

Proposed Ballynalacken Windfarm Project

Environmental Impact Assessment Report

Non-Technical Summary of the EIA Report 2025



March 2025

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Introduction to this Non-Technical Summary (NTS)

This is the Non-Technical Summary of the Environmental Impact Assessment Report (EIA Report) which has been submitted with the Planning Application to An Bord Pleanála for the Ballynalacken Windfarm Project.

The Non-Technical Summary has been compiled and written by Phil Kenealy, EIA Report Coordinator ((Dip. EIA) of Ecopower Developments, Juliette Harvey, BA (Hons) Anthropology, Cert in Environmental Impact Assessment, member of International Association for Impact Assessment (IAIA), and James Carroll BSc Environmental Science.

It is a summary document, written in non-technical language, avoiding technical terms, detailed data and scientific discussion. The aim is that the Non-Technical Summary is accessible and understandable to a member of the public, who does not have a background in the environment or in-depth knowledge of the development itself.

The Non-Technical Summary provides:

- a summary introduction to the proposed development;
- An overview of relevant policies, and the process undertaken to put together the EIAR
- the different options examined for the development;
- summary descriptions of the proposed development;
- the use of natural resources such as land, soil, water and nature, and the emissions and wastes expected;
- the environment surrounding the development specific to each environmental topic (i.e. land, soils, water, air quality, noise and shadow flicker, climate, biodiversity (habitats and animals), the landscape and visual amenity, cultural heritage, material assets (such as roads, services under roads and on overhead line, telecommunication signals, and aviation) and to the local population and human health. The likely effects of the project during its construction and operation and during the eventual decommissioning of the windfarm are examined in relation to each of these topics;
- The potential for the impacts from other projects to combine with the Ballynalacken project is also examined;
- Summary of the key mitigation measures that will be implemented to avoid or reduce negative effects;
- The residual impacts on each of the environmental topic factors. The residual impact is the impact that will occur after the mitigation measures have taken effect.

Non-Tech Summary: Ch1 Introduction and Policy Context

NTS of EIAR Section 1.1 and 1.2: The Ballynalacken Windfarm Project Proposal

It is proposed to **construct and operate twelve (12) wind turbines and associated works** on the elevated lands equidistant **between the towns of Ballyragget (4.3km) and Castlecomer (4.2km) in County Kilkenny**, and 3.2km from the village of Ballinakill in County Laois. The villages of Ballyoskill and Attanagh are located 3km and 3.9km respectively to the west-northwest of the windfarm.

The wind turbines and associated works will be located in Byrnesgrove; Commons; Ballymartin; Ballynalacken; Ballyoskill and Loughill townlands. The windfarm control building will be located in Ballymartin townland. The windfarm substation will be located in Tinnalintan townland. Underground electrical cabling will connect the windfarm control building to the windfarm substation through Ballymartin and Tinnalintan townlands. There will be an underground grid connection laid from the windfarm substation in Tinnalintan to the EirGrid Ballyragget Substation in Moatpark townland.

The Ballynalacken Windfarm associated works include twelve foundations and hardstanding areas, on-site windfarm roads, an on-site windfarm control building and internal underground cabling connecting the turbines to an electrical control building; an off-site windfarm substation called Tinnalintan Substation in this Report; underground cabling connecting the windfarm control building to the Tinnalintan Substation; underground cabling and associated grid connection works from the Tinnalintan Substation to the EirGrid Ballyragget Substation; ancillary works including site entrances, met mast, telecoms relay pole, site drainage network, temporary construction compounds, temporary borrow pits, temporary works in private lands and along the public road corridor; public road widening works, haul route works and activities, and landscaping and reinstatement works.

NTS of EIAR Section 1.3 The Project Promoters

Ecopower and Art Generation, two Kilkenny based companies, have combined to form **Rowanmere Limited** with the purpose of jointly developing the proposed Ballynalacken Windfarm Project. Ecopower and Art Generation are well established developers experienced in the development, construction and operation of windfarm projects throughout Ireland.

NTS of EIAR Section 1.4 Application to An Bord Pleanála

The planning application for the Ballynalacken Windfarm Project will be made directly to An Bord Pleanála. This is because, the Board decided during a pre-application process that the proposed Ballynalacken Windfarm Project is a 'strategic infrastructure development' in accordance with the Planning and Development Act 2000 (as amended) and therefore the application must be submitted directly to An Bord Pleanála and not to Kilkenny County Council.

NTS of EIAR Section 1.5 Structure of the Planning Application

The planning application consists of a number of documents, which are grouped in Volumes (A to E) for ease of accessibility:

- A. Planning application, newspaper and site notices, list of prescribed bodies who have been notified that the planning application has been lodged, landowner letters of consent, and EIA Portal details.
- B. Planning Drawings pack
- C. Environmental Impact Assessment Report, which includes this Non Technical Summary
- D. Environmental Management Plan for the Project
- E. Appropriate Assessment Report

NTS of EIAR Section 1.6 Policy Context

NTS of EIAR Sec.1.6.1 European Policy

Renewable Energy Directive: The Renewable Energy Directive (RED) is the framework for the development of renewable energy across all sectors of the EU economy. November 2023 RED III is the latest Directive, which pushes the renewable energy targets upwards in order to combat increasing greenhouse gas emissions. RED III seeks to increase the EU wide renewable energy generation target to reach 45% by 2030. RED III is legally binding on all EU Member states and the proposed Ballynalacken Windfarm will support Ireland in reaching its obligations under the Directive.

REPowerEU Emergency Plan: In 2022, in response to Russia's invasion of Ukraine, the EU adopted an emergency Plan – REPowerEU, to boost Europe's energy independence from Russian gas, oil and coal. The plan aims to diversify gas supply sources from Russia and to accelerate the generation of electricity in the EU from renewable sources. Relevant to Ballynalacken Windfarm, the Plan recognises the importance of wind energy as a renewable energy source. The commitment is to more than double the amount of wind energy electricity generated in the EU by 2030. Regulation (EU) 2022/2577 was adopted in December 2022 to lay down a framework to accelerate the deployment of renewable energy in the EU Member states.

The Ballynalacken Windfarm Project is compliant with these EU plans for indigenous European Union renewable electricity supplies. Ballynalacken Windfarm will generate approx 140 million kWh per annum of renewable generated electricity from the power in the wind.

NTS of EIAR Sec.1.6.2 National Policy

Climate Action Plan 2024 (CAP24): In Ireland, the government is creating and implementing Irish policies and strategies to achieve its long-term goal of transitioning to a low-carbon, climate-resilient and environmentally sustainable economy by 2050.

Ballynalacken Windfarm Project Contribution to Climate Action: Ballynalacken Windfarm is aligned with Climate Action Plan 2024 and will contribute positively to the increasing imperative to ameliorate climate change by generating electricity without polluting greenhouse gas emissions.

To better understand the value of the Ballynalacken Windfarm contribution e.g.: **Homes Supplied:** 31,021 homes in Kilkenny and Laois per annum and **Carbon Dioxide equivalent (CO₂e) offsets:** Saving of 35,700

tonnes of Carbon Dioxide equivalent (CO₂e) per annum. This saving would be equivalent to 19,820 diesel / petrol cars switching to electric vehicle.

National Planning Framework: Project Ireland 2040: The Framework acknowledges that greenhouse gas emissions from the energy sector must be reduced by at least 80% by 2050 when compared to 1990 levels, while ensuring a secure supply of energy exists. The development of Ballynalacken Windfarm is in line with the aims and objectives of the Framework which seeks to transition to a low carbon and climate resilient economy. Similarly, one of the **National Development Plan 2021-2030** strategic climate priorities is the need for low-carbon, resilient electricity systems; specifically, the plan commits to increasing the share of renewable electricity up to 80% by 2030.

Wind Energy Guidelines: The Wind Energy Development Guidelines 2006 have been taken into account in the design of the Ballynalacken Windfarm. The Draft Revised Wind Energy Development Guidelines 2019 have also been considered in the design of Ballynalacken Windfarm, to the extent practicable, given the draft status of these Guidelines.

NTS of EIAR Sec.1.6.3 Regional Policy

The Southern Regional Assembly - Regional Spatial and Economic Strategy is supportive of the future growth of renewable energy technology in the Southern Region and sets a clear precedent to identify and capitalise on those opportunities associated with the transition to renewable energy generation.

NTS of EIAR Sec.1.6.4 Local Policy – Kilkenny City & County Development Plan (2021-2027)

Kilkenny City and County Development Plan 2021-2027 is also supportive of climate action and the development of renewable resources including wind energy, in suitable locations in the County. The proposed development location is identified as a suitable location for wind energy development in the Wind Energy Strategy for the County. The developer has also identified the site as suitable for the development of a windfarm due to elevation and scale, absence of designated sites, the prospect of achieving an adequate separation distance from the nearest houses and national grid connection possibilities.

Looking to the future, by 2030, it is estimated that County Kilkenny will use 633 Gigawatt hours (Gwh) of electricity. According to the latest figures from Wind Energy Ireland, Kilkenny generated 138 Gigawatt hours of electricity in 2024 from wind turbines located in the County. In order to reach the strategic aim of generating 100% of electricity demand from renewables. County Kilkenny needs to increase generation capacity from renewables. Ballynalacken Windfarm will deliver an estimated 140 Gigawatt hours per annum of renewable electricity to assist in reaching the Kilkenny City and County Development Plan Strategic Aim target and the Objective to increase production. Ireland and Kilkenny have excellent renewable energy resources, which will be a critical and growing component of Irish energy supply in the future as set out in the policy context for all renewables in the Kilkenny City and County Development Plan.

Kilkenny City and County Development Plan Locational Requirements for Wind Energy Developments

Within County Kilkenny, the Council's Wind Energy Strategy identifies key areas where there is significant wind energy potential and grid connection capacity, where-subject to criteria such as design and landscape planning, natural heritage, environmental and amenity considerations-wind energy development will be either acceptable, open for consideration or not permissible. Ballynalacken Windfarm is within an area where wind energy developments are considered 'Acceptable in Principle' and where the Strategy states that

Acceptable in Principle areas are “preferred area for wind energy development, characterised by high wind speeds, and no significant conflict with environmental designations or sensitivities”.

The Ballynalacken Windfarm is large scale, within a location that is compatible with the Council’s Wind Energy Development Strategy. Also, according to the competent expert who prepared the landscape chapter for the EIA Report, the location is also compatible with the Department of Environment, Heritage and Local Government Wind Energy Development Guidelines (2006) which provide guidance on wind farm siting and design criteria for a number of different landscape types. Overall, the expert considers that the Ballynalacken Windfarm design, is fully in accordance with the guidance for this landscape setting. Even in respect of turbine height, which the guidance states would; “tend not to be tall” the location is acceptable because of the exception made for ridgelines of a relatively large scale and the fact that these are not tall turbines by current standards. The Ballynalacken Windfarm proposal is compatible with the Climate Change and Renewable Energy Strategic Aims of the Kilkenny City and County Development Plan because the proposed windfarm renewable energy generation of 140 Gigawatt hours (Gwh) per annum, will contribute to the delivery on the obligations of the State to transition to low carbon and climate resilient society and to promote and facilitate all forms of renewable energies in a sustainable manner.

NTS of EIAR Sec.1.6.5

Summary of Policy Context

The proposed development of a windfarm of c.50Megawatt (MW) installed capacity is compatible with **European and National Policy** on the de-carbonisation of the electricity sector as part of Climate Action imperatives. The proposal is also compatible with European and National policy to develop indigenous, renewable sources of electricity generation in the context of security of supply independent of gas supply, particularly from Russia and other fossil fuel suppliers outside of the EU area.

NTS of EIAR Sec.1.6.6

Financial Contribution to Kilkenny Local Authority Area

Community Benefit Scheme, a Ballynalacken Windfarm Community Fund of **c.€280,000 per annum**

Distribution of the Community Benefit Fund, Designed to benefit local residents in the vicinity of the windfarm annually. A local fund committee will be formed and the fund will support a near neighbour scheme of direct payments to local residents in the vicinity of the windfarm annually. It will also provide **sustainable funding for retrofit schemes, community enterprises, clubs and societies locally**. It will be the **responsibility of those operating the fund to administer the fund** in a manner that will predominantly benefit the area local to Ballynalacken Windfarm to ensure that those most impacted by the windfarm in the locality, receive the greatest benefit.

Landowner Payments, Lease payments totalling **c.€700,000** will be paid annually to the landowners.

Commercial Rates to Kilkenny County Council, commercial rates payments are predicted to be **c.€800,000 per annum**, delivering a positive benefit to the population of Kilkenny.

Non-Tech Summary: Ch2 EIAR Process and Presentation

NTS of EIAR Section 2.1 The EIA Directive

The Environmental Impact Assessment (EIA) of projects is governed by the European Directive – the EIA Directive, which requires that projects that are likely to have significant effects on the environment be made subject to assessment prior to development consent being given by the planning authority.

As Ballynalacken Windfarm Project is a large infrastructure project, an EIA Report accompanies the planning application.

NTS of EIAR Section 2.3 The Environmental Impact Assessment Report

This EIA Report fulfils all the requirements of an EIA Report under the EIA Directive and has been carried out in accordance with the EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (published in 2022).

An EIA Report requires that specialist engineering and environmental consultants are engaged for the planning, design and evaluation of the Ballynalacken Windfarm Project. The specialists who are competent in their field of expertise were engaged to evaluate the effects of the proposal on the environmental topics that are prescribed under the Directive.

The effects on the following environmental topics during construction, operation and decommissioning of the development must be analysed – effects on :

- land;
- soils;
- water;
- air (air quality, noise and vibration; shadow flicker);
- climate;
- biodiversity (nature);
- landscape;
- cultural heritage (archaeology and architectural heritage);
- material assets (public roads and underground and overhead services); telecommunications (existing masts on-site);
- local population and
- human health.

NTS of EIAR Section 2.4 Scoping for the Content and Extent of the EIA Report

A process of determining the content and extent of information to be submitted to the planning authority is used to ensure that the environmental assessment is focused on any likely significant effects of the project.

A process is used to identify sensitive aspects of the environment which have potential to be affected by the development. Within this process, techniques such as field surveys; desktop surveys; information from other assessments; industry guidance and competent experts knowledge and expertise are used. Study areas are identified, relevant to each topic and each sensitive aspect.

A process or action that is used to avoid, reduce or remedy the effects of a development is known as **mitigation**. The primary mitigation for the proposed project is mitigation by avoidance i.e. the design of the Project through the consideration of alternative locations, layouts, size and scale. Mitigation measures to reduce any negative effects if required/possible, are brought forward and the final or residual effect is established and quantified.

Residual effects is the final intended or predicted effects after the implementation of a mitigation measure. The co-ordination of these separate chapters was organised by EIA practitioners in Ecopower Developments.

NTS of EIAR Section 2.5 Evaluation Methodology used in this EIA Report

The environmental topic chapters are generally carried out in accordance with that topic's (e.g. Soil) best practice industry guidelines (e.g. *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (NRA, 2009).

Where industry specific guidelines are not available or not applicable, then the topic experts have used a multi-criteria decision analysis approach together with the guidance provided in the *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA, 2022).

The methods used for the evaluations are details at the start of the topic chapter.

NTS of EIAR Section 2.6 Descriptive Terminology Used in this EIA Report

The evaluations in the EIA Report use widely accepted meanings that are used in the EIA report along with table's that define how some of the terminology can be interpreted.

New terminology can make it challenging to understand new information. In support of knowledge exchange, there is a **Glossary of Terms** at the beginning of each EIA report chapter.

The terms used to describe effects are the Environmental Protection Agency (EPA) definitions taken from the latest relevant guidance - *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA. May 2022). The key terminology is presented in the tables below:

Quality of Effect	Description
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities)
Neutral Effect	No effect or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Probability of Effect	
Likely Effect	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effect	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Type of effect	
Residual Effects	The impact that will occur after the proposed mitigation measures have taken effect.
‘Do Nothing’ Effect:	The environment as it would be in the future should the project not be carried out.
Duration of Effect	
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Frequency of Impacts	How often the effects will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Significance of Effect	
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Impacts	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Impacts	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant Impacts	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant Impacts	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound Impacts	An effect which obliterates sensitive characteristics

The EIAR Guidelines also highlight that ‘Significance’ is a concept that can have different meanings for different topics. For the purposes of this EIAR, effects rated as being ‘Significant’, ‘Very Significant’ and ‘Profound’ are considered to be significant in EIA terms. Effects rated as being ‘Moderate’ are effectively significant or not significant, subject to professional judgement, and Effects rated as ‘Imperceptible’, ‘Not Significant’ and ‘Slight’ are considered to be not significant in EIA terms.

NTS of EIAR Section 2.7 Presentation of the EIA Report

Ease of reading, clarity and structure were key considerations during chapter preparation and review to produce an Environmental Impact Assessment report that is concise and well-integrated across the environmental topic chapters.

The appendices and mapping used to present the information are included at the end of each topic chapter.

Red font is used to cross reference to the appendices and figures.

A list of chapter figures, appendices, a glossary of terms and a list of abbreviations is included at the start of each chapter of the EIA Report.

Non-Tech Summary: Ch3 Consultation

NTS of EIAR Section 3.1 to Section 3.8: Consultation with An Bord Pleanála, Kilkenny County Council and Various Other Bodies

During the design of the Project and during the preparation of the EIA Report, consultations regarding the proposal were carried out with An Bord Pleanála; Kilkenny County Council; National Monument Service; National Parks and Wildlife Service; Inland Fisheries Ireland; Uisce Éireann; Transport Infrastructure Ireland; Irish Aviation Authority; and other statutory and non-government bodies with an interest in the environment. Their considerations informed the design and the specific issues to be examined/resolved in EIA Report chapters.

NTS of EIAR Section 3.9 Consultation with the Public

Consultation with the public has occurred. Most of the landowners involved in the proposed project live locally and they are fully apprised of the proposal. A public information event was held in July 2025 and all houses within 1km of a proposed turbine were provided with a summary of the proposal by mailshot prior to the event. Notice of the **public information event** which took place in Ballyouskill Hall, was also **advertised** in the local newspaper and in the parish newsletter. Qualified experts were on hand, at the event to engage with the public and to explain the specifics of the environmental findings of the pre-planning surveys and evaluations and respond to questions people had. Details on the amount and operation of the project community benefit fund were also provided. Local feedback and knowledge exchange during the event informed the design of the final project.

A dedicated community website www.ballynalackenwindfarm.com is available to provide an overview of the proposal and contains contact details of the **dedicated project community liaison** person for the project. The site is updated with the progress of the proposal including the submission of the planning application and the procedure and timelines for submitting observations on the development to the planning authority, which in this case is An Bord Pleanála.

NTS of EIAR Sec.3.9.1 Public Consultation via the Planning System

Because the windfarm will have an output capacity of more than 50MW it falls within the criteria of Part 1 of the Seventh Schedule of the Planning and Development Act 2000 (as amended) and thus is considered Strategic Infrastructure Development (SID) and therefore the application for planning permission must be made directly to An Bord Pleanála. The **public has the same right of participation** in the planning process under the Strategic Infrastructure Development planning system as under the Local Authority system.

The **Site and Newspaper Notices** have been erected prior to the submission of the planning application and the application will have its own dedicated planning website with the full application available – www.ballynalackenwindfarmplanning.ie

The **planning documents** submitted to An Bord Pleanála are also **accessible online** through a link on www.pleanala.ie and can be **viewed** at their offices in 64 Marlborough St, Rotunda, Dublin 1. Any submission/observation on the application must be made to An Bord Pleanála within the period specified. The Bord Pleanála website will provide information on how the public can make a submission/observation,

either online or in writing about the application. An Bord Pleanála is obliged to take the public's views into account when deciding on an application.

The full application will also be made **available by Kilkenny County Council online** at <https://planning.kilkennycoco.ie/SearchExact> and a **paper copy** of the application can also be examined at the offices of Kilkenny County Council, County Hall, John Street, Kilkenny.

General public notice on applications for projects subject to Environmental Impact Assessment (EIA), is through the EIA Portal hosted by the Department of Housing, Local Government and Heritage prior to the lodging of the application. The EIA Portal is an online map-based website that provides the public with information on current applications for development consent which are accompanied by an Environmental Impact Assessment Report. The **EIA Portal** web link is

<https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1>

Non-Tech Summary: Ch4 Alternatives Considered

NTS of EIAR Section 4.1 Requirements under the EIA Directive

In accordance with the EIA Directive, this chapter of the EIAR comprises a description of the reasonable alternatives studied by the developer for Ballynalacken Windfarm Project which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

NTS of EIAR Section 4.2 Alternative Site Locations

Alternatives were considered for the windfarm site location in the context of the Wind Energy Strategy for County Kilkenny and the capacity of electricity infrastructure in the County.

The highest tier of acceptability for the location of wind energy development as identified in the strategy, was the developers preferred option. A number of sites in North Kilkenny were considered. **The chosen site is the Ballynalacken site in Upland Area B Castlecomer Plateau** which is an area Acceptable in Principle for large windfarm development.

NTS of EIAR Section 4.3 Alternative Locations – Grid Connection Point

Alternatives were considered for **alternative grid connection points**. The grid operator, Eirgrid is currently completing upgrades to Ballyragget Substation, and is completing the construction of the 110kV OHL between Ballyragget and Coolnabacky, near Portlaoise. These upgrade works will result in grid capacity becoming available locally, which is sufficient to accept electricity generated by a large-scale windfarm. Two alternative locations were considered – (i) the existing Eirgrid Ballyragget Substation at Moatpark, and (ii) Knockardagur Substation, which is consented as part of the Pinewood Windfarm development in Co Laois. **The chosen grid connection point is the Ballyragget Substation.**

NTS of EIAR Section 4.4 Alternative 110kV Substation and Cable Routes

Three locations for the 110kV substation were considered, one at the top of the hill on the windfarm site, and two locations at the bottom of the hill in Tinnalintan townland. **The chosen location for the Tinnalintan Substation was the more southerly location in Tinnalintan townland.**

Overhead lines and underground cables were considered as alternative connection types, **the chosen type of connection was underground cable.**

Alternative routes along the public road and through private lands were considered for the cable (called the Internal Cable Link) between the windfarm and the substation at Tinnalintan. **The chosen route for the Internal Cable Link is mainly through private lands, with a section along the public road in Tinnalintan.**

Alternative routes along the public road and through private lands were also considered for the Grid Connection cables between the Tinnalintan Substation and the grid connection point at the Ballyragget Substation. **The chosen route for the Grid Connection is along site access road and the public road.**

NTS of EIAR Section 4.5 Alternative Size and Scale of the Wind Turbines

Alternatives were considered for **alternative turbine sizes and numbers**. In the context of sustainable development and efficient use of available site area and grid capacity locally, several combinations of turbine size/turbine numbers were considered. These included;

- (i) turbines with tip heights of 185m to 200m,
- (ii) turbines with tip heights of 150 to 180m, and
- (iii) turbines with tip heights of 120 to 150m.

The developer considered that turbines with 185-200m tip heights are too large in scale for the windfarm site, and as a result did not develop this size turbine any further.

During the early design stage, the developer considered the two remaining alternative turbine sizes – 150-180m tip heights compared to 120-150m tip heights, and a wind farm was modelled using 9 turbines with 150m-180m tip heights, and 18 turbines with 120-150m tip heights. Although of a smaller scale and therefore less visually dominant locally, it was considered that 18 Turbines with 120-150m tip heights would cause greater visual clutter and complexity when viewed from the wider surrounding area. In contrast, the 9 Turbines with 150m - 180m tip heights presents a simpler cleaner layout. In addition, the 9 Turbines with 150-180m tip height windfarm would require less construction works, and therefore construction related effects to the receiving environment would be less with this combination. It was also noted that the smaller sized turbines – i.e. the 120-150m tip height turbines are becoming increasingly hard to procure, with some models already unavailable to the Irish market. For these reasons, **turbines with a tip-height of 150m-180m was the chosen size/scale for the Ballynalacken Windfarm Site.**

NTS of EIAR Sec.4.5.1 Further Alternative Size/Scale Considered following Public Feedback

During the site design and landowner consultation phase, additional lands became available and the final landholding accommodated 12 Turbines 150m-180m tip height. A windfarm comprising 12 turbines, 170m tip height (with a rotor diameter of 150m) and 6MW each was designed. This design was presented at an information event in the local community (Ballyousskill Hall, July 2024).

Concerns expressed by members of the local community about the size of the proposed turbine, was considered by the developer and used to further inform the project design, and a wind turbine with an overall tip height of 155m (reduction of 15m tip height) and with a smaller rotor diameter of 117m (reduction of 33m) was selected as the turbine size for the site. **12 Turbines with a 155m Tip Height and 117m rotor diameter is the chosen Turbine Size/Number combination for the windfarm site.**

NTS of EIAR Section 4.6 'Do Nothing' Alternative

The '**do-nothing**' alternative of not proceeding with Ballynalacken Windfarm is also examined. The 'do-nothing' alternative represents an opportunity lost of:

- Loss of significant community benefit funds to the locality,
- loss of significant commercial rates to the County,
- loss of the opportunity to contribute to the development of indigenous renewable energy electricity generation in Ireland and
- **most significantly a lost opportunity to contribute to national and international efforts on Climate Change Action.**

Non-Tech Summary: Ch5 Description of the Development

NTS of EIAR Section 5.1 Overview of the Proposed Ballynalacken Windfarm Project

The proposal is to build a 12-turbine windfarm and ancillary works to be called the Ballynalacken Windfarm Project and to connect the windfarm by underground cable to the EirGrid Ballyragget Substation. The Ballynalacken Windfarm Project is proposed for locations on elevated lands between the towns of Ballyragget and Castlecomer, County Kilkenny

NTS of EIAR Section 5.2 Purpose of Proposed Ballynalacken Windfarm Project

Ballynalacken Windfarm aims to generate electricity from the power in the wind. This electricity will go to the National Grid and be for sale in the Irish electricity market. Generating electricity from wind has the advantages of being renewable and sustainable. The activity of generating electricity from the wind has no associated air pollution emissions.

There is a financial contribution from the windfarm during its operational life. This is locally through landowner payments of c.€700,000 per annum, the Community Benefit Fund of €280,000 per annum and also to County Kilkenny through commercial rates of c. €800,000 per annum.

NTS of EIAR Sec.5.2.1 Location of the Ballynalacken Windfarm Project

The proposed Ballynalacken Windfarm locations are typical of Kilkenny rural countryside with lands enclosed by hedgerows. There are farmsteads and one-off housing located in the open countryside and generally the commercial, civic and community services are in the surrounding small towns and villages. Farming in the area is predominantly grassland, with some commercial forestry on the higher ground. Ballynalacken Windfarm site itself comprises agricultural grassland and commercial forestry.

