Knockastanna Wind Farm Extension of Operational Life

Environmental Impact Assessment Report
Volume I: Main Text

SSE Renewables Generation Ireland Limited

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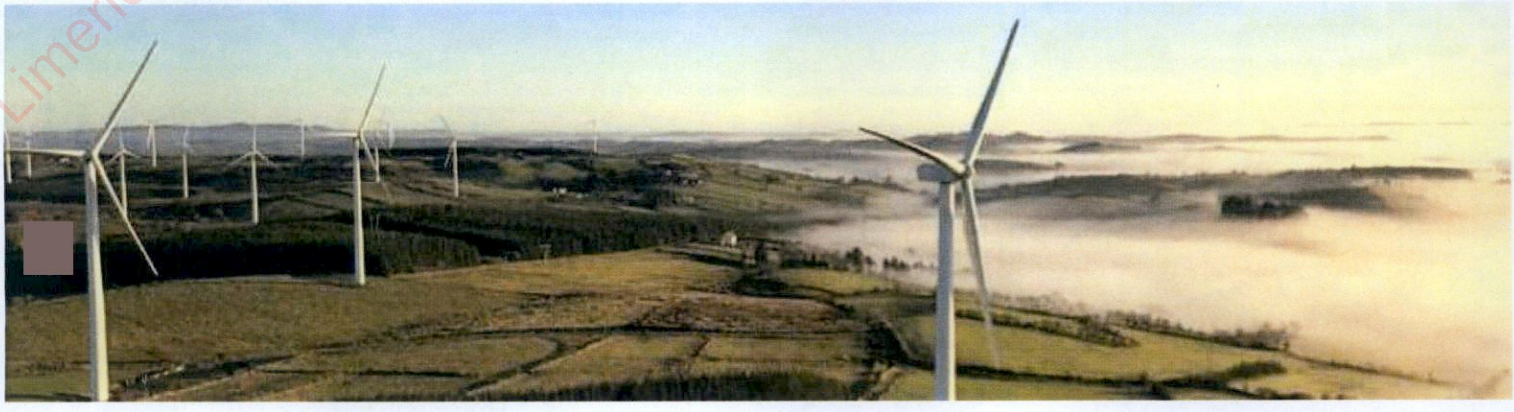

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Preface

SSE Renewables Generation Ireland Limited (SSE) is applying for planning permission for the continued operation of the existing Knockastanna Wind Farm located in the townland of Curraghfoil, Co. Limerick. The existing wind farm, which comprises 4 no. wind turbines (with an electrical capacity of 6-megawatts) and associated ancillary infrastructure, was granted planning permission for an operational period of 20-years. It is proposed to continue operate the existing wind farm for a further period of 15-years following the expiry of its extant planning permission.

Planning legislation requires that planning applications for such projects be accompanied by an Environmental Impact Assessment Report (EIAR) which is a statement of the effects, if any, which the proposed development, if carried out, would have on the environment. The EIAR provides information which competent authorities use in undertaking the formal Environmental Impact Assessment (EIA) process and in informing their decision making. The EIAR can also be used by third parties as part of the public participation process to evaluate the proposed development and its likely impacts.

The content of this EIAR has been prepared by Galetech Energy Services and SLR Consulting, on behalf of SSE, and is arranged in fourteen separate chapters which describes the proposed development and addresses each component of the environment likely to be affected and their likely interactions. The scope of the EIAR also addresses relevant 'off-site' developments occurring as a direct result of the proposed development including, for example, the project's connection to the national electricity grid.

A virtual consultation meeting was held with Limerick City & County Council to discuss the proposed development and the scope of this EIAR. All of the relevant issues discussed, together with those expressed by other consultees, have been addressed in this EIAR.

The EIAR should be read in conjunction with all plans and particulars submitted with the planning application including technical drawings and annexes. A separate Non-Technical Summary and Natura Impact Statement have also been prepared.

Overall, it is concluded that the impact of the proposed development on the receiving environment is not likely to be significant. Negative impacts from the proposal vary in significance but are generally in the minor to negligible range. A number of positive impacts have also been identified such as a significant contribution towards satisfying national targets for energy production from renewable sources. On balance, the combined impacts which have been identified within this EIAR demonstrate that the proposed development will not result in any likely significant impact on the environment.

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Chapter 1: Introduction

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Contents

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by Galetech Energy Services Limited ('GES') **and SLR Consulting ('SLR')** on behalf of SSE Renewables Generation Ireland Limited (**'the Applicant'**) to inform the Environmental Impact Assessment (EIA) to be carried out in respect of a planning application submitted pursuant to Section 34 of the Planning & Development Act 2000 (as amended) **('the Act')** for the proposed continued operation of the Knockastanna Wind Farm for a further period of 15-**years ('the proposed development'**[1]).

The Knockastanna Wind Farm, which comprises 4 no. turbines (with an electrical output of 6 megawatts [MW]) and all associated site development and ancillary works, commenced operations in 2009 and planning permission for its operation shall cease to have effect after July 2023. It is, therefore, proposed to continue the operation of the wind farm until July 2038.

The Knockastanna Wind Farm is located in northeast County Limerick; approximately 6km north of the village of Doon, c. 10km northeast of the village of Cappamore, and c. 29km east of Limerick city. The proposed development site is situated approximately 500m from the administrative boundary between the local authorities of Limerick City & County Council and Tipperary County Council.

1.1.1 What is Environmental Impact Assessment (EIA)?

EIA is a process required by the European Union (EU) Environmental Impact Assessment Directive 2011/92/EU, as amended by 2014/52/EU, and transposed into Irish law by way of Part X of the Planning & Development Act 2000 (as amended).

EIA is carried out by the relevant competent authority, in this case Limerick City & County Council, to ensure that projects, where the likelihood of significant effects on the environment cannot be excluded, are subject to a comprehensive and independent examination, analysis and evaluation of their likely significant effects on the environment; including the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects; of both their construction and operational phases, prior to being granted planning permission.

EIA is fully integrated into the planning application process and helps to ensure that decisions to grant or refuse planning permission for proposed developments are made in the full knowledge of their likely significant effects on the environment, including through consultation with the public concerned.

1.1.2 What is an Environmental Impact Assessment Report (EIAR)?

An EIAR is a written statement prepared by the developer (in this case, the Applicant) of the likely significant effects, if any, which the proposed development, if carried out, will have on the environment. The EIAR consists of a systematic analysis of the proposed development, including its operational and decommissioning phases, in relation to the existing environment.

The EIAR is the principal document that informs the EIA process and provides integral information which a planning authority (in this case Limerick City & County Council

[1] For the purposes of this EIAR, the terms 'proposed development', 'development', 'project', 'proposed development site', 'site', 'wind farm' and 'wind farm development', and any variation thereof, are used interchangeably throughout and to encompass and refer to the entire project being assessed in this EIAR including all elements referred to in **Chapter 3**.

['the Planning Authority']) can use; amongst other considerations, including, where appropriate, its own supplementary assessments; in independently undertaking EIA and informing its decision to grant (including subject to conditions and/or modifications) or to refuse planning permission, and/or to seek further information from the Applicant.

The EIAR can also be used by third parties, including members of the public concerned, as part of the public participation process, to evaluate the proposed development and its likely significant environmental effects, and to inform any submissions made to the planning application process.

1.2 Screening

The first stage of the EIA process involves deciding whether an EIA needs to be undertaken or not. This ensures that EIA is only undertaken for projects where the likelihood of significant effects on the environment cannot be excluded. In carrying out this screening exercise, and preparing this EIAR, the Applicant has had particular regard to the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, May 2022), published by the Environmental Protection Agency (EPA) and the *OPR Practice Note PN02 Environmental Impact Assessment Screening* (June 2021) published by the Office of the Planning Regulator (OPR).

1.2.1 EIA Classes & Thresholds

In accordance with the provisions of the Act, EIA is mandatory when certain prescribed classes of projects exceed specific sizes and thresholds. Planning applications for such projects must be accompanied by an EIAR.

Schedule 5, Part 2, Para. 3(j) of the Planning and Development Regulations 2001 (as amended) **('the Regulations')** provides that the following class of development proposal shall be subject to EIA:-

> *'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.'*

The proposed development consists of the continued operation of an existing wind farm comprising 4 no. wind turbines and an output of 6 megawatts (MW) (i.e. in excess of 5MW) and is, therefore, of a scale which exceeds the mandatory threshold for EIA referred to above.

Accordingly, this EIAR has been prepared and submitted with the planning application.

1.3 Content

In order to be relevant, complete and legally compliant, the content of this EIAR includes all of the information required by the EIA Directive and national legislation, as appropriate and necessary to the specific characteristics of the proposed development, and includes:-

(a) A description of the project comprising information on the site, design, size and other relevant features of the project;
(b) A description of the likely significant effects of the project on the environment;
(c) A description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
(d) A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the

main reasons for the option chosen, taking into account the effects of the project on the environment;

(e) A non-technical summary of the information referred to in points (a) to (d); and

(f) Any additional information specified in Annex IV of the EIA Directive relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

1.4 Format

The EIAR is presented as 2 no. volumes, which should be read in conjunction with each other, as follows:-

- **Volume I** comprises the Main EIAR text and follows a 'grouped format' structure whereby each environmental factor is assessed and presented as a separate chapter. The EIA Directive prescribes the range of environmental factors which should be used to organise descriptions of the environment and likely significant environmental effects. These have been supplemented with additional environmental factors owing to the characteristics of the project under assessment, as follows:-
  - Chapter 1: Introduction;
  - Chapter 2: Assessment of Project Alternatives;
  - Chapter 3: Description of the Proposed Development;
  - Chapter 4: Population & Human Health;
  - Chapter 5: Biodiversity;
  - Chapter 6: Land & Soils;
  - Chapter 7: Water;
  - Chapter 8: Air Quality & Climate;
  - Chapter 9: Landscape;
  - Chapter 10: Cultural Heritage;
  - Chapter 11: Noise & Vibration;
  - Chapter 12: Shadow Flicker;
  - Chapter 13: Material Assets; and
  - Chapter 14: Interactions of the Foregoing.
- **Volume II** comprises a range of annexes, including technical data and reports, which informed the impact assessment provided in **Volume I** so as to ensure the EIAR is transparently supported by evidence.

A **Non-Technical Summary** of the EIAR is also provided as a separate standalone volume in order to facilitate the wider public concerned in their involvement in the statutory consultation process during the EIA and planning application determination stage.

1.5 Structure

In order to provide for a consistent approach and to communicate clear, concise, unambiguous information, each chapter of this EIAR is systematically organised so as to follow a similar basic structure, as follows:-

- The existing environment: A description of the context, character, significance and sensitivity of the receiving (baseline) environment using standard descriptive methods, in order to predict the likely significant effects of the proposed development;
- The likely significant effects of the proposed development: The aspects of the continued operation and decommissioning of the proposed development that

are likely to affect the existing environment including, as appropriate, predicted, **potential, residual, 'do nothing' and 'worst case'** effects. The likely significance of any effects is determined with reference to magnitude, intensity, integrity, duration and probability; and

- The measures to mitigate and monitor adverse effects: The range of methods which are proposed for mitigation by avoidance, reduction and remedy of any likely significant effects (including unplanned events) together with ongoing monitoring of the efficacy of mitigation measures.

