ireland Landscape Character Areas in relation to wind energy development. 'LCA 1 – The Garrison Lowlands' and 'LCA 4 – The Lough Navar and Ballintempo Uplands' are identified with and overall 'High to medium' sensitivity whilst 'LCA 5 – The Garrisson Lowlands' is classified with a 'high' sensitivity.

Visual receptors will be selected from the following categories;

- Designated scenic routes / views (CDP)
    - Protected views and prospects are identified in Table 20 of the current CDP. Many of these are located within the study area and are often associated with the lakes and uplands. The nearest protected views and prospects are V10 and V16 and are located on the outskirts of Manorhamilton.
    - There are no designated viewpoints within the Northern Ireland Landscape Character Assessment, however it does identify some areas that offer long distances views and that are visually sensitive. This are typically located in upland areas of the landscape and along the fringe of rivers and lakes.
    - A number of 'scenic routes' and 'visually vulnerable' areas are identified within the portions of Sligo that occur within the study area.
    - A number of scenic routes and scenic views are also located within the study area in County Cavan.
- Local Community views (roads and residences within approximately 5km)
- Centres of Population
    - Notable settlements include Manorhamilton (c. 2.5km southwest), Kiltyclogher (c. 4km northeast), Lurganboy (c. 4km southwest), Garrison (c. 7km north), Belleek (c. 14km north), Dromahair (c. 14.5km north), Dowra (c. 15km southeast), Belcoo (c. 15km east), Bundoran (c. 17km northwest), Ballyshannon (c. 17km northwest), Drumkeeran (c. 17km south).
- Major Transport Routes
    - Notable transport routes: N16, N15, N3 A4, A46, R282, R281, R283, R280, R286, R206 B52, B53
- Amenity, Heritage and Tourism locations
    - Manorhamilton Castle
    - Waymarked Trails, Cycling Routes and local walks (Ireland): Leitrim Way, Sligo Way, Cavan Way, Miner's Way & Historical Trail, The Northwest Cycle Trail, Sligo Leitrim Northern Counties Railway Trail, Ballyshannon Cycle Loops, Glenfarne Loop Walks,

- Waymarked Trails, Cycling Routes and local walks (Northern Ireland): Carrigan Forest – Lough Formal Walk, Ballintempo Forest – Aghanaglack Walk, Kingfisher Cycling Loops
- The Wild Atlantic Way Touristic Driving Route
- Lake side amenities – Lough Melvin, Lough Gill, Lough Allen, Lower Lough Erne
- Glencar Waterfall
- Parke's Castle
- Creevelea Friary
- Corracloona Megalithic Tomb

14.4 SURVEY METHODS

14.4.1 DESKTOP AND FIELD SURVEY

The desktop study will comprise of the following:

- Prepare and review of Zone of Theoretical Visibility (ZTV) maps, which indicates areas from which the development is potentially visible in relation to terrain within the Study Area;
- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity; and
- Preparation of an initial VRP selection report and associated map for consultation purposes (Planning Authorities).

Fieldwork will consist of:

- Select a refined set of VRP's for assessment.
- Record a description of the landscape elements and characteristics within the Study Area generally and also within view from each VRP.
- Capture high quality base photography from which to prepare photomontages of the proposal.

14.5 IMPACT ASSESSMENT

The assessment of landscape effects involves establishing the landscape baseline. This includes consideration of the geographic location and landscape context of the proposed wind farm as well as the essential landscape character and salient features of the wider Study Area and is discussed with respect to; landform and drainage and; vegetation and land use. The visual baseline is more population based, but still overlaps with elements of the landscape baseline. The visual baseline is discussed in relation to; centres of population and houses; transport routes and; public amenities and facilities. Once the baseline environment is established an assessment of the potential significant

effects associated with the proposed development will be carried out. In accordance with the Guidelines for Landscape and Visual Impact Assessment (2013), the method for estimating the significance of landscape impacts and visual impacts is very similar. This is summarised in the diagram below.