NTS of EIAR Section 5.3 Location of the Ballynalacken Windfarm Project

The Windfarm and Substation

Seven of the twelve turbine locations are proposed for forestry lands in Byrnesgrove; Commons; Ballymartin and Ballynalacken townland. Five are proposed for agricultural grassland in Ballynalacken; Ballyoskill and Loughill townland. The Met Mast is proposed for a field in Loughill townland and a Telecom Relay Pole is proposed for Ballynalacken townland.

The internal windfarm cabling from the twelve turbines will be undergrounded to an electrical control building (the Windfarm Control Building) which is proposed for a field in Ballymartin townland.

The Windfarm Control Building will be connected to the Tinnalintan Substation by underground cabling through grassland in Ballymartin and Tinnalintan townlands, with short sections under the public roads. The Windfarm Substation is proposed for a field in Tinnalintan townland, 3km to the west of the windfarm site.

The Grid Connection: Approval for connection of Ballynalacken Windfarm to the national electrical transmission network will be sought from EirGrid. A grid application can only be made after application for the windfarm has been made to the planning authority. However, at this stage, it is anticipated that the

electricity from Ballynalacken Windfarm will be exported to the national electricity system at the existing EirGrid Ballyragget Substation which is located at Moatpark on the Regional Road (R432) between Ballyragget and Ballinakill.

The proposed Ballynalacken Grid Connection will be laid under private and public roads from the Tinnalintan Substation in Tinnalintan to the EirGrid Ballyragget Substation, in Moatpark. The route is through the townlands of Tinnalintan, Coole and Moatpark.

It is proposed that the Project works locations will be accessed from the public road network from 11 No. Site Entrances.

The location of the development on OSI Discovery mapping is illustrated on **NTS Figure 1**.

The layout of the windfarm, cable routes, the Tinnalintan substation and the grid connection is shown on aerial photography mapping on **NTS Figure 2**.

These illustrations can be found at the end of this Non-Technical Summary.

NTS of EIAR Section 5.4 Size and Design of the Ballynalacken Windfarm Project

NTS of EIAR Sec.5.4.1 Size and Design of Ballynalacken Windfarm

NTS of EIAR S.5.4.1.1 Wind Turbines

The proposed turbines will have a rotor diameter of 117m and a 96.5m hub height giving an uppermost tip height of 155m. This is for eleven of the twelve turbines. One turbine (turbine T4) is lower with a hub height of 84m and a rotor diameter of 117m, giving an uppermost tip height of 142.5m.

The turbines will be the usual three-bladed, tubular tower turbine design. They will be finished in high specification, factory applied paint finish - light grey in colour, with no nacelle logo.

The towers will be tubular steel, slightly tapering from the base to the top where the nacelle will be mounted. The nacelle at the top of each turbine tower will contain the generator, gearbox and the control unit which monitors and controls all the major functions of the turbine. The nacelle will have effective sound insulation which will ensure minimal noise emissions.

The blades will taper to tip and include serrated edges along the outside edge to reduce aerodynamic resistance (noise). The blades will be made of fiberglass reinforced epoxy and are affixed to the turbine at the nacelle.

At present, this turbine size has a **generator capacity** of 4.2 Megawatt (MW).

Each wind turbine will require a reinforced concrete **foundation**. The foundation will have a diameter of 20m and depth of 3.2m. The bottom section of the turbine tower is fixed to a steel unit embedded in the foundation.

Each wind turbine will require a **hardstand area** adjacent to the foundation, to provide a safe, level working area around each turbine position and to accommodate the large cranes used in the assembly and erection of turbines. This area is designed primarily for the construction phase works but will also provide safe access for maintenance during operations. The construction phase hardstands will be 77m by 35m, with a total area of 2695m². Following the erection of the turbine, an area of 32m x 30m (960m²) will be concealed from view at each hardstand area as the full extent of the construction phase hardstands will not be required during the operational phase of the windfarm. This area will be covered with 200mm of soil, using soils which were

excavated during initial groundworks and stored in a overburden storage area at the turbine location. The covered over area will be sown with low growing grasses.

NTS of EIAR S.5.4.1.2 Internal Cabling

The Internal Windfarm Cabling will link the turbines together into a turbine 'string' and connect these strings to the Windfarm Control Building. The cabling will be undergrounded in trenches 1.25m deep.

NTS of EIAR S.5.4.1.3 Windfarm Site Roads

The Windfarm Site Roads will involve the construction of 5.8km of new access roads and the upgrading of 1.7km of existing private farm roads and forestry roads. The new Windfarm Site Roads will be 4.5m in width and wider at bends. The site roads will be constructed of crushed stone over a layer of geotextile material. The site roads will be capped with a layer of hardwearing limestone. Existing farm and forestry roadways will be widened and surfaced in the same manner as the new site roads.

NTS of EIAR S.5.4.1.4 Windfarm Control Building

A compound containing a control building will be constructed at the windfarm site to gather and regulate the electricity from the wind turbine. The compound yard will be 910m², and the new Control Building will measure 20m x 10m, with a height of 6.9m. The Windfarm Control Building will contain electrical and communications equipment, along with a storage room, canteen and welfare facilities. All the electricity generated at the windfarm will be sent from the Windfarm Control Building to the Substation at Tinnalintan, via underground cables (internal cable link).

NTS of EIAR S.5.4.1.5 Internal Cable Link to Tinnalintan Substation

The cabling will be 4km in length installed under windfarm site roads; under agricultural lands; public road corridor; site access road and under Tinnalintan Substation hard core area. The Internal Cable Link will comprise cables, ducts and other apparatus installed in a trench, 1.25m deep and up to 0.75m wide.

NTS of EIAR Sec.5.4.2 Size and Design of Tinnalintan Substation and the Grid Connection

NTS of EIAR S.5.4.2.1 Tinnalintan Substation

The windfarm substation in Tinnalintan (called the Tinnalintan Substation) will consist of a hardcore compound yard containing control buildings, lightning protection monopoles, underground cabling and overhead wire and other electrical equipment and apparatus. The Tinnalintan Substation will be 110kV capacity.

The compound yard will be 129m x 58m in size, surrounded by a perimeter palisade security fencing (2.6m in height) with entrance gates. The Control Buildings will be standard single storey concrete block buildings with nap plaster render and black slate roofs. The Control Buildings will contain electrical and metering equipment, along with welfare and storage facilities. The compound will also contain outdoor electrical equipment and apparatus including lightning protection monopoles 18.5m in height. The compound will be serviced by an integrated drainage system. A new hedgerow will be planted to the north of the compound to provide screening from local residences. Access to the Substation will be via an existing farm entrance on the L58442, and then along 0.7km of site access road to the new substation compound.

NTS of EIAR S.5.4.2.2 Ballynalacken Grid Connection

The Ballynalacken Grid Connection will connect the Tinnalintan Substation to the national electricity system at the existing EirGrid Ballyragget Substation. The works will be 2km in length, comprising underground cables and three Joint Bays. The Ballynalacken Grid Connection cabling will be laid under hardcore area at the Tinnalintan Substation; under site access road; under the local road L58442, under the Regional Road R432, and under the existing hardcore area associated with the EirGrid Ballyragget Substation.

The grid connection cabling will be installed in trenches (c.1.3m deep and 0.6m wide). Ducts will be laid on bedding sand and then surrounded by concrete, and red cable protection strip and yellow warning tape will be placed over the concrete in the trench before the top of the trench is backfilled and reinstated. The cables will be pulled through the ducts and joined together at the jointing chambers (Joint Bays) along the route. A man-hole type cover will be fitted over the Joint Bay chambers. The manhole covers will be the only surface expression of the cabling when works are completed. The design of the Ballynalacken Grid Connection complies with EirGrid specifications and technical and operational requirements.

New plant and electrical apparatus will also be installed for Ballynalacken Grid Connection at the Eirgrid Ballyragget Substation.

NTS of EIAR Sec.5.4.3 Size and Design of Ancillary Works

Site Entrances: The windfarm and substation works locations will be accessed from the public road network in the vicinity from eleven entrances – three new entrances and eight existing entrances to farm or forestry lands.

Meteorological Masts: It is proposed to erect one met mast 30m in height with meteorological equipment attached 1.1km to the east of the windfarm site, which is used to monitor meteorological conditions independent of the equipment on the wind turbines.

Telecom Relay Pole: The Telecom Relay Pole will comprise a c.18m wooden pole with antennae attached and it can be used to relay existing communications links if they are impacted by the operating windfarm.

Site Drainage System: Surface water run-off management during both the construction and operational phases of the proposed development will be implemented through a surface water management plan which has been designed for the project. The system will comprise permanent drainage channels which will be installed around the turbine foundation and hardstanding areas, and around the new and upgraded Windfarm Site Roads, Windfarm Control Building, and around Tinnalintan Substation. Permanent concealed drains will be installed at the Site Entrances at the public road to prevent water runoff from construction/site areas flowing onto the road. No drainage will be required for the cabling works. The drainage at temporary infrastructure areas, such as borrow pits or construction compounds will be removed at the end of the construction phase, during reinstatement works.

Crossing of Watercourses & Wet Drainage channels: One small stream and four wet drainage channels occur at the windfarm site, mainly in Commons/Ballymartin. In order to cross these watercourses/channels to access turbine locations, four new crossing structures and an extension to an existing plastic pipe are required. These crossings are identified as W1 (Cloghnagh stream) and D1 to D4 (wet drainage channels) in the EIA Report.

Outside of the windfarm site, there are two stream crossings along cable routes (these are identified as W2 along the Internal Cable Link route, and W3 along the Grid Connection route. Both of these cross the Rathduff stream. The cabling will be installed in the public road over the culvert at W2, and either over the bridge (in the deck) or under the bridge (by directional drilling) at W3.

Crossing of Existing Farm, Forestry and Road Drains: Manmade drainage ditches occur around the edges of some agricultural grassland fields, and a network of small drains occur within forested sections of the windfarm site. The forestry drains will be diverted around construction works areas to minimise the amount of water in the vicinity of the works. Where existing drains interact with the windfarm infrastructure, they will be incorporated into the site drainage network.

Crossing Existing Underground Services: Underground services relevant to the Ballynalacken Grid Connection route include Uisce Eireann water pipes and Eir communication cables. The grid connection cabling will be installed under these services, in accordance with EirGrid and Uisce Eireann specifications.

Temporary Construction Works Area Boundary Fencing: Temporary livestock-proof fencing will be installed ahead of construction works along the alignment of the construction works area boundary. The fencing will protect the adjoining lands, and will also protect sensitive cultural heritage or biodiversity features in the vicinity of the construction works by preventing the encroachment of personnel, machinery, or materials onto lands outside of the works area boundary.

Temporary Construction Compounds: Three temporary construction compounds will be set up at the beginning of the construction stage two in Ballynalacken and one at the Tinnalintan Substation.

Temporary Borrow Pits: In order to provide an on-site source for the majority of construction stone, it is proposed that stone will be won from two on-site borrow pits in Ballynalacken/ Ballymartin townlands. It is anticipated that the stone will be extracted by rock breaking. Following construction, the borrow pit will be reinstated to the same level as the existing and surrounding ground level and reseeded with grass species in keeping with the surrounding lands, for return to agricultural /forestry use.

Soil Deposition Areas: Soils will be stored on both a temporary basis and long-term basis at the windfarm site. Some soil will be stored temporarily and will be used to reinstate borrow pits and temporary compound areas, and use to cover part of the hardstands at the end of construction. Long-term deposition will also be required, the storage areas will be located inside of the site drainage network.

Turbine Component Delivery Facilitating Works: Turbine components are transported by sea to Ireland. From the port, special extendable flatbed semi-trailers will be used to transport the components by road using the motorway and national road networks to the vicinity of the windfarm site. It is expected that the turbine components for Ballynalacken Windfarm will be delivered to the Port of Waterford at Belview. Recent(2024) works to adapt the Slieverue and Luffany Roundabouts have been completed to facilitate the transport of large turbine components from the port to the M9 motorway network. Therefore, no further works between the Port of Waterford and Exit 8 (Kilkenny) on the M9 motorway will be required for the delivery of the Ballynalacken Windfarm turbine components.

Turbine components transportation vehicles will use the motorway and national road network from port, joining the M9 and using Exit 8 (Kilkenny) then the N10 to the outskirts of Kilkenny City. The vehicles will then follow the N77 and then the N78 (Kilkenny - Castlecomer Road); travel into Castlecomer town and then turning towards Ballyragget onto the R694 (Castlecomer-Ballyragget-Freshford Road); and then on to wind turbines locations using windfarm access roads and the Local Roads (L58451, L5845, L5846 and L5840) in the vicinity of the windfarm site as necessary.

In order to access the windfarm site some works and activities will be required, mainly along the public road and also in private lands. This will include a hardcore area in Damerstown adjacent to the N78 which will be used to transfer the turbine blades from a normal blade carrier trailer to a blade lifter type trailer. This area is called the Blade Transfer Area HR8 in the EIA Report. Access to the blade transfer area will be through an existing field entrance from the adjoining local road. Haul route works will also include the temporary removal of road signs, the temporary removal of some vegetation and soil, and construction of hardcore areas.

Once the blades are transferred onto the blade lift trailer, the blades will continue their transport to the windfarm site along the N78, driving straight onto the R426 (Chatsworth Row) and then lifting the blade to an upright position and reversing back onto the N78 (High Street) to continue onto the R694 (Barrack Street), when the blade will be lowered to its normal position. There will be a temporary removal of street furniture and overhead lines and poles. The services will be rerouted through the existing electricity / telecoms network while works are ongoing. On the Ballyragget Road (R694) some tree trimming will be required.

Following each transportation event there will be an immediate reinstatement of street furniture (road signs and barriers). Following the completion of blade deliveries, overhead lines and poles will be reinstated, and topsoil will be reinstated on the hardcore areas and reseeded/replanted. All shrubs will be replanted.

Junction Works in the vicinity of the Windfarm Site: In the vicinity of the windfarm site, a number of works in private lands and along the public road corridor will be required to facilitate the delivery of the turbine components. These works include the provision of temporary hardstanding areas in agricultural lands adjacent to Ballymartin Crossroads (identified as HR12 on the maps), and south of Ballymartin Crossroads on the junction of the local road with a cul-de-sac road (identified as HR13 on the maps).

Road Widening Works: In the vicinity of the windfarm site the parts of the Local Roads L5840 and L5845 and L5846 will be widened by an average of 1 meter to provide a running width of 4.5 meters for the turbine component haulage.

Reinstatement of Construction Works Areas: Following the completion of construction works, the construction facilities and hardcore area at the temporary construction compounds and other temporary hardcore areas will be removed and the area will be reinstated with soil from the surrounding berms.

The areas inside the Construction Works Area Boundary but outside of the operational phase works area, will be levelled and sown with a mix of native grass species. In agricultural lands, temporary livestock proof fencing will be erected until the area has revegetated. Following the completion of construction works, the roadside boundary at the Site Entrances and also at the junction widenings on the Local Roads in the vicinity of the windfarm site will be reinstated along the original alignment. The roadside boundary fences will comprise mesh fence fixed to wooden posts.

Reduction in the extent of Hard Surfaces at the Windfarm site: The extent of the hardcore construction footprint at the windfarm site is determined by the requirements of the delivery, assembly and erection of the wind turbines. However, the full extent of these areas are not needed for routine maintenance or access during the operational phase of the windfarm, and it is proposed to cover those parts of the hardcore construction footprint which are not needed with topsoil which will be sown with grasses i.e. part of the turbine hardstands, parts of widened site entrances and the haul route works in the vicinity of the windfarm site.

Fencing at the Operational Windfarm: Following the completion of construction works, permanent livestock proof fencing will be installed mainly just beyond the drainage network alongside the windfarm site roads, around turbine hardstands and foundations, and the Windfarm Control Building compound. Existing landholding boundaries will be delineated with gates on the windfarm site roads. Access to adjoining fields and forestry plots will be facilitated by the installation of crossing points and gates in the fences. The fences will be fitted with mammal gates to facilitate the passage of wildlife (such as badger and otter) across the site.

Planting treatment of overburden storage areas: New long-term soil deposition areas will be created during construction works to store soils at the turbine locations during the operational phase. This stored soil will eventually be reused to cover over the footprint of the turbine foundation and hardstanding areas during its

decommissioning. These long-term deposition areas will be located inside the operational windfarm fence at each turbine location and will be planted/sown with low growing native grasses common to the surrounding vegetation. A permanent deposition area (berm) will also be formed at the Tinnalintan Substation site. This berm will be planted with native grass and native flowers.

Landscape treatment of felled forestry areas: Forestry will be felled to accommodate the erection and operation of the turbines. This felled area includes bat buffer or exclusion areas around the turbines to be maintained in order to reduce collision impact for bats and the Kestrel by removing foraging/hunting habitat from around the turbine. This will be achieved by levelling the buffer areas, sowing the areas with drought tolerant, native, and low growing grasses, and managing the area to keep the sward height low, either by mowing or grazing, during the operational lifetime of the windfarm. Any encroaching scrub will be removed annually.

New Hedgerows & Hedgerow Improvement: The following hedgerow planting will be carried out within the windfarm site (but beyond the bat buffer zones imposed around the turbines) to provide alternative foraging habitat and to restore habitat connectivity to bat species, and to enhance and create habitat for other animal species:

- 1.5m of new hedgerow will be planted. These new hedgerows will include 43 no. trees (i.e. a new tree will be planted at 35-40m intervals in new hedges).
- 4.1km of existing hedgerow/field boundary will be improved by interplanting new hedging into gaps in the existing field boundary.

A mix of native fruiting hedges will be used for any new hedges and will predominantly comprise of hawthorn, along with blackthorn, holly, hazel, guelder rose, spindle, crab apple, and bird cherry. New trees will comprise a mix of native trees such as oak, alder, birch, crab apple bird cherry and rowan. Hedging and trees will be of Irish provenance and sourced from Department of Agriculture approved nurseries.

NTS of EIAR Sec.5.4.4	Biodiversity Protection Area at Ballynalacken Windfarm
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A localised area (8.1ha in area) of wet heath/wet grassland/scrub in Ballyouskill townland will be protected for the operational lifetime of the Ballynalacken Windfarm under a long-term lease agreement with the landowner. The protection and conservation of this area will be managed by the Site Ecologist for the Ballynalacken Windfarm. Conservation management will include controlled low intensity grazing and selective removal of encroaching scrub such as willow or gorse. The Biodiversity Protection Area will be fenced to ensure that it allows wildlife free passage, but controls access by livestock.

NTS of EIAR Sec.5.4.5	Viewpoint Picnic Area
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A viewpoint/picnic area will be provided at Site Entrance No. 7 in Ballynalacken townland, where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains.

NTS of EIAR Section 5.5 Use of Natural Resources

NTS of EIAR Sec.5.5.1 Natural Resource - Land

The Ballynalacken Windfarm Project site is proposed for agricultural lands, forestry lands and along the public road network corridor. The area of land taken during construction will be 51.1 hectares. Once the proposed windfarm is constructed, the windfarm area will reduce to 42 hectares during operation and to 15.6 hectares during decommissioning.

Agricultural Land: During the construction phase within the Construction Works Area, 24ha are located on agricultural lands. The agricultural lands are predominantly comprised of permanent grassland(23.1ha), along with farm tracks. During the operational phase, the requirement for agricultural lands will reduce from 24ha to 12.4ha; with 11.6ha of land returning to agricultural use by the landowner. The 12.4ha of lands will remain within the operational footprint of the project. The **Biodiversity Protection Area** is proposed for agricultural lands. This area comprises 8.1ha of wet heath/wet grassland/scrub and is currently lightly grazed by cattle. This area is not included within the 24ha/12.4ha land area required as it lies outside of the construction works area boundary and the operational footprint of the windfarm. Although the management of the Biodiversity Protection Area includes controlled low intensity grazing(annually/biennially)by livestock, it will be under the control of the Windfarm and will not be available for general agricultural use. Therefore, the total amount of Agricultural land which will not be available for general agricultural use during the lifetime of the windfarm will be 20.5ha. Following the decommissioning of the windfarm, all of the agricultural lands at the windfarm site will return to the landowners for agricultural use, the turbine foundations and hard standings will be covered over with topsoil and reseeded in grass species, and the operational drainage and fencing at the turbine locations will be removed. It is proposed that any of the Windfarm Access Roads that are of use to the landowners will remain in place following decommissioning of the turbines.

Forestry Land: During the construction phase, forestry land comprises 21.35ha of the Construction Works Area, mainly commercial forestry plantation (20.7ha) which will be felled, and forestry roads(0.65ha). During the operational phase, the requirement for forestry lands will reduce from 21.35ha to 19.9ha. Of the 20.7ha felled to accommodate the construction of the windfarm, 0.8ha will be replanted at the borrow pit location following construction works, and the remaining 19.9ha will remain permanently felled, and not returned to forestry use at the windfarm site. Following felling, this 19.9ha will comprise windfarm hardstanding areas, bat buffer areas around the turbines, new wind farm site roads, drainage features and berms. Replanting of permanently felled forestry land totalling 19.9ha, will be replanted at an off-site location in Ireland. This site will be technically approved, under an afforestation licence issued by the Forest Service. The trees will be planted on the approved afforestation lands after the felling has taken place at Ballynalacken Windfarm site and in accordance with the Forest Service licence conditions.

Other Lands: The remaining area of 5.0 ha within the construction works area boundary, relates to non-productive lands such as the along the public road corridor or within EirGrid Ballyragget Substation compound.

NTS of EIAR Sec.5.5.2 Natural Resource - Soils & Rock

Excavations: Based on the results of trial pit investigations, surveys of ground conditions, topographical surveys, desktop surveys of Geological Survey Ireland mapping for the project site and taking into account the size and design of the turbine foundations, hardstanding areas, access roads and compound areas, the construction of the Ballynalacken Windfarm Project is expected to require the excavation of approximately

118,633m³ of soils (made up of topsoil, subsoil and rock) from construction works areas and from the borrow pits.

It is estimated that c.38,270m³ of rock excavated from the borrow pits and c.21,515m³ of rock, subsoil excavated during Project groundworks will be suitable for use as backfill at hardstand areas, windfarm site roads, to backfill cable trenches in agricultural lands and to reinstate construction works areas. Unsuitable rock and subsoil excavated from the borrow pits and windfarm footprint will be used to reinstate the borrow pits.

Imported Rock: The Project will require c.14,000m³ of imported stone from local quarries such as Cemex in Dunmore County Kilkenny. This imported stone will be a hard wearing rock such as limestone and will be used to cap the wind farm access roads.

NTS of EIAR Sec.5.5.3 Natural Resource - Water

Potable: Drinking water will not be required at the windfarm site either during construction or operation - bottled water will be brought onto the site as required. Potable Water supply from the public mains in Tinnalintan (ducting will be installed under the site access road) will provide water to the welfare facilities at the Tinnalintan Substation.

Non-potable: During construction, non-potable, tanked water will be supplied for welfare facilities at the temporary construction compounds. During operation, water for welfare facilities will be supplied from a rainwater harvesting system which will be integrated into the design of the Windfarm Control Building and the Tinnalintan Substation.

NTS of EIAR Sec.5.5.4 Natural Resource - Biodiversity

The dominant habitat at the Ballynalacken Windfarm Project site is improved agricultural grasslands, with a small proportion of wet grassland. Commercial conifer plantation, comprises c.30% of the project site. Conifer plantations and agricultural grasslands provide habitat for a variety of animal species.

1.5km of hedgerows and 12 no. trees will be removed, while 1.5km of new hedgerow, including 43no. immature trees will be planted, and hedgerow species will be planted into gaps along 4.1km of existing field boundaries at the windfarm site during construction works. Also a localised area of wet heath/ wet grassland/scrub (8.1 hectares in area) will be protected for the operational lifetime of the windfarm through the conservation management of the land under a lease agreement with the landowner. Conservation management in this Biodiversity Protection Area will include controlled low intensity grazing and removal of encroaching scrub such as willow or gorse.

NTS of EIAR Section 5.6 Emissions

NTS of EIAR Sec.5.6.1 Greenhouse Gas Emissions

Turbines: The main potential for greenhouse gas emissions to air arises during the manufacturing, operation, service and ultimate decommissioning of the wind turbines themselves (full life cycle).

The energy balance of a wind turbine is the relationship between the energy requirement over the full life cycle of the turbine (manufacture, operation and decommissioning) versus the energy generated by the wind turbine over its operating life. This is called the energy payback. According to the Vestas website (one of the largest wind turbine manufacturers in the world and a global leader in sustainable energy solutions), a turbine of the size of the turbines proposed for Ballynalacken, the Vestas 4Megawatt(MW) type wind turbine, **pays back the energy used during manufacture and construction within 4 to 8 months of operating.** By contrast, production of electricity from oil and coal consumes more energy during extraction and burning than is generated into electricity and therefore never pays back the energy used in the process.

Return on Energy: Alternatively, energy payback can be measured by 'number of times payback' meaning- the amount of energy paid back to society versus the energy needed in the lifetime of that generation source. For example, over the life cycle of a Vestas 4MW type wind turbine, it will return 30 to 50 times (depends on the wind resource on site) more energy back to society than it consumed in its manufacture and operation. By contrast, less than half (40%) of the energy expended in mining and burning coal is eventually returned as electricity. In this context, wind power generated electricity is a clean and sustainable alternative to fossil fuels for the generation of electricity for the National Grid.

Emissions during construction and decommissioning: Emissions of Nitrogen Dioxide and other greenhouse gases will be limited to vehicles (in the worst-case scenario that no electric vehicles are used) and plant on-site and excavations. Most of these emissions will be concentrated on site. Emissions will also occur from the manufacture of concrete for foundations and cable trenches which will produce greenhouse gases at the manufacturing facility.

Offset of Greenhouse Gases Emissions during Operation: The proposed twelve wind turbines at Ballynalacken Windfarm is expected to generate 140,000,000 Kilowatt hours of electricity per year, offsetting the emission of 37,500 tonnes of carbon dioxide. This electricity will be generated without emitting greenhouse gases or ash pollution and this will avoid an equal amount of electricity being generated from gas, coal or oil, which does emit greenhouse gases. The electricity produced at Ballynalacken Windfarm will be enough to supply 31,021 homes in the Kilkenny / Laois area.

Planting of forestry and switching to electric cars (EVs) rather than diesel/petrol cars, are also part of Government policy to reduce greenhouse gas emissions as part of a carbon neutral future. The following actions would be required to offset the equivalent amount of Carbon dioxide equivalent (CO₂e) as the potential offsets from Ballynalacken Windfarm;

- Planting 2,915ha (29.1km²) of forestry to sequester 37,500 tonnes of Carbon dioxide (CO₂).
- Changing 19,820 diesel/petrol cars to EVs to avoid the emission of 35,700 tonnes of Carbon dioxide equivalent.