This structure, which clearly separates data (descriptions of the receiving environment and of the project) from impact predictions (likely significant effects and mitigation measures), is designed to ensure that replicable impact assessments, based on rigorous scientific information and verifiable evidence, is carried out using recognised methods that are presented and documented in a fully legible, transparent and objective manner.

This methodological structure is designed to reduce any possible subjective information and bias in order to facilitate the Planning Authority in its independent EIA of the proposed development.

1.6 Guidance

A range of general statutory and non-statutory guidance documents were consulted in undertaking and preparing this EIAR, including *inter alia*:-

- *OPR Practice Note PN02 Environmental Impact Assessment Screening* (Office of the Planning Regulator, 2021);
- *Environmental Assessment and Planning in Ireland: Planning Leaflet 11* (Office of the Planning Regulator, 2021);
- *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (Environmental Protection Agency, 2022);
- *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (Environmental Protection Agency, August 2017);
- *Draft Advice Notes for preparing Environmental Impact Statements (Project Type 33)* (Environmental Protection Agency, 2015);
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Housing, Planning, Community and Local Government, 2018);
- *Wind Energy Development Guidelines for Planning Authorities* (Department of , Heritage, and Local Government, 2006);
- *Draft Wind Energy Development Guidelines for Planning Authorities* (Department of Housing, Planning and Local Government, 2019);
- *Best Practise Guidelines for the Irish Wind Energy Industry* (Irish Wind Energy Association, 2012);
- *Guidelines for Ecological Impact Assessment in the UK and Ireland* (Chartered Institute of Ecology and Environmental Management, 2018);
- *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission; 2013); and,
- *Guidelines for Landscape and Visual Impact Assessment – Third Addition* (Landscape Institute and Institute of Environmental Management and Assessment 2013).

The above is a general and non-exhaustive list of EIAR-related guidance. Additional guidance documents, specific to each environmental topic, are referenced in each chapter of this EIAR, as relevant.

1.7 EIAR Project Team

The EIA Directive requires that an EIAR must be prepared by a team of competent, qualified experts with an appropriate combination of experience, expertise and knowledge related to the significance, complexity and range of effects that an EIAR needs to assess. Such competence includes an understanding of the legal context of the decision-making process and a variety of technical experts to address different environmental topics, and their interactions, in order to ensure that the information included in the EIAR is complete to a high level of objective quality.

An overview of the specialist experts involved in the preparation of each chapter of this EIAR, together with their relevant qualifications and key environmental factors covered, is provided in **Table 1.1** below. Each appointed specialist is a recognised expert in their field and was selected having regard to their knowledge of relevant environmental legislation; their experience and involvement in EIAR projects for wind energy developments; familiarity with pertinent standards and criteria for the evaluation and classification of significance of effects; the ability to interpret technical documents and to work with project designers to arrive at practical and reliable measures to avoid, mitigate and monitor likely significant effects; and to clearly and comprehensively present their findings in a concise and objective manner. A statement of competence for all of the specialist consultants who contributed to the preparation of this EIAR is provided in each individual chapter of this EIAR, as appropriate.

Ch.	Environmental Topic	Specialist Consultant	Personnel
1	**Introduction**	Galetech Energy Services & SLR Consulting	Gavin Daly *BA Dip MIPI* 17-years' experience Simon Carleton *BA MSc MIPI* 7-years' experience Aislinn O'Brien *BA MCD MIPI MRTPI* *15-years experience* Paula McCarthy *BSc MScI* *15-years experience*
2	**Assessment of Project Alternatives,** including: • Repowering; • Greenfield Development • Continuation of Operations; and • Alternative Technologies.	Galetech Energy Services	
3	**Description of the Proposed Development,** including: • Rationale for Continued Operations • Wind Farm; • Grid Connection; • Operational Phase Activities.	Galetech Energy Services & SLR Consulting	
4	**Population & Human Health,** including: • Employment; • Human Health (considered with reference to benchmark standards under other chapters such as noise, shadow flicker, air quality etc.); and • Amenity.	SLR Consulting	Ciarán O'Sullivan *BA (GPEP), MRUP* 7- years experience
5	**Biodiversity,** including: • Habitats • Birds • Bats • Non-volant mammals; and • Aquatic ecology	SLR Consulting	Richard Arnold *BSc (Hons) MRes* 22 - years experience

6	**Land & Soils,** including: • Superficial Geology; • Bedrock Geology; • Geological Heritage & Designated Sites; and • Soil Contamination.	SLR Consulting	Colin Duncan *BSc. MSc.* 25-years experience Peter Glanville *PGeo. EurGeol.* 20-years experience
7	**Water,** including: • Local & Regional Hydrology; • Flood Risk; • Hydrogeology; • Ground/Surface physical characteristics; and • Drainage Management.	SLR Consulting	Katy Rainford *BSc.* 4-years experience Peter Glanville *PGeo. EurGeol.* 20-years experience
8	**Air Quality & Climate,** including: • Air Quality; • Climate; • Dust; and • Greenhouse gas emissions.	SLR Consulting	Crystal Leiker *BA, MPlan* 6-years experience
9	**Landscape,** including • Landscape Character; • Views & Prospects • Landscape Impact; and • Visual Impact.	SLR Consulting	Anne Merkle *Dipl.-Ing (FH), MSc, MILI* 19-years experience
10	**Cultural Heritage,** including • Known archaeological monuments; • Areas of archaeological potential (including unknown archaeology); • Architectural heritage; and • Designations or sensitivities	SLR Consulting	Beth Gray *MA (hons) ACIfA* 6-years experience
11	**Noise & Vibration,** including • Appropriate Noise Limits • Post-Construction Noise Monitoring; and • Vibration sources; and • Sensitive receptors.	Galetech Energy Services	Cormac McPhillips *BSc* 13-**years' experience** Gavin Daly Simon Carleton
12	**Shadow Flicker,** including • Worst Case Effects; • Expected Effects; and • Mitigation Measures.	Galetech Energy Services	Joseph Buckley *BSc MSc* 7-**years' experience** Gavin Daly Simon Carleton
13	**Material Assets,** including • Transport & Access; • Aviation; • Telecommunications; and • Resources & Utility Infrastructure.	Galetech Energy Services	Gavin Daly Simon Carleton
14	**Interaction of the Foregoing**	Galetech Energy Services	Gavin Daly Simon Carleton

Non-Technical Summary	Galetech Energy Services & SLR Consulting	Various

Table 1.1: Specialist Consultants involved in the preparation of this EIAR

1.7.1 Galetech Energy Services

GES is an Irish multi-disciplinary renewable energy consultancy that specialises in the project management of planning, environmental and technical engineering services of wind energy developments from project feasibility through to delivery and operation. GES combines the expertise of leading experts in wind farm design, planning and environmental assessment and has extensive experience in managing and coordinating EIAR projects for wind energy and associated electricity grid and substation developments. Some examples of wind energy and ancillary EIAR projects managed by GES are provided in **Table 1.2** below.

Development	Development Description	Status
Carrickallen Wind Farm, Co. Cavan	Wind Farm comprising 10 no. wind turbines and associated ancillary infrastructure.	Operational
Oldmill Wind Farm, Co. Monaghan	Wind Farm comprising 7 no. wind turbines and associated ancillary infrastructure.	Operational
Taghart Wind Farm, Co. Cavan	Wind Farm comprising 7 no. wind turbines and associated ancillary infrastructure.	Under Construction
Taghart Wind Farm Grid Connection, Co. Cavan & Co. Meath	Approximately 12km of underground electricity line located predominately within the carriageway of the public road network.	Under Construction
Cloghan Wind Farm, Co. Offaly	Wind Farm comprising 9 no. wind turbines and associated ancillary infrastructure.	Under Construction
Cloghan Wind Farm Grid Connection, Co. Offaly	Approximately 8km of underground electricity line located predominately within the carriageway of the public road network.	Under Construction
Pinewoods Wind Farm, Co. Laois	Wind Farm comprising 11 no. wind turbines and associated ancillary infrastructure	Permitted
Pinewoods Wind Farm Substation & Grid Connection	110kV electricity substation and ancillary electrical infrastructure and all associated site development works.	Permitted
Drumlins Park Wind Farm, Co. Monaghan	Wind Farm comprising 8 no. wind turbines and associated ancillary infrastructure.	Permitted
Drumlins Park Wind Farm Substation & Grid Connection, Co. Monaghan	110kV electricity substation and ancillary electrical infrastructure and all associated site development works.	Permitted
Bracklyn Wind Farm & Grid Connection. Co. Westmeath & Co. Meath	Wind Farm comprising 9 no. wind turbines, 110kV electricity substation and associated ancillary infrastructure.	Proposed

Table 1.2: Examples of EIAR Wind Energy Projects managed by GES

1.7.2 SLR Consulting

SLR is one of **Ireland's leading planning** and environmental consultancies and is experienced in preparing planning applications and environmental impact assessment reports for private and public sector clients in Ireland, Northern Ireland and the UK.

SLR has one of the largest teams of qualified and experienced planning and environmental experts and undertakes a large variety of projects throughout Europe, North America and further afield. SLR specialises in the built environment, industry, infrastructure, mining &minerals, oil & gas and power sectors and delivers expert sustainability advice and project management support.

SLR is a registered Environmental Impact Assessor Member of the Institute of Environmental Management and Assessment (IEMA) and was also one of first consultancies to achieve the IEMA EIA Quality Mark. SLR is also an ISO 9001 accredited company.

1.8 Scoping

The scoping process involves identifying the environmental factors that are likely to be significant during EIA and eliminates those that are not. The scoping process is highly interrelated with the consultation process as described in **Section 1.9** below. The prior determination of the nature and detail of the information to be contained in the EIAR is one of the most important stages of EIA and may be conducted through a formal or informal process. Scoping helps ensure that the EIAR remains focussed on factors that are environmentally based, likely to occur and may have likely significant and adverse effects.

In undertaking scoping, the statutory obligations as set out in Schedule 6 of the **Planning & Development Regulations 2001 (as amended) ('the Regulations') and a** range of guidance documents were consulted, including those referenced in **Section 1.6**. A desktop analysis was undertaken of relevant data sources and precedents of EIAs carried out for similar developments, together with other relevant policy documents; such as the Limerick County Development Plan 2010-2016 (as extended) and Draft Limerick Development Plan 2022-2028; and all accompanying Strategic Environmental Assessment (SEA). The scoping process also considered relevant secondary and off-site developments associated with the Knockastanna Wind Farm, including the existing 20kV overhead electricity line between the on-site control building and the Cappamore 38kV electricity substation.

1.8.1 Scoping Report

As part of the scoping process a 'Preliminary **Scoping Report'** (enclosed at **Annex 1.1**) was prepared to provide a high level overview of the project context; description of the baseline environment; alternatives considered; the proposed development; its possible likely significant environmental effects; and mitigation and monitoring measures. This report was used in the course of the consultation process, as described in **Section 1.9** below, to allow consultees to inform themselves of the scope of the project and possible environmental effects, and to invite comments on the information which should be included in the EIAR, so that a focused and robust EIAR is produced.