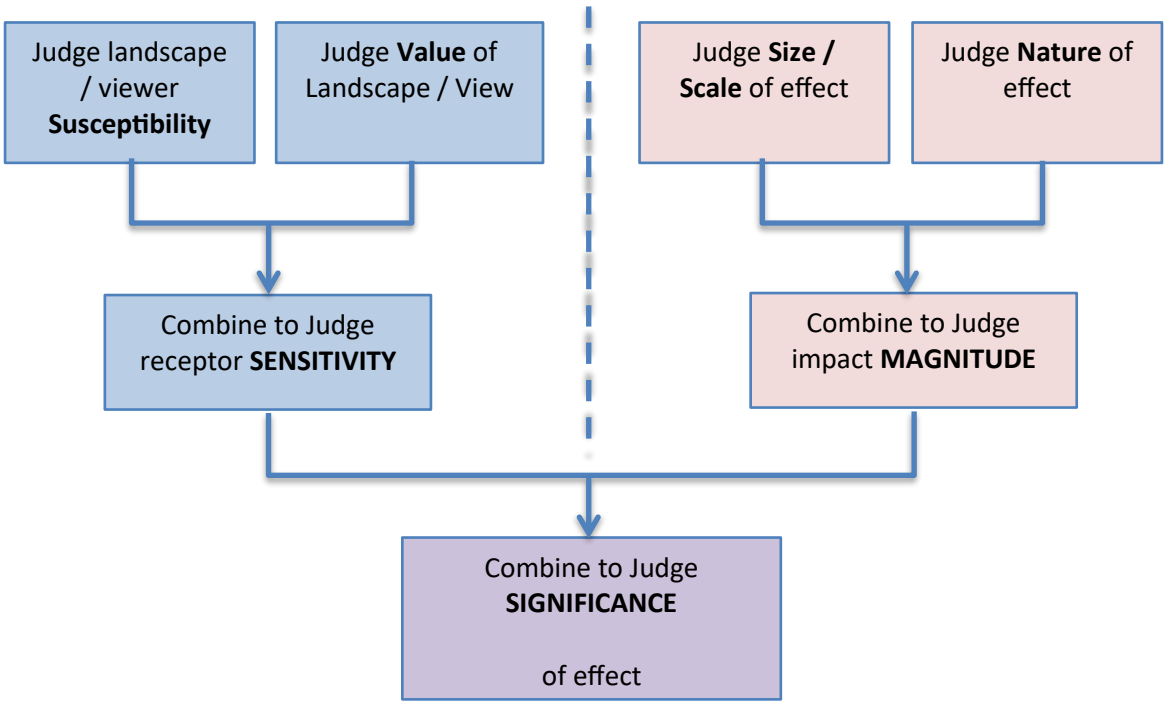

Figure 14-1 - Method for assessing Landscape Impact significance and Visual Impact significance (based on GLVIA – 2013)

14.5.1 LVIA ASSESSMENT TOOLS / TECHNIQUES

The following assessment tools and techniques will be considered for this project and applied as appropriate and beneficial to the assessment.

Photomontages:

Photomontages are photo-realistic depictions of the proposed development superimposed on baseline photography at selected receptor/viewpoint locations. The photomontages will be fully compliant with the most recent SNH guidelines (2014).

Route Screening Analysis (RSA):

The project team landscape specialist has developed a 360° vehicle mounted photo-capture unit to gather imagery every second (approximately 15m intervals). The images are then synchronised with a 3D model of the proposed development for rapid analysis of screening levels. When used in vegetated lowland landscapes, RSA has shown actual visibility to be much less than indicated by traditional Zone of Theoretical Visibility (ZTV) maps.

Theoretical Visual Intensity (TVI) Mapping:

Because traditional ZTV maps are of limited value in illustrating likely comparative visual prominence over distance, a more advanced form of visibility mapping will also be utilised, which takes into account both the scale in relation to distance of the proposed development and the degree to which it is visible within the 'bare-ground' terrain context. TVI mapping will highlight, at the baseline stage, those areas that have the most potential to be significantly affected by views of the proposed development as well as areas where visual impacts are not likely to be significant.

360° On-line Photomontage Viewer:

This is principally a design team collaboration tool but can be used for consultation purposes also. All viewpoint photography will be captured in 360° and early-stage design iterations will be presented on an on-line photomontage viewer, which is calibrated to a 24-inch screen allowing the viewer to pan around the image as if turning their head. This resource allows the project team to efficiently compare design options and discuss potential impacts / design solutions.