NTS of EIAR Sec.5.6.2

Other Emissions to Air

Dust: During the construction phase, dust will arise from the transportation of aggregate; movement of delivery vehicles; the movement of excavated materials, and from stored excavated materials. Dust emissions will be actively managed so as not to adversely impact locally. There will be minimal dust arisings during the operation and decommissioning phases.

Noise: During construction, noise will arise from operating machinery and plant and from delivery vehicles. During the operational phase, the presence of vehicles or machinery on the windfarm site, and therefore noise emissions, will be negligible.

The operating Tinnalintan Substation will emit noise. An earth berm of 2m height and a solid fence of 2m on top of the berm are proposed along the northwestern boundary of the substation area to mitigate noise at the nearest residences.

The operating turbines will emit noise. Turbines of the size proposed for Ballynalacken Windfarm are installed with sound optimisations modes to reduce the noise from the operating turbine, if required by planning condition.

Vibration: During construction, the use of heavy machinery and rock breaking equipment will cause negligible levels of ground vibration in the immediate vicinity of groundworks and no blasting will be required at the works areas, including the borrow pits.

Once operational there are no significant vibrations from a windfarm - minimal heavy machinery will be used, while the level of vibrations from wind turbines are so small that they are almost impossible to detect.

Shadow Flicker: During operation, rotating wind turbine blades can cause brightness levels to vary momentarily at locations where they obstruct the sun's rays. This can result in a nuisance indoors when the shadow is cast over the windows of a dwelling. Shadow flicker effect is dependent upon the proximity and relative position of the turbine to the dwelling window, in combination with weather conditions (i.e. presence of direct sunlight, adequate wind speed to turn the turbine blades and critical wind direction to turn the rotor towards the dwelling) and the time of day and year (i.e. usually dawn and dusk or when the sun is low in the sky). Shadow Flicker from operating turbines can be predicted by a special module in the turbine software and the identified turbine can be turned off if the shadow flicker limits are about to be exceeded at a particular dwelling.

Light: During construction, lighting will be used at the temporary construction compounds and at the Tinnalintan Substation compound and occasionally at turbine sites if required to complete a work task.

During operation lighting will be used at the Tinnalintan Substation compound and at the Windfarm Control building. The lighting will be of a cowled design along with motion-sensor and timer-controlled lights which will not remain turned-on overnight. Selected turbines will also have aviation lights directed upwards and installed according to Irish Aviation Authority recommendations.

Electromagnetic Fields: Similar to all operating indoor and outdoor electrical equipment, the operational wind turbines, cabling and substation will be a source of electromagnetic fields.

In the context of the International Commission on Non-Ionising Radiation Protection (ICNIRP 1998 EMF) limits for Electric Fields and Magnetic Fields, the increase from the operating windfarm project is imperceptible and are similar to existing levels in the environment.

NTS of EIAR Section 5.7 Waste

All waste will be managed under the project Waste Management Plan. Waste water from welfare facilities, general waste and chemical waste and some spoiled soils from excavations in the public road, will be generated during the construction phase.

Waste during the operational and decommissioning phases will be negligible.

All wastes will be removed from the site to licensed waste facilities.

NTS of EIAR Section 5.8 Ballynalacken Windfarm Life Cycle Construction

Once a windfarm secures planning permission and all the necessary permits and licences and grid connection agreement are in place, construction can then commence. These can take a number of years to obtain, and as a result the Promoter is seeking a 10-year duration of planning.

The construction of the Ballynalacken Windfarm Project will take c.12 months to complete. It is planned to construct all elements of the Ballynalacken Windfarm Project at the same time using multiple specialist crews. It is expected that up to 120 workers will be involved in the pre-construction, main construction and commissioning works.

Normal construction times will be between 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays.

In total, there will be 989 loads of concrete; 1,167 loads of crushed stone; 150 loads of surface dressing; 108 extra-wide and long loads of turbine components; 12 loads of reinforcing steel; 24 loads of electrical equipment and 102 loads of building materials including pre-cast concrete units, ducting, fencing and hedging materials required. The delivery vehicles will use the N78 (Kilkenny - Castlecomer Road) or N77 (Ballyragget to Abbeyleix Road) and then the R694 (Castlecomer to Ballyragget Road) to Site Entrance No.1 in Byrnesgrove, using the windfarm access road network and then the local roads (L5846, L5845, L58451, and L5840) in the vicinity of the windfarm site. The Construction Materials Haulage Routes can be found on **NTS Figure 3**.

A Traffic Management Plan has been developed and is included in the Environmental Management Plan which accompanies the planning application.

Construction will proceed generally in the following manner, with work being carried out on several elements at the same time:

- **Site Entrances** are opened through the provision of hardcore areas and clearance of roadside boundaries to ensure adequate visibility in both directions.
- **The Construction Works Area Boundary** are established by the erection of livestock proof fencing to protect the surrounding environmental features from construction works, machinery and personnel and to prevent ingress from livestock.
- **The Temporary Construction Compounds** are constructed by excavating vegetation, topsoil and subsoils from the area to formation level and the excavation of adjacent drainage channels. Geotextile matting will be laid out and the compounds will be surfaced with stone. Facilities including portacabins, waste collection containers, welfare facilities will be installed.
- **The Borrow Pits** are opened by excavating the vegetation and topsoil from the surface of the pit. The rock is then extracted by rock breaking whereby an excavator breaks large pieces of rock from the ground and this is broken into smaller pieces using hydraulic rock breaking attachments on the excavator, until they

are small enough for use or to fit into a rock crusher for grading into various sizes. Following the completion of windfarm site access road and turbine hardstand construction, the borrow pits are reinstated using the unsuitable subsoil and rock materials excavated from the borrow pits and from other excavations within the windfarm site. The reinstated borrow pit are then graded by the excavator to match in with the surrounding topography. The excavator spreads the previously excavated top soil over the borrow pit area to reinstate the surface layer of the borrow pit. The area is reseeded.

- **The Windfarm Site Access Roads** involve the construction of new 4.5m wide site roads and the widening to 4.5m of existing farm and forestry tracks. The site roads are constructed of crushed stone over a layer of geotextile material. The site roads are capped with a layer of hardwearing limestone. Existing farm and forestry roadways are widened and surfaced in the same manner as the new site roads. The construction of the Windfarm Site Roads also involves the construction of the adjacent drainage channels, cross drains, outfall weirs, check dams and settlement ponds. Works at **Windfarm Watercourse Crossings** are carried out to include installation of new pre-cast concrete bottomless culvert pipes.
- The **Internal Windfarm Cabling** will be installed in ducting for the most part under the windfarm site access roads. The remaining sections will be through agricultural fields, along forestry firebreak and under the public road.
- Preparation of the **Wind Turbine Foundations** will involve excavations to remove vegetation, topsoil and subsoils and excavations of rock to the required width and depth. Any rock excavated which is suitable for use as construction material is reused for the construction of the hardstands. The steel base sections of the turbine tower is installed and reinforcing steel is then built up around the steel base and through the excavated area. The outside of the foundation is shuttered to allow the pouring of concrete. The concrete is delivered and poured into the turbine foundation.
- Preparation of the **Turbine Hardstanding Areas** comprising levelled stone. Hardstanding areas are constructed around the location of each turbine. The hardstanding area at each turbine is extended to cover the turbine foundations once the foundation construction is completed. The adjacent drainage network is excavated and installed around the hardstanding, foundation and soil deposition areas. Material for the handstand would be sourced predominantly from the on-site borrow pits and from suitable excavations at the hardstands and from the turbine foundations, with just higher-grade hard wearing surfacing material to be imported from local quarries.
- The site is then ready for **turbine deliveries**. These deliveries are highly controlled. The transport delivery plan and schedule for the turbine components from port to site would be coordinated with Kilkenny County Council and An Garda Síochána. The delivery of turbine components are expected to take place overnight or during off-peak hours due to the oversize nature of some of the components such as the blades. A normal delivery consists of three trucks in convoy with escorts. The entire delivery would be fully escorted. One of the escorts would precede the convoy. For the Ballynalacken Windfarm blades deliveries, the blades will be lifted from the standard blade carried trailers onto specialist blade lifter trailers at the constructed blade transfer area adjacent to the Kilkenny to Castlecomer road (N78) – identified on maps as HR8. These trailers called blade-lift trailers, have the ability to stand the blade in an almost upright position, which will facilitate manoeuvring the blades around the corner in Castlecomer onto the Ballyragget Road. All truck/trailer axle weights will be within legal limits.
- As soon as possible after delivery, the **turbines are erected on site** and fixed to the foundation ring and connected to the internal windfarm cabling.
- The on-site **Windfarm Control Building** is constructed and fitted with equipment and connected to the internal windfarm cabling network.

- Trenches for the internal cable link are excavated, and ducting and safety tapes installed. These trenches are backfilled, and the cables pulled through the ducting at jointing chambers.
- The off-site **Tinnalintan Substation is constructed** and fitted with equipment and connected by cable to the windfarm control building.
- The **grid connection from the Tinnalintan Substation to the Eirgrid Ballyragget Substation** is constructed predominantly under the public road and connected.
- The Met Mast/ Telecom Relay Pole are erected.
- **Electrical Connection and Commissioning Works** are completed. Electrical cabling and fibre-optic telecommunications cabling will be pulled through the ducting in the cable trenches. The cables are joined at the turbines, the windfarm control building, the Tinnalintan Substation and the Ballyragget Substation.
- The wind turbines, windfarm control building, Tinnalintan Substation, underground cabling and new plant and apparatus at the EirGrid Ballyragget Substation are tested and commissioned. Following the completion of commissioning, the turbines are turned on and electricity generation commences.
- The construction site is cleared of temporary works and the lands reinstated.

NTS of EIAR Section 5.9 Ballynalacken Windfarm Project Life Cycle - Operation

Ballynalacken Windfarm is expected to have a lifespan of at least 35 years, and therefore planning permission is sought for a 35-year operational period. The lifespan of wind turbines has been increasing steadily in recent years and allowing this duration by planning condition will maximise the Greenhouse Gases(GHG)s offset potential of the windfarm.

In the operational stage, wind turbines operate automatically, responding by means of anemometry equipment and control systems to changes in wind speed and direction. Turbine output, performance, wind speeds and fault alarms are monitored off-site continuously by the Windfarm Manager and Asset Manager who also co-ordinates the turbine, electrical plant and civil works maintenance programme.

Routine maintenance works will include regular scheduled inspection, testing and servicing of the wind turbines and unscheduled repairs; regular inspection and annual maintenance of the windfarm control building, Tinnalintan Substation and of the met mast; inspection of the underground internal windfarm cabling and internal cable link routes; inspection and maintenance (half-yearly) of the windfarm site roads and windfarm drainage network; maintenance of the site entrances; and scheduled biodiversity activities.

As the windfarm ages, component replacement becomes more common. The gearbox and generator are likely to be changed at least once during the operational lifetime of a turbine. Blade replacement is less common, conservatively perhaps one blade per turbine during the operational life.

Operational windfarms require **repair and maintenance**, providing certainty of employment for skilled workers in communities across Ireland. Windfarm by their nature, are located in regional rural areas, and there is a thriving windfarm operation and maintenance sector in Ireland, working from regional hubs throughout the country. It is expected that the operation & maintenance of the Ballynalacken Windfarm will require 6 No. full time jobs equivalent.

The operational of the Ballynalacken Windfarm will also involve **Asset Managers** who provide a variety of services to the windfarm including Site Manager, Health & Safety, Financial including landowner payments, Regulatory compliance, Energy sales and Community Benefit Fund management, payments and liaison. Ballynalacken Windfarm asset management will require 1 No. full time jobs equivalent.

The EirGrid side of the new Tinnalintan Substation, the Ballynalacken Grid Connection and the new plant and electrical apparatus installed for Ballynalacken Grid Connection at the Ballyragget Substation, will be operated and maintained as part of EirGrid's substation operation and maintenance programme. The minimum lifecycle of the electrical cables and electric plant is 80 - 100 years in accordance with EirGrid specifications. As the cables and electric plant will be factory tested to a high standard, sourced from approved suppliers and built in accordance with EirGrid specifications, it is not likely or expected that there will be any requirements for unplanned repairs to the Ballynalacken Grid Connection during its operational life.

NTS of EIAR Section 5.10 Changes to the Project

The operation lifespan of windfarms in Ireland is currently limited by planning condition to 35 years, after which the options will be (1) decommission the windfarm at the end of the permitted period (i.e. after 35 years of operation); or (2) seek new planning permission to continue operating either the as-built windfarm or to repower the site with the latest renewable generation technology.

Where the windfarm is to be decommissioned, this would generally relate to the turbines, internal cables, windfarm control building, met mast, internal cable link and the windfarm operator side of the Tinnalintan Substation. The EirGrid side of the Tinnalintan Substation and the Ballynalacken Grid Connection will be taken over by EirGrid following its construction and will be operated permanently as assets within the national electricity system.

Compared to fossil fuel or nuclear power stations, the decommissioning of a windfarm is a relatively straight forward dismantling of structures and reinstatement of the land. There are no toxic residues from the windfarm process and therefore there would be no requirement for site clean-up or rehabilitation and no legacy waste to be considered.

Decommissioning would take **approx. 3-4 months**, completed by multiple specialist crews working in tandem and would involve decommissioning and dismantling electrical plant and apparatus; dismantling the turbines; and reinstatement and restoration of the windfarm site.

Most electrical plant and apparatus are composed of steel and cast iron with some metals for wiring and rare earths for magnets. All the electrical plant and apparatus in the turbines and at the windfarm control building would be decommissioned, drained of hydrocarbon fluids, if present, and transported to be re-used as second-hand plant or to be segregated into materials and repurposed into other electrical plant or parts or recycled and recast in its original form.

Dismantled wind turbines are a valuable source of resources which can be reused in the **circular economy**. Eighty-five to ninety per cent of a dismantled wind turbine can be recycled because the towers, generators and gearboxes are mostly made up of steel and cast iron and copper which is easy to recycle and for which there is an active circular economy market in Ireland and Europe.

Operating fluids or lubricants which are used in turbines would be drained off by trained specialist personnel with the aid of special machines recycling offsite at a licenced facility.

Wind turbine blades are made of composite material that boost the performance of wind energy by allowing lighter and longer blades. The main technology at present for recycling composite waste is through the cement kiln route, also known as cement co-processing with waste recovery and energy production through incineration, to recover waste as energy. Currently, blades are also being repurposed for street furniture, bicycle shelters, bridges and walkways; reefs and motorway sound barriers and these uses will be expanded

in the coming years as part of the turbine manufacturer's environmental, social, governance (ESG) and sustainability programmes.

The new and widened site roads would be left in place if they are of use to the landowners of the site. The windfarm control building would be decommissioned, and electrical plant and apparatus removed, however the building and hardstanding area would remain in place for farm use.

The subterranean concrete i.e. turbine foundations, would be left in situ because their removal would require extensive excavations and set and cured concrete is a stable material. For the same reasons, the ducting for underground cables would be left in-situ, but the cables would be pulled out of the ducts at the jointing locations.

The site would be restored after all decommissioning works have been completed. This would involve covering the hard-core areas with topsoil, filling in adjacent drainage channels and reseeded the area with native grasses. All restored areas will be graded and landscaped sympathetically with the site contours. The works will be carried out in consultation with Kilkenny County Council and under the supervision of a suitably qualified engineer and hydrologist. Re-vegetation of the site will be carried out under the supervision of a suitably qualified ecologist.

Cost of decommissioning: At present commodities prices, decommissioning costs are fully covered by the scrap value of the plant and equipment. There is also a market for second-hand turbines although this is very variable and would depend on condition and technology use. At present commodities prices, the sale of the steel, aluminium and copper recovered from a dismantled turbine exceeds the cost of dismantling the turbine and reinstatement of the site – an excess of €41,560 of sales of second-hand plant and equipment over the costs of dismantling and transporting same.

NTS of EIAR Section 5.11 Vulnerability to Major Accidents

The vulnerability of the windfarm project to major accidents and natural disasters such as extreme weather, flooding, landslip or wildfire are considered in this section.

Vulnerability Major Accidents: There are no Seveso sites in proximity to the Ballynalacken Windfarm Project, the nearest being Grassland Fertilizers on the outskirts of Kilkenny City, which is c.16km from the windfarm site. Furthermore, the Ballynalacken Windfarm Project itself will not cause a major accident from the use of dangerous substances during construction and operation, because of the minimal volumes of such substances which will be used on site.

Extreme Weather – Wind Storms: The wind turbines which will be installed at the Ballynalacken Windfarm site will be designed to withstand at least 60 m/s (215km/h) winds. Met Eireann Storm Centre data shows that, in recent years, the highest sustained mean wind speed (29m/s or 106km/h) was recorded at Roches Point, County Cork during Storm Eunice in February 2022, and also at Mace Head, County Galway during Storm Isha in January 2024, while the highest gust (39m/s or 139km/h) was recorded during Storm Franklin at Mace Head, County Galway in February 2022, with gusts reaching 137km/hr during Storm Isha in January 2024.

These wind speeds are well below the design capability of the proposed turbines. The likelihood of the Ballynalacken Windfarm Project being affected by wind storms is considered to be extremely unlikely.

Extreme Weather – Temperature Variations: In relation to temperature extremes, the turbines to be installed at Ballynalacken Windfarm will be designed in accordance with the IEC 61400 standard to ensure the structures are appropriately engineered against damage from hazards (including temperature). The Ballynalacken turbines will be designed to operate within temperature ranges between -20°C and +50°C. The

turbines can be fitted with a de-icing system which will thaw ice from the blades using fans installed inside each blade root.

Climate change has also increased the risk of wildfires in Ireland, particularly during periods of drought. However, the Ballynalacken Windfarm Project is not considered to be at risk from wildfires due to the predominance of pasture lands around windfarm infrastructure; the extent of the felled areas around the turbines which are located within forestry, the height of the nacelle above ground level, and the absence of vegetative fuel sources immediately adjacent to the turbines as a result of the hardstanding's at each turbine base and the maintenance of a scrub/tree free bat buffer zone around the turbines. The likelihood of the Ballynalacken Windfarm Project being affected by temperature extremes is considered to be extremely unlikely.

Extreme Weather – Flooding and Rainfall: Flooding is unlikely to be high risk at the site due to the elevated location of the windfarm. In addition, the design of the windfarm drainage system ensures that the development of the Ballynalacken Windfarm will not cause nor contribute to flooding risk in downslope areas. It is considered that the likelihood of the Ballynalacken Windfarm Project being affected by flooding or extreme rainfall events is considered to be extremely unlikely.

Natural Disaster – Landslide: In relation to land-slippage potential, site visits and ground investigations, which included peat probes, soil cores and trial hole investigations found that while thin peaty mineral soils overlay the subsoil and rock in parts of the windfarm site. An area of deeper peat occurs in Coillte lands in the central part of the windfarm site, however no part of the windfarm is located within this area of deeper peat – as this area was avoided during the design stage of the project.

There are no areas with a high-risk of landslide within the windfarm site, and no areas of high-risk either upslope or downslope of turbine locations as defined by the Geological Survey of Ireland (GSI) mapping. In addition, also according to GSI data, no previous failures have been recorded within 10km of the windfarm. While there are areas of high landslide susceptibility along the Ballynalacken ridge, these are all located on the steep western slopes of the ridge, whereas the windfarm turbine sites are generally located on the more moderately/gently sloping eastern and southern slopes of the ridge. The Ballynalacken Windfarm will not be at risk from these areas of high susceptibility as none of the windfarm infrastructure is located above or below these high-risk areas. The likelihood of the Ballynalacken Windfarm Project being affected by landslip, or causing land slip to occur, is considered to be extremely unlikely.

In relation to unrelated disasters in the locality: Should a disaster occur, unrelated to the windfarm, but occurring within the locality – the use of weather forecasting, and the monitoring of the construction works by the Environmental Clerk of Works, monitoring of the operating windfarm and substation by the Operations Manager, provision of point of contact details to key stakeholders, and the ability to control the operational turbines and substations remotely, will ensure that the Ballynalacken Windfarm Project will not make the consequences of the unrelated event worse.

NTS of EIAR Section 5.12 Cumulative Projects

Other projects and activities are considered in combination with Ballynalacken Windfarm. The term cumulative impacts relate to changes caused by activities or projects in combination with other activities or projects. Another way to understand this is that an impact from one project might be small and not important, when there are several impacts from a combination of projects, altogether, they can cause a bigger impact. This has been assessed as part of cumulative evaluations throughout the EIA Report Chapters 6 to 18.

NTS of EIAR Sec.5.12.1 Off-site Projects

In total, 19.9ha of lands will be permanently felled at the Ballynalacken Windfarm site to facilitate the construction of the windfarm. It will be a requirement of the felling licence to replant the equivalent hectares of forestry on an alternative site(s) in Ireland. The developer commits to securing these licensed afforestation lands in a location outside of the River Nore and River Barrow catchments in order to avoid cumulative impacts on water quality. Nonetheless, the potential for cumulative impacts as a result of the afforestation of replant lands is taken into account in the cumulative evaluations throughout the environmental topic chapters.

NTS of EIAR Sec.5.12.2 Secondary Projects

Secondary Projects are projects that may arise largely because of the existence of the principal project, though they are usually not carried out by the developer of the principal project.

The existence of the Tinnalintan Substation and Ballynalacken Grid Connection (should they be permitted and constructed) could result in other energy projects seeking to use the Tinnalintan Substation and Ballynalacken Grid Connection to connect onto the national electricity system. The potential for cumulative impacts as a result of another energy project potentially connecting into the Tinnalintan Substation and Ballynalacken Grid Connection is taken into account in the cumulative evaluations.

NTS of EIAR Sec.5.12.3 Other Unrelated Projects and Activities

Research of an area covering 25km from the Ballynalacken Windfarm site was carried out to identify any existing, consented or currently proposed (in the planning system) projects which, due to their size and characteristics, were considered to have potential to cause cumulative impacts with the proposed Ballynalacken Windfarm Project. In relation to water and aquatic impacts, the research area was extended (beyond the 25km) to include the full extent of any hydrologically connected sub-catchments, this effectively included all of the upper catchment of the River Nore, and this area extended downstream as far as, and including, the Nore sub-catchment which includes Kilkenny City and Bennettsbridge village.

A number of other projects and activities were identified within this research area including electrical infrastructure; energy projects; and the Tirlán processing plant in the vicinity of the Ballyragget Substation in Moatpark, and other windfarms both existing and consented in the wider landscape. These projects and activities are considered for potential to cause cumulative effects with the Ballynalacken project in each of the EIA Report topic chapters.

NTS of EIAR Section 5.13 Environmental Management at Ballynalacken Windfarm

Environmental management during the construction of the Ballynalacken Windfarm Project will be implemented through the Environmental Management Plan (EMP) for the Ballynalacken Windfarm.

The purpose of the EMP is to communicate environmental protection measures that apply during the various phases of the Ballynalacken Windfarm Project to those with responsibility for carrying out works, so that any likely significant adverse effects on the receiving environment can be prevented.

An Environmental Clerk of Works and team of Environmental Managers will be engaged, independent of the main construction contractor, and will monitor the implementation and effectiveness of the mitigation measures during the construction works.

Further Information on the Development

See **Planning Drawings**, for detailed technical drawings of the development.

See **EIA Report 2025** for comprehensive details about the development and the area in which it will be located. The EIA Report also includes scientific analysis of the effects of the development over fourteen environmental topic chapters, illustrative figures and scientific and technical appendices.

See **Environmental Management Plan (EMP)** which has been prepared for the development and which describes the approach to environmental management pre-dominantly during the construction stage of the development.

See **Appropriate Assessment Report 2025 (Stage 2: Natura Impact Statement)** for the scientific assessment of the effects on Natura 2000 sites such as Special Areas of Conservations (SACs) and Special Protection Areas (SPAs)

Non-Tech Summary: Ch6 Land

NTS of EIAR Section 6.1 Introduction

The study in Chapter 6: Land relates to the land and landuse in the area. Landuse relates to the various ways in which society uses land. Land take is the removal of land from agricultural or other beneficial uses.

The Land chapter was prepared by **Andy Dunne** (B.Agr.Sc., M.Sc.(Agr.), PhD) director of Environmental Agricultural Engineering Consultancy (EAEC), a firm of agricultural and engineering consultants.

Consultation, desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which involved collecting all relevant land and geographical information for the proposed development site and surrounding area. A site visit and field walking were carried out in April 2023, on lands within and beside the proposed development site.

The evaluation for Land has been carried out in accordance with Guidance on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022), along with the ARVI approach for impact significance assessment developed under the EC IMPERIA LIFE11 Project.

NTS of EIAR Section 6.2 Scoping for the Land evaluation

The effects on the following sensitive aspects of Land were studied: **Agricultural Land; Forestry Land; Public Amenity Land Use and Equestrian Land-use.**

The **study area** is the area within the landholding boundaries of the project site. An area three-times the tip height from a turbine is considered for equestrian land use.

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result **Agricultural Land** and **Forestry Land** were scoped in for evaluation in the Land chapter.

In relation to **Equestrian Land-Use** and **Public Amenity Land-Use**, it was considered that the potential for significant impacts could be excluded, and as a result they were not brought forward for in-depth evaluation in the EIA Report.

NTS of EIAR Section 6.3 Evaluation Section

NTS of EIAR Sec.6.3.1 Agricultural Land

NTS of EIAR S.6.3.1.1 Baseline Environment - Agricultural Land

In the vicinity of the proposed Ballynalacken Windfarm, and along the Internal Cable Link, Grid Connection and haul route works elements, the agricultural usage of the land is improved grassland/and permanent pasture. The proposed windfarm is sited on a ridge overlooking the River Nore as it runs north to south from Durrow to Ballyragget. The ridge line demarcates the western edge of an area known as the Castlecomer Plateau. Agriculture on the Castlecomer Plateau is dominated by grassland production on heavy, clay rich soils. Farming here is long established, comprising livestock farming, dairying and beef cattle rearing with sheep rearing a minor enterprise. 24ha of the Construction Works Areas are located on agricultural lands.

The agricultural lands are predominantly comprised of permanent grassland (23.1ha), along with farm tracks. Access to these lands is generally through existing gateways off the local public road network, primarily off the local roads that run south, north and east from Ballymartin Crossroads. In total there are 20 no. of agricultural landholdings involved in the Project, the vast majority of these landowners live and farm locally.

Evolution of the baseline environment (the 'Do Nothing' scenario):

In terms of **land use trends** in the area, no particularly strong tendency is apparent in farming practice. However, Climate change will impact on agricultural land in Ireland. The increased average temperature will change plant growth patterns and will make the management of plant types adapted to past temperature ranges and annual precipitation amounts more challenging and livelihood threatening. Additionally, the changed climate and especially elevated temperature will enable new pests and diseases of agricultural relevance to become established here. Farm systems that are now relatively stable will become vulnerable and yields and performance will have more unpredictable tendencies.