In addition to EIA, scoping for the potential for any significant effects on European nature conservation sites designated under the EU Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC) was undertaken through the preparation of an

Appropriate Assessment Screening Report (see **Section 1.15** below). The Screening Report concluded that it could not be confirmed that designated conservation sites would not be adversely affected by the direct and indirect effects of the proposed development, either individually or in combination with other plans and projects, having regard to their conservation objectives.. As a result of this scoping process, it was determined that the project should be subject to a Stage 2 Appropriate Assessment and that a Natura Impact Statement (NIS) should be prepared and submitted with the planning application.

1.8.2 Formal Scoping

Section 173(2)(a)(i) of the Act provides for a discretionary provision whereby a developer may formally request the opinion of the Planning Authority on the scope of an EIAR. In this case, however, no formal scoping was considered necessary and informal scoping was carried out, primarily through ongoing iterative dialogue and feedback processes between the EIAR Project Team and the Applicant, and through the consultation process described in **Section 1.9** below.

1.8.3 Informal Scoping

Informal scoping was carried out through ongoing iterative dialogue and feedback processes between the EIAR Project Team and the Applicant, and through the feedback received from the consultation process. Informal scoping was considered the most appropriate means of EIAR scoping in this case, as it was envisaged from the outset that no environmental factors would be scoped out or eliminated from the EIAR. Accordingly, all environmental factors, as prescribed in the transposing legislation, have been fully addressed and included in this EIAR, as described in **Section 1.4** above.

As an active, iterative process, scoping continued throughout the preparation of the EIAR, including during the impact assessment stage, and the EIAR Project Team maintained a flexible view of the scope throughout, by way of open, effective and ongoing communication, and consultation. The EIAR scope was dynamically informed and continually reviewed in light of environmental criteria and information emerging during the scoping process, and *vice versa*.

1.9 Consultation

1.9.1 Community Consultation, Engagement & Participation

1.9.1.1 Non-Statutory Consultation

Consultation is a key element of each stage of the EIA process and there are procedures for statutory public consultation at various stages in the EIA process. While it is not obligatory during the scoping and preparation of an EIAR, the Applicant has undertaken consultation with local residents, community groups and other local interested parties throughout the EIAR process. For the most part, these consultations comprised one-to-one discussions between the Applicant's Community Liaison Officer (CLO) and homeowners and local residents, in accordance with prevailing public health guidelines, and, supplemented by the distribution of information leaflets. A full report on the public consultation process undertaken as part of this EIAR is presented at **Annex 1.2**. This approach is now recommended as standard per the *Draft Wind Energy Development Guidelines for Planning Authorities 2019*.

The public consultation process undertaken facilitated the early identification of the potential concerns of the public in respect of the proposed development and a more focused consideration of likely significant effects.

1.9.1.2 Statutory Engagement

Once the planning application and EIAR are formally submitted for consideration; the Planning Authority will make arrangements for public access to, and dissemination of, the information contained in the EIAR in accordance with the procedures contained in the transposing legislation and as described in **Section 1.14** below.

1.9.2 Stakeholder & Prescribed Body Consultations

A wide range of statutory and non-statutory organisations, including all bodies prescribed in the Regulations were contacted in writing at early stage in the scoping process to gather their views on the EIAR scope and the likely significant environmental effects of the proposed development. The consultation process involved furnishing each organisation with the 'Preliminary Scoping Report' described in **Section 1.8.1** above, accompanied by a set of maps and drawings, and requesting written feedback.

Annex 1.3 provides a sample copy of the consultation letter issued to each organisation, while a copy of all responses received is enclosed at **Annex 1.4**. **Table 1.3**, below, lists all organisations which have been consulted, details whether or not a response was received and provides a summary of the content contained therein.

While the consultation undertaken to date has allowed for any identified concerns to be addressed within this EIAR; the statutory consultation process, to be commenced following submission of the planning application to the Planning Authority, will allow these organisations to make any further comments, as necessary.

1.9.3 Planning Authority Consultation

An applicant for planning permission is not obliged to consult with the relevant planning authority prior to the submission of a planning application. Notwithstanding this and in addition to the scoping request issued to the Planning Authority dated 14 June 2021, in order to provide the Planning Authority with an opportunity to discuss the project directly with the EIAR Project Team, a consultation meeting was held on 10 August 2021. During the meeting, the project was described in detail and the scope of relevant environmental topics; including, *inter alia*, biodiversity and landscape and visual amenity; planning policy provisions, and the Applicant's approach to public consultation were discussed in detail. A series of planning application/procedural items were also discussed at length.

Consultee	Response Received	Summary of Feedback
Airspeed Telecom	No	-
An Garda Síochána	Yes	An Garda Síochána confirmed that the Limerick Division has no objection to the proposed development.
An Taisce	No	-
Ajisko Limited	No	-
Bat Conservation Ireland	Yes	Bat Conservation Ireland (BCI) requested that bat surveys are undertaken in accordance with best practice guidelines.
Birdwatch Ireland	No	-
Bord Gáis Energy	No	-
Broadcasting Authority of Ireland	Yes	The Broadcasting Authority of Ireland (BAI) confirmed that the existing wind turbines are not located in close proximity to any existing or planned transmission sites.
BT Communications Ireland	No	-
Commission for Communications Regulation	No	-
Commission for Regulation of Utilities	No	-
Department of Agriculture, Food and the Marine	Yes	The Department requested that the EIAR give due consideration to the requirement for felling or re-planting of forestry.
Department of the Environment, Climate and Communications	Yes	Please refer to Geological Survey Ireland response below.
Department of Defence	No	-
Department of Housing, Local Government and Heritage	Yes	The Department notes that this development is located within the Slievefelim to Silvermines Mountains Special Protection Area (SPA) (Site Code 004165) and that Hen Harrier is listed as a Special Conservation Interest for this SPA. It is the

Consultee	Response Received	Summary of Feedback
		Department's view that the proposed development would "screen-in" for appropriate assessment and would require the preparation of a Natura Impact Statement. The EIAR and NIS should detail what monitoring of bird usage has taken place at the site since construction and whether regular systematic searching for corpses of birds or bats has taken place on the site and what the results of that have been.
Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media	Yes	Advised that the Department has no remit regarding the proposed development.
Department of Transport	No	-
Eir Limited	Yes	Eir confirmed that the proposed development will not affect its network.
EirGrid	No	-
Enet Telecommunications Network Limited	Yes	Enet confirmed that the proposed development will not affect its network.
Environmental Protection Agency	No	-
ESB Networks	No	-
Fáilte Ireland	Yes	Fáilte Ireland did not make any specific comment on the proposed development but offered guidance on the preparation of an EIAR relating to tourism matters.
Gas Networks Ireland	Yes	No specific comment.
Geological Survey of Ireland	Yes	Geological Survey Ireland (GSI) provided a response relating to matters including geo-heritage, groundwater, and geo-hazards. The GSI did not raise any specific concerns regarding the proposed development but noted that the general area is classified as having a 'High to Modeately High' landslide susceptibility.
Health and Safety Authority	No	-
Health Service Executive – Environmental Health Department	No	-
Iarnród Éireann	No	-

Consultee	Response Received	Summary of Feedback
Imagine Group	No	-
Inland Fisheries Ireland	No	-
Irish Aviation Authority	Yes	The Irish Aviation Authority (IAA) offered advice in relation to appropriate steps to be followed in the event of the erection of manmade structures, including cranes.
Irish Peatland Conservation Council	No	-
Irish Raptor Study Group	No	-
Irish Water	Yes	Irish Water did not make any specific comment on the proposed development but offered guidance on the preparation of an EIAR relating to tourism matters.
Irish Wildlife Trust	No	-
JFK Communications Limited	No	-
Limerick City & County Council	No	-
Mosaic Net	No	-
National Ambulance Service	No	-
National Federation of Group Water Schemes	No	-
National Parks & Wildlife Service	No	-
Sport Ireland (National Trails Office)	No	-
Office of Public Works	No	-
Open Eir	No	-
Ripplecom	No	-
Radio Services & Building Limited	No	-
RTE Transmission Network Limited (2rn)	Yes	2rn confirmed that it has no objection to the proposed development.
Southern Regional Assembly	No	-

Consultee	Response Received	Summary of Feedback
Sustainable Energy Authority of Ireland	No	-
Tetra Ireland Communications Limited	Yes	Tetra Ireland Communications Limited confirmed that it has no objection to the proposed development.
The Arts Council	No	-
The Heritage Council	No	-
Three (3) Ireland	Yes	Three (3) confirmed that the proposed development will not affect its network.
Tipperary County Council	No	-
Towercom	No	-
Transport Infrastructure Ireland	Yes	Transport Infrastructure Ireland (TII) did not make any specific comment on the proposed development but offered generic guidance on the preparation of an EIAR.
Údarás na Gaeltachta	No	-
Virgin Media Ireland	No	-
Viatel Ireland Limited	No	-
Vodafone Ireland Limited	No	-
Waterways Ireland	No	-

Table 1.3: Summary of Written Consultations

1.10 Cumulative Impact

This EIAR has considered the likelihood of the proposed development, in its totality including secondary and off-site developments, acting in combination with other existing, permitted and proposed developments in the wider vicinity of the proposed development site, to result in likely effects on the environment which, when combined, may result in impacts which are cumulatively significant.

In the first instance, a desktop review of available data sources (satellite imagery) was undertaken to identify existing developments in the local area. Secondly, the EIA Portal[2] was consulted to assess for the presence of proximate developments which have been subject to EIA. Finally, the respective online ePlan portals of Limerick City & County Council[3] and Tipperary County Council[4] were examined to assess for extant planning permissions which had not yet been commenced. Developments warranting a cumulative impact assessment range from one-off rural dwellings to large-scale wind energy developments. **Table 1.4**, below, provides a list of developments which have been considered in the cumulative impact assessment of this EIAR.

It should be noted that a universal study area was not applied in this EIAR in the identification of developments to be included within the cumulative assessment for different environmental topics. Accordingly, individual chapters within this EIAR apply a study area having regard to the scope of their specific assessment and the inclusion of the identified developments in the cumulative assessment for each environmental topic varies.