14.6 CUMULATIVE EFFECTS

There are four wind farms situated c. 10km from the proposed wind farm. Faughery Wind Farm is located immediately adjacent the current proposed turbines to the west. Callagheen Wind Farm is situated c.10km to the northwest, whilst Tullynamoyle Wind Farm c. 10km to the south. Carrickeeny Wind Farm is situated c. 10km west of the proposed wind farm. A number of wind farms are also situated on the wider periphery of the study area, most notably to the south in the surrounds of Corry Mountains, west of Lough Allen.

Cumulative impacts will be assessed in accordance with the SNH guidance note for 'Assessing the cumulative impact of onshore wind energy developments' (2012) taking account of 'Combined Views' 'Succession Views' and 'Sequential Views'. The landscape specialist will use their own on-line viewer (see detailed description above) to compare 360° photography against corresponding 360° cumulative Wireframe images to aid the cumulative impact assessment.

15.0 CULTURAL HERITAGE

15.1 INTRODUCTION

The principle aim of the Cultural Heritage Assessment is to anticipate and avoid impacts on the cultural heritage resource. Detailed constraints mapping in GIS will form the basis of this work, followed by further analysis of sites that will potentially be impacted upon, and field surveys to ground truth the results of the desk-based assessment and ascertain the significance of any potential impacts.

15.2 STUDY AREA

IAC Archaeology will map the Study Area in GIS and identify the cultural heritage resource within the broader area. The various data sources (including but not limited to OSI mapping and historic mapping, aerial photography, archaeological sites, architectural sites and other cultural heritage sites) will be presented as GIS datasets which will be combined with desktop data.

15.3 SENSITIVE RECEPTORS

The archaeological and architectural sites noted above will be reviewed in GIS to ascertain whether there is a potential for direct or indirect impacts or for impacts on the setting of cultural heritage sites. Where sites are in visually prominent locations and may be susceptible to impacts on their setting from visually prominent development in the wider area these will also be mapped. Sensitive receptors within and in the vicinity of the study area of the proposed Wind Farm will be identified as part of the scoping, constraints and EIAR process. Initial work indicates that there are two archaeological features within the site boundary to the north west which are both scheduled to be included in the next revision of the Record of Monuments and Places (RMP). These are a Cairn (LE008-006001-) and a Cist (LE008-014----).

15.4 DESKTOP AND FIELD SURVEYS

All cultural heritage work will be cognisant of best current practice. IAC Archaeology will undertake preliminary windscreen surveys to ensure that any potentially significant cultural heritage constraints are noted as early as possible. Along with analysis of the density of cultural heritage sites within and in the vicinity of the proposed development, this will form the basis of the initial scoping report. IAC Archaeology will produce written studies identifying cultural heritage constraints (including sites where there is potential for impact on setting). This initial scoping document will comprise a high-level report outlining the relevant legislation and what the designated and undesignated cultural heritage sites that could be impacted on by the proposed development are. It will include a review of County Development Plans, Heritage Plans, Landscape Conservation Areas, other heritage studies such as industrial heritage surveys and relevant Policies and Objectives. A report will be produced that provides written

description of data including how and when it was obtained and outlining the various degrees of legislative protection and importance.

Cultural heritage sites located in the immediate vicinity of the proposed development which could be subject to direct physical impacts during the construction phase will be highlighted for review of design to avoid impacts where possible. We will also undertake a review of the data to highlight sites with particular sensitivity to impacts on setting that are located within the surrounding landscape. IAC Archaeology will assist the lead consultant in the layout optimisation process as necessary, providing specialist feedback in relation to cultural heritage issues. A review of cartographic sources and aerial photography will be carried out at this stage, and any anomalies observed will be mapped and recorded. Any issues arising will be flagged at this stage for further investigation.

A second phase of field inspection will be carried out to investigate any identified anomalies and ground truth the desktop analysis. This will, where possible, involve viewing sites from nearby roads or field visits. A survey of the proposed cable and haul routes will also be carried out. The survey team allocated to this task will note, record and locate vernacular features which could be impacted upon by the proposed works. This will include Protected Structures, bridges, street furniture etc. and other cultural heritage features as well as other cultural heritage features in the vicinity of these proposed routes.