NTS of EIAR S.6.3.1.2 Evaluation of impacts to Agricultural Land

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Agricultural Land.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.6.3.1.2.1 Degradation or loss of farm water supply

This impact could occur during the construction phase, due to the reduction in Groundwater Quality or Quantity at local wells from oil/fuel spills, use of cement-based compounds, excavations causing turbidity.

Significant impacts are not predicted to occur, mainly because of the separation distances from wells to works areas, and the temporary duration of any impacts to underground water supply pipes. There is potential for a small number of wells (6 no.) to be adversely affected, and mitigation will be required.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral**.

NTS of EIAR S.6.3.1.2.2 Reduction in Land Area available for Agricultural Use

This impact could occur during the construction phase, due to turbine foundations, new hardstanding areas and access roads, deposition areas, drainage network, compounds, works areas.

Significant impacts are not predicted to occur, mainly because the permanent or long-term loss of agricultural land is relatively small in scale (12.4 hectares in total) in the context of the abundance of agricultural lands at the project site and in the surrounding area, spread out over 20 landholdings.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.6.3.1.3 Cumulative Effects on Agricultural Land

When the effects of the Ballynalacken Windfarm Project on Agricultural Land are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.6.3.2 Forestry Land

NTS of EIAR S.6.3.2.1 Baseline Environment – Forestry Land

Forestry is a significant landuse in the area of the proposed development and part of the proposal is located on forested lands. There is approximately 275ha of forestry in the area around the Ballynalacken site. The majority is commercial forestry, with a high percentage also having very good growth rates and having good quality timber. In total 21.35ha of the Construction Works Areas are located on forestry lands, comprising commercial forestry plantation (20.7ha) and forestry roads (0.65ha). The forestry within the Construction Works Areas comprises three species of trees (Norway Spruce, Sitka Spruce and Japanese Larch) planted in 29 no. of forest plots over 5 no. of landholdings.

Evolution of the baseline environment (the 'Do Nothing' scenario):

Forestry in Ireland is expanding in area albeit at a very slow rate. Therefore, it is assumed in this report that the baseline environment identified above will be the receiving environment. Climate change will impact on forestry land in Ireland. Changed climate and especially elevated temperature will enable new pests and diseases of silvicultural relevance to become established here, and increase wildfire risk in our forests. Forest systems that are now relatively stable will become vulnerable and yields and performance will have more unpredictable tendencies.

NTS of EIAR S.6.3.2.2 Evaluation of impacts to Forestry Land

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Forestry Land.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.6.3.2.2.1 Reduction in Land Area available for Commercial Forestry Use

This impact could occur during the construction phase, due to construction works, forestry felling, use of forestry lands to operate the project.

Significant impacts are not predicted to occur, mainly because it is considered that the area subject to permanent felling (19.9 hectares) is relatively small in the context of the extent of forestry available in the area. The 19.9 hectares of forestry will also be replanted at an alternative location.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.6.3.2.3 Cumulative Effects on Forestry Land

When the effects of the Ballynalacken Windfarm Project on Forestry Land are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.6.3.3 Mitigation and Monitoring Measures

In relation to Land, Mitigation and Monitoring Measures are proposed (See [Chapter 19](#) of the EIAR). The most relevant are:

- MM01 – The Construction Works Area will be fenced to prevent encroachment of construction phase personnel, machinery or materials beyond this boundary
- MM02 – Construction traffic, personnel and materials will be restricted to within the Construction Works Area Boundary fence.
- MM03 – Land reinstatement will not be carried out during very wet weather and compaction will be remedied
- MM21 – Concrete control procedures will be implemented including no batching; ready mixed concrete will be used for all foundations; works scheduled for dry days; experienced operators; run-off will be settled out and no concrete truck washing on-site
- MM22 – Fuel/oil control procedures will be implemented including control of on-site refuelling of plant and machinery; provision of spill kits. Trained operatives, use of double-skinned mobile bowzers. Emergency Response Plan in place.
- MM24 – All fuels or oils will be stored in designated, bunded, locked storage areas and fitted with a storm drainage system and an appropriate oil interceptor. Emergency Response Plan in place.

NTS of EIAR Section 6.4 Summary Conclusion for Land

Overall, it is evaluated that the impact on the Environmental Factor, Land, will be Imperceptible, and there is no likelihood for adverse significant effects.

Non-Tech Summary: Ch7 Soils

NTS of EIAR Section 7.1 Introduction

The study in Chapter 7: Soils relates to the land coverage and use, topsoil and subsoil along with the underlying bedrock, associated geological heritage and supported ecological habitats.

The study on Soil was carried out by David Broderick P.Geo (BSc, H.Dip Env Eng, MSc.) a Hydrogeologist and Michael Gill P.Geo (BA, BAI, Dip Geol., MSc, MIEI) an Environmental Engineer and Hydrogeologist of **Hydro Environmental Services**, a specialist geological, hydrological, hydrogeological and environmental consultancy.

Consultation, desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which involved collecting all relevant land and geographical information for the proposed development site and surrounding area.

Fieldwork consisted of walkover surveys, geological mapping and baseline monitoring of the proposed Project site; 24 no. trial holes were completed and c.140 soil probe locations along with slope angle measurements.

The evaluation for Soils has been carried out in accordance with Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009).

NTS of EIAR Section 7.2 Scoping for the Soils evaluation

The effects on the following sensitive aspects of Soils were studied: **Local Soils, Subsoils & Bedrock; Soils, Subsoils & Bedrock in Designated Sites; Geological Heritage Sites.**

The **study area** includes soils, subsoils and bedrock within the construction works area boundary, Designated Sites within 10km and Geological Heritage Sites within 10km.

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result **Soils, Subsoils & Bedrock** were scoped in for evaluation in the Soils chapter.

In relation to **Soils, Subsoils & Bedrock in Designated Sites** and **Geological Heritage Sites**, it was considered that the potential for significant impacts could be excluded, and as a result they were not brought forward for in-depth evaluation in the EIA Report.

NTS of EIAR Section 7.3 Evaluation Section

NTS of EIAR Sec.7.3.1 Soils, Subsoils & Bedrock

NTS of EIAR S.7.3.1.1 Baseline Environment – Soils, Subsoils & Bedrock

The northern portion of the windfarm site is dominated by shallow well drained soils, while the southern portion is dominated by poorly drained soils. A pocket of blanket peat is also mapped at a central location.

Subsoils are largely absent on the northern portion of the wind farm site where bedrock outcrop or subcrop is extensive. On the southern portion of the wind farm site sandstone and shale tills are more dominant and bedrock outcrop or subcrop is less extensive.

To investigate the extent of blanket peat coverage at the windfarm site, ~140 soil probes were carried out. Peaty topsoil depths recorded ranged from no peat to 0.4m with an average depth of 0.2m. Eighty-five per cent (85%) of the peat probes recorded no peat.

A total of 24 trial pits were undertaken at the windfarm site. The dominant subsoils type was SILT/CLAY or SILT which was typically slightly sandy and gravelly. The majority of the trial pits that met bedrock encountered SANDSTONE, followed by SHALE then SILTSTONE.

Evolution of the baseline environment (the 'Do Nothing' scenario):

The soils and subsoils at the project site have all been altered to some extent by drainage or by other land improvement works related to the existing land use (i.e. forestry, agriculture). Landuse improvement practices are expected to continue, as agricultural land and forestry regularly need continued management to improve soil and subsoil structure. The other main, ongoing land use improvement practice that will directly affect soil and subsoil is drainage works. Climate change is not likely to significantly alter the current state of the environment at the site over the lifetime of the Project.

NTS of EIAR S.7.3.1.2 Evaluation of impacts to Soils, Subsoils & Bedrock

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Soils, Subsoils & Bedrock.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.7.3.1.2.1 Reduction in Soil quantity due to excavation & relocation of soils, subsoils and bedrock

This impact could occur during the construction phase due to excavation and relocation of soils, subsoils and bedrock was evaluated in relation to the excavation, relocation and storage of soil, subsoil and bedrock; groundworks; extraction from borrow pits.

Significant impacts are not predicted to occur, mainly due to the volumes of soil removed (c.63,963m³), the localised nature of effects, with no part of the windfarm with designated sites, ecological features or geological heritage sites, the shallow nature of cabling works and the extent of any excavations or relocations of soils at Haul Route Works locations.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Moderate (Windfarm) to Slight/Imperceptible**.

NTS of EIAR S.7.3.1.2.2 Soil degradation due to contamination by hydrocarbons, chemicals or cement-based compounds

This impact could occur during the construction phase due to oils, fuels and chemicals.

Significant impacts are not predicted to occur, mainly because only small volumes of fuels/oils will be on-site at any one time, works are spread out over a large geographical area and pre-cast concrete structures will be used as new/replaced water crossing structures.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.7.3.1.2.3 Soil degradation due to erosion or weathering

This impact could occur during the construction phase due to excavations and storage of overburden.

Significant impacts are not predicted to occur, mainly due to the relatively small footprint of the proposed excavation areas and overburden storage in the context of the overall project site landholding.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.7.3.1.2.4 Ground instability

This impact could occur during the construction phase due to excavation and storage of soil, subsoil and bedrock.

Significant impacts are not predicted to occur, mainly because no significant peat deposits were identified on site, the risk of a peat slide on site is considered to be negligible, slopes for excavations are anticipated to be stable and the height of temporarily stored excavated materials will be limited to 1.5m in height.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **No Likely Impact**.

NTS of EIAR S.7.3.1.3 Cumulative Effects on Soils, Subsoils & Bedrock

When the effects of the Ballynalacken Windfarm Project on Soils, Subsoils & Bedrock are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.7.3.2 Mitigation and Monitoring Measures

In relation to Soils, Mitigation and Monitoring Measures are proposed (See **Chapter 19** of the EIAR). The most relevant are:

- SM14 – A suitably qualified engineer will supervise all windfarm site excavations and construction works
- MM05 – During windfarm construction works, excavations will be backfilled as soon as possible
- MM21 – Concrete control procedures will be implemented including no batching; ready mixed concrete will be used for all foundations; works scheduled for dry days; experienced operators; run-off will be settled out and no concrete truck washing on-site
- MM22 – Fuel/oil control procedures will be implemented including control of on-site refuelling of plant and machinery; provision of spill kits. Trained operatives, use of double-skinned mobile bowsers. Emergency Response Plan in place.
- MM24 – All fuels or oils will be stored in designated, bunded, locked storage areas and fitted with a storm drainage system and an appropriate oil interceptor. Emergency Response Plan in place.

NTS of EIAR Section 7.4 Summary Conclusion for Soils

Overall, it is evaluated that the impact on the Environmental Factor, Soils, will be Imperceptible to Moderate, with no likely significant impacts to Soils.

Non-Tech Summary: Ch8 Water

NTS of EIAR Section 8.1 Introduction

The study in Chapter 8: Water relates to the hydrology and hydrogeology in the area of the Proposed Ballynalacken Windfarm Project site.

The study on Water, was carried out by David Broderick P.Geo (BSc, H.Dip Env Eng, MSc.) Hydrogeologist and Michael Gill P.Geo (BA, BAI, Dip Geol., MSc, MIEI) Environmental Engineer and Hydrogeologist, of **Hydro Environmental Services** (HES), a specialist geological, hydrological, hydrogeological and environmental consultancy.

Consultation, desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which involved collecting all relevant geological, hydrological, hydrogeological and meteorological information for the proposed development and surrounding area.

Fieldwork included a walkover survey, hydrological mapping and baseline monitoring of the proposed site, a trial pit investigation with 24 no. trial pits completed at the windfarm site, 140 no. soil probe locations with slope angle measurements, field hydrochemistry measurements, and surface water sampling at 16 no. locations.

The evaluation for Water has been carried out in accordance with industry and best practice guidance, including *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (NRA, 2009) along with *Guidance on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022).

NTS of EIAR Section 8.2 Scoping for the Water evaluation

The effects on the following sensitive aspects of Water were studied: **River Waterbodies; Groundwater Bodies; Water Supply; Bathing Waters; Designated Sites; Local Water Dependent Habitats.**

The **study areas** for Water are defined as follows:

- River Waterbodies; and Bathing Waters –within river sub-catchments which the project is located;
- Groundwater Bodies – All aquifers within 500m of the project site
- Water Supply – Groundwater abstractions within 500m of construction works and local water mains pipes along the R432 regional road and L58442 local road in the vicinity of works areas
- Designated Sites – Designated Sites downstream of the Project as far as the Nore_SC_100 sub-catchment, and local groundwater catchments within 500m of construction works areas
- Local Water Dependent Habitats – Water dependent habitats within 50m of construction works areas

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result **River Waterbodies, Groundwater Bodies, Water Supply (Surface Water and Groundwater Abstractions) and Designated Sites (River Barrow and River Nore SAC, River Nore SPA, River Nore/Abbeyleix Woods Complex pNHA, Ardalo Fen pNHA, Inchbeg pNHA, Dunmore Complex pNHA)** were scoped in for evaluation in the Water chapter.

In relation to **Water Supply (Piped Uisce Eireann supply), Bathing Waters, other Designated Sites not listed above (for example The Loughans SAC and pNHA) and Local Water Dependent Habitats**, it was considered

that the potential for significant impacts could be excluded, or they were already evaluated in another chapter of the EIAR, and as a result they were not brought forward for in-depth evaluation in the Water chapter.

NTS of EIAR Section 8.3 Evaluation Section

NTS of EIAR Sec.8.3.1 River Waterbodies

NTS of EIAR S.8.3.1.1 Baseline Environment – River Waterbodies

Regionally, the project site is located in the River Nore surface water catchment and locally the windfarm is located within the Cloghnagh River, Castlecomer Stream and Owveg River sub-catchments. The majority of the Ballynalacken Windfarm site drains to the River Nore via the Dinin River.

Drainage on the southern half of the proposed Ballynalacken Windfarm drain towards two headwater streams of the Cloghnagh River, largely facilitated by a network of forestry and field drains. The central section of the proposed Windfarm site drains towards a headwater stream of the Castlecomer Stream. Drainage in the northern section is facilitated by two main land drains which drain into the Kilcronan stream which flows into the Owveg River. The western extents of the Windfarm site drain directly to the River Nore via a network of local stream catchments.

EPA water quality Q-Ratings are available for surface waters bodies downstream of the project site. The Q-Ratings at the closest monitoring points downstream of the proposed Windfarm site range from Moderate (River Nore) to Good (Cloghnagh, Castlecomer Stream, Dinin River, Owveg River). Surface water quality monitoring was completed at 16 no. monitoring locations in downstream sub-basins to the Ballynalacken Windfarm Project site (51 no. samples in total).

Baseline runoff volumes for the project site were assessed. There are no recurring flood incidents within the proposed project site boundary identified in the Office of Public Works Past Flood Event Mapping.

Evolution of the baseline environment (the 'Do Nothing' scenario):

It is assumed that the status of the surface water bodies within the study area will be the same as present or at least Good during the timeline of the proposed Ballynalacken Windfarm development. This is based on the assumption that surface waterbodies will have to achieve at least Good Status by 2027. While the agricultural sector continues to have a negative effect on river water quality, results from this study indicate that this effect has declined in recent times. In terms of Climate Change, recent research has showed that under medium/high emissions scenario by the end of the century (2080s), winter flows are likely to increase on average by about 13%, but up to 30% for some rivers. Reductions in summer flows of about 20% on average are simulated, reaching more than 35% for some rivers.

NTS of EIAR S.8.3.1.2 Evaluation of impacts to River Waterbodies

There were **no profound or very significant impacts** considered likely or to have potential to occur in relation to River Waterbodies.

Potentially significant impacts, or impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.8.3.1.2.1 *Reduction in Surface Water Quality due to suspended solid entrainment in surface waters*

This impact could occur during the construction phase due to excavations, earthworks and groundworks, excavation dewatering, movement and storage of overburden, wind/physical erosion of soils, watercourse crossing works, installation of site drainage system and forestry felling.

It is considered that there is potential for significant effects as there is high runoff potential at the proposed project site and, as a result, if mitigation is not put in place - downstream river waterbodies will be potentially at risk from indirect surface water quality effects. However, the distributed nature of the windfarm site along with the significant downstream distances to the River Nore means the potential for the various elements of the proposed project to cumulatively contribute to hydrological effects is significantly lessened.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.1.2.2 *Reduction in Surface Water Quality due to the potential release of hydrocarbons, cement-based compounds or nutrients*

This impact could occur during the construction phase due to the use/presence of fuels, oils & chemicals, use of machinery on site, refuelling, cement/concrete for foundations and cable trenches, forestry felling, contaminated soils.

Significant impacts are not predicted to occur, mainly because only relatively small volumes of fuels/oils will be on site at any one time, turbine bases will be poured over a period of several days, and forestry felling will be spread out over 3 no. sub-catchments.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.1.2.3 *Hydromorphological effects due to watercourse crossing works*

This impact could occur during the construction phase due to the excavation of watercourse banks and bed, culvert placement/extension.

Significant impacts are not predicted to occur, mainly because the streams and drains which require instream/crossing works typically have low flows or no flows, and as bottomless culverts will be used for all new crossing structures.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.1.2.4 *Changes to Surface Water Quantities due to increased site runoff rates and/or changes to drainage patterns*

This impact could occur during all phases due to new permanent access roads, access road upgrades and hardstanding areas, and the site drainage network.

Significant impacts are not predicted to occur, mainly because the development will result in a very small increase in average runoff volumes at the site (0.43% increase), while the site drainage network will take full account of the existing drainage patterns or surface water flow paths on site.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.1.2.5 *Reduction in Surface Water Quality during the Operational Phase*

This impact could occur during the operational phase due to development site runoff (access roads, hardstands and reinstated areas), excavations, movement and storage of overburden, soil erosion, use of machinery, fuels & oils.

Significant impacts are not predicted to occur, mainly because works during the operational phase will be of a very minor scale, with very small numbers of vehicles associated and no refuelling envisaged.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.1.2.6 *Reduction in Surface Water Quality during Decommissioning Works*

This impact could occur during the decommissioning phase due to excavations, earthworks and groundworks, soil erosion, and the use of machinery, oils.

Significant impacts are not predicted to occur, mainly because these works areas are of very small scale, generally set in agricultural grassland fields, located at discrete areas spread over several sub-basins, electrical cabling removed by pulling from the ducts from the turbine locations and jointing chambers, leaving the ducting itself in-situ.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.1.3 *Cumulative Effects on River Waterbodies*

When the effects of the Ballynalacken Windfarm Project on River Waterbodies are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.8.3.2

Ground Waterbodies (Hydrogeology)

NTS of EIAR S.8.3.2.1 Baseline Environment – Ground Waterbodies

The Ballynalacken Windfarm Project site is located within three separate Groundwater Bodies (GWBs) which are the Durrow GWB, Ballingarry GWB and the Kilkenny-Ballynakill Gravels GWB.

Most groundwater flow is expected to be in the uppermost part of the aquifer. Groundwater levels in this bedrock typically have been measured mainly 0-5m below ground level. Groundwater flowpaths are likely to be short (30-300m), with groundwater discharging to nearby streams and small springs. Groundwater flow directions are expected to follow topography and therefore groundwater directions within the site are expected to be towards the primary streams within the valleys of the site.

In the 2016 – 2021 Water Framework Directive cycle, the Ballingarry GWB and Kilkenny-Ballynakill Gravels GWB are assigned Good status while the Durrow GWB has a Poor Status.

Evolution of the baseline environment (the 'Do Nothing' scenario):

It is assumed that the status of all groundwater bodies within the receiving environment will be at least Good status during the timeline of the Ballynalacken Windfarm Project Works. Climate change could result in increased rainfall followed by periods of drought, potentially resulting in increased groundwater level variation and wider seasonal ranges.

NTS of EIAR S.8.3.2.2 Evaluation of impacts to Ground Waterbodies

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Ground Waterbodies.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.8.3.2.2.1 *Reduction in Groundwater Quality due to sedimentation, and/or contamination by hydrocarbons and/or cement-based compounds*

This impact could occur during the construction phase due to excavation works and erosion of soils (sediment/turbid waters), presence of machinery, oils and fuels, and cement-based compounds.

Significant impacts are not predicted to occur, mainly due to the spread-out nature of works across several river waterbody catchments, short groundwater flowpaths, low permeability of bedrock and the use of non-toxic drilling fluid.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.2.2.2 *Alteration of groundwater levels and/or flow paths*

This impact could occur during the construction phase due to excavation dewatering.

Significant impacts are not predicted to occur, mainly because no significant groundwater dewatering will be required.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.2.3 Cumulative Effects on Ground Waterbodies

When the effects of the Ballynalacken Windfarm Project on Ground Waterbodies are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.8.3.3

Water Supply

NTS of EIAR S.8.3.3.1 Baseline Environment – Water Supply

The Ballyragget water supply uses an abstraction near the River Nore, located 1.5km downstream of the nearest Project works. The Kilkenny City Public Water Supply at Troyswood is approximately 17km downstream of the Project. There is an abstraction point 1.7km downstream of the Project associated with the Castlecomer water supply. The Project site is not located within the groundwater catchment of any mapped Public Water Supply or National Federation of Group Water Schemes registered groundwater source.

It is assumed that every private dwelling in the vicinity of the project site has a well water supply associated with it. There are no residences within 500m of a turbine, and only one residence within 500m of a borrow pit (c.457m), owned by the landowner of the borrow pit. There are nine wells used to supply drinking water to livestock within 500m of a turbine or borrow pit, with eight of these on lands involved in the Project. There are 85 no. wells identified within 500m around all Ballynalacken Windfarm Project works areas.

Evolution of the baseline environment (the 'Do Nothing' scenario):

No trends are known in respect of water quality or quantity of the individual well sources identified. Climate change has the potential to cause reductions in the quality and quantity of surface water and groundwater sources.

NTS of EIAR S.8.3.3.2 Evaluation of impacts to Water Supply

There were **no profound or very significant impacts** considered likely or to have potential to occur in relation to Water Supply.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.8.3.3.2.1 Reduction in Groundwater Quality or Quantity at local wells

This impact could occur during the construction phase due to oils, fuels, cement-based compounds and excavations (turbidity).

Significant impacts are not predicted to occur, mainly due to the elevated position of the Ballynalacken Windfarm site, expected short groundwater flowpaths of 300m, and separation distances to houses (and assumed wells).

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral**.

NTS of EIAR S.8.3.3.3 Cumulative Effects on Water Supply

When the effects of the Ballynalacken Windfarm Project on Water Supply are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.8.3.4

Designated Sites

NTS of EIAR S.8.3.4.1 Baseline Environment – Designated Sites

Designated sites scoped in for assessment in this EIAR Water Chapter include two Natura 2000 sites (River Barrow and River Nore SAC, and the River Nore SPA) and four proposed Natural Heritage Areas (River Nore/Abbeyleix Woods Complex pNHA, Inchbeg pNHA, Ardalo Fen pNHA, and Dunmore Complex pNHA).

Evolution of the baseline environment (the 'Do Nothing' scenario):

Climate change will contribute to the drying out of the watercourses in the summer months followed by isolated flooding in winter months, resulting in greater risk of sediment run-off and contamination flowing downstream.

NTS of EIAR S.8.3.4.2 Evaluation of impacts to Designated Sites

There were **no profound or very significant impacts** considered likely or to have potential to occur in relation to Designated Sites.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Potentially significant impacts and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.8.3.4.2.1 *Reduction in Water Quality in the River Barrow and River Nore SAC, the River Nore SPA and the River Nore/Abbeyleix Woods pNHA*

This impact could occur during the construction phase due to excavations, earthworks and groundworks, excavation dewatering, movement and storage of overburden, watercourse crossing works, installation of site drainage system, forestry felling, use/presence of fuels, oils & chemicals, use of machinery on site, refuelling, cement/concrete for foundations and cable trenches.

There is potential for significant impacts as the construction of the Ballynalacken Windfarm Project could potentially result in the release of suspended solids, hydrocarbons, concrete, and nutrients into downstream Designated Sites via site run-off. An increase in these pollutants in downstream waterbodies could potentially result in a decrease in water quality in Designated Sites

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.8.3.4.2.2 *Potential erosion and flow regime effects to the River Barrow and River Nore SAC, River Nore SPA and River Nore/Abbeyleix Woods Complex pNHA*

This impact could occur during the construction and operational phases due to new permanent access roads, access road upgrades and hardstanding areas, and the site drainage network.

Significant impacts are not predicted to occur, mainly because the development will result in a very small increase in average runoff volumes from the site (0.43% increase), and the design of the drainage network which has taken full account of existing drainage regimes and surface water flow paths at the site.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral**.

NTS of EIAR S.8.3.4.3 Cumulative Effects on Designated Sites

When the effects of the Ballynalacken Windfarm Project on Designated Sites are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.8.3.5 Mitigation and Monitoring Measures

In relation to Water, Mitigation and Monitoring Measures are proposed (See **Chapter 19** of the EIAR). The most relevant are:

- SM15 – Regular inspection of the windfarm drainage network by the Contractor and Project Hydrologist.
- SM16 – Regular surface water quality monitoring and recording during the construction phase.
- MM09 – Excavations unsuitable for use as construction/reinstatement material within the catchment of the Owveg River will not be stored in the catchment.
- MM17 – New culverts will be bottomless or clear spanning
- MM21 – Concrete control procedures will be implemented including no batching; ready mixed concrete will be used for all foundations; works scheduled for dry days; experienced operators; run-off will be settled out and no concrete truck washing on-site.
- MM22 – Fuel/oil control procedures will be implemented including control of on-site refuelling of plant and machinery; provision of spill kits. Trained operatives, use of double-skinned mobile bowzers. Emergency Response Plan in place.
- MM24 – All fuels or oils will be stored in designated, bunded, locked storage areas and fitted with a storm drainage system and an appropriate oil interceptor. Emergency Response Plan in place.

NTS of EIAR Section 8.4 Summary Conclusion for Water

Overall, it is evaluated that the impact on the Environmental Factor, Water, will be Imperceptible.

Non-Tech Summary: Ch9 Air (Air Quality & EMF)

NTS of EIAR Section 9.1 Introduction

Air quality relates to the quality of air in our environment. Sources of electromagnetic fields (EMF) in the existing environment include electric equipment, overhead electricity lines, overhead telephone lines, signals from existing telecommunications masts and underground communication cables

Air Quality impact was studied by Ciara Nolan, MSc in Applied Environmental Science and BSc (Hons) in Energy Systems Engineering, of **AWN Consulting**, a multidisciplinary environmental consultancy.

Electromagnetic Fields (EMF) impact was studied by Lewis Brien BEng (Hons) in Electronics of **Compliance Engineering Ireland (CEI)**.

Consultation, desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which involved reviewing EPA air quality monitoring reports, reviewing online mapping and modelling electromagnetic fields from the works.