Development	Planning Register Reference	Integrated Pollution Control (IPC) or Industrial Emissions Directive (IED) License	Development Description	Status
Rearcross Quarries, Co. Tipperary	03/510121 and 11/510323	-	Quarry and all associated ancillary infrastructure	Operational
Lackamore Quarry, Co. Limerick	00/975 and 07/752	-	Quarry and all associated ancillary infrastructure	Operational
Garracummer Wind Farm, Co. Tipperary	04/1034, 04/1259, 04/1178, 08/1236, 09/154, 09/213, 10/79, 10/183, 11/26, 11/70 and 12/77	-	17 no. wind turbines and associated ancillary infrastructure	Operational

[2] http://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1
[3] http://www.eplanning.ie/LimerickCCC/searchtypes
[4] http://www.eplanning.ie/TipperaryCC/searchtypes

Mienvee Wind Turbine, Co. Tipperary	00/649, 00/700, 03/1478 and 05/1493	-	1 no. wind turbine and associated ancillary infrastructure	Operational
Hollyford Wind Farm, Co. Tipperary	05/287 & 12/400	-	3 no. wind turbines and associated ancillary infrastructure	Operational
Glenough Wind Farm, Co. Tipperary	04/1195, 08/136, 08/701, 10/5 and 10/595	-	14 no. wind turbines and associated ancillary infrastructure	Operational
Templederry Wind Farm Co. Tipperary	03510743, 07510779	-	2 no. wind turbines and associated ancillary infrastructure	Operational
Glencarbry Wind Farm, Co. Tipperary	07/255, 11/80, 13/24, 13/135, 13/205, 14/33, 15/955 and 16/796	-	12 no. wind turbines and associated ancillary infrastructure	Operational
Cappawhite A Wind Farm, Co. Tipperary	07/364, 11/6, and 13/210	-	17 no. wind turbines and associated ancillary infrastructure	Operational
Cappawhite B Wind Farm, Co. Tipperary	12/510385, 13/510414, 14/10, 15/600566, 16/600701 and 18/601014	-	4 no. wind turbines and associated ancillary infrastructure	Operational
Castlewaller Wind Farm, Co. Tipperary	11/510251 and 16/600472	-	16 no. wind turbines and associated ancillary infrastructure	Permitted
Upperchurch Wind Farm, Co. Tipperary	13/510003, 18/600913, 20/1048 and ABP-306204-19	-	22 no. wind turbines and associated ancillary infrastructure	Permitted
Turraheen Upper Wind Turbine	14/600062 and 15/600867	-	1 no. wind turbine and associated ancillary infrastructure	Operational
Curraghgraigue Wind Farm Co. Tipperary	04/511635, 04/511665 06/510441	-	4 no. wind turbines and associated	Operational

	06/511940 10/510301 5122877		ancillary infrastructure	
Commercial Forestry	-	-	Various	Various
Agricultural Developments	Various	-	Various	Various
Residential Dwellings	Various	-	Various	Various

Table 1.4: Developments addressed in cumulative impact assessment

The location of the above developments (excluding forestry, agricultural developments and residential dwellings) are illustrated at **Annex 1.5**.

1.11 Impact Assessment

This EIAR focuses on describing environmental effects that are both likely and significant by reference to the individual environmental factors described in **Section 1.4** and their sensitivities. In order to provide for clarity of method, language and meaning, and to accurately explain the full range of effects, the impact classification and sensitivity terminology described in the *Guidelines on the information to be contained in Environmental Impact Assessment* Reports (EPA, 2022) is used in this EIAR to ensure that all likely significant effects are adequately considered and clearly and transparently communicated.

Within this EIAR, a distinction is drawn between 'impacts' and 'effects'. In accordance with the *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018), an 'impact' is an action resulting in changes to the environment (for example, the construction activities of a development removing a hedgerow). An 'effect' is the outcome on the environment from an 'impact' (for example, the effects on a dormouse population from loss of a hedgerow). The effect arising from an impact may, or may not, be likely to be significant[5].

Significance is a concept related to the weight that should be attached to effects when decisions are made. A significant effect is an effect that is sufficiently important to require assessment and reporting so that the competent authority (Limerick City & County Council) is adequately informed of the environmental consequences of permitting a project.

Further specific guidance, legislation and technical standards for describing environmental effects, and pertinent to particular environmental topics, are also described in each individual chapter of this EIAR, as necessary.

Magnitude	Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
Very High	Profound	Profound-substantial	Substantial	Moderate	Slight

[5] As the purpose of this EIAR is to provide a report of the effects, if any, which proposed development would have on the environment, the term 'effects' is used generally throughout this EIAR.

High	Profound-substantial	Substantial	Substantial - moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial - moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

Table 1.5: Impact Significance Matrix

Source: *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022)*

*Categories with dark grey shading are considered to equate with 'significant' impacts/effects

**The significance matrix provides an indicative framework from which the significance of impact is derived.

1.11.1 Approach to Impact Assessment

Due to the specific characteristics of the proposed development (i.e. the continued operation of the existing Knockastanna Wind Farm), this EIAR has been prepared in the context of an existing environment which includes the Knockastanna Wind Farm and focuses solely on the likelihood of significant effects on the environment arising during the proposed further operational period of 15-years of the wind farm and during the decommissioning phase.

All construction activities are complete and, other than standard maintenance works associated with the wind farm, no notable works are predicted to be undertaken at the site until the decommissioning phase. The likely effects on the environment during the construction phase, and the permitted operational phase, have previously been assessed and a retrospective assessment of these effects is not undertaken; however, the conclusions of the previous assessment have been used to inform and provide context to this EIAR. This approach accords with Article 5(1) of the EIA Directive which specifically provides that:-

> *"The developer shall, with a view to avoiding duplication of assessments, take into account the available results of other relevant assessments under Union or national legislation, in preparing the environmental impact assessment report."*

For the avoidance of doubt, therefore, this EIAR is prepared with the Knockastanna Wind Farm forming part of the existing baseline environment and provides an assessment of the likely significant effects on the environment of the proposed further operational period of 15-years and during the decommissioning phase.

1.12 Mitigation & Monitoring Measures

Each chapter of the EIAR includes a description of the measures proposed, where required, to avoid, prevent, reduce or offset, as appropriate, any likely significant effects on the environment together with any proposed monitoring measures in respect of both operational and decommissioning phases. Many mitigation measures

have already been incorporated into the project during the construction and current-operational phases. Monitoring measures have also been proposed, where appropriate, to demonstrate compliance with, and efficacy of, the mitigation measures proposed.

In order to ensure clarity of the mitigation and monitoring measures proposed, all such measures are included in a compendium as a separate annex to this EIAR (see **Annex 1.6**).

1.13 Non-Technical Summary

A short and accessible non-technical summary has also been prepared as a separate and self-contained document which can be distributed to the public concerned and who may be likely to be affected by the proposed development.

The non-technical summary is laid out in a similar, but condensed, format to the main EIAR, i.e. describing the proposed development, existing environment, effects and mitigation and monitoring measures, but presented in a manner that avoids technical language, such that it is easily understandable and accessible to a layperson.

The purpose of the non-technical summary is to transparently facilitate the full public access and participation of the public concerned in the statutory consultation process following the submission of the planning application to the Planning Authority.

1.14 Public Access

Public access and participation is a core feature of the EIA process. Compliance with the Aarhus Convention and the EIA Directive requires that arrangements for public access facilitate the convenient dissemination of the information contained in the EIAR in a timely and fully transparent manner. The core objective is to ensure that the public is made as fully aware as possible, and at the earliest possible stage, of the likely significant environmental effects of the proposed development prior to a decision being made by the Planning Authority.

Prior to the submission of the planning application, a public newspaper notice will be published and site notices erected in accordance with the legislative requirements and any further directions provided by the Planning Authority. Full information will also be made available in these notices as to how the public concerned can access the planning application documentation and this EIAR, and involve themselves in the decision-making process, including through making written submissions.

The Planning Authority will also make arrangements for public access and dissemination of this EIAR and other planning application documentation in accordance with the procedures contained in the legislation. This will include making all documents available to view and purchase at the offices of Limerick City & County Council (Dooradoyle Road, Dooradoyle, Limerick, V94 WV78).

A centralised EIA Portal, managed by the Department of Housing, Local Government and Heritage, is a publicly accessible map-based database which provides users with access to all applications for development consent which have been accompanied by an EIAR since 16 May 2017. Following the submission of the planning application to Limerick City & County Council, the public concerned will also be able to access this EIAR via the EIA portal website. The EIAR shall be submitted in a format searchable by electronic means, in so far as practicable.

Finally, a hyperlink to all planning application and EIAR documentation will be provided by the Applicant on the existing Knockastanna Wind Farm web-page.

1.15 Habitats Directive – Appropriate Assessment

1.15.1 Appropriate Assessment Screening (Stage 1)

As a separate but interrelated process, screening for the likelihood of any significant effects on European nature conservation sites (Natura 2000) designated under the EU Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC) was also undertaken through the preparation of what is known as an Appropriate Assessment (AA) Screening Report (Stage 1). This is formally a separate assessment process, with discrete reporting requirements, but is obviously highly interrelated with EIA.

The AA Screening Report assesses whether the preparation and submission of a Natura Impact Statement (NIS) to inform an AA (Stage 2), also to be undertaken by the Planning Authority, is required.

The AA Screening Report prepared on behalf of the Applicant concluded that it could not be confirmed that designated conservation sites would not be adversely affected by the direct and indirect effects of the proposed development, either individually or in combination with other plans and projects, having regard to their conservation objectives.

As a result, and in accordance with the precautionary principle, it was concluded that the proposed development should proceed to be subject to a Stage 2 AA and that a NIS should be prepared and submitted with the planning application alongside this EIAR.

1.15.2 Natura Impact Statement (Stage 2)

The NIS is presented and submitted as a separate standalone document and accompanies the planning application. The NIS includes both the Stage 1 Screening Report and the Stage 2 Appropriate Assessment. The NIS concludes that, on the basis of best available evidence, the proposed development will not adversely affect the integrity of any designated European site, having regard to their conservation objectives.

The Biodiversity chapter of this EIAR (**Chapter 5**) does not repeat the detailed assessment included in the NIS but cross refers to the findings of this separate assessment, as necessary. This approach is in accordance with the EPA Guidance (2022) which states "*[a] biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process*" but should "*refer to the findings of that separate assessment in the context of likely significant effects on the environment*".

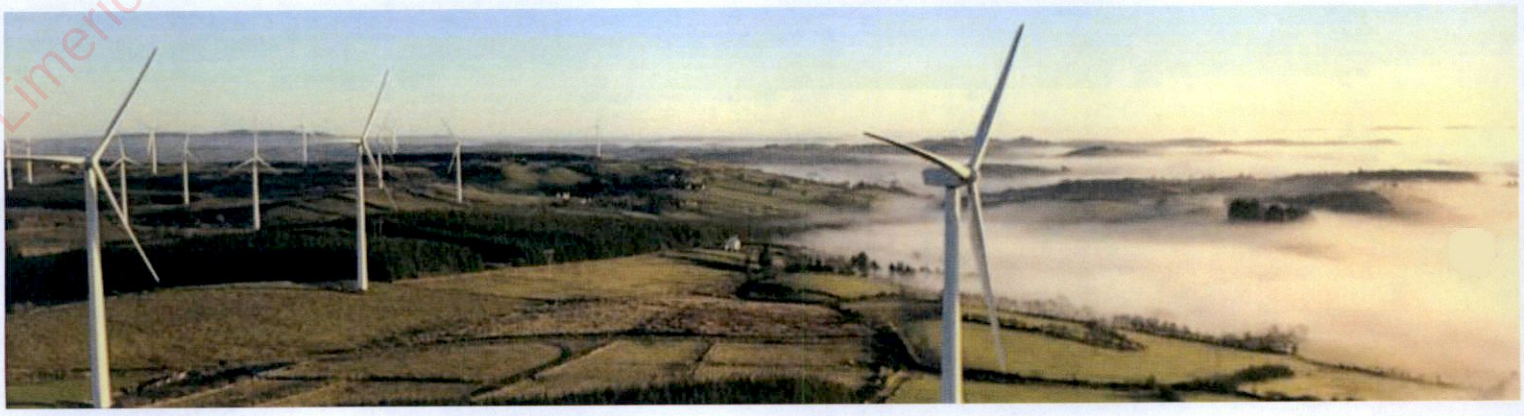
1.16 Limitations and Difficulties Encountered in Compiling the EIAR

No general difficulties or limitations, including technical deficiencies or lack of knowledge, were encountered in compiling the information required to be provided in this EIAR. Where specific difficulties or limitations were encountered in relation to specific environmental factors, they are reported in the individual chapters of this EIAR, as appropriate.