Upon completion of a final design of access routes, haul roads, substations, connections and location of turbines etc., IAC Archaeology will undertake the preparation of the Cultural Heritage Chapter of the EIAR. This work will be completed to the highest standards of professional best practice and cognisant of EPA guidelines, relevant County Development Plans, Best Practice Guidelines and legislative protection afforded to the archaeological, architectural and cultural heritage resource. IAC Archaeology will ensure that the scope and extent of the cultural heritage chapter are appropriate to form the basis of the EIAR to be submitted with the application. Following completion of the preliminary baseline study and preliminary assessment of impacts, and, subsequent to freezing of site layout, a final programme of fieldwork will be undertaken to ground truth the results of the desk-based work and ascertain the likely potential significance of the impacts that the proposed development may have on the cultural heritage resource. Sites that may experience impacts from the proposed development will be visited and the potential impacts qualified and quantified in line with EPA guidelines.

IAC Archaeology will work closely with the landscape consultant in highlighting the most important archaeological and architectural sites and coordinate with them in the production of photomontages from the most sensitive archaeological and architectural receptors.

A detailed assessment will be carried out on any potential impacts that the proposed development may have on the cultural heritage resource, based on analysis of the data sources listed above and elsewhere herein. Any potential impacts identified will be discussed with the project team and amendments made to the proposed design where possible to eliminate or minimise the potential impact.

15.5 CUMULATIVE EFFECTS

Based on the findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction.

16.0 TRAFFIC AND TRANSPORT

16.1 INTRODUCTION

The purpose of the traffic impact assessment will be to assess the potential impacts of the proposed wind farm on the surrounding roads and potential sensitive receptors. The potential requirement for construction stage traffic management will be assessed as part of the EIAR process.

16.2 STUDY AREA

The national road, the N16, is approximately 3km from the proposed Wind Farm. A network of regional roads including the R280, R281, R282 and R283 are in the vicinity of the proposed wind farm with local access to the existing site access and internal haul roads.

16.3 SENSITIVE RECEPTORS

As detailed in Section 5, sensitive receptors in the vicinity of the proposed wind farm will be identified as part of the scoping and EIAR process.

16.4 DESKTOP AND FIELD SURVEY

The primary traffic related impact caused by a wind farm generally occurs during the construction stage of the project. As such, the traffic assessment within the EIAR will focus on the impacts that will be associated with the construction of the wind farm. From the site investigation works, the quality of the materials that will be arising from excavations will be considered and peat/overburden will be side cast or deposited elsewhere on the site for beneficial reuse.

The extent of rock, sand and gravel on-site will be identified, and it is expected that if present that this will be exploited in order to minimise traffic movements to and from the site. The wind farm will also be designed such that all surplus excavated materials will be used on-site for landscaping purposes thereby minimising the volume of materials leaving the site, reducing the cost of disposal and minimising the construction traffic.

Using aerial photography and mapping, haul routes will be identified for the construction process. These haul routes will be originally assessed by undertaking a site visit and driving the proposed haul routes. A qualitative assessment of the proposed haul routes will be carried out identifying pinch points, tight bends, steep elevations, poor pavement conditions, road structures, watercourse crossings etc. and the haul routes will be revised where necessary. Swept path analysis will be undertaken at identified constraints by the traffic specialists to inform the assessment. Early engagement with third party landowners will be undertaken where details of external road improvements are proposed and these will be included in the EIA as appropriate.

The traffic team will also look at traffic access to the site from the public road network, including sightlines and advise on any limitations. They will consider if the existing site access is appropriate for construction and work vehicles to enter and exit the site in a safe manner. Due to the location and existing land use, steep gradients are envisaged on existing access roads. Longitudinal profiles and sections shall be undertaken in accordance with the TII Publication Rural Road Link Design (DN-GEO-03031 June 2017) to develop suitable road levels.

Using information on the project construction methodology, an estimate of the number of vehicles (both light and heavy good vehicles) that would be generated by the construction phase, will be produced. These estimates can be used to assess the impact on the road network in numerical terms and will also feed into other EIAR chapters such as noise and air quality. The Road / Traffic Section of Leitrim County Council will be consulted, and the relevant information will be taken into consideration in accordance with the Traffic and Transportation Assessment Guidelines, May 2014 (PE-PAV-02045).

The Traffic Chapter of the EIAR will be completed, taking into consideration the information generated during the processes described above, identifying impacts and proposing mitigation measures where appropriate. A separate report, a Traffic and Transportation Assessment Report, will be appended to the EIAR.