A site visit was carried out to establish the proximity of nearby sensitive receptors to the works areas.

The evaluation for Air (Air Quality & EMF) has been carried out in accordance with EU Directives 2024/2881/EC and 2008/50/EC, IAQM document *Guidance on the Assessment of Dust from Demolition and Construction*, TII document PE-ENV-01103 and the International Commission on Non-Ionizing Radiation Protection 1998 guidelines.

NTS of EIAR Section 9.2 Scoping for the Air (Air Quality & EMF) evaluation

The effects on the following sensitive aspects of Air (Air Quality & EMF) were studied: **Local Residents, Community & Amenities; Transient People; EMF Interference with Telecommunications Infrastructure; and EMF Interference with Electrical and Electronical Equipment.**

The **study areas** for Air (Air Quality & EMF) are defined as follows:

- Local Residents, Community & Amenities; Transient People –250m from construction works areas; 50m from sections of public road used by construction site vehicles transporting overburden or borrow pit rock; 50m from public roads used by construction or delivery vehicles for the first 250m of the public roads from the Project site exit points; 200m from roads which will experience a significant change in traffic levels; 100m from turbines, Tinnalintan Substation and underground cabling.
- EMF Interference with Telecommunications Infrastructure; EMF Interference with Electrical and Electronical Equipment – 100m from turbines, Tinnalintan Substation and underground cabling.

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result **Local Residents, Community & Amenities** were scoped in for evaluation in the Air (Air Quality & EMF) chapter.

In relation to **Transient People, EMF Interference with Telecommunications Infrastructure** and **EMF Interference with Electrical and Electronical Equipment**, it was considered that the potential for significant impacts could be excluded, and as a result they were not brought forward for in-depth evaluation in the EIA Report.

NTS of EIAR Section 9.3 Evaluation Section

NTS of EIAR Sec.9.3.1 Local Residents, Community & Amenities

NTS of EIAR S.9.3.1.1 Baseline Environment – Local Residents, Community & Amenities

Air Quality: The area of the proposed development is predominantly rural and as such, there are not significant numbers of residential dwellings or community facilities in close proximity to the site. There are a total of 41 residential properties within the study area for Air Quality.

Electromagnetic Fields: Electric and magnetic fields are produced in all residential and working environments as a result of nearby electrical wiring, appliances, power lines and telecommunication masts, among other things. There are 9 no. sensitive receptors within 100m of the Internal Cable Link and 14 no. sensitive receptors within 100m of the Ballynalacken Grid Connection.

Evolution of the baseline environment (the 'Do Nothing' scenario):

There are no specific future trends with air quality. Air quality is likely to improve in future years due to government and international policies on Climate Action with the replacement of diesel and petrol vehicles with electric vehicles; and the replacement of fossil fuel and solid fuel heating systems with electrical heating, increasingly generated by renewable sources like wind and solar.

NTS of EIAR S.9.3.1.2 Evaluation of impacts to Local Residents, Community & Amenities

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Local Residents, Community & Amenities.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report. These were:

- Decrease in ambient air quality as a result of traffic derived pollutants (NO₂, PM₁₀, PM_{2.5}) (All Phases);
- Increase in ambient EMF levels (Construction & Decommissioning Phases);
- Indirect improvement in air quality due to clean, renewable electricity production (Operation Phase);
- Increase in airborne dust (Operation & Decommissioning Phase).

Impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.9.3.1.2.1 Increase in airborne dust

During the construction phase, increase in airborne dust was evaluated in relation to the delivery of construction materials to works areas, excavation and relocation of soils, and earthmoving. Significant impacts are not predicted to occur.

Mitigation and monitoring measures will be implemented as best practice environmental management (SM23, MM06, MM07, MM34, MM46, MM47). These measures are summarised in Section 9.3.2 below.

The residual impact significance is **Imperceptible**.

NTS of EIAR S.9.3.1.2.2 Savings in NO_x emissions and improvement in transboundary air pollution

During the operation phase, savings in nitrogen oxide emissions and improvement in transboundary air pollution has been evaluated in relation to the production of renewable energy. Impacts are predicted to be long-term and positive.

No mitigation is required.

The residual impact significance is **Long-term, indirect, slight, positive**.

NTS of EIAR S.9.3.1.2.3 Increase in ambient EMF levels

During the operational phase, increase in ambient electromagnetic field levels from the operational wind turbines, substation, grid connection and internal cabling has been evaluated. Significant impacts are not predicted to occur.

No mitigation is required.

The residual impact significance is **Imperceptible**.

NTS of EIAR S.9.3.1.3 Cumulative Effects on Local Residents, Community & Amenities

When the effects of the Ballynalacken Windfarm Project on Local Residents, Community & Amenities are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.9.3.2 Mitigation and Monitoring Measures

In relation to Air (Air Quality & EMF), Mitigation and Monitoring Measures are proposed (See **Chapter 19** of the EIAR). The most relevant are:

- SM23 – During working hours, the construction contractor will monitor dust control methods.
- MM46 – To ensure local roads are kept clean and site roadways are clear of mud, a road sweeper and dry wheel washes will be used.
- MM47 – Any loads of material which have potential for dust emissions will be covered during transportation.

NTS of EIAR Section 9.4 Summary Conclusion for Air (Air Quality & EMF)

Overall, it is evaluated that the impact on the Environmental Factor, Air (Air Quality), will be **short-term, localised, direct, negative and imperceptible, and therefore not significant**.

Overall, it is evaluated that the impact on the Environmental Factor, Air (EMF), will be **long-term, localised, negative and Imperceptible and therefore not significant**.

Non-Tech Summary: Ch10 Noise & Vibration

NTS of EIAR Section 10.1 Introduction

This chapter is an assessment of potential noise and vibration undertaken to assess potential impact on local residential amenity, from the proposed Ballynalacken Wind Farm development.

Noise and vibration impact was studied by: Mike Simms (Principal Acoustic Consultant), BE and MEngSc in Mechanical Engineering of **AWN Consulting**, a multidisciplinary environmental consultancy and Dermot Blunnie (Principal Acoustic Consultant), BEng (Hons) in Sound Engineering, MSc in Applied Acoustics and Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control, of **AWN Consulting**, a multidisciplinary environmental consultancy.

Consultation, desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which involved reviewing appropriate guidance and undertaking predictive calculations to assess potential impacts. Fieldwork consisted of baseline noise surveys at various Noise Sensitive Locations surrounding the proposed development.

The evaluation for Noise & Vibration has been carried out in accordance with industry and best practice guidance, including *Guidance on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022); *Wind Energy Development Guidelines 2006*; and *Institute of Acoustics Good Practice Guide to the Application of ETSU-R-97*. A full list can be found in **Chapter 10** – Noise & Vibration.

NTS of EIAR Section 10.2 Scoping for the Noise & Vibration evaluation

The effects at **Local Residences and Community Facilities** were studied.

The **Study area for operational noise** is defined as: All houses within 2km of a proposed turbine and 500m from the proposed Tinnalintan Substation, called Noise Sensitive Locations in the Environmental Impact Assessment Report. In relation to construction noise - Residences along local roads subject to concentrated material haulage routes are relevant.

The cumulative wind farms which were considered in the study area extends to 5km. The only wind farm within 5km is Pinewood Wind Farm, a permitted development of 11 turbines approximately 4.5 km to the northeast of the proposed Ballynalacken Windfarm.

The potential for the Ballynalacken Windfarm Project to adversely affect the local community was considered, and as a result **Local Residences and Community Facilities** were scoped in for evaluation in the Noise & Vibration chapter.

NTS of EIAR Section 10.3 Evaluation Section

NTS of EIAR Sec.10.3.1 Noise Impact Assessment

NTS of EIAR S.10.3.1.1 Baseline Environment – Noise

As part of the assessment for noise, 169 Noise Sensitive Locations have been assessed for noise impact. This includes 159 within 2km of the proposed turbines (17 of which are stakeholders in the project) and 10 within 500m of Tinnalintan Substation (1 is a stakeholder in the project). The locations of these Noise Sensitive Locations can be found on [NTS Figure 4](#)

Baseline noise surveys were carried out at 6 no. representative locations around the proposed Ballynalacken Windfarm site. The results of this survey were used to determine operational noise limits for the development cumulatively with other permitted windfarms in the area.

No significant sources of vibration were noted at any of the survey locations.

Evolution of the baseline environment (the 'Do Nothing' scenario):

If the development is not progressed the existing noise environment will remain largely unchanged.

NTS of EIAR S.10.3.1.2 Irish and International Noise Limit Criteria and Guidance

Assessment of Noise: The operational noise assessment in the EIA Report is based on guidance in relation to acceptable levels of noise from wind farms as contained in the *Wind Energy Development Guidelines* 2006. These guidelines are in turn based on detailed recommendations set out in the Department of Trade and Industry (UK) Energy Technology Support Unit (ETSU) publication *The Assessment and Rating of Noise from Wind Farms* (1996). The original ETSU-R-97 concepts underwent a thorough standardisation and modernisation in 2013 with the Institute of Acoustics (IOA) publication of A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (IOA GPG) including 6 Supplementary Guidance Notes. These documents bring together the combined experience of acoustic consultants in the UK and Ireland in the application of the assessment methods. The guidance contained within IOA GPG, and its Supplementary Guidance Notes (SGNs) are considered to represent best practice and have been adopted for this assessment.

In December 2019, the Draft Revised Wind Energy Development Guidelines December 2019 (Draft WEDG) were published for consultation and have yet to be finalised. Therefore the assessment presented in this EIAR is based on the current guidance outlined in the Wind Energy Development Guidelines for Planning Authorities (2006) and has been supplemented with guidance from ETSU-R-97 and the IOA GPG and its Supplementary Guidance Notes (SGNs). If updated Wind Energy Guidelines are published during the application process for the proposed development, it is anticipated that any relevant changes affecting the noise will be addressed through an appropriate planning condition. Modern wind turbines can be controlled to within permitted operational noise levels should the noise criteria change materially in the new Wind Energy Guidelines.

NTS of EIAR S.10.3.1.3 Evaluation of Noise Impacts

NTS of EIAR S.10.3.1.3.1 Noise from the Operating Turbines

Predicted noise levels have been calculated representing worst-case conditions for all 159 no. Noise Sensitive Locations within the study area. The predicted noise levels include predicted noise from the consented, but

not yet constructed, Pinewood Wind Farm. With the exception of ten Noise Sensitive Locations where marginal exceedance was found, noise levels from the operating turbines at the remaining Noise Sensitive Locations were within the operational noise limits. Therefore, the potential worst-case effects at these 149 no. Noise Sensitive Locations is considered **negative, not significant and long-term**.

An additional assessment was carried out for the set of ten locations where exceedances are noted (and therefore there is potential for significant effects). While noise levels at low wind speeds will increase due to the operation of the turbines, the predicted levels will remain low, albeit new sources of noise will be introduced into the soundscape. Noise control modules will be installed in each of the turbines, and the implementation of this measure will effectively control noise emissions from the turbines. The predicted residual operational turbine noise effects at the closest noise sensitive areas are considered to be **negative, not significant and long-term**.

NTS of EIAR S.10.3.1.3.2 *Special Characteristic – Low Frequency Noise and Infrasound*

There is a significant body of evidence to show that the infrasound and low-frequency noise associated with wind turbines will be below perceptibility thresholds and typically in line with existing baseline levels of infrasound and low-frequency noise within the environment and therefore need not be considered further in this assessment.

NTS of EIAR S.10.3.1.3.3 *Special Characteristic – Amplitude Modulation*

Although no Amplitude Modulation is expected to occur at sensitive locations, if a complaint arises the matter will be investigated, and control mitigation measures will be put in place. Therefore, the residual impact of any Amplitude Modulation experienced will **not be significant**.

NTS of EIAR S.10.3.1.3.4 *Noise from the Operational Tinnalintan Substation*

Due to the separation distance between the turbines and the Tinnalintan Substation, there will be no cumulative impact of operational noise. No mitigation is required. The potential worst-case associated effects at the nearest Noise Sensitive Locations associated with the operation of the proposed substation is described as **negative, not significant and long-term**.

NTS of EIAR S.10.3.1.3.5 *Noise from Construction Works*

During the construction phase, noise can arise from the construction of turbines and hardstanding areas; internal roads; borrow pits; substation; and from construction traffic. Given the distances between the main construction works and nearby Noise Sensitive Locations, and the fact that the construction phase of the development is temporary in nature, it is expected that the various noise sources will not be excessively intrusive.

It is considered that with mitigation measures are taken into account, the environmental noise effects of the construction phase of the proposed development will be **negative, not significant and short-term**.

NTS of EIAR S.10.3.1.3.6 *Vibration from Construction Works*

During the construction phase, vibration can arise from the construction of turbines and hardstanding areas; internal roads; borrow pits; substation; and from construction traffic. Due to the distance of the proposed works boundary from the Noise Sensitive Locations, the limited extent of piling required and that no blasting is anticipated, the residual vibration effect on Noise Sensitive Locations is assessed as **not significant and short-term**.

NTS of EIAR S.10.3.1.3.7 *Vibration during the Operational Phase*

Vibration from operational wind turbines is low and will not result in perceptible levels at nearby sensitive receptors nor will the levels of vibration result in any structural damage. Therefore, there are no expected sources of vibration associated with the operational phase of the proposed development. It is assessed that the residual operational vibration effects will be **not significant and short-term**

NTS of EIAR S.10.3.1.4 Cumulative Noise Effects

In relation to cumulative construction noise, although it is unlikely to occur, there is potential that the other projects in the vicinity of the Eirgrid Ballyragget Substation at Moatpark could all be constructed during the same time period as the Ballynalacken Windfarm Grid Connection. Mitigation measures will be put in place during the construction of the proposed Ballynalacken Windfarm Project which will control noise emissions from the Ballynalacken Grid Connection works. Overall, it is considered that collectively noise would be predicted to be **Neutral and cumulatively not significant**.

In relation to cumulative operational noise, the assessment presented in this Chapter is cumulative, in that Pinewood Windfarm (permitted but not constructed) is included in the predicted noise levels. This is in accordance with the requirements of the Institute of Acoustics Good Practice Guidelines. Other wind farms are at too great a distance from the Noise Sensitive Locations to have any cumulative noise effects.

NTS of EIAR Sec.10.3.2 Mitigation and Monitoring Measures

In relation to Noise & Vibration, Mitigation and Monitoring Measures are proposed (See **Chapter 19** of the EIAR). The most relevant are:

- MM48 – Construction operations shall generally be restricted to between 0700-1800hrs Monday to Friday, and 0700-1400hrs on Saturdays.
- MM49 & OMM24 – A Community Liaison Officer will be appointed to liaise with and keep the local community up-to-date with relevant construction work schedules.
- OMM17 – A noise curtailment strategy will be developed and implemented to ensure that the operating windfarm complies with the prescribed operational noise criterion.
- OMM18 - In the event of a complaint which indicates potential amplitude modulation (AM) associated with turbine operation, the windfarm operator will employ an independent acoustic consultant to assess the level of AM experienced by the complainant. The mitigation measures, if required, will consist of the implementation of operational controls on specified turbines, which will curtail or stop the relevant turbines under specific operational conditions, so that OAM is eliminated.
- OMM20 - A new berm and hedgerow will be planted on the northern side of the substation compound to provide noise and visual screening of the new substation compound.

NTS of EIAR Section 10.4 Summary Conclusion for Noise & Vibration

In summary, **the noise and vibration impact of the Proposed Development is assessed as not significant** in the context of current national guidance.

Non-Tech Summary: Ch11 Shadow Flicker

NTS of EIAR Section 11.1 Introduction

This study in Chapter 11 Shadow Flicker assesses potential shadow flicker effects.

The Shadow Flicker chapter was written by Aileen Byrne (BA, H.Dip) who is an environmental scientist. The report was reviewed by Ms. Sarah Moore (BSc, MSc) and Mr. David Kiely of **Jennings O'Donovan (JOD)** consulting engineers.

Desktop studies were carried out in order to calculate the occurrence of shadow flicker at sensitive receptors.

The evaluation for Shadow Flicker has been carried out in accordance with industry and best practice guidance, including the 2006 Wind Energy Development Guidelines and the 2019 Draft Revised Wind Energy Development Guidelines.

NTS of EIAR Section 11.2 Scoping for the Shadow Flicker evaluation

The **study area** for Shadow Flicker includes houses (sensitive receptors) within a distance equivalent in length to 10 of the proposed wind turbine rotor diameters (1170m). There are 72 no. sensitive receptors within this study area.

A cumulative study area of 2340m to account for the sum of 1170m from the nearest Ballynalacken turbine and 1170m from any other constructed or permitted turbine in the area, was identified. There are no other wind turbines either constructed or permitted within the cumulative study area, therefore there is no potential for cumulative effects from other turbines on sensitive receptors.

NTS of EIAR Section 11.3 Evaluation Section

NTS of EIAR Sec.11.3.1 Shadow Flicker

The results show that 18 no. receptors will experience no shadow flicker, and of the 54 no. receptors that will experience shadow flicker effects, 11 no. are below the daily 2006 Guidelines guidance and 43 no. receptors exceed the daily guidance. Two receptors will experience shadow flicker above the yearly guidance of 30 hours per year.

It is important to note that the results are predominately a theoretical worst-case, no allowance is included for the periods when the blades are not turning, nor for periods when the wind direction has turned the rotor plane away from the sensitive receptor, nor for any screening provided by trees or buildings. Therefore, the results are an overestimate. Should this project be granted planning there will be planning conditions controlling shadow flicker.

When the mitigation and monitoring measures are implemented, **no significant residual impacts** are predicted to occur.

NTS of EIAR Sec.11.3.2 Mitigation and Monitoring Measures

In relation to Shadow Flicker, Mitigation and Monitoring Measure OMM19 is proposed:

OMM19 - The wind turbines will be fitted with a Shadow Flicker Control Module. Should a complaint regarding shadow flicker be received from a neighbouring resident, the occurrence of shadow flicker at the receptor will be investigated and the Control Module can be set to automatically turn off the turbine if the defined parameters for shadow flicker events, at a given sensitive receptor, are predicted to occur. This will eliminate shadow flicker at the residence in question.

NTS of EIAR Section 11.4 Summary Conclusion for Shadow Flicker

No significant residual impacts are predicted to occur and therefore it is concluded that that the proposed windfarm will not result in a significant impact on the sensitive receptors in the locality.

Non-Tech Summary: Ch12 Climate

NTS of EIAR Section 12.1 Introduction

Climate is defined as the average weather over a period of time. Climate change is a significant change in this average weather. Climate change is a natural phenomenon but in more recent years has accelerated as a result of human activities through the release of greenhouse gases (GHGs).

The Climate chapter was prepared by Ciara Nolan, MSc in Applied Environmental Science and BSc (Hons) in Energy Systems Engineering, of **AWN Consulting**, a multidisciplinary environmental consultancy.

Consultation and desktop studies were carried out in order to gather information. No fieldwork was required.

The evaluation for Climate has been carried out in accordance with industry and best practice guidance, including the Transport Infrastructure Ireland guidance document PE-ENV-01104 *Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document*, and the TII Carbon Tool.

NTS of EIAR Section 12.2 Scoping for the Climate evaluation

The effects on the following sensitive aspects of Climate were studied: **Climate Change (Greenhouse Gas Emissions)** and **Climate Change Risk (Vulnerability of the Project to Climate Change)**.

The **study areas** are defined as follows:

- Climate Change (Greenhouse Gas Emissions) – Irish State
- Climate Change Risk (Vulnerability of the Project to Climate Change) – The Windfarm Site

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result **Climate Change (Greenhouse Gas Emissions)** were scoped in for evaluation in the Climate chapter.

In relation to **Climate Change Risk (Vulnerability of the Project to Climate Change)**, it was considered that the potential for significant impacts could be excluded, and as a result they were not brought forward for in-depth evaluation in the EIA Report.

NTS of EIAR Section 12.3 Evaluation Section

NTS of EIAR Sec.12.3.1 Climate Change

NTS of EIAR S.12.3.1.1 Baseline Environment – Climate Change

In Ireland, greenhouse gas emissions, annual amounts of precipitation and annual average air temperature are all increasing, while the ocean becomes warmer and more acidic, river flows increase across most of the country and the area of land covered by forests and wetland areas is decreasing.

Data published in July 2024 by the Environmental Protection Agency predicts that Ireland exceeded its 2023 annual emissions limit set under EU's Effort Sharing Regulation. The EPA estimate that 2023 total national GHG emissions have decreased by 6.8% on 2022 levels to 55.01 megatons of carbon dioxide equivalent (Mt

CO₂e), with a 2.2 Mt CO₂e (-21.6%) reduction in electricity industries alone. This was driven by a 40.7% share of energy from renewables in 2023 and by increasing our imported electricity. The sector with the highest emissions in 2023 was agriculture at 37.6% of the total, followed by transport at 21.4%.

Evolution of the baseline environment (the 'Do Nothing' scenario):

Under the Do-Nothing Scenario, no construction works will take place and the site will remain as it currently is. If the Ballynalacken Windfarm Project does not proceed, the renewable generation from the Ballynalacken wind turbines will not be transported to the National Grid and the subsequent benefits of greenhouse gas offsets will not occur. The baseline environment will only change in line with the trends of CO₂e emissions identified above.

NTS of EIAR S.12.3.1.2 Evaluation of impacts to Climate Change

There were **no profound or very significant impacts** considered likely or to have potential to occur in relation to Climate Change.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Potentially significant impacts, and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.12.3.1.2.1 Increase in Renewable Energy – Electricity (RE-E) production

This impact will occur during the operational phase due to operating turbines.

The Ballynalacken Windfarm Project will provide 140 Gigawatt hours of renewable electricity per annum. Over the lifetime of the development, it is anticipated that the production of renewable electricity will result in total greenhouse gas emissions savings of 35,700 tonnes of CO₂e each year. This is considered a significant, beneficial impact.

No mitigation is required. The residual impact significance is **Long-term, positive, significant**.

NTS of EIAR S.12.3.1.2.2 Greenhouse Gas Emissions

This impact could occur during the construction phase due to construction materials; excavations; land use change; transportation of materials; production of the turbine components.

Significant impacts are not predicted to occur, mainly because the total greenhouse gas emissions resulting from the project will equate to 0.15% of Ireland's 2030 Electricity sector carbon budget, and because the turbines will be energy neutral within 4 to 8 months.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Not Significant**.

NTS of EIAR S.12.3.1.3 Cumulative Effects on Climate Change

Institute of Environmental Management & Assessment guidance states that "When considering the cumulative assessment, all global cumulative Greenhouse Gas sources are relevant to the effect on climate change. As a result, the effects of Greenhouse Gas emissions from specific cumulative projects should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has Greenhouse Gas emissions for assessment over any other".

NTS of EIAR Sec.12.3.2 Mitigation and Monitoring Measures

In relation to Climate, there are 4 no. proposed Mitigation and Monitoring Measures (See **Chapter 19** of the EIAR). The most relevant are:

- MM05 – During windfarm construction works, excavations will be backfilled as soon as possible
- MM51 – Plant and machinery will not be allowed to idle and machinery used intermittently will be shut down or throttled back to a minimum when not in use

NTS of EIAR Section 12.4 Summary Conclusion for Climate

Overall, it is evaluated that the impact on the Environmental Factor, Climate, will be long-term, likely, positive and significant.

Non-Tech Summary: Ch13 Biodiversity

NTS of EIAR Section 13.1 Introduction

This study in Chapter 13 relates to Biodiversity, which is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within and between species and ecosystems.

Biodiversity was studied by **Inis Environmental Consultancy** team members who are scientific experts in various fields of Ecology and Biodiversity. The main ecologists involved in the Biodiversity chapter were: Dr Alex Copland (BSc, PhD, MEnvSC, MCIEEM); Howard Williams (BSc, CEnv, MCIEEM, CBiol, MRSB, MIFM); Andrew Whitfield (MA, BA, CEnv, CECOL); and Megan Doyle (MSc, BSc). Ross Macklin (BSc (Hons), MIFM, HDip (GIS), PDip (IPM) and Bill Brazier (BSc (Hons), MIFM) of Triturus Environmental Ltd.

Consultation, desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which involved a thorough review of available information that is relevant to the ecology of the proposed development site.

Fieldwork included site walkovers, habitat classification surveys, mammal surveys, camera trap deployment, bat habitat assessment surveys, bat transect and static detector surveys, vantage point surveys, watercourse crossing surveys, catchment-wide electrofishing surveys, aquatic site assessments and biological water quality sampling.

The evaluation for Biodiversity has been carried out in accordance with industry and best practice guidance, including the Chartered Institute of Ecology and Environmental Management (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland*, NatureScot (2017) *Recommended bird survey methods to inform impact assessment of onshore Wind Farms*, and NatureScot (2021) *Bats and onshore wind turbines – survey, assessment and mitigation*.

NTS of EIAR Section 13.2 Scoping for the Biodiversity evaluation

The effects on the following sensitive aspects of Land were studied: **Terrestrial Habitats; Invertebrates; Amphibians & Reptiles; Terrestrial Mammals; Bats; Birds; Aquatic Habitats & Species; Designated Sites and Local Water Dependent Habitats.**

The **study areas** for Biodiversity were defined as follows:

- Terrestrial Habitats; Invertebrates; Amphibians & Reptiles; and Terrestrial Mammals (Badger and Other Mammals) – Construction works area boundary plus 100m in all directions
- Terrestrial Mammals (Otter) – Watercourse crossing locations and suitable habitat 300m in both directions
- Bats – Buildings within 250m, and mature trees within 50m of the construction works area boundary, linear vegetation features of high suitability for foraging bats within the construction works area boundary, bridges within the construction works area boundary and along material haulage routes
- Birds – 2km from construction works areas
- Aquatic Habitats & Species – Watercourses at crossing locations
- Designated Sites – All downstream protected aquatic/water dependent habitats and species and habitats of protected species in the Nore_SC_060, Dinin[North]_SC_010, Nore_SC_080, and the

Nore_SC_100, along with Nore_SC_040, Nore_SC_050, Nore_SC_070, Nore_SC_090 and Dinin[South]_SC_010 sub-catchments

- Local Water Dependent Habitats – All areas present within 500m of project excavation works.

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result **Terrestrial Habitats, Invertebrates, Amphibians & Reptiles, Terrestrial Mammals, Bats, Birds, Aquatic Habitats & Species** and **Designated Sites** were scoped in for evaluation in the Biodiversity chapter.

In relation to **Local Water Dependent Habitats**, it was considered that the potential for significant impacts could be excluded, and as a result they were not brought forward for in-depth evaluation in the EIA Report.