1.17 Note on Quotations

It is important to acknowledge that statutory EIAR requirements call for a comprehensive description of the existing environment as well as all likely impacts and significant effects. The EIAR therefore necessarily contains statements describing the positive and negative aspects of a proposed development. Selective quotation, out

of context, may not be representative of the overall findings of the EIAR and, therefore, any quotations should always be provided in their proper context.



Knockastanna Wind Farm Extension of Operational Life

Chapter 2: Assessment of Project Alternatives

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Contents

2.1 Introduction

The presentation and consideration of the various reasonable project alternatives investigated is an important requirement of the EIAR process and the single most effective means of avoiding likely significant effects on the environment. The purpose of this chapter is to document the assessment of the range of alternatives considered in the design process and the main reasons for selecting the development, as proposed.

2.2 Requirements of the EIA Directive

EIA Directive 2014/52/EU requires that an EIAR must include:-

> *'A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, 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 environmental effects'.*

This provision requires an EIAR to present transparent and objective evidence on the range of reasonable alternatives which were examined, analysed, and evaluated as part of the iterative EIA processes which led to the selection of the proposed development.

The *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (May 2022) state that it is generally sufficient to provide a broad description of each main alternative, identifying the key issues associated with it, and to demonstrate how environmental considerations were taken into account. A detailed assessment (or 'mini-EIA') of each alternative is not required.

2.3 Alternatives Considered

Alternatives may be identified at many levels and stages during the evolution of a project, from strategic site selection through to site layouts, design, technologies and on to mitigation and any monitoring measures. Alternatives that are available for consideration at the earlier stages in the evolution of a project are considered to represent the greatest potential for avoidance of likely significant effects on the environment; and the assessment of alternative locations and alternative site designs will have been undertaken at the early stage of the Knockastanna Wind Farm design process.

Consequently, the array of alternatives currently available are limited by the presence of the extant development e.g., alternative site layout/design. Therefore, the reasonable alternatives considered in undertaking this EIAR were therefore as follows:-

- 'Do Nothing' alternative;
- Continued operation of the Knockastanna Wind Farm;
- Repowering of the Knockastanna Wind Farm; and
- Alternative Technologies

Each of these alternatives was considered relevant to the proposed development and its specific characteristics and are discussed in further detail below, including an assessment of the likely environmental effects.

2.4 Assessment of Alternatives

2.4.1 'Do-Nothing' Alternative

Current national Government policy in respect of energy production and the reduction of anthropogenic greenhouse gas emissions are all collectively strongly supportive of the increased generation of renewable electricity, including wind energy generation, to rapidly reverse climate breakdown and the transition of energy production away from fossil fuels in order to increase security of supply.

The current Programme for Government commits to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (a c.51% reduction over the decade) and to achieving 'net-zero' emissions by 2050. This has recently been legislated for in the Climate & Low Carbon Development (Amendment) Bill 2021[1] and is one of the most ambitious decarbonisation pathways anywhere in the world. The Programme for Government also recommits to a renewable energy target of at least 70% by 2030. According to the latest EPA projections, a 70% contribution of renewable energy in electricity generation by 2030 will mainly result from a further expansion in wind energy, including 8.2 GW of onshore wind as set out in the Climate Action Plan 2019[2]. In addition to the continued operation of existing renewable energy developments. The Climate Action Plan 2021[3] seeks to further increase the contribution of renewable energy/electricity generation to up to 80% by 2030.

The Government's *Wind Energy Development Guidelines for Planning Authorities 2006* (DoEHLG, 2006) and subsequent updated *Draft Revised Wind Energy Development Guidelines 2019* (DoHPLG, 2019) establishes a land-use planning framework whereby planning authorities can proactively support the development of wind energy projects at appropriate locations. In accordance with these land-use policies, the *Limerick County Development Plan 2010-2016* and *Draft Limerick City & County Development Plan 2022-2028* are both supportive of wind energy development at suitable locations within County Limerick.

In the 'Do Nothing' alternative, the existing Knockastanna Wind Farm would continue to operate before being decommissioned upon the expiry of the extant planning permissions. Subsequently, the site would be restored, with wind farm infrastructure removed, and would gradually evolve as managed farmland or, due to prevailing conditions and surrounding land uses, may be afforested with commercial plantations.

The quantum of renewable energy produced in County Limerick would, therefore, be diminished in the 'Do-Nothing' scenario. Consequently, due to the central importance of onshore wind energy in the transition to a low carbon economy in all national policies, as outlined above, the 'Do Nothing' alternative was not considered a viable option.

The rationale for the continued operation of the existing development is further reinforced by the fact that the existing development is operating benignly and, as assessed throughout this EIAR, is not resulting in any likely significant environmental effects. Furthermore, the development has only been operating (at the time of writing) for a period of 13-years which is a significantly shorter timeframe than is

[1] S.I. No. 32 of 2021.

[2] *Climate Action Plan 2019 to Tackle Climate Breakdown* (2019) Department of Communications, Climate Action & Environment.

[3] *Climate Action Plan 2021 Shaping our Future* (2021) Department of Environment, Climate & Communications.

typical for wind energy development and a shorter timeframe than the wind turbines are capable of operating.

2.4.2 Continued Operation of the Knockastanna Wind Farm

Planning permission was granted for the Knockastanna Wind Farm on 16 July 2003 for a period of 20-years from that date. However, as a direct consequence of the requirement to secure other consents (e.g., grid connection agreement) which are outside the control of the Applicant, the commissioning of the Knockastanna Wind Farm was not completed until 2009, approximately 6-years following the decision of An Bord Pleanála to grant planning permission. This is normal for wind farm developments and post-consent licensing and construction periods can take a significant period of time, which is why 10-year permission periods are typically granted followed by an operational lifetime of 25-30 years. Therefore, the actual operational life of the development has been substantially curtailed and will, on the date of required decommissioning, only have ben operational for a period of approximately 14-years.

Modern wind turbines are widely accepted as having an operational lifespan of 25-30-years[4] and, given that the existing turbines will only have been operational for approximately 14-years at the currently required decommissioning date, it is considered that a period of further operation of the existing development is a reasonable, and appropriate, alternative to efficiently maximise the use of extant renewable energy generating infrastructure and which avoids the need for replacement capacity elsewhere. In informing the assessment of this alternative, a comprehensive assessment of the existing wind turbines and ancillary infrastructure has been undertaken by the Applicant and it has been concluded that the wind turbines are fully capable of operating for a further period of at least 15-years from their currently predicted date of decommissioning.

Table 2.1 below, therefore, provides an assessment of environmental constraints and opportunities associated with the continued operation of the Knockastanna Wind Farm for a period of 15-years.

Factor	Assessment
Population & Human Health	There will be no change to existing noise and shadow flicker levels. No construction activities would be required, other than ongoing maintenance of the wind farm, and significant volumes of dust is unlikely.
Biodiversity	Due to the absence of construction activities, no loss of habitat would occur and there will be no increased level of disturbance to species currently present within the site. The continued operation of the wind farm would not increase the likelihood of bird or bat collisions/fatalities.
Land & Soil	Due to the absence of construction activities, no effects on land or soil would occur. Existing pollution prevention arrangements and management of contaminants (e.g., hydrocarbons) would be continued.
Water	Due to the absence of construction activities, no effects on water would occur. Existing drainage infrastructure would continue to be maintained to ensure the appropriate management of surface water; while current pollution prevention arrangements and

[4] As acknowledged at Section 2.4 of the *Draft Revised Wind Energy Development Guidelines 2019*.

	management of contaminants (e.g., hydrocarbons) would be continued.
Air & Climate	No dust-generating activities, other than occasional maintenance activities, would be undertaken. The wind farm would continue to supply renewable electricity to the national grid and contribute to the reduction in fossil-fuel generated electricity.
Landscape	No alterations to the existing development would be required and thus, the landscape will remain in its current condition. Since the completion of construction, the site has generally been allowed to vegetate naturally and is consistent with the surrounding landscape character.
Cultural Heritage	No alterations to the existing development would be required and, therefore, cultural heritage features would not experience any additional effects.
Noise & Vibration	Noise generated by the wind turbines will remain unaltered. Regular maintenance of the wind turbines will continue.
Shadow Flicker	Instances of shadow flicker generated by the wind turbines will remain unaltered.
Material Assets (Transport & Access; Telecommunications)	No works to the local road network would be required and operational phase traffic volumes would remain consistent with levels to date. No additional effects on telecommunication or aviation would occur.

Table 2.1: Environmental Assessment of Repowering the Knockastanna Wind Farm

2.4.3 Repowering of the Knockastanna Wind Farm

The existing Knockastanna Wind Farm comprises 4 no. wind turbines, with an electrical capacity of 6 megawatts (MW), and all associated ancillary infrastructure. Repowering of the site would involve the decommissioning and removal of the existing wind turbines and replacement with larger, more efficient, turbines; and 2 no. separate approaches could be implemented.

Firstly, the current generation of wind turbines have a generating capacity of up to 6MW and, in theory, the existing development could be replaced by a single wind turbine with an overall tip height of approximately 180m. Secondly, the existing development could be decommissioned and replaced with a number of larger turbines. This approach would likely increase the volume of renewable energy generated at the site thus increasing the contribution of the development to reaching national binding targets regarding renewable energy generation and the reduction of greenhouse gas emissions.

However, the selection of either of the above options would necessitate substantial construction works to be undertaken at the site to accommodate the larger wind turbines. In the case of the first option (i.e., repowering with 1 no. turbine), such works would include the construction of larger foundations, larger areas of hardstanding and the re-alignment of existing on-site access tracks and public roads to accommodate the delivery of turbine components.

Additionally, in the case of selecting the second option, the requirement to provide sufficient inter-turbine spacing to the manufacturer's specifications would, in effect, require a full revised site layout to be designed. The requirement to adhere to the

relevant specifications would likely render the majority of the existing turbine foundations and hardstandings redundant while the construction of additional access tracks would also be required. As above, upgrade works would also be required along the public road network to facilitate the delivery of the larger turbine components.

Table 2.2 below provides an assessment of environmental constraints and opportunities associated with the repowering of the Knockastanna Wind Farm. For the purposes of this assessment, the repowering process has been assessed on the basis of repowering with a number of larger turbines as, in environmental terms, it is considered as likely to result in the greatest effect on the environment. In undertaking this assessment, the criteria provided in Schedule 7 of the Planning & Development Regulations 2001 (as amended) together with the general environmental factors included in Article 3(1) of the EIA Directive were used as a framework for analysis.