Typically, wind farms are located in rural areas and this poses challenges for the delivery of abnormal load turbine components to site. The proposed Wind Farm is no different in this respect and so one of the key roads and traffic issues will be identifying a suitable route for the successful and safe delivery of turbine components to site. The close proximity of the N16 national road, with links to ports in Galway, Dublin and Killlybegs is a benefit to the site location.

A Construction Traffic Management Plan will be prepared which will outline the following:

- Objectives
- Existing site conditions
- Proposed Construction (Traffic volumes, staffing levels, construction equipment and Abnormal Loads)
- Proposed Traffic Management Plan (Accesses, Signage, Vehicle Routing, Material Deliveries, Construction Speed Limits, Road Cleaning and CTMP Enforcement); an
- Proposed Emergency Procedures for the Construction Stage

The requirement for the preparation of a Stage 1 Road Safety Audit (RSA) will be considered and discussed with the traffic department in Leitrim County Council. Where required, this will be completed by a suitably qualified traffic expert and included in the EIAR.

16.5 CUMULATIVE EFFECTS

Based on the site investigation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction, operation and decommissioning.

17.0 INTERACTION OF THE FOREGOING

A section of the EIAR entitled "Interaction of the Foregoing" will summarise the primary interrelationships of aspects of the various environmental topics with the potential for significant effects as a result of the proposed development.

18.0 SCHEDULE OF MITIGATION MEASURES

A summary chapter collating all of the mitigation measures relevant to the proposed development will be included in a standalone section of the EIAR i.e., a Schedule of Mitigation Measures.

19.0 CONSULTATION

19.1 SCOPING CONSULTATION

Following the preliminary design of the Wind Farm layout and turbine locations, it is proposed that the project team will commence consultation initially with the bodies listed below, in order to allow sufficient time for receipt of meaningful feedback.

Should any additional consultees be identified during the preparation of the EIAR, these will be added.

Table 19.1: EIAR Consultees

Leitrim County Council	Geological Survey of Ireland
Northern and Western Regional Assembly	BirdWatch Ireland
Sligo County Council	Bat Conservation Ireland
Donegal County Council	Teagasc
Fermanagh and Omagh District Council	Irish Raptor Study Group
Department of Environment, Climate and Communications	Irish Red Grouse Association
Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media (National Parks and Wildlife Services & National Monuments Service)	The Arts Council
Department of Housing, Local Government and Heritage	Environmental Protection Agency
Department of Agriculture, Food and Marine	Health & Safety Authority
Department of Defence	Health Service Executive
Department of Transport	Sustainable Energy Authority of Ireland
Transport Infrastructure Ireland	Irish Wildlife Trust
An Taisce - The National Trust for Ireland	Bat Conservation Ireland
Fáilte Ireland	Office of Public Works
The Heritage Council	Forest Service
Inland Fisheries Ireland	Mountaineering Ireland
Waterways Ireland	Sport Ireland
Coras Iompair Eireann (CIE)	Met Eireann
Irish Rail	Irish Aviation Authority
Health and Safety Executive	Ireland West Airport (Knock Airport)
Commission for Communications Regulation	Sligo Airport
Commission for Regulation of Utilities	Donegal Airport
Irish Water/Uisce Eireann	Telecommunications operators (list)
	Department for Infrastructure Northern Ireland
	Broadcasting Authority of Ireland
	EirGrid

19.2 PUBLIC CONSULTATION

The Community Engagement Strategy for the Project is based around engaging with the local community in an open, honest and transparent manner with the aim to not only provide clear and understandable information but also to gain feedback to understand the views of the local community. This feedback and information will be used to inform the design process, thereby allowing the local community an opportunity to have an influence on the project design.

A Community Liaison Officer (CLO) has been appointed as the point of the contact for the Project and has begun engaging with the local community. The purpose of the CLO is to introduce the project to the local community, engage and establish a line of dialogue with the local community and facilitate one-to-one consultation meetings, or group meetings as appropriate. The CLO will also disseminate information on the project to the local community as it becomes available and as the project progresses.

Contact details for the CLO and Project Manager will be provided, for local residents to get in touch with any queries or comments regarding the design and assessment of the proposed project as it progresses.

TOBIN will be providing assistance to the FuturEnergy Ireland DAC Engagement Team where needed, particularly in areas where technical specialist knowledge is required.

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