NTS of EIAR Section 13.3 Evaluation Section

NTS of EIAR Sec.13.3.1 Terrestrial Habitats

NTS of EIAR S.13.3.1.1 Baseline Environment – Terrestrial Habitats

In total, 18 habitat types occur within the Ballynalacken Windfarm Site, comprising 212.08 hectares and 24,056m (for linear features). The dominant habitats present are improved agricultural grassland, conifer plantation, wet grassland and buildings and artificial surfaces, which make up approximately 93% of the study area. No Flora Protection Order species are present within, or in close proximity to, construction works areas. Only one Invasive Alien Species was recorded during surveys: Cherry Laurel was recorded at the edge of a site road junction.

Evolution of the baseline environment (the 'Do Nothing' scenario):

The majority of the proposed Ballynalacken Windfarm Project is improved agricultural grassland and conifer plantation. As such these habitats are expected to remain relatively unchanged in the 'Do-Nothing' scenario. Climate change with potentially warmer wetter winters and/or drier and hotter springs and summers may result in droughts and potentially change the nature of semi-natural habitats.

NTS of EIAR S.13.3.1.2 Evaluation of impacts to Terrestrial Habitats

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Terrestrial Habitats.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.13.3.1.2.1 Introduction or spread of invasive species

This impact could occur during the construction, operation and decommissioning phases, due to the excavation and relocation of soils and the movement of machinery.

Significant impacts are not predicted to occur, mainly because no soils will be imported to the Project site during the construction phase, and the level of groundworks will be much reduced during the operational and decommissioning phases.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral**.

NTS of EIAR S.13.3.1.2.2 *Habitat enhancement and protection*

This impact will occur during the construction and operation phases, due to the preservation of wet heath habitat, planting/establishment of new hedgerows, and enhancement of existing hedgerow.

Positive impacts are predicted to occur due to the protection of 8.1 hectares of wet heath, wet grassland and scrub habitat for the lifetime of the windfarm, the planting of 1.5km of new hedgerow and c.43 no. new immature trees and the enhancement of 4.12km of existing hedgerow with native Irish species.

No mitigation is required. The residual impact significance is **Slight Positive**.

NTS of EIAR S.13.3.1.3 Cumulative Effects on Terrestrial Habitats

When the effects of the Ballynalacken Windfarm Project on Terrestrial Habitats are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.13.3.2

Invertebrates

NTS of EIAR S.13.3.2.1 Baseline Environment – Forestry Land

With the exception of Marsh Fritillary, no Invertebrate surveys were undertaken for the Project and no incidental records were made. A total of 62 Marsh Fritillary larval webs were recorded in an area of 6 hectares of suitable habitat in a field 1.88km to the east of the windfarm site.

Evolution of the baseline environment (the 'Do Nothing' scenario):

Climate change with potentially warmer wetter winters and/or drier and hotter spring and summers may result in droughts and potentially reduce the availability of suitable habitat for Marsh Fritillary, however, any such effects would be unlikely to occur prior to construction activities commencing

NTS of EIAR S.13.3.2.2 Evaluation of impacts to Invertebrates

There were **no profound, very significant, significant, moderate or slight impacts**, or non-significant impacts considered important enough or of local concern considered likely or to have potential to occur in relation to Invertebrates.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

NTS of EIAR S.13.3.2.3 Cumulative Effects on Invertebrates

When the effects of the Ballynalacken Windfarm Project on Invertebrates are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.13.3.3 Amphibians & Reptiles

NTS of EIAR S.13.3.3.1 Baseline Environment – Amphibians & Reptiles

The majority of the proposed windfarm site consists of highly modified habitat of improved agricultural grassland and non-native conifer plantation, limiting its potential suitability for Smooth Newt, Common Frog and Common Lizard. Surveys resulted in no sightings of amphibians or reptiles at the proposed Ballynalacken Windfarm site.

Evolution of the baseline environment (the 'Do Nothing' scenario):

No population estimate is available for Smooth Newt, but it is thought to be stable. Common Lizard are widely distributed across Europe while Common Frog is a widespread and very abundant species in Ireland. It is assumed that the baseline environment in relation to amphibians and reptiles, as identified above, will be the receiving environment at the time of construction and on into the operational phase. Climate change with potentially warmer wetter winters and/or drier and hotter spring and summers may result in droughts and potentially reduce the availability of suitable habitat for Amphibians.

NTS of EIAR S.13.3.3.2 Evaluation of impacts to Amphibians & Reptiles

There were **no profound, very significant, significant, moderate or slight impacts**, or non-significant impacts considered important enough or of local concern considered likely or to have potential to occur in relation to Invertebrates.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

NTS of EIAR S.13.3.3.3 Cumulative Effects on Amphibians & Reptiles

When the effects of the Ballynalacken Windfarm Project on Amphibians & Reptiles are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.13.3.4 Terrestrial Mammals

NTS of EIAR S.13.3.4.1 Baseline Environment – Terrestrial Mammals

Suitable habitat for Badger, Irish Hare, Pine Marten, Irish Stoat, Red Squirrel, Hedgehog, Red Fox, Pygmy Shrew and Red Deer occurs at the proposed Ballynalacken Windfarm site. Suitable habitat for Otter is of potential value to otter the area of the Project.

Evidence of the presence of Otter (scats, spraint, couch, crayfish remains), Badger (droppings, badger hair, camera trap sighting), Irish Stoat (scats), Red Squirrel (food signs), Hedgehog (scats) and Red Fox (mammal run, scats, carcass, camera trap sightings, possible den) were recorded during mammal surveys. Irish Hare, Pine Marten, Pygmy Shrew and Red Deer were not identified during the field studies. Evidence of invasive mammal species such as Rabbit and Brown Rat were recorded during field studies.

Evolution of the baseline environment (the 'Do Nothing' scenario):

It is assumed in this report that the baseline environment in relation to Terrestrial Mammal species, as described herein, will be the receiving environment at the time of construction. The main drivers of change for mammals result from agricultural improvements and habitat loss/change as well as potential pollution events from agricultural activities and commercial forestry resulting in habitat loss. Climate change with potentially warmer wetter winters and/or drier and hotter spring and summers may result in droughts and potentially reduce foraging habitat for otters, however, any such effects would be unlikely to occur prior to construction activities.

NTS of EIAR S.13.3.4.2 Evaluation of impacts to Terrestrial Mammals

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Agricultural Land.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.13.3.4.2.1 Physical Loss or degradation of suitable habitat for Otter

This impact could occur during the construction and operational phases due to works in proximity to natural watercourses, works in wet drainage channels, groundworks, vegetation clearance, hedgerow removal, landuse change.

Significant impacts are not predicted to occur, mainly because no instream works to natural watercourses are required, the expected low usage of the site by Otter and because the habitats at the site are of lower value to Otter than suitable habitats available in the wider local area.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Slight**.

NTS of EIAR S.13.3.4.2.2 Reduction in aquatic habitat quality and availability of aquatic prey item species

This impact could occur to Otter during the construction phase due to construction works near and at watercourses, groundworks, forestry felling, excavation and relocation of soils.

Significant impacts are not predicted to occur, mainly because most of the watercourses and drainage channels on-site are dry for at least part of the year, and do not provide a valuable prey-item fish/crayfish resource for Otter, the low number of frogs expected to occur on site, and that significant reductions in downstream water quality are not expected to occur as a result of the Project.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral – Not Significant**.

NTS of EIAR S.13.3.4.2.3 *Mortality, injury, disturbance or displacement of Otter*

This impact could occur during the construction phase due to noise and visual intrusion, movement of machinery, groundworks and vegetation clearance.

Significant impacts are not predicted to occur, mainly because no otter holts or couches were located on site or within 300m of works locations in proximity to suitable Otter habitat, the works at watercourse crossing locations will be of brief duration and there are far more suitable habitats for commuting across the wider environment.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Slight (mortality) – Not Significant (disturbance, displacement)**.

NTS of EIAR S.13.3.4.2.4 *Mortality, Disturbance or Displacement of Badger at Setts*

This impact could occur during the construction phase due to the excavation of soils, groundworks, vegetation clearance, noise and visual intrusion.

Significant impacts are not predicted to occur, mainly because no badger setts were recorded within the study area. Potential exists for a badger sett to be established in the intervening periods between the preparation of the planning application and the commencement of construction works, so mitigation measures are required.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral – Not Significant**.

NTS of EIAR S.13.3.4.3 Cumulative Effects on Terrestrial Mammals

When the effects of the Ballynalacken Windfarm Project on Terrestrial Mammals are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.13.3.5

Bats

NTS of EIAR S.13.3.5.1 Baseline Environment – Bats

A preliminary roost assessment was carried out to assess the likelihood of bats being present at various features/sites within the study area. A high number of bats were recorded emerging from a building (identified as BL2) which could be categorised as a hibernation roost. No other potential maternity or hibernation roosts were identified. A tree (identified as TR1) was observed to be a roost, but only 6 individuals were recorded emerging/entering the roost. Common Pipistrelle was the bat species recorded the most during static detector surveys (22.03%) followed by Soprano Pipistrelle (8.6%) and Leisler's Bat (3.6%). Transect surveys identified commuting Leisler's Bat, Common and Soprano Pipistrelle. No swarming areas or migration routes were found on site or in the surrounding area.

Evolution of the baseline environment (the 'Do Nothing' scenario):

All Irish bat species are considered to be of favourable conservation status. It is expected that bat activity will not change significantly by the time of construction of the project. Climate change is having an effect on bat behaviour and physiology, with studies showing a decrease in accumulated fat reserves at the start of the hibernation and potential effects on breeding success.

NTS of EIAR S.13.3.5.2 Evaluation of impacts to Bats

There were **no profound or very significant impacts** considered likely or to have potential to occur in relation to Bats.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Potentially significant impacts, or impacts of potential moderate or slight significance which are likely or have potential to occur were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.13.3.5.2.1 *Mortality of bats due to collision or barotrauma*

This impact could occur during the operation phase due to operating turbines.

Collision risk for Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat is considered to be High, with high activity levels for these species recorded at each turbine location at least once during static detector surveys. All other species are considered low risk from collision or are present in low numbers. As there is potential for significant impacts to high risk species, mitigation measures will be required.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible** (low risk species) **to Slight** (high risk species).

NTS of EIAR S.13.3.5.2.2 *Loss, Reduction of feeding areas and/or Severance of commuting routes*

This impact could occur during all phases due to site clearance and hedgerow removal.

Significant impacts are not predicted to occur, mainly because there is an extensive hedgerow network in the area, the bat species which occur at the Project site are known to be adaptable to different habitats and because there will be no additional hedgerow removal or loss of semi-natural habitat during the operation or decommissioning phases.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Slight (positive) to Not Significant (positive)**.

NTS of EIAR S.13.3.5.2.3 *Disturbance or displacement of bats*

This impact could occur during the construction phase due to landuse change, physical disturbance, hedgerow / tree removal, noise, vibration, lighting and forestry felling.

Significant impacts are not predicted to occur, mainly because of the low number of identified/potential roosts, the availability of suitable alternative foraging and commuting habitat in the local and wider area and the temporary duration of the construction phase.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral (general) to Imperceptible (TR1, BL2)**.

NTS of EIAR S.13.3.5.2.4 *Disturbance or displacement of roosting or foraging bats from operational turbines*

This impact could occur during the operational phase due to noise and visual intrusion from operating turbines and lighting at turbines.

Significant impacts are not predicted to occur, mainly because of the low number of identified/potential roosts, the separation distance of the operational turbines from local roosts and the establishment of a bat buffer zone to encourage bats away from operational turbines.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral (general) to Imperceptible (TR1, BL2)**.

NTS of EIAR S.13.3.5.3 Cumulative Effects on Bats

When the effects of the Ballynalacken Windfarm Project on Bats are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.13.3.6 Birds

NTS of EIAR S.13.3.6.1 Baseline Environment – Birds

Kestrel, Buzzard, Sparrowhawk and Peregrine Falcon were recorded during bird surveys for the Project, however they were not recorded nesting within 2km of the proposed windfarm site. Merlin and Hen Harriers were not observed during bird surveys for the Project.

Kingfisher are the special conservation interest of the River Nore SPA but were not observed during ecological surveys undertaken for Ballynalacken Windfarm, or during water crossing surveys.

Passerine bird species recorded at the windfarm site include Meadow Pipit, Redwing, Skylark, Starling, Willow Warbler and Raven. Waders recorded during bird surveys include Golden Plover, Woodcock and Snipe. Lesser Black-backed Gull and Grey Heron were waterbirds recorded at the windfarm site.

Evolution of the baseline environment (the 'Do Nothing' scenario):

Climate Change has been identified as a threat to several bird species and their habitats. Instances of extremely warm summers places pressures on nesting habitats and hunting ability for raptors. Extreme temperature put greater pressure on brooding females and can result in eggs over heating or for chicks to die from dehydration. The increase of regular high energy storms as a result of climate change can affect prey availability and also put greater pressures on young birds still developing their flight skills. These threats are likely to be present in a 'Do-Nothing' scenario.

NTS of EIAR S.13.3.6.2 Evaluation of impacts to Birds

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Birds.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur, or non-significant impacts considered important enough or of local concern were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.13.3.6.2.1 Birds of Prey: Collision Risk

This impact could occur during the operation phase due to collision with turbine structures or turbine blades.

Significant impacts are not predicted to occur, mainly because Collision Risk Modelling evaluated low levels of projected fatalities to Kestrel (one collision every 13.57 years and 8.16 years during the breeding season and winter season respectively), Sparrowhawk (one collision every 139.03 years and 30.64 years during the breeding season and winter season respectively) and Buzzard (one collision every 4.54 years and 4.2 years during the breeding season and winter season respectively).

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Not Significant** (high risk species) – **Neutral** (low risk species).

NTS of EIAR S.13.3.6.2.2 Kingfisher – Reduction in foraging or nesting resource in downstream habitats

This impact could occur during the construction phase due to decreases in downstream water quality due to sedimentation from earthworks, contamination from oils, fuels, cements, and erosion of banks due to changes in flow regimes, spread of invasive species.

Significant impacts are not predicted to occur, mainly because none of the aquatic habitats at watercourse and drain crossing location are of high fisheries values, significant reductions in downstream water quality are not expected to occur and due to the installation of the windfarm site drainage network ahead of works.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral – Not Significant**.

NTS of EIAR S.13.3.6.2.3 *Passerines: Physical injury/destruction of nests or chicks*

This impact could occur during the construction phase due to the movement of machinery and soils, hedgerow trimming and tree felling.

Significant impacts are not predicted to occur, mainly because no works to buildings are proposed, low numbers of passerines were recorded at the site and works are only likely to affect nests established before construction works commence in an area. When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral**.

NTS of EIAR S.13.3.6.2.4 *Waders: Collision risk*

This impact could occur during the operational phase due to collision with turbine structures or turbine blades.

Significant impacts are not predicted to occur, mainly because Collision Risk Modelling evaluated levels of projected fatalities to Golden Plover as one collision every 2.53 years and 0.41 years during the breeding season and winter season respectively, however this species was not identified as a resident in the receiving environment and records of Golden Plover during bird surveys were determined to be migratory flocks.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Not Significant**.

NTS of EIAR S.13.3.6.2.5 *Birds of Prey: Disturbance/displacement from Operating turbines*

This impact could occur during the operational phase due to operating turbines.

Significant impacts are not predicted to occur, mainly because of the availability of extensive alternative areas of suitable habitat in the area, the strong turbine avoidance of Buzzard and because Peregrine Falcon, Barn Owl and Sparrowhawk were only recorded in low numbers. When the mitigation and monitoring measures are implemented, the residual impact significance will be **Not Significant**.

NTS of EIAR S.13.3.6.2.6 *Waders: Physical injury/destruction of nests or chicks*

This impact could occur during the construction phase due to the movement of machinery and soils, hedgerow trimming and tree felling.

Significant impacts are not predicted to occur, mainly because no species of wader, other than Woodcock, was recorded as breeding within the Ballynalacken Windfarm Project site or its immediate environs, the low numbers of waders recorded on site with records of Golden Plover determined to be migratory flocks, and because of the extent of suitable habitat in the wider area.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Not Neutral**.

NTS of EIAR S.13.3.6.3 Cumulative Effects on Birds

When the effects of the Ballynalacken Windfarm Project on Birds are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.13.3.7

Aquatic Habitats & Species

NTS of EIAR S.13.3.7.1 Baseline Environment – Aquatic Habitats & Species

The Ballynalacken Windfarm Project site is located within the River Nore catchment, draining into the main River Nore channel via a number of headwater streams and the Dinin and Owveg Rivers. The River Nore and sections of the Dinin River and Owveg River form part of the River Barrow and River Nore Special Areas of Conservation, which is designated for a number of aquatic species. The watercourses and aquatic survey sites in the vicinity of the proposed Ballynalacken Windfarm Project were typically small, upland eroding watercourses and agricultural drainage ditches. Biological water quality sampling took place at 14 no. sites, with seven achieving good status, three achieving moderate status and four achieving poor status.

Four dead Freshwater Pearl Mussel shells were recorded in the River Nore during aquatic surveys with the areas of low/poor suitability offering little in suitable habitat area for Freshwater Pearl Mussel. Atlantic Salmon, Brown Trout, European Eel, Minnow, Three-Spined Stickleback, Stone Loach and Lamprey were recorded during electrofishing surveys. No White-clawed Crayfish were recorded, however the Castlecomer Stream tested positive for crayfish plague in 2023.

Evolution of the baseline environment (the 'Do Nothing' scenario):

Climate change has been identified as a threat to several aquatic species and habitats. Instances of major flooding and extremely warm summers places pressures on suitable nursery and redds habitats due to bank erosion and vegetation loss. Drivers of this threat are tied to greenhouse gas emissions and continued reliance on fossil fuels. These drivers are projected to remain sources for climate change pressures and threats to aquatics species for the foreseeable future as most developed nations are not on target to achieve the net zero carbon emissions by 2030.

NTS of EIAR S.13.3.7.2 Evaluation of impacts to Aquatic Habitats & Species

There were **no profound or very significant impacts** considered likely or to have potential to occur in relation to Bats.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Potentially significant impacts, or impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts considered important enough or of local concern were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.13.3.7.2.1 *Habitat Degradation Effects on Aquatic Habitats and Aquatic Species*

This impact could occur during the construction phase due to the excavation of soils, groundworks, overburden storage, presence/use of machinery, oils and fuels, concrete pours, forestry felling.

Given the potential for Significant impacts (in an unmitigated scenario) to downstream water quality, it is evaluated that the Water Framework Directive status and biological value of downstream waterbodies could be adversely affected. Grid Connection works over the Rathduff_15 stream also have potential to release sediment to surface waters (if crossing in the deck of the bridge) or non-toxic drilling lubricant and sediment should a riverbed breach occur during directional drilling. As there is potential for significant impacts, mitigation measures will be required.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral – Not Significant**.

NTS of EIAR S.13.3.7.2.2 *Spread of aquatic & riparian invasive species*

This impact could occur during all phases due to vegetation removal and groundworks and other construction activities.

There is only one incidence of invasive species recorded within the Ballynalacken Windfarm Project construction works area boundary, or within 7m of this boundary (Cherry Laurel), however the risk of introduction of invasive species into the river catchment cannot be excluded. As there is potential for significant impacts, mitigation measures will be required.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **No Impact**.

NTS of EIAR S.13.3.7.2.3 *Hydromorphological impacts to downstream waterbodies due to changes to drainage regimes and surface water runoff*

This impact could occur during all phases due to development site runoff.

Significant impacts are not predicted to occur, mainly because of the use of permeable aggregate for constructing hardcore areas, the predicted increase in runoff volumes of 1% and due to the location of the windfarm in the upper reaches of sub-basins.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Neutral**.

NTS of EIAR S.13.3.7.2.4 *Hydromorphological impacts due to wind farm construction works at W1, D1, D2, D3 and D4*

This impact could occur during the construction phase due to Instream works at D1, D2, new crossing structure at W1, D3 and D4.

Significant impacts are not predicted to occur, mainly because of the use of bottomless culverts (at W1, D1, D3 and D4), the negligible instream works at D2 and the seasonally low flows of the Cloghnagh, Ballymartin and Kilcronan streams.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible**.

NTS of EIAR S.13.3.7.3 *Cumulative Effects on Aquatic Habitats & Species*

When the effects of the Ballynalacken Windfarm Project on Aquatic Habitats & Species are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.13.3.8

Designated Sites

NTS of EIAR S.13.3.8.1 Baseline Environment – Designated Sites

European designated sites relate to Natura 2000 network Special Protection Area (SPA) and Special Area of Conservation (SAC) sites. The proposed Ballynalacken Windfarm site, the met mast, ancillary works, Internal Cable Link, Tinnalintan Substation, Ballynalacken Grid Connection, and Haul Route Works at HR8 do not overlap the boundary of any SPA or SAC boundary. The haul route works at HR3 will take place within the boundary of the River Barrow and River Nore SAC, while HR2 will take place in close proximity. However, all works will be on the public road corridor.

The proposed Ballynalacken Windfarm Project does not overlap the boundary of any Ramsar site, NHA or pNHA site.

The River Barrow and River Nore SAC, River Nore SPA, River Nore/Abbeyleix Woods Complex pNHA, Inchbeg pNHA, Ardalo Fen pNHA and Dunmore Complex pNHA are scoped in for further evaluation.

Evolution of the baseline environment (the 'Do Nothing' scenario):

The main drivers of change for Designated Sites result from agricultural improvements and habitat loss/change resulting in the loss of habitat both locally and within a wider landscape. There are no current policies or initiatives that are likely to result in significant land-use change and therefore habitats prior to and during construction, operation and decommissioning of the proposed Ballynalacken Windfarm Project.

NTS of EIAR S.13.3.8.2 Evaluation of impacts to Designated Sites

There is potential for habitat degradation, the spread of aquatic and riparian invasive species and disturbance or displacement to the Designated Sites. A suite of mitigation and monitoring measures will be implemented to protect Designated Site, and the residual impact is that no adverse effects on the integrity of the Designated Sites is likely to occur – i.e. not significant.

NTS of EIAR S.13.3.8.3 Cumulative impacts on Designated Sites

When the effects of the Ballynalacken Windfarm Project on Designated Sites are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.13.3.9 Mitigation and Monitoring Measures

In relation to Biodiversity, Mitigation and Monitoring Measures are proposed (See **Chapter 19** of the EIAR). The most relevant are:

- SM16 – Regular surface water quality monitoring and recording during the construction phase in accordance with the Surface Water Management Plan
- MM01 – The Construction Works Area will be fenced to prevent encroachment of construction phase personnel, machinery or materials beyond this boundary
- MM17 – New culverts will be bottomless or clear spanning
- MM38 – A buffer zone of 50m from the tips of turbine blades to any trees or hedgerows will be created
- MM42 – Hedgerow removal, tree felling and scrub clearance will take place outside of the bird breeding season
- OMM14 – The rotational speed of the turbine blades when idling will be reduced so to not exceed 2RPM to pose less of a risk to bats

NTS of EIAR Section 13.4 Summary Conclusion for Biodiversity

Overall, it is evaluated that the residual impact on the Environmental Factor, Biodiversity, will be Neutral.

Non-Tech Summary: Ch14 The Landscape (Landscape and Visual Assessment)

NTS of EIAR Section 14.1 Introduction

This chapter describes the landscape context of the proposed Ballynalacken Wind Farm and assesses the likely landscape and visual impacts of the scheme on the receiving environment. Although closely linked, landscape and visual impacts are assessed separately.

This Landscape and Visual Assessment (LVIA) report was prepared by Richard Barker (MLA MILI) of **Macro Works Ltd**, a specialist Landscape and Visual Impact Assessment company with over 20 years of experience in the appraisal of effects from a variety of energy, infrastructure and commercial developments.

Consultation, desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which involved reviewing relevant County Development Plans, establishing an appropriate study area and selecting potential viewshed reference points. Fieldwork included capturing reference images and grid reference coordinates for each viewshed reference location.

The evaluation for The Landscape has been carried out in accordance with industry and best practice guidance, including the Institute of Environmental Management and Assessment *Guidelines for Landscape and Visual Impact Assessment*.

NTS of EIAR Section 14.2 Scoping for The Landscape evaluation

The minimum radius recommended for establishing the zone of theoretical visibility of the proposed windfarm project is 20km from the outermost turbines of the scheme. There will be a particular focus on receptors and effects within the 'central study area' (i.e. within approx. 5km of the site).

The site met mast and telecoms relay pole will not have a material influence on the overall landscape and visual effects of the proposed development and are scoped out from further assessment.

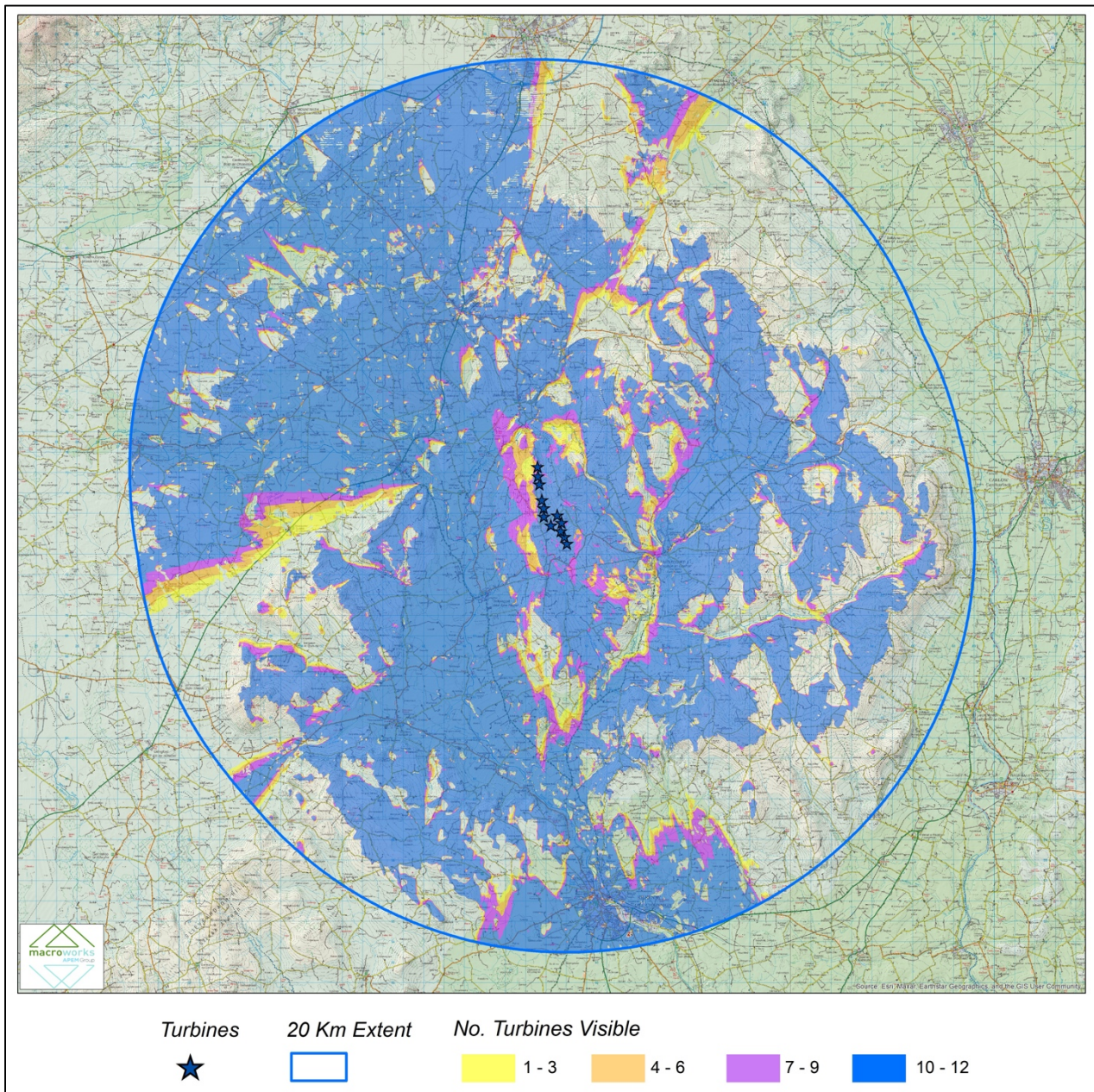
NTS of EIAR Section 14.3 Evaluation Section

NTS of EIAR Sec.14.3.1 Landscape & Visual Impact Assessment

NTS of EIAR S.14.3.1.1 Baseline Environment – Landscape & Visual

Landscape: The proposed development is located along the western extent of the Castlecomer Plateau, a broad upland area located in the northeast of County Kilkenny. East and south of the site within the central study area, the terrain is characterised by this broad elevated upland plateau. However, immediately west and north of the site, the terrain swiftly descends towards the more lowlands in the surrounds of the River Nore. The wider study area has similar landform characteristics to the central study area. The principal land use within the central and wider study area is pastoral farmland. Pockets of mature conifer forestry are also located throughout the central and wider study area. Quarries and extensive industrial facilities such as the existing Tirlán factory are located on the western periphery of the central study area, in addition to a network of major route corridors.