Factor	Assessment
Population & Human Health	Potential for increased adverse effects due to increased levels of dust and traffic generation (during construction), noise and shadow flicker. Positive socio-economic effects are also likely due to construction phase employment, increased spend/investment in local contractors/suppliers and increased community fund
Biodiversity	Increased likelihood of effects on biodiversity arising from the revised site layout and, therefore, interactions with habitats and habitat loss. Construction activities also increase the likelihood of adverse effects on downstream water quality including, potentially, within the Lower River Shannon Special Area of Conservation (SAC).
Land & Soil	The repowering process would necessitate excavations to be undertaken within areas of blanket peat.
Water	The requirement to undertake construction works and excavations, combined with the presence of peat, increases the risk of adverse effects on local watercourses and downstream water quality. This is of particular relevance due to the hydrological connectivity of the site, via drainage ditches and adjacent watercourses, with the Lower River Shannon Special Area of Conservation.
Air & Climate	While construction activities are likely to result in the generation of dust and vehicular emissions, the increased generation of renewable energy would off-set this effect and result in improved air quality through a reduction in fossil-fuel generated electricity.
Landscape	The increased height of wind turbines has a greater potential for adverse visual effects.
Cultural Heritage	The revised site layout increases the likelihood of effects (during construction) on previously unknown archaeological features. Additionally, the taller wind turbines may increase the visual effect on cultural heritage features in the wider vicinity.
Noise & Vibration	While more modern wind turbines are, due to technological advancements, generally quieter than older models; there is the potential for increased noise levels at local dwellings arising from the installation of larger turbines.

Shadow Flicker	The increased blade length of the larger wind turbines may increase the level of shadow flicker experienced at local dwellings; thus necessitating the curtailment of turbine operation and, potentially, reducing the quantum of electricity generated.
Material Assets (Transport & Access; Telecommunications)	Due to the characteristics of the local road network, extensive upgrade works would likely be required to accommodate the delivery of longer turbine components thus increasing the likelihood of temporary disruption to road users. The taller turbines may also interact with telecommunication service providers and aviation installations.

Table 2.2: Environmental Assessment of Repowering the Knockastanna Wind Farm

2.4.4 Alternative Technologies

As discussed above, wind energy is recognised in Government policy as a proven and cost-effective renewable energy generation technology in the context of **Ireland's abundant wind resource. A potential** alternative technology to achieve the objectives of the project could be the development of a solar energy project. Photovoltaic solar is the only other terrestrial technological process reasonably available to the Applicant.

The most appropriate means of delivering a photovoltaic solar development is considered to be the decommissioning and removal from site of the existing wind farm infrastructure and construction of solar arrays. However, having regard to the characteristics of the site, a number of constraints have been identified:-

- A solar development with an output of 6MW would require an approximate land-take of 12 hectares (30-acres) and would, therefore, have a substantially greater footprint that the existing wind farm;
- A consequence of the increased footprint of a solar development would be greater disturbance to existing habitats across the site. While solar developments can be delivered without the requirement for extensive excavations (habitat loss), the placing of a large solar array at the site would undoubtedly alter the habitat composition of the site, and given that the proposed development site is located within an SPA, adverse effects on biodiversity could arise;
- The topography of the site is noticeably northerly and westerly facing. The optimum orientation of solar arrays is to the south, to maximise irradiation levels, and therefore, the site is not considered optimal and is unlikely to be viable for a solar energy development; and
- The placing of c. 12 hectares of solar panels at the site would be a substantial alteration to the existing landscape and may, in this landscape context, appear incongruous with the existing landscape character. The existing wind farm sits comfortably within this rugged and relatively remote landscape; however, the introduction of a solar array would represent a very noticeable alteration to the existing landscape.

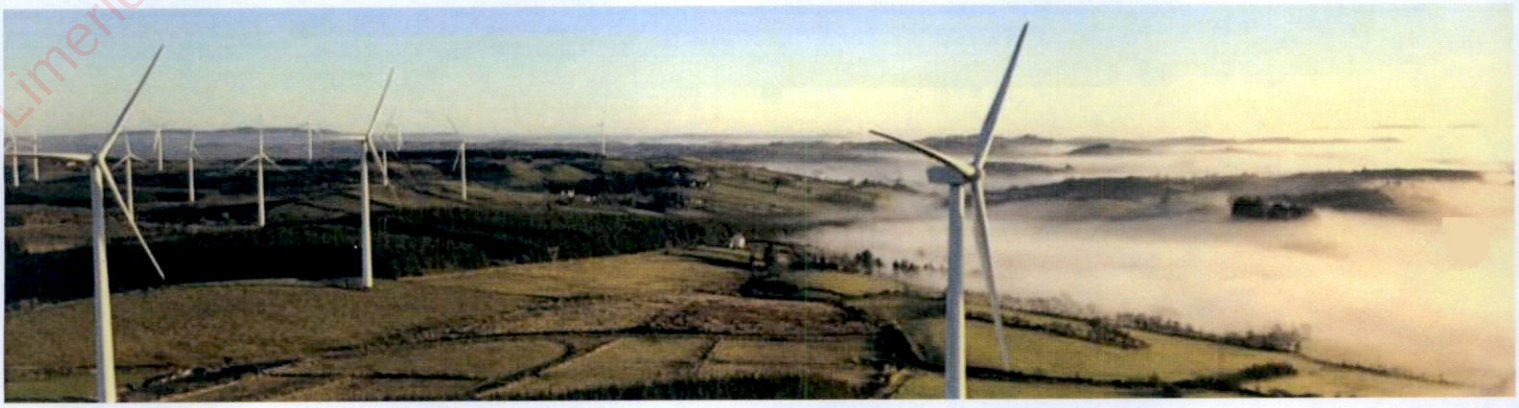
Moreover, a solar energy project would not generate renewable electricity in a similarly efficient manner as a wind energy development. The *Renewable Electricity Support Scheme (RESS) High Level Design*, published by the Government, considers that onshore wind has a generating capacity of 31% while photovoltaic solar developments have a capacity factor of 11%; thus illustrating the substantially greater efficiencies offered by onshore wind energy developments compared to

solar energy developments. On this basis, other technologies were considered inferior and not considered a viable and reasonable alternative.

2.5 Conclusion

This chapter has provided a description of the reasonable alternatives, which are relevant to the proposed project and its specific characteristics, which have been assessed, evaluated, and analysed, and an indication of the main reasons for selecting the preferred option, including a comparison of environmental effects. The objective of this process was to avoid any likely significant effect on the environment through the selection of a proposal which avoided inherent environmental effects, in favour of a development which had fewer constraints and greater capacity to assimilate into the existing environment.

It is assessed that the continued operation of the existing development represents the most environmentally sensitive and appropriate alternative which efficiently maximises the use of extant renewable electricity generating infrastructure which is currently operating without any significant environmental effects and which avoids the need for replacement capacity elsewhere. The avoidance of extensive construction activities associated with this alternative is a particularly positive aspect, from an environmental perspective which also **meets the Applicant's objectives for** the project to continue generating renewable electricity in conformance with **Ireland's urgent and binding renewable energy and climate targets.** Consequently, the Applicant chose to progress with a planning application and EIAR for the continued operation of the existing development for a further period of 15-years while discounting the other alternatives assessed.



Knockastanna Wind Farm Extension of Operational Life

Chapter 3: Description of Proposed Development

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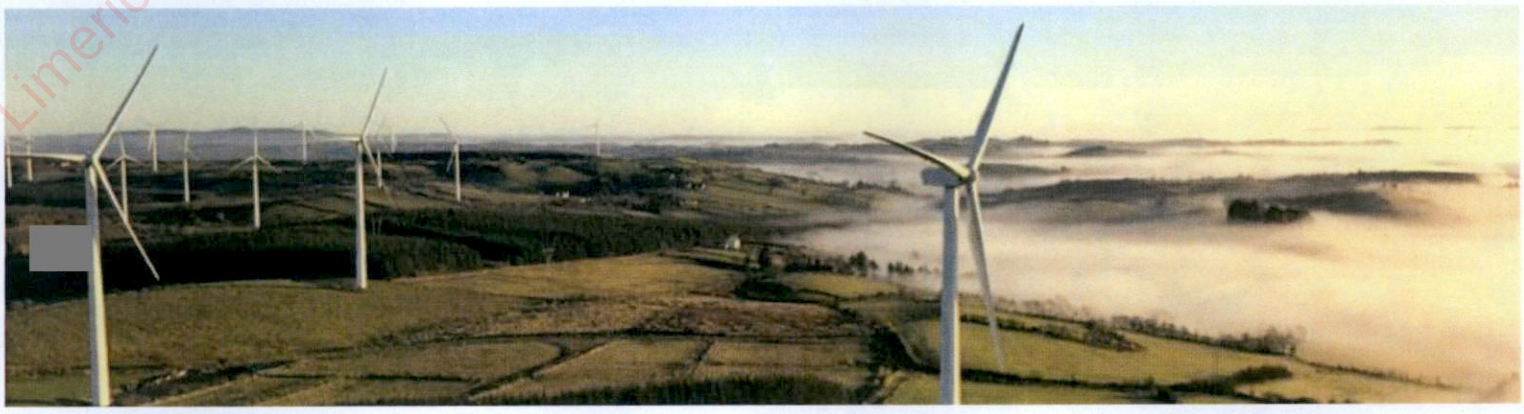

Contents

3.1 Introduction

The purpose of this chapter is to provide a description of the proposed development in sufficient detail, which, when taken together with the descriptions of the existing environment provided in this EIAR, will allow an independent reader to understand the significant environmental impacts likely to arise from the proposed development.

The description considers the location of the proposed development together with its main physical characteristics including design, size, scale and land-use requirements of all relevant phases of the existence of the project from its construction through to operation and decommissioning. This chapter should also be read in conjunction with the technical annexes enclosed at **Volume II** of this EIAR and the plans and particulars submitted with the planning application.

Further descriptions of specific elements of the proposed development and the existing baseline environment are also provided in individual chapters of this EIAR as they relate to particular environmental factors including, for example, the potential production of residues, waste, pollution, noise and nuisances etc.

The description of the proposed development also addresses other off-site/secondary developments which occur as a direct result of the proposed development, including the **project's** grid connection and traffic volumes associated with the continued operation of the project.

3.2 Planning History

Planning permission was granted, by An Bord Pleanála, for the Knockastanna Wind Farm on 16 July 2003 (An Bord Pleanála Reference PL13.130938 for a period of 20-years from the date the Decision Order (Condition No. 2). The planning permission was for a total of 5 no. turbines and all associated works. However, one of the turbines (T01) was never built. Additionally, as further described below, T05 is currently temporarily demounted for technical engineering investigations.

The decision of An Bord Pleanála to grant planning permission for a defined period of time from the date of a grant of planning permission is unusual. Typically, for wind energy developments, planning authorities or An Bord Pleanála specify that the defined operational period shall commence upon the commissioning of the wind turbines. This typically allows for wind farms to be constructed up to 10-years following a grant of permission and to operate for 25-30 years from that date. This is due to the lengthy timeframes that can often arise from the requirement to obtain other licences and consents to construct the project following a grant of permission and the lengthy construction periods regularly associated with large infrastructure projects, such as wind farms.