Visual: A computer-generated Zone of Theoretical Visibility map has been prepared to illustrate from where the proposed Development is potentially visible, as shown in the figure below.



Zone of Theoretical Visibility map

Several notable urban centres within the central study include Ballinakill, Castlecomer and Ballyragget. Transport routes within the study area include the N77 and N77 national routes, and the M7 and M8 motorways. Tourism, recreation and heritage features within the central and wider study areas include Castlecomer Discovery Park, Heywood Gardens, the North Kilkenny Cycle Route and multiple walking trails.

There are a number of protected views and routes designated under local County Development Plans of potential relevance to the proposed development, including 4 no. views in Kilkenny, 2 no. views in Laois, 2 no. views in Carlow and 4 no. routes in Carlow. There are also several Special Protection Areas and proposed Natural Heritage Areas within the central study area, including the River Barrow and River Nore SAC.

Thirty-two (32 no.) Viewshed Reference Point locations were selected to study the landscape and visual impact of the proposed wind farm in detail. These Viewshed Reference Points were located at Key Views, Designated Scenic Routes and Views, Local Community Views, Centres of Population, Major Routes and Amenity and Heritage Features throughout the central and wider study areas.

Evolution of the baseline environment (the 'Do Nothing' scenario):

In a Do-Nothing scenario, the existing areas of commercial forestry and pastoral farmland managed as is. There would likely be further proposals for wind energy development within the central and wider study area as a result of the 'acceptable in principal' designation that contains the site and part of the central and wider study area and the general landscape suitability and wind resource in the study area.

NTS of EIAR S.14.3.1.2 Evaluation of Landscape Impacts

NTS of EIAR S.14.3.1.2.1 Construction-stage Effects

Significant impacts are not predicted to occur, mainly because none of the proposed features have an extensive physical 'footprint', the topography and land cover will remain largely unaltered, excavations will be the minimum required to ensure efficient working, the internal track layout has been designed to follow the natural contours of the land where possible, and because the construction stage impacts are considered short-term.

The proposed development is deemed to have a short-term Moderate significance of construction-stage effect on the physical landscape and local landscape character.

NTS of EIAR S.14.3.1.2.2 Operational & Decommissioning-stage Effects on Landscape Character

The greatest potential for landscape impacts to occur is as a result of the change in character of the immediate area, due to the introduction of tall structures with moving components.

Significant impacts are not predicted to occur, mainly because several existing wind turbines are located along elevated lands in the study area's wider eastern and western half, the proposed development is well assimilated within the context of the central study area, and the impact on the landscape is reversible.

The significance of operational and decommissioning stage impacts on landscape character is deemed to be Moderate within the central study area, reducing to Slight and Imperceptible at increasing distances thereafter.

NTS of EIAR S.14.3.1.3 Evaluation of Visual Impacts

The table below summarises the full textual assessment of the visual effects for each Viewshed Reference Point.

VRP No.	Existing View	Distance to nearest turbine	Significance of impact
VP1	Portlaoise Rugby Club, Port Laoise	N/A	Imperceptible
VP2	Ballyroan Abbey GAA Club, Ballyroan	10.9km (T12)	Slight-imperceptible
VP3	Local Church, Abbeyleix	8.5km (T12)	Imperceptible
VP4	Local Road L1596 overbridge of the M7 at Kilcotton	18.8km (T12)	Slight-imperceptible
VP5	Regional Road R430 between The Swan and Crettyard	11.3km (T12)	Slight
VP6	Heywood Demesne	4.5km (T12)	Moderate
VP7	Laois County Council Scenic Viewpoint at Ballinakill GAA club	4.0km (T12)	Moderate
VP8	Local Road L7799 at Ironmills (Kilrush)	2.8km (T12)	Moderate-slight
VP9	Local Road at Attenagh	3.9km (T11)	Moderate-slight
VP10	National Road N77 northeast of Durrow	6.5km (T12)	Slight

VP11	Local Road L5591 overbridge of the M8 east of Cannonswood Cross Roads	13.9km (T12)	Slight-imperceptible
VP12	Local Road at Ballyouskill	1.3km (T11)	Moderate
VP13	Local Road at Ballynalackan	1.1km (T10)	Substantial-moderate
VP14	Local Road L5846 at Ballynalacken	0.4km (T6)	Substantial-moderate
VP15	Local Road (Cromwell's Road) immediately west of the site	0.4km (T10)	Substantial-moderate
VP16	Local Road at Skehana	3.1km (T5)	Moderate-slight
VP17	National Road N78 at Cloneen	9.4km (T5)	Slight
VP18	Regional Road R432 at Tinnalintan south of Glashagal Bridge	3.2km (T7)	Moderate-slight
VP19	Regional Road R694 at Glenmagoo or Firoda Lower	1.8km (T1)	Moderate-slight
VP20	Local Road L5846 intersection of the R694	1km (T1)	Moderate
VP21	National Road N77 at Ballynaslee, west of the River Nore	5km (T7)	Slight
VP22	Local Road L5853 west of Castlecomer	3.6km (T1)	Slight-imperceptible
VP23	Regional Road R694 at Finnan	N/A (T1)	Imperceptible
VP24	Lisdowney	8.0km (T7)	Moderate-slight
VP25	Local Road L5853 at Rathkyle	1.6km (T1)	Moderate-slight
VP26	St Patricks GAA Club, Ballyragget	5.2km (T1)	Moderate-slight
VP27	Local Road at Frankford, south of Gathabawn Village	14.1km (T7)	Slight-imperceptible
VP28	Local Road L1820 north of Kilmacar	4.5km (T1)	Slight
VP29	Local Road east of Muckalee	9.9km (T1)	Slight-imperceptible
VP30	Local Road L7122 northwest of Ridge Crossroad	15.3km (T1)	Slight-imperceptible
VP31	St. Lachtain's GAA Club at Freshford	12.1km (T1)	Slight
VP32	St Canice's Round Tower, Kilkenny City	17.2km (T1)	Slight-imperceptible

NTS of EIAR S.14.3.1.3.1 *Impacts on Designated Views*

The most potential for scenic routes to be impacted relates to those scenic designations located nearest to the proposed turbines.

Significant impacts are not predicted to occur, mainly because the protected views in Kilkenny are oriented in the opposite direction to the proposed turbines and have limited potential to be notably impacted, while at Heywood Demesne (i.e. Scenic Views 22 and 23), the demesne itself is much modified by the presence of modern secondary school building, most of the features from Heywood Demesne are largely screened by trees and topography, while there is a clear view from the site of the former Heywood House, this building no longer exists.

It is considered the proposed windfarm development **will not generate significant visual impacts** in relation to scenic designations within the study area.

NTS of EIAR S.14.3.1.3.2 *Impacts on Local Community Views*

Local Community views are considered to be those experienced by those people who live, work and move around the area within approximately 5km of the site (i.e., the central study area).

Significant impacts are not predicted to occur, mainly because whilst the proposed turbines will present at a considerable scale and with a dominant visual presence, they do not generate any sense of overbearing due

to the dispersed nature of the layout and present in a clear and comprehensible manner, and due to the upland setting which comprises extensive areas of commercial conifer forest and exposure to the elements.

It is considered the proposed windfarm development **will not generate significant visual impacts** in respect of local community receptors.

NTS of EIAR S.14.3.1.3.3 *Impacts on Centres of Population*

Settlements within the central study area include Ballinakill, Attanagh, Castlecomer and Ballyragget.

Significant impacts are not predicted to occur, mainly because the proposed development is presented in a clear and comprehensible manner of the rural hinterland without being an imposing feature on the context of the settlements (within the central study area), and due to the distance of the settlements from the proposed development (within the wider study area).

It is considered the proposed windfarm development **will not result in significant visual impacts** at centres of population within the study area.

NTS of EIAR S.14.3.1.3.4 *Impacts on Major Routes*

The study area's most notable major routes include the M7 and M8 motorways and the N77 and N78 national secondary routes.

Significant impacts are not predicted to occur, mainly due to the separation distance of the major routes to the proposed development with most of their location in the wider study area. There is potential for intermittent clear views of the turbines from sections of the N78, but the turbines will present in a clear and comprehensible manner.

It is considered that the proposed development will **not result in significant visual impacts** at major route receptors within the study area.

NTS of EIAR S.14.3.1.3.5 *Impacts on Tourism, Recreational and Heritage Features*

In terms of tourism, recreational and heritage features many of these overlap with other visual receptors such as scenic designation and centres of population within the study area.

Significant impacts are not predicted to occur, mainly because the majority of walking trails are located well beyond the central study area, and due to the considerable viewing distance and minimal visual presence of the proposed turbines from heritage features (e.g. St. Canice's Round Tower).

It is considered that the proposed development will **not result in significant visual impacts** at tourism, recreational and heritage receptors within the study area.

NTS of EIAR S.14.3.1.4 *Cumulative Landscape & Visual Effects*

When the Landscape and Visual effects of the Ballynalacken Windfarm Project are considered collectively with the effects of other existing and permitted wind farm projects, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.14.3.2 Mitigation and Monitoring Measures

In relation to The Landscape, Mitigation and Monitoring Measures are proposed (See **Chapter 19** of the EIAR). The most relevant are:

- OMM20 – A new berm and hedgerow will be planted on the northern side of the substation compound to provide noise and visual screening
- OMM27 – A viewpoint/picnic area will be provided at Site Entrance No. 7 where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains.

NTS of EIAR Section 14.4 Summary Conclusion for The Landscape

Overall, it is considered that the proposed wind farm will not give rise to any significant landscape or visual impacts.

Non-Tech Summary: Ch15 Cultural Heritage

NTS of EIAR Section 15.1 Introduction

Cultural Heritage includes all aspects of the environment resulting from the interaction between people and places through time.

The Environmental Impact Assessment for Cultural Heritage was prepared by Dr Kim Rice, Senior EIA Consultant BA (hons.) in Heritage Studies, MA in Landscape Archaeology, PhD in Archaeology and Advanced Diploma in Planning and Environmental Law, and Breana McCulloch, EIA Archaeologist with AMS (BA in Anthropology MES in Archaeology), consultants with **Archaeological Management Solutions (AMS)** Cultural Heritage Consultants.

Consultation, desktop studies and fieldwork were carried out, including a review of historical maps, the Record of Protected Structures (RPS), The National Inventory of Architectural Heritage (NIAH) and the Sites and Monuments Record (SMR). Fieldwork included a comprehensive site walkover in March and April 2023, and April 2024, a geophysical survey in May 2023 and an assessment of visual impacts and impacts to setting.

The evaluation for Cultural Heritage has been carried out in accordance with industry and best practice guidance, including *Guidance on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022), *Architectural Heritage Protection Guidelines for Planning Authorities* (DAHG, 2011) and the *National Inventory of Architectural Heritage Handbook* (DHLGH, 2023).

NTS of EIAR Section 15.2 Scoping for the Cultural Heritage evaluation

The effects on the following sensitive aspects of Cultural Heritage were studied: **Legally Protected Sites; Other Designated Sites; Previously Unrecorded Extant Sites; and Unrecorded Subsurface Sites.**

The **study area** includes the Red Line Boundary of the Proposed Project plus 200m, while also including Haul Route Works locations. Cultural Heritage receptors of High or Very High importance within 20km of the Proposed Project were also assessed.

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result no sensitive aspects were excluded from the Cultural Heritage chapter.

NTS of EIAR Section 15.3 Evaluation Section

NTS of EIAR Sec.15.3.1 Overview of the Baseline Environment

Archaeological receptors in the study area include features from the Prehistoric Period (e.g. fulachtaí fia and a Late Bronze Age to Iron Age hillfort), the Early Medieval Period (e.g. ringforts), the Medieval Period (e.g. an Anglo-Norman motte and castle and the historic town of Ballyragget) and the Post-Medieval to Modern Era (e.g. Heywood House). There are no demesnes or historic gardens within the 200m Study Area, owing to its marginal upland character. However, Haywood House is located c.3km north-northwest from the Red Line Boundary. Architectural heritage assets within the Study Area include features such as vernacular structures and farm buildings, gate piers, stone walls, in addition to structures related to the former Waterford and Maryborough Branch of the Great Southern and Western Railway.

A total of 318 no. Cultural Heritage receptors were identified, however 127 no. of these were scoped out from further assessment as it was considered there are no likely or potential effects to these Sensitive Receptors.

Evolution of the baseline environment (the 'Do Nothing' scenario):

There will be no adverse impact on the Cultural Heritage environment if the Proposed Development does not proceed. There is a slight to moderate potential for adverse effects to occur as a result of weather events associated with climate change, as well as other unforeseen circumstances.

NTS of EIAR Sec.15.3.2 Impact on Cultural Heritage of the Ballynalacken Windfarm Project

NTS of EIAR S.15.3.2.1 Introduction to the Impact Evaluation Section

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Cultural Heritage.

Impacts of potential moderate or slight significance which are likely or have potential to occur, and potential cumulative effects, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.15.3.2.2 Evaluation of Effects of Moderate Significance

These effects could occur during the construction and operational phases, due to windfarm turbines, groundworks and the movement of plant/transportation of components.

Indirect visibility/setting effects on 11 no. Cultural Heritage receptors was evaluated. While the long-term visual impact from turbines during the operational phase is negative, significant impacts are not predicted to occur. Direct effects on 2 no. Cultural Heritage receptors from construction works and activities was evaluated. While there is potential for negative permanent direct impacts to an undesignated bridge receptor, and accidental damage to built heritage from Haul Route Works in Castlecomer, significant impacts are not predicted to occur.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Slight – Moderate**.

NTS of EIAR S.15.3.2.3 Evaluation of Effects of Slight Significance

These effects could occur during the construction and operational phases, due to windfarm turbines, control building, groundworks, the movement of plant/machinery and ancillary works.

Indirect adverse impacts are predicted to 31 no. Cultural Heritage receptors, and direct adverse impacts are predicted to 77 Cultural Heritage receptors. While the potential impacts are negative, significant impacts are not predicted to occur.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Not Significant – Slight**.

NTS of EIAR S.15.3.2.4 Cross Factor Effects to Cultural Heritage

Primary climate change impacts have the potential to affect Cultural Heritage in a number of ways. It is concluded in Chapter 7: Soils, that the construction of the windfarm will not cause landslip in the area. As per Chapter 8: Water, impacts through the alteration of groundwater levels and/or flow paths were determined to be non-significant. The Chapter 8 specialists also determined that the overall risk of fluvial flooding at the

project site is considered to be low, and that the risk of the project site contributing to downstream flooding is also very low.

NTS of EIAR S.15.3.2.5 Summary of Effects

No Significant Negative impacts (direct or indirect) are predicted for the proposed Ballynalacken Windfarm.

NTS of EIAR S.15.3.2.6 Cumulative Effects on Cultural Heritage Receptors

When the effects of the Ballynalacken Windfarm Project on Cultural Heritage receptors are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.15.3.3 Mitigation and Monitoring Measures

In relation to Cultural Heritage, Mitigation and Monitoring Measures are proposed. The most relevant are:

- Archaeological monitoring
- Avoidance
- Geophysical survey
- Offsetting through measures such as an interactive database
- Protective barriers

NTS of EIAR Section 15.4 Summary Conclusion for Cultural Heritage

No Significant Negative impacts (direct or indirect) are predicted for the proposed Ballynalacken Windfarm.

Non-Tech Summary: Ch16 Material Assets

NTS of EIAR Section 16.1 Introduction

Material Assets address the potential effects of the proposed Ballynalacken Windfarm Project on roads and traffic and built services.

The Material Assets chapter was written by Angeliki Kalatha and Adam Price of **ORS**, Ruairí Geary and David Tarrant of **TLI Group**, and Kevin Hayes and David McGrath of **AiBridges**.

Consultation, desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which included reviewing mapping and databases of local service providers, modelling microwave radio link paths and conducting Radio Path Profile and Radio Link Budget analysis.

Fieldwork included a survey of all construction works areas, GPS survey of all existing underground and overhead services, passing traffic volume data collection and assessment, junction surveys and surveys of buried structures.

The evaluation for Material Assets has been carried out in accordance with Guidance on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022), along with the ARVI approach for impact significance assessment developed under the EC IMPERIA LIFE11 Project.

NTS of EIAR Section 16.2 Scoping for the Material Assets evaluation

The effects on the following sensitive aspects of Material Assets were studied: **Road Users; Public Roads and Local Built Services; Road Users at haul route works and activity locations; Airborne Telecommunication Networks; Aviation and Electricity Transmission & Distribution System.**

The **study areas** are defined as follows:

- Road Users – Regional Road R694 between Castlecomer and Ballyragget; Regional Road R432 between Ballyragget and the junction with local road L58442; Local roads L5846, L5840, L5845, L58451 between the windfarm site entrances; the entire length of the L58442; and Local Road L5838 at the site entrance to the met mast location
- Public Roads and Local Built Services – Public roads in the vicinity of the Windfarm used for material and turbine component transportation; Public Roads subject to cable trenching, site entrances and road widening works; Underground serviced within the construction works boundary in the public road; and Overhead lines at site entrances, road work and haul route work locations
- Road Users at haul route works and activity locations – Boundary of the works at Haul Route Works locations
- Airborne Telecommunication Networks – Signal paths and telecommunication links passing through the windfarm site
- Aviation -
- Electricity Transmission & Distribution System – National electricity network within the construction works boundary, and proposed connection point of the grid connection

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result **Road Users, Public Roads and Local Built Services, Airborne Telecommunication Networks and Aviation** were scoped in for evaluation in the Material Assets chapter.

In relation to **Road Users at haul route works and activity locations** and **Electricity Transmission System and overhead electricity lines**, it was considered that the potential for significant impacts could be excluded, and as a result they were not brought forward for in-depth evaluation in the EIA Report.

NTS of EIAR Section 16.3 Evaluation Section

NTS of EIAR Sec.16.3.1 Road Users

NTS of EIAR S.16.3.1.1 Baseline Environment – Road Users

There are 3 no. population centres of significance within the study area: Kilkenny City, Castlecomer and Ballyragget. There is 1 no. motorway (M9), 3 no. national routes (N10, N77 and N78), 2 no. regional routes (R694, R432), and several local roads in close proximity to the construction site and/or along haul routes for the turbine components. The traffic generated by the new development will access the site area through the regional roads R694 and R432, via the local roads L-5846, L-5845, L-5840, L-5838, L-58451 and L-58442. These local roads are generally rural in nature and experience light traffic.

Based on the traffic counts obtained for the roads assessed, the roads in the area are generally very lightly trafficked, reflecting the rural nature of the study area. Currently, the site lacks direct access for pedestrians or cyclists, with no dedicated cycle lanes or pedestrian footpaths on either side of any of the local road, or on the regional roads where they occur outside of Castlecomer and Ballyragget urban areas. There are no waymarked trails along any of the local roads associated with the Project, however, local knowledge and observations during site visits identified that the L5840 (Cromwell's Road) is used as a local walking amenity.

Evolution of the baseline environment (the 'Do Nothing' scenario):

Increases in annual traffic volumes are predicted to be in the region of 1-2% per annum. The most immediate climate-change related risks in Ireland are those associated with weather extremes, such as floods, precipitation and storms. In particular, systemic risks due to weather events leading to the breakdown of infrastructure networks and critical services such as transport, energy, communications, water supply, health and emergency services are expected.

NTS of EIAR S.16.3.1.2 Evaluation of impacts to Road Users

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Road Users.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.16.3.1.2.1 *Increased Journey Time or Disruption to Road Users using Local Roads*

This impact could occur during the construction phase due to construction traffic.

Significant impacts are not predicted to occur, mainly because the local road network will continue to operate within its carrying capacity even with the additional construction traffic, the low volumes of traffic on local roads, and because any disruption will be of a brief duration.

When the mitigation and monitoring measures are implemented, the residual impact significance is **Slight - Moderate**.

NTS of EIAR S.16.3.1.2.2 *Increased Journey Time or Disruption to Road Users using Regional Roads*

This impact could occur during the construction phase due to construction traffic.

Significant impacts are not predicted to occur, mainly because the R694 and R432 would continue to operate within their capacities even with the additional construction traffic, the utilization of one-lane closures with flagmen for trenching works, the brief duration of works and the carrying out of turbine deliveries during off-peak hours.

When the mitigation and monitoring measures are implemented, the residual impact significance is **Slight – Moderate**.

NTS of EIAR S.16.3.1.2.3 *Disrupted Access to Property*

This impact could occur during the construction phase due to road works on the R432, L5845, L5840, L5846 and L58442.

Significant impacts are not predicted to occur, mainly because of the low number of properties potentially impacted (7 no. residential/farm properties on the R432 and 5 no. properties on the L58442), and the brief duration of loss of access to properties for 3-4 hours.

When the mitigation and monitoring measures are implemented, the residual impact significance is **Neutral**.

NTS of EIAR S.16.3.1.2.4 *Increased risk of road accidents*

This impact could occur during the construction phase due to excavations of public road pavements, road widening work, trenching works, dust/dirt, damage to road pavements.

Significant impacts are not predicted to occur, mainly because all site entrances have been designed to achieve the required sightlines (with the exception of Site Entrance No. 3 looking south and Site Entrance No. 11 looking east), the lightly trafficked nature of local roads and the transport of turbine components under Garda escort.

When the mitigation and monitoring measures are implemented, the residual impact significance is **No Likely Increase in Road Safety Risk**

NTS of EIAR S.16.3.1.3 *Cumulative Effects on Road Users*

When the effects of the Ballynalacken Windfarm Project on Road Users are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.16.3.2

Public Roads and Local Built Services

NTS of EIAR S.16.3.2.1 Baseline Environment – Public Roads and Local Built Services

The Regional Roads R694 and R432 and Local Roads L5840, L5845, L5846, L58451 and L58442 will be used to gain access to the Project site. Road works will occur on these roads to install cable trenches and/or to widen the width of the public road in order to facilitate the delivery of turbine components.

There are also two buried structures along cable routes, a masonry culvert under the L58442 along the Internal Cable Link route, and a masonry arch bridge under the R432 along the Ballynalacken Grid Connection route. A number of underground services were identified and mapped during consultations with service providers, and verified during site investigations. Overhead Services are sparsely present throughout the construction works boundary, and are limited to local lines which occur along the road boundaries on the L5845, L58442 and along the R432. A 38 kilovolt (kV) overhead line and 110kV overhead line also cross the route of the Internal Cable Link above the L58442. There are overhead lines present along the Turbine Component Haul Route, in particular in the town of Castlecomer where it is proposed to manoeuvre of a blade lifter.

Evolution of the baseline environment (the 'Do Nothing' scenario):

The public road network is continually maintained throughout the year by Kilkenny County Council. This trend is likely to continue. No new road schemes proposed in the vicinity of the works. An increase in unpredictable extreme weather events (i.e. storms, flooding) has the potential to affect the structural integrity of road pavements and buried structures, while local service users could be affected by interrupted electricity and internet supply as a result of falling trees.

NTS of EIAR S.16.3.2.2 Evaluation of impacts to Public Roads and Local Built Services

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Public Roads and Local Built Services.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.16.3.2.2.1 *Damage to Regional and Local Road Pavements*

This impact could occur during the construction phase due to excavations of public roads and road pavements, excavations for cable trenches and joint bays, construction/delivery traffic.

Significant impacts are not predicted to occur, mainly because regional roads are in good condition with a well-maintained surface dressing along the route, and the road network is structurally capable of accommodating the increase in heavy vehicle movements as a result of the construction of the Project. Road widening works are likely to result in a positive impact on road structures.

When the mitigation and monitoring measures are implemented, the residual impact significance is **Neutral**.

NTS of EIAR S.16.3.2.2.2 *Damage to bridges and culverts*

This impact could occur during the construction phase due to excavations of public roads and road pavements, excavations for cable trenches, construction/delivery traffic.

Significant impacts are not predicted to occur, mainly because the bridge structure on the R432 was found to be in good condition during surveys and Grid Connection works will have no impact on the structural integrity of the bridge, and because surveys of the culvert on the L58442 show adequate cover over the structure to install cables. These structures are not located along the route of any significant construction traffic, so impacts from an increase in traffic volumes are not anticipated.

When the mitigation and monitoring measures are implemented, the residual impact significance is **Neutral**.

NTS of EIAR S.16.3.2.2.3 *Loss of local public water supply*

This impact could occur during the construction phase due to excavations.

Significant impacts are not predicted to occur, mainly because of the limited extent of the Uisce Eireann network potentially affected (c.12 properties) and the temporary duration of any disruption, should it occur.

When the mitigation and monitoring measures are implemented, the residual impact significance is **Neutral**.