As a direct consequence of the requirement to secure other consents (e.g. grid connection agreement), the commissioning of the Knockastanna Wind Farm was not completed until 2009, approximately 6-years following the decision of An Bord Pleanála to grant planning permission. Therefore, the actual operational life of the development has been substantially reduced and will, on the date of the currently required decommissioning, only have been operational for a period of approximately just 14-years.

3.3 Site Location & Context

The proposed development is located in northeast County Limerick; approximately 6km north of the village of Doon, c. 10km northeast of the village of Cappamore, and c. 29km east of Limerick city. The proposed development site is situated approximately

500m from the administrative boundary between the local authorities of Limerick City & County Council and Tipperary County Council, as illustrated in **Figure 3.1**.

The local area is typical of this part of Ireland, with settlement patterns largely comprising dispersed rural dwellings often accompanied by agricultural holdings and buildings and small nucleated settlements often located at road junctions. In total, there are 53 no. dwellings located within 2km of an existing wind turbine.

The proposed development site and surrounding environment are characteristic of an upland landscape with extensive tracts of commercial forestry plantations dominating the surrounding undulating, landscape. Other agricultural activities in the wider environs of the proposed development site tend to be extensive (i.e. non-intensive) cattle and sheep enterprises.

A large wind energy complex is located to the east and southeast of the proposed development site (in County Tipperary) comprising a number of individual projects including the Garracummer Wind Farm, Mienvee Wind Turbine, Hollyford Wind Farm, Glenough Wind Farm, Glencarbry Wind Farm, Cappawhite A Wind Farm and Cappawhite B Wind Farm.

The proposed development site is located on the northern slope of Knockastanna hill and within the Slievefelim to Silvermines Mountains Special Protection Area (SPA; 004165).

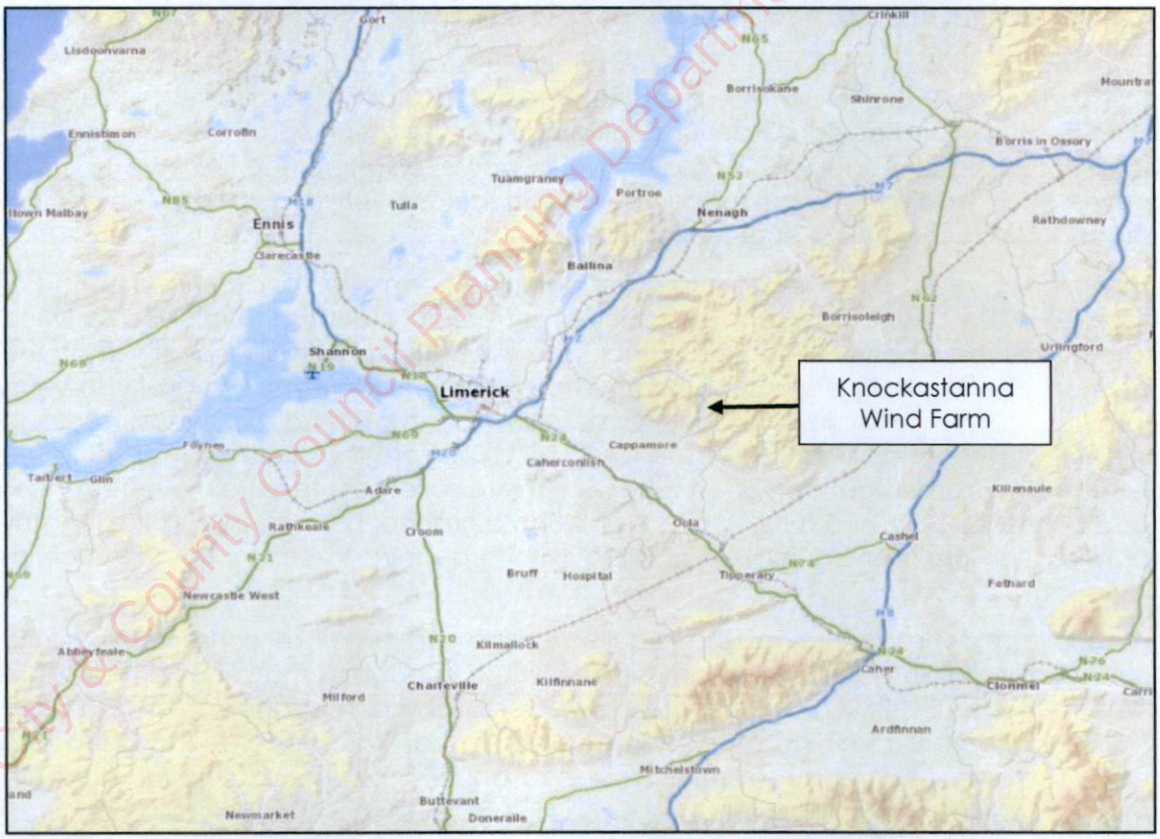

Figure 3.1: Proposed Development Site Location

3.4 Description of the Proposed Development

Following a comprehensive lifetime extension assessment of the existing wind turbines and ancillary infrastructure by the Applicant, it has been concluded that the wind turbines are fully capable of operating for a further period of at least 15-years from

their currently required date of decommissioning. Modern wind turbines are widely accepted as having an operational lifespan of in excess of 30-years and, given that the existing turbines will only have been operational for a period of approximately 14-years at the currently required decommissioning date, it is considered prudent and wholly appropriate to continue the operation of the Knockastanna Wind Farm for a further period of 15-years.

Any further operation beyond this date would be subject to a further planning application and EIA; however, it is unlikely that further operations would be proposed at that point and decommissioning of the development is highly likely. This EIAR therefore assumes that full decommissioning will take place at the end of the proposed additional 15-year period.

The proposed development assessed within this EIAR comprises the continued operation of a wind farm; including all associated activities to accommodate its operation, maintenance and the export of electrical power to the national grid; for a further period of 15-years. It should be noted that all infrastructure required to facilitate the continued operation of the Knockastanna Wind Farm is pre-existing and no new infrastructure will be required to accommodate its continued operation.

The existing wind farm comprises a number of individual components which are described in the following sections. It is again important to reiterate that the proposed development does not provide for any increase in size of the existing development or intensification of activities at the proposed development site but, instead, simply proposes to continue existing operations for a further period of 15-years. The continued operation of each of the following elements of the development are therefore assessed in this EIAR.

The existing development comprises:-

- 4 no. wind turbines;
- Associated turbine foundations and crane hardstandings;
- 1 no. electrical control building with a total footprint of 66 square metres (m^2), including welfare facilities and associated electrical equipment enclosure;
- Underground electrical cabling between each of the existing wind turbines and the electrical control building;
- 1 no. site entrance from the L-5029-419 and 2km of site access tracks; and
- Site drainage infrastructure.

3.4.1 Wind Turbines

The existing wind turbines, constructed in accordance with the specifications as previously permitted, are General Electric GE1.5s turbines with a hub height of 64.7m, a rotor diameter of 70.5m and an overall tip height of 99.95m. The rated electrical output of each wind turbine is 1.5 megawatts (MW). An elevation drawing of the existing wind turbines is provided at **Annex 3.1** and a photograph of the existing turbines at the proposed development site is provided at **Figure 3.2**.

Figure 3.2: Existing Wind Turbines

The turbines each consist of a three-bladed rotor attached to a nacelle (hub) which contains the mechanical drive train and electrical generation mechanisms, mounted on a steel/concrete tower of tubular construction. The blades are constructed of glass reinforced plastic. The colour of the turbines and blades is off-white which accords with the agreement reached between the Applicant and Planning Authority during the discharge of pre-commencement planning conditions associated with the permitted development.

The turbines are geared to ensure that all turbines rotate in the same direction and will have a cut-in wind speed of 4 metres-per-second (m/s) and a cut-out speed of 25m/s. At the cut-out speed the turbines automatically shut down.

The layout of the existing wind turbines is illustrated at **Annex 3.2**.

ID*	Easting**	Northing**
T02	585713	656629
T03	585898	656425
T04	586031	656305
T05	586199	656099

Table 3.1: Wind Turbine Coordinates

**Turbine T01 was not constructed*
***Coordinates provided In Irish Transverse Mercator (ITM)*

On occasion during the extended operational period, a turbine component or its foundation may require maintenance. For example, at the time of writing, 1 no. of the wind turbines (T05) has been temporarily demounted. As part of regular maintenance

activities in 2018, a structural defect was identified with the foundation of turbine T05 which necessitated its demounting (in October 2018) for works and it is currently temporarily stored on-site. Investigations undertaken over a number of years have concluded that structural support works will be required

The activities associated with the structural support works, which will be identical to the methods employed during the original construction period, will consist of the following:-

- Removal of the existing wind turbine foundation;
- Pouring of a new concrete foundation followed by reinstatement of previously excavated spoil material; and
- Remounting of current/previous turbine T05 components which have been temporarily stored on-site since its demounting.

It should be noted that the temporary demounting of the wind turbine is a consequence of a technical foundation defect and is not related to any ground stability concerns or other environmental concern. It may be the case that during the extended operational period, one or more of the other turbines will require the same or similar maintenance works as T05.

3.4.2 Turbine Foundations

Each turbine tower is secured to a steel ring foundation within a reinforced concrete raft foundation. The existing foundations are square in plan-view and are of an approximate depth of 3m.

No alterations to the existing foundations and no construction activities are required except, as described above, for the replacement of the foundation of T05.

3.4.3 Turbine Hardstands

Hardstand areas were established adjacent to each turbine to facilitate crane operations during turbine erection and, should they be required, for maintenance and final decommissioning. The shape of hardstands is not uniform across the proposed development site; however, they typically have a footprint of c. 600m^2. Each hardstand area is constructed of levelled and compacted (unsealed) hardcore.

No construction activities are proposed in respect of the turbine hardstands; however, occasional maintenance work will be undertaken during the extended operational period, as required, to ensure that they remain fit for purpose.

3.4.4 On-Site Access Tracks & Site Entrance

A total of 2km of on-site access tracks have been constructed to provide access through the wind farm site. The access tracks are similar to normal agricultural tracks but with a slightly wider typical running width of approximately 4m (see **Figure 3.3** below). Access tracks have been constructed of crushed stone material and are unsealed to allow for permeability.

No construction activities are proposed in respect of the access tracks; however, occasional maintenance work will be undertaken during the extended operational period, as required, to ensure that they remain fit for purpose.

The proposed development site is served by a single access point, from the L-5029-419, located to the north of the proposed development site. The site entrance provides access to operational and maintenance personnel who typically access the site on 1-2 no. occasions per week.

No alterations to the site entrance are proposed. Occasional maintenance work will be undertaken during the extended operational period, as required, to ensure that a safe means of access and egress is maintained.

Figure 3.3: Existing Access Track

3.4.5 Electrical Control Building

The on-site electrical control building (see **Figure 3.4**) houses the electronic equipment, including connection points and associated equipment such as incoming and outgoing circuit breakers, metering equipment, computer and server. The control building comprises a single storey building, constructed of blockwork and finished in sand and cement render, slate roof covering and steel doors. The control building has a footprint of 66m^2 and an overall height of 4.4m.

To the rear (south) of the control building, a small enclosure is present which contains **electrical equipment associated with the project's connection** to the national electricity network. The electrical equipment is enclosed within palisade fencing for health and safety and security reasons.

Welfare facilities, including a toilet and hand-washing facilities, for personnel during the operational phase are also located to the rear of the switchroom. The control building and welfare facilities do not require a dedicated water source due to

infrequent use and the low volumes of water that are required (toilet facilities and hand washing) and, accordingly, water is sourced from a rainwater harvesting system. Wastewater is directed to an existing foul-waste holding tank, located adjacent to the control building, which is regularly inspected, maintained and emptied, as required.

Figure 3.4: Electrical Control Building

No works are required or proposed to the electrical control building. During the extended operational phase, occasional maintenance works will be undertaken as required. Additionally, electrical equipment may be replaced or upgraded, as necessary and per normal operations.

3.4.6 Transformers & Cables

Each turbine utilises its own transformer which is located inside the turbine structure. The transformers increase the electrical voltage on site and on-site electrical cables connect the turbines to the electrical control building.

All on-site electrical cables are located underground and comprise a solid polymeric construction with copper conductors. Electrical cables, which were placed in trenches excavated during the construction phase, typically follow the alignment of the on-site access tracks between the wind turbines and the electrical control building.

No works to the transformers or electrical cables are proposed other than any maintenance work which may be required during the extended operational phase.

3.4.7 Surface Water Management & Site Drainage

During the construction of the Knockastanna Wind Farm, drainage infrastructure (including track-side drains, access track cross-drains, and culverts) was installed to ensure the appropriate management of surface water due, predominately, to the sloping nature of the site. In particular, this infrastructure was installed to collect surface water runoff (arising from rainfall events) from areas of hardstanding (turbine

hardstandings, access track and electrical control building) and direct it to the existing local drainage network. The drainage infrastructure continues to function and is regularly inspected to ensure its efficacy.

Surface water runoff is directed to existing local (agricultural) drainage ditches. While there are no watercourses within the proposed development site, a number of lower-order watercourses; including the Curraghfoil stream; are present in the environs of the site and, due to the topography of the site, it is likely that surface water runoff will subsequently enter these existing watercourses at natural runoff rates.

Other than ongoing maintenance of the drainage infrastructure, no specific works to the existing drainage network are proposed.

3.5 Off-Site & Secondary Developments

3.5.1 Grid Connection

A High Court judgement of December 2014 (*O'Grianna & Ors v An Bord Pleanála*) determined that, for the purposes of EIA, a wind farm's attendant grid connection cannot be separated from the balance of a project, and therefore the cumulative effect of both the wind farm and its grid connection must be assessed in order to comply with the EIA Directive. **Accordingly, the project's grid connection is** assessed within this EIAR. However, it should be noted that as the grid connection does not form part of the wind farm, as permitted by An Bord Pleanála, it does not form part of the accompanying planning application.

The existing wind farm is connected to the national electricity grid at the Cappamore 38kV substation, located c. 10km to the southwest, by approximately 11km of overhead electricity line and c. 200m of underground electricity line from the on-site control building. The overhead electricity line infrastructure comprises a simple pole-and-wire arrangement with electrical lines suspended from wooden pole-sets; while the underground electricity line comprises electrical cables placed in ducts.

No works are required or proposed to the grid connection infrastructure other than occasional maintenance, should it arise.

3.6 Construction Phase

All construction activities associated with the wind farm have been completed and no additional infrastructure is proposed. Any works to be undertaken, including the remounting of turbine T05, comprise routine maintenance works undertaken in the normal management of an operational wind farm.

3.7 Operational Phase

It is proposed to extend the operational phase of the existing development for a further period of 15-years. During this period, the wind turbines and electrical equipment will be operational and, other than routine maintenance and monitoring of the wind turbines and ancillary infrastructure, there will be no other activities on site. The wind farm is currently operated and monitored remotely; however, a regular on-site presence is maintained. It is proposed that such arrangements will continue throughout the proposed extended operational period.

On average, the wind farm will be visited on 1-2 no. occasions per week by a light commercial vehicle for maintenance purposes. Where specific maintenance works are required; for example, the maintenance of the access track or turbine hardstandings; a small number of heavy-goods vehicles (HGVs) may access the site to deliver necessary materials or plant and machinery.

Subject to planning permission being secured for the subject proposed development, works will be undertaken to the foundation of turbine T05 to facilitate its remounting. Such works, which are described at **Section 3.4.1** above, will include a range of plant and machinery accessing, or being delivered to, the site to undertake the necessary works and an increase in the number of personnel travelling to the site. However, the necessary works would be completed intermittently over a number of weeks and would only result in a short-term increase in the volume of traffic in the local area. A crane will also be brought to site to remount the turbine.

Small volumes of waste will continue to be generated during the operational phase including, for example, cooling oils, lubricating oils and packaging from spare parts or equipment. All waste is removed from site and reused, recycled or disposed of in accordance with best-practice and all regulations in a licensed facility; and it is proposed to continue these arrangements.

During the extended operational phase, waste will continue to be removed from site by a local licensed waste contractor.

Further details of the proposed development are provided in each chapter of this EIAR as they relate to each environmental topic.

3.8 Decommissioning Phase

At the end of the proposed additional operational period, several options will be available to the Applicant, including:-

- Further operation of the existing turbines, subject to a technical assessment of the wind turbines;
- Refurbishment/replacement of the turbines and continued operation; and
- Decommissioning of the wind farm.

Any further operation beyond the proposed 15-years would be subject to a further planning application and EIA. However; in its scope, this EIAR assumes that a full decommissioning of the Knockastanna Wind Farm will take place after a further 15-years of operations.

Prior to decommissioning, it is proposed that the Applicant will engage with the Planning Authority to agree a specific Decommissioning Plan to ensure the appropriate decommissioning and reinstatement of the site having regard to prevailing environmental conditions and to ensure the use of best available recycling technology and techniques available at the time. A Planning-Stage Decommissioning Plan, which will be further developed by the appointed contractor, is enclosed at **Annex 3.3**.

In general, all structures above ground level shall be disassembled and removed from the site for reuse or recycling; however, access tracks may be retained depending on the proposed future use of the site. It is likely that, in order to minimise environmental disturbance, the majority of sub-surface elements of the wind farm shall remain in situ. For example, electrical cabling shall be removed and recycled but the ducting within which it is located would remain to avoid unnecessary excavations and further ground disturbance. The following sections detail the methodologies to be implemented during decommissioning.

It should be noted that decommissioning is required under the parent planning permission and the proposed development is simply postponing those activities for a further 15-years. Notwithstanding this, the decommissioning activities envisaged in the Decommissioning Plan have evolved since the original planning application was

submitted and this EIAR, and the NIS, therefore, assesses the methodologies to be implemented.

3.8.1 Wind Turbines

Wind turbines are comprised of the tower, nacelle and blades which are modular items that can be disassembled. This will involve a process which will be similar to the construction phase, but in reverse. If the turbines are to be sold on or reused elsewhere, they shall be removed from site by specialist vehicles similar to those used during their transportation to site.

If wind turbine components are not to be reused, then they shall be scrapped. The tower sections and nacelle are inert steel/ferrous metal structures which are readily recyclable. Having been dismantled, and assuming scrapping/recycling, it is likely that turbine blades will be processed on the crane hardstanding to accommodate their removal by standard HGVs. This process will avoid the requirement for abnormal-sized loads, or oversized vehicles, to utilise the local road network.

The turbine blades are constructed of fibreglass which is not readily re-used or recyclable. Due to the large number of turbine blades currently being decommissioned globally, extensive research[1] is being undertaken to find an alternative use for the fibreglass. There are a number of emerging innovations for fibreglass recycling including the re-purposing of fibreglass for other civil engineering projects (e.g. as a component in concrete production, roofs for social housing and incorporation to the construction of electrical powerline masts/structures.) While extensive research is being undertaken to find a means of recycling decommissioned wind turbine blades[2], this EIAR assumes that, at the proposed date of decommissioning, all blades will be removed to an approved waste handling/recycling facility.

3.8.2 Turbine Foundations

Wind turbine foundations are likely to be grubbed up to a depth of 1m below ground level using conventional mechanical diggers. Exposed rebar and holding down bolts shall be burned off and removed off-site to an approved waste handling facility for recycling or disposal. The broken concrete can be processed to provide an aggregate material to be used elsewhere in construction projects. Alternatively, it may be used on site as an inert fill to make up levels as part of a wider decommissioning/restoration plan, reducing the need for the importation of additional soil onto the site. Excavated areas shall then be soiled over, seeded out or allowed to vegetate naturally.

3.8.3 Turbine Hardstands & Access Tracks

Hardstands shall be grubbed up to a depth of 1m below ground level and the excavated material shall be used to regrade the hardstand area to match existing ground contours and profile. Additional inert material derived from demolition in other areas of the site may be used if sufficient material is available. Once the area has been profiled to match the surrounding ground, soil shall be spread over the reinstated area. This area shall then be seeded out or allowed to vegetate naturally. If it is decided not to retain the access tracks on site for future use, then these shall be removed using a similar methodology.

[1] https://www.re-wind.info/

[2] Additionally, SSE Renewables is currently involved in the SusWIND project which seeks to increase the sustainability of existing wind turbine blades.

3.8.4 Transformers & Cabling

The decommissioning of transformers will depend entirely on any future use of the wind turbine. If the turbine is to be used elsewhere, the transformer will be removed from site for refurbishment and future use. If the turbine is to be scrapped, the transformer will be removed to an approved waste handling/recycling facility and stripped of any useable parts with the remainder being recycled.

The cables at the Knockastanna Wind Farm contain a core of copper which can be recycled. Cables shall be pulled from the existing ducting and removed to an approved waste handling facility where the cores shall be recycled and the remaining material shall be disposed of at an approved facility.

3.8.5 Electrical Control Building

The on-site electrical control building will involve the strip-out and removal of steel, conductors, switches, and other materials and equipment that can be reconditioned and reused or recycled. A soft strip of the building shall ensure that all fixtures and fittings are removed prior demolition.

Demolition of the control building shall take place using conventional demolition methods. Foundations and building services shall be grubbed up to a depth of 1m below ground level. The demolition waste shall comprise mainly rubble (blocks, broken concrete, and plaster etc.) and timber. Rubble can be processed to provide an aggregate material to be used elsewhere in construction projects. Alternatively, it may be used on site as fill elsewhere on the subject site.

Timber and other waste shall be segregated according to material type with a view to recycling where possible or disposal. All demolition materials which cannot be reused on site shall be removed off site to a licensed waste handling facility for recycling or disposal. Excavations shall be backfilled with suitable material, soiled over and seeded out or allowed to vegetate naturally.

3.8.6 Monitoring

A monitoring period of 2-years, immediately following the decommissioning and restoration activities, will be implemented to monitor *inter alia* the vegetative re-colonisation of the site and to ensure that drainage measures continue to function correctly. The monitoring period will allow the site to experience seasonal changes and to determine if additional restoration works are required.