NTS of EIAR S.16.3.2.2.4 *Loss of local electricity or telephone/fibre services*

This impact could occur during all phases due to excavations, movement of machinery and facilitating works for component transport.

Significant impacts are not predicted to occur, mainly because standard construction practice includes the use of goal-posts to identify overhead lines, a banksman will supervise excavation works in the public road and the brief duration of any disruption, should it occur.

When the mitigation and monitoring measures are implemented, the residual impact significance is **Neutral**.

NTS of EIAR S.16.3.2.3 *Cumulative Effects on Public Roads and Local Built Services*

When the effects of the Ballynalacken Windfarm Project on Public Roads and Local Built Services are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.16.3.3 Airborne Signals & Aviation

NTS of EIAR S.16.3.3.1 Baseline Environment – Airborne Signals & Aviation

Airborne Signals: Following the concerns raised by Eir, ESB, Imagine Broadband, Tetra Ireland, and Three Ireland during consultation, surveys were undertaken of the Ballyouskill Masts to gather information on the size, bearing and height of the antennas installed on each of the masts, and then desktop modelling was then carried out using a telecommunications industry radio planning tool. Two Point to Point (PTP) microwave radio links remain potentially affected by the wind turbines, however effective mitigation strategies are available for both of these links.

Aviation: Public and private airport/airfield and helipad locations within the study area include Waterford Airport, c.71km from the nearest Ballynalacken turbine, Kilkenny Airfield (c.17.7km to the south), Abbeylax Airfield (c.7.6km to the northwest) and Midlands Heliport (c.5.6km to the north-northeast). The proposed Ballynalacken Windfarm is located outside of the restricted areas around Baldonnell Airfield and would have no impact on the Irish Air Corps activity. It is considered unlikely that Garda Air Support Unit would be carrying out low-level flight activity over the Ballynalacken area and it is considered that Emergency Aeromedical Service helicopter landings are highly unlikely to occur at the windfarm site as it consists of forestry/agricultural land and is largely rural.

Evolution of the baseline environment (the ‘Do Nothing’ scenario):

In recent years, telecom networks and aviation navigation tools have evolved significantly, driven by advances in technology and changing communication needs. Modern networks use advanced technologies like 5G, fiber-optic cables on the Eir telephone line network, satellite communications and cloud computing to provide faster, more reliable communication services to users. These trends are likely to continue into the future.

NTS of EIAR S.16.3.3.2 Evaluation of impacts to Airborne Signals & Aviation

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Airborne Signals & Aviation.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts of local concern were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.16.3.3.2.1 *Interference with ESB Networks PTP microwave radio link*

This impact could occur during the operational phase due to operational Ballynalacken Turbines.

Significant impacts are not predicted to occur, mainly because the only ESB Networks link which could be affected is the Ballyouskill – Glencoumwood radio link, and effective mitigation is available.

When the mitigation and monitoring measures are implemented, the residual impact significance is **No Impact**.

NTS of EIAR S.16.3.3.2.2 *Interference with Eir PTP microwave radio link*

This impact could occur during the operational phase due to operational Ballynalacken Turbines.

Significant impacts are not predicted to occur, mainly because the only Eir link which could be affected is the Eir Ballyouskill – Kilmadum microwave radio link, and effective mitigation is available.

When the mitigation and monitoring measures are implemented, the residual impact significance is **No Impact**.

NTS of EIAR S.16.3.3.2.3 *Interference with Tetra Ireland Network signals*

This impact could occur during the operational phase due to operational Ballynalacken Turbines.

Significant impacts are not predicted to occur, mainly because even with the exclusion of the TETRA signals from the Ballyouskill Mast, there is relatively good TETRA coverage in the area from 21 neighbouring cells even if the Ballynalacken Windfarm does cause a degradation of service from the Tetra base station at the Ballyouskill Mast.

No mitigation is required. The residual impact significance is **Neutral**.

NTS of EIAR S.16.3.3.3 Cumulative Effects on Airborne Signals & Aviation

When the effects of the Ballynalacken Windfarm Project on Airborne Signals & Aviation are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.16.3.4 Mitigation and Monitoring Measures

In relation to Material Assets, Mitigation and Monitoring Measures are proposed (See **Chapter 19** of the EIAR). The most relevant are:

- MM56 – Telecom operators will be contacted prior to the erection of the wind turbines to confirm the requirement for mitigation and the form of mitigation measure to be implemented.
- MM62 – The Traffic Management Plan will be implemented to safely coordinate and manage traffic during the construction works.
- MM63 – Flag-men will be used on public roads which will be subject to one-lane closures.
- MM65 – No other deliveries to the windfarm will be scheduled to occur on the same days as concrete pours.

NTS of EIAR Section 16.4 Summary Conclusion for Material Assets

Overall, it is evaluated that the impact on the Environmental Factor, Material Assets, will be Slight.

Non-Tech Summary: Ch17 Population & Human Health

NTS of EIAR Section 17.1 Introduction

Local community/population and local economy relates to the people living in the area, and includes the demographic makeup, economic activity and social functioning of local communities.

The socio-economic section has been prepared by Ciara Morley (Ph.D. and M.A. in Economics and Finance), Director at **Morley Economic Consulting Ltd.** The Health Impact Assessment has been prepared by Tara Barratt (MSc (DIC) in Environmental Technology, BSc (Hons) in Geography, Associate Director in **Savills'** Health and Social Impact Assessment team) and Millie Potter (MSc in Environmental Science, BSc (Hons) in Geology and Physical Geography). It has been checked by Dr Andrew Buroni (PhD in international Health and Impact Assessment methods and best practice, Savills' Health and Social Impact Assessment Practice Leader)

Desktop studies and fieldwork were carried out in order to gather information. A desk study was completed which included reviewing Central Statistics Office data, research of tourism in Kilkenny and Laois, and a review of Lenus the Health Repository website. A site visit was undertaken to establish the extent of settlement patterns, amenities and local businesses.

The evaluation for Population & Human Health has been carried out in accordance with industry and best practice guidance, including *Guidance on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022), the *Manual on Health Impact Assessment Guidance*, the *IEMA Guide to Determining Significance for Human Health in EIA*, along with the ARVI approach for impact significance assessment developed under the EC IMPERIA LIFE11 Project.

NTS of EIAR Section 17.2 Scoping for the Population & Human Health evaluation

The effects on the following sensitive aspects of Population & Human Health were studied: **National Economy; Local Economy; Tourism; and Local Community Health & Wellbeing.**

The **study areas** are defined as follows:

- National Economy – The Irish State
- Local Economy; and Tourism – Electoral Divisions Attanagh, Kilmacar, Ballyragget, Castlecomer, Durrow and Ballinakill
- Local Community Health & Wellbeing – Groundwater abstractions within 500m of construction works; surface water abstractions from downstream river waterbodies (Water Supply); 250m from construction works areas, 50m from sections of public roads used by construction site vehicles transporting within the windfarm site, 50m from public roads used by construction or delivery vehicles for the first 250m of the public roads from the site exit points, sensitive receptors within 200m of roads experiencing a significant change in traffic levels, 100m from turbines, Tinnalintan Substation and underground cabling (Air Quality & EMF); Houses within 2km of a proposed turbine and 500m from the proposed Tinnalintan Substation (Noise); Houses within 1.5km of a proposed turbine (Shadow Flicker); Irish State (Climate); and 20km from the outermost turbines of the scheme (Visual Impacts).

The potential for the Ballynalacken Windfarm Project to adversely affect each of the Sensitive Aspects was considered, and as a result **Local Economy, Tourism and Local Community Health & Wellbeing** were scoped in for evaluation in the Population & Human Health chapter.

In relation to **National Economy**, it was considered that the potential for significant impacts could be excluded, and as a result they were not brought forward for in-depth evaluation in the EIA Report.

NTS of EIAR Section 17.3 Evaluation Section

NTS of EIAR Sec.17.3.1 Local Community Health & Wellbeing

NTS of EIAR S.17.3.1.1 Baseline Environment – Local Community Health & Wellbeing

Local Water Supply: The proposed Project is located upstream of three Public Water Supply abstraction points at Castlecomer, Ballyragget and Troysgate in Kilkenny. Groundwater flow paths are considered to be short (~300m). There are no Uisce Éireann wells or Group Water Scheme wells, and 10 no. private wells located within 500m of wind turbines or of windfarm borrow pits.

Local Air Quality & EMF: There is a generally good level of air quality in the area of the proposed development. Concentrations of NO₂, PM₁₀ and PM_{2.5} are all predicted to be significantly below the ambient air quality standards. There are 37 sensitive residential properties within the study area for Air Quality & EMF. There are 9 no. sensitive receptors within 100m of the Internal Cable Link and 14 no. sensitive receptors within 100m of the Ballynalacken Grid Connection.

Noise & Vibration: There are 159 no. Noise Sensitive Locations within 2km of a proposed turbine and 500m from the proposed Tinnalintan Substation.

Shadow Flicker: There are 72 no. Sensitive Receptors within 1170m of a proposed turbine.

Climate Action: It is evaluated in Chapter 12: Climate that the Project will have a long-term significant positive impact on the Irish State's efforts on climate action.

Local Views and Amenities: The evaluation in Chapter 14: The Landscape considers views from local and regional roads, centres of population, designated scenic views and views from amenity areas within 20km of the windfarm site.

Evolution of the baseline environment (the 'Do Nothing' scenario):

There will be no change to the baseline environment should the proposal not be constructed. It is expected that Climate Change will continue to cause a worry to the majority of the population and increased demands to Government for Climate Action will be a continuing trend.

NTS of EIAR S.17.3.1.2 Evaluation of impacts to Local Community Health & Wellbeing

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Local Community Health & Wellbeing.

Non-significant impacts considered important enough or of local concern were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.17.3.1.2.1 *Secondary Impact of Water Supply Impacts on Health & Wellbeing*

This impact could occur during the construction phase. Significant impacts are not predicted to occur, mainly because the residual impact on water abstractions, as evaluated in Chapter 8: Water, will not be significant, and therefore the secondary impact on local population health is not significant.

NTS of EIAR S.17.3.1.2.2 *Secondary Impact of Air Quality Impacts on Health & Wellbeing*

This impact could occur during the construction phase. Significant impacts are not predicted to occur, mainly because the residual impact on air quality from dust and nitrogen oxides, as evaluated in Chapter 9: Air (Air Quality & EMF), will not be significant, and therefore the secondary impact on local population health is not significant.

NTS of EIAR S.17.3.1.2.3 *Secondary Impact of EMF Impacts on Health & Wellbeing*

This impact could occur during the operational phase. Significant impacts are not predicted to occur, mainly because the residual impact from electromagnetic fields, as evaluated in Chapter 9: Air (Air Quality & EMF), will not be significant, and therefore the secondary impact on local population health is not significant.

NTS of EIAR S.17.3.1.2.4 *Secondary Impact of Noise Impacts on Health & Wellbeing*

This impact could occur during the construction and operational phases. Significant impacts are not predicted to occur, mainly because the residual impact from noise, as evaluated in Chapter 10: Noise & Vibration, will not be significant, and therefore the secondary impact on local population health is not significant.

NTS of EIAR S.17.3.1.2.5 *Secondary Impact of Shadow Flicker Impacts on Health & Wellbeing*

This impact could occur during the operational phase. Significant impacts are not predicted to occur, mainly because the residual impact from shadow flicker, as evaluated in Chapter 11: Shadow Flicker, will not be significant, and therefore the secondary impact on local population health is not significant.

NTS of EIAR S.17.3.1.2.6 *Secondary Impact of Climate Impacts on Health & Wellbeing*

This impact could occur during the operational phase. Significant impacts are not predicted to occur, mainly because while the residual impact of the Ballynalacken Windfarm on climate, as evaluated in Chapter 12: Climate, will be significant and positive, it is assessed that the secondary impact on local population health is not significant.

NTS of EIAR S.17.3.1.2.7 *Secondary Impact of Landscape Impacts on Local Community Wellbeing*

This impact could occur during the operational phase. Significant impacts are not predicted to occur, mainly because the residual impact on landscape, as evaluated in Chapter 14: Landscape, will not be significant, and therefore the secondary impact on local population health is not significant.

NTS of EIAR S.17.3.1.3 *Cumulative Effects on Local Community Health & Wellbeing*

When the effects of the Ballynalacken Windfarm Project on Local Community Health & Wellbeing are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.17.3.2

Local Economy & Tourism

NTS of EIAR S.17.3.2.1 Baseline Environment – Local Economy & Tourism

According to Census 2022, the population of the Ballynalacken Windfarm Project Study Area was 7,080 persons. The size of the local economy is estimated to be €288 million in Gross Value Added terms. Professional Services and Commerce and Trade are two of the main employment sectors in the Study Area. Agriculture and Forestry is an important sector of employment in the Study Area, accounting for 8% of the workforce.

Tourism products in the study area include the Dunmore Loop and Durrow Leafy Loop Walk, the North Kilkenny Cycle Route, Castlecomer Discovery Park and Heywood Gardens. There is limited accommodation within the Study Area with much of it located in the Durrow Electoral Division.

Evolution of the baseline environment (the 'Do Nothing' scenario):

It is expected that over the operational phase of the Windfarm, the local population will grow in line with, albeit possibly at a slower rate, the national average. It is also expected that GVA per person, and consequently the socio-economic circumstances will continue to improve over the long-term. Tourism data indicates that the sector continues to rebound following the Covid-19 pandemic. Visitor volumes through the first half of 2023 were up in every region in most sectors compared to 2022, broadly driven by improvements in overseas tourism.

NTS of EIAR S.17.3.2.2 Evaluation of impacts to Local Economy & Tourism

There were **no profound, very significant or significant impacts** considered likely or to have potential to occur in relation to Local Economy & Tourism.

Impacts which were considered of neutral or imperceptible significance, or impacts which are unlikely to occur, were not brought forward for detailed evaluation in the EIA Report.

Impacts of potential moderate or slight significance which are likely or have potential to occur, and non-significant impacts considered important enough or of local concern, were brought forward for detailed evaluation, as described in the sections below.

NTS of EIAR S.17.3.2.2.1 *Improvements in county budget due to commercial rates*

This impact could occur during the operational phase due to commercial rates revenue.

It is estimated that the Ballynalacken Windfarm Project will generate c.€800,000 of commercial rates per annum over the 30-year operational phase, representing 4% of the overall commercial rates collected by Kilkenny County Council. While not significant, the impact is evaluated to be positive.

No mitigation is required. The residual impact significance is **Slight (positive)**.

NTS of EIAR S.17.3.2.2.2 *Gross value added to businesses & employment opportunities*

This impact could occur during the construction phase due to construction contracts, purchasing of materials and services and landowner payments.

The Ballynalacken Windfarm Project capital costs are estimated to amount to €106 million. Of this, c.€6 million will be spent locally, equivalent to approximately 2% of the overall size of the local economy in the study area. While not significant, the impact is evaluated to be positive.

No mitigation is required. The residual impact significance is **Imperceptible (positive)**.

NTS of EIAR S.17.3.2.2.3 *Strengthening the local economy*

This impact could occur during the operational phase due to maintenance contracts, purchasing of materials and services, landowner payments and the Community Benefit Scheme.

It is anticipated that c.10 persons will be employed during the operational phase of the Ballynalacken Windfarm Project. Financial contributions made to the local population via landowner payments and the Community Benefit Scheme will equate to c.€1 million annually for 30 years – 0.4% of the overall local economy. While not significant, the impact is evaluated to be positive.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible (positive)**.

NTS of EIAR S.17.3.2.2.4 *Decrease in Local Property Prices*

This impact could occur during the operational phase due to the presence of wind turbines in an area.

Significant impacts are not predicted to occur, mainly because house resale values are multi-factorial and affected by many variables, such as supply and demand and the response of global markets to the effects of climate change. The Community Benefit Fund, paid directly to near neighbours, can also be considered an additional income to a property.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Imperceptible – Slight**.

NTS of EIAR S.17.3.2.2.5 *Secondary impact on walking & cycling routes tourism from the presence of a windfarm in the landscape*

This impact could occur during the operational phase due to operating turbines and operating substation.

Significant impacts are not predicted to occur, mainly because walkers and cyclists will be progressing in a linear manner along these routes, with views of the Ballynalacken Windfarm turbines intermittent with screening available from buildings and vegetation, lessening the potential for views of the windfarm.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Slight**.

NTS of EIAR S.17.3.2.2.6 *Secondary impact on scenic routes tourism from the presence of a windfarm in the landscape*

This impact could occur during the operational phase due to operating turbines and operating substation.

Significant impacts are not predicted to occur, mainly because the 2 no. scenic views within the study area, both from Heywood Demesne, will not experience a significant visual impact as a result of the Ballynalacken Windfarm, with the tourism product of Heywood Gardens and Demesne offering additional tourism experiences.

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Slight**.

NTS of EIAR S.17.3.2.2.7 *Secondary impact on amenity areas tourism from the presence of a windfarm in the landscape*

This impact could occur during the operational phase due to operating turbines and operating substation.

Significant impacts are not predicted to occur, mainly because of the multitude of tourism offering in Kilkenny city and the separation distance to Ballynalacken Windfarm (c.17km).

When the mitigation and monitoring measures are implemented, the residual impact significance will be **Slight**.

NTS of EIAR S.17.3.2.3 Cumulative Effects on Local Economy & Tourism

When the effects of the Ballynalacken Windfarm Project on Local Economy & Tourism are considered collectively with the effects of other existing and permitted projects and projects advanced in the planning system, it is considered that the **collective cumulative impact will not be significant**.

NTS of EIAR Sec.17.3.3 Mitigation and Monitoring Measures

In relation to Population & Human Health, Mitigation and Monitoring Measures are proposed (See **Chapter 19** of the EIAR). The most relevant are:

- SM25 – Monitoring of noise and vibration will be carried out at a number of nearby residences during critical periods of the construction works;
- SM16 – Monitoring of downstream water quality will be carried out during construction works;
- MM49 & OMM24– A Community Liaison Officer will be appointed for the duration of the construction and operational phases
- SM23:Dust monitoring within 100m of the site boundary will be carried out by the construction contractor and the Environmental Clerk of Works.
- MM46:To ensure that local roads are kept clean and site roadways are clear of mud, a road sweeper and dry wheel washes will be used.
- MM48:Construction operations shall generally be restricted to between 0700-1800hrs Monday to Friday, and 0700-1400hrs on Saturdays.
- SM25:Monitoring of noise and vibration will be carried out at a number of nearby residences during critical periods of the construction works
- OMM17:A noise curtailment strategy will be developed and implemented to ensure that the operating windfarm complies with the prescribed operational noise criterion. Noise reduction control modules will be installed in the turbines and will be activated to ensure that permitted levels are not exceeded during operation.
- OMM18: In the event of a complaint which indicates potential amplitude modulation (AM) associated turbine operation, the windfarm operator will employ an independent acoustic consultant to assess the level of amplitude modulation AM experienced by the complainant, and mitigation measures, if required, will consist of the implementation of operational controls on specified turbines, which will curtail or stop the relevant turbines under specific operational conditions, so that OAM at noise-sensitive locations is eliminated.
- OMM19: The wind turbines will be fitted with a Shadow Flicker Control Module to ensure that permitted levels are not exceeded or shadow flicker is eliminated if required, during operation.
- OMM20:A new berm and hedgerow will be planted on the northern side of the substation compound to provide noise and visual screening of the new substation compound;
- OMM25 - The community benefit fund will be managed in accordance with the *Good Practice Principles Handbook for Community Benefit Funds* (DECC, 2021). The Promoter of the project will initiate engagement with the local community post consent and prior to the commencement of construction works. A committee will be formed to oversee the distribution of the Community Benefit Fund. This committee will include the Promoter, an administrator, the Community Liaison Officer and members of the local community who have volunteered to serve on the Fund Committee.

- OMM26 - Following the completion of the construction and commissioning of the Project, the Environmental Management Plan will be updated, and the operation of the Ballynalacken Windfarm will be carried out in accordance with the updated Plan.
- OMM27 - A viewpoint/picnic area will be provided at Site Entrance No. 7 in Ballynalacken townland, where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains. This will afford a safe place to enjoy Viewpoint V19 “View west towards the Slieve Bloom Mountains on road no’s LS5840 and LS5839 from the junction with road nos. LS5839 and LS5846 (Ballymartin Cross Roads)” as described in Kilkenny City and County Development Plan 2021 - 2027. The proposed Ballynalacken Windfarm turbines will be behind the viewer and therefore not visible within the Viewpoint V19 viewshed west.

NTS of EIAR Section 17.4 Summary Conclusion for Population & Human Health

Negligible effects on local population health are associated with water quality effects to local water supply in relation to dust emissions during the construction phase of the proposed project. During the operational phase of the proposed development, there would be long-term positive impacts on air quality due to nitrogen oxides (No_x) savings. These benefits would be diffuse across the region/Ireland, similar to the benefits on local population health from positive impacts on climate change. While the proposed development would contribute positively to climate change action, the benefits are diffuse nationally/globally and require collective action for any material change. However, the delivery of the Ballynalacken Windfarm project may improve perception of climate change action, with associated wellbeing benefits to those locally and would result in a minor beneficial effect on local population health.

The proposed Ballynalacken Windfarm Project will positively impact the local economy during the construction phase through gross value added(GVA) to businesses and employment opportunities with c.€6 million of the construction spend occurring locally. During the operation phase the Local Economy will be strengthened through c.€1 million annual local payments relating to landowner payments; the **community benefit fund** and local operation and maintenance employment. Commercial rates of c.€800,000 will be paid to **Kilkenny County Council annually**. It is considered that in the context of the gross value added (GVA) of the local economy, the impact is assessed as positive but not significant. Similarly, in that context the cumulative impact of any additional windfarms or other large projects in the area would be positive but not significant.

Tourism in the area is limited to walking and cycling routes, designated scenic routes in Counties Kilkenny and Laois, and Garden trails in County Laois where the landscape forms part of the tourism experience. The secondary impact on local tourism, the impact on tourism to Kilkenny city, and the secondary impact on tourism activities of walking and cycling in the vicinity are assessed as not significant. Mitigation proposed includes provision of a viewpoint/picnic area at Site Entrance No.7 at Ballynalacken townland, where a car can pull off the road and enjoy the view west over the River Nore valley towards the Slieve Bloom Mountains.

Overall, it is evaluated that the impact on the Environmental Factor, Population & Human Health, will not be Significant.

Non-Tech Summary: Ch18 Interaction of the Foregoing

Each of the competent experts has considered the potential for effects passed on from other environmental topic to the environmental topic they studied. For example: the potential for effects to Soils (excavation of soils) to have a secondary effect to Climate (release of embodied emissions from bare and exposed soil). This is an example of an impact interaction.

The **interactions** between the potential effects on a topic such as Water and another environmental topic for example Land is what is considered in Chapter 18 of the EIA Report.

The following show a **sample of the interactions** examined, and are presented in order of the **Primary Environmental Factor**, Sensitive Aspect, then the **> Receiving Environmental Factor**, Sensitive Aspect:

- **Land:** Forestry land -> **Climate:** Climate Change.
- **Land:** Agricultural Land & Forestry Land -> **Biodiversity:** Terrestrial Habitats; Fauna.
- **Soils:** Local Soils & Subsoils - > **Water:** River Waterbodies, Groundwater Bodies, Water Supply (Local Wells), Designated Sites
- **Soils:** Local Soils & Subsoils - > **Air Quality & Electromagnetic Fields:** Local Residents, Communities, Amenities
- **Soils:** Local Soils & Subsoils - > **Climate:** Climate Change
- **Water:** River Waterbodies, Groundwater Bodies - > **Biodiversity:** Terrestrial Habitats; Amphibians & Reptiles; Mammals (Otter); Birds(Kingfisher); Aquatic Habitats & Species; Designated Sites
- **Water:** Water Supply -> **Population & Human Health:** Local Community Health & Wellbeing
- **Noise & Shadow Flicker** - > **Population & Human Health:** Local Community Health & Wellbeing.
- **Climate:** Climate Change -> **Land:** Agricultural Land, Forestry Land.
- **Climate:** Climate Change -> **Water:** River Waterbodies, Groundwater bodies, Designated Sites.
- **Climate:** Climate Change -> **Biodiversity:** Terrestrial Habitats, Invertebrates, Amphibians & Reptiles, Terrestrial Mammals (Otter), Bats, Birds, Aquatic Habitats & Species, Designated Sites.
- **Climate:** Climate Change -> **Cultural Heritage:** Cultural Heritage.
- **Climate:** Climate Change -> **Material Assets:** Public Road Networks, Other Built Services.
- **Climate:** Climate Change -> **Population & Human Health:** Local Economy & Tourism, Local Community Health & Wellbeing; Local Community Health and Wellbeing.
- **Climate:** Climate Action -> **Air quality & Electromagnetic Fields:** Air quality.
- **Climate:** Climate Action -> **Population & Human Health:** National Economy.
- **The Landscape** - > **Cultural Heritage:** Visual impacts.
- **The Landscape** - > **Population and Human Health:** Local Economy & Tourism; Local Community Health & Wellbeing.
- **Population:** Local Economy - > **Material Assets,** Public Road Network.

Non-Tech Summary: Ch19 Mitigation and Monitoring Measures

NTS of EIAR Section 19.1 Introduction

A summary of the mitigation measures which are envisaged to avoid, prevent, reduce or offset adverse effects of the Ballynalacken Windfarm Project to the environment are set out in the sections below.

The mitigation measures and monitoring arrangements have been developed by the EIA Topic **competent experts** in collaboration with the **Project Design Team** and the **EIA Co-ordinators**.

The primary mitigation for the Ballynalacken Windfarm Project is mitigation by **avoidance** i.e. the design of the Project through the consideration of alternative locations, layouts, size and scale, as set out in EIAR Chapter 4: Alternatives Considered. For effects that cannot be avoided through consideration of alternatives, mitigation by **prevention, reduction or offsetting** are proposed. These are listed in EIAR Chapter 19. The expected effectiveness of the mitigation measures is provided within the topic chapters.

Monitoring is also proposed to take place after consent is granted, in order to check that proposed processes and measures are operating as intended and that the Project in practice conforms to the predictions made during the EIA process and to record any unforeseen effects or non-compliance with consent conditions in order to undertake appropriate remedial.

What follows below, is an example of mitigation measures and monitoring arrangements that are presented within the EIA report. Three examples are shared from each section of the list to illustrate how the full list can be consulted in the EIA report. Due to the technical language within many of the individual measures the full list has not been included here.

NTS of EIAR Section 19.2 Construction Phase Mitigation Measures and Monitoring Arrangements

NTS of EIAR Sec.19.2.1 Construction Phase Surveying , Monitoring, Inspection & Supervision

Surveying & Monitoring Measure (SM) Preconstruction Surveying & Monitoring

Example 1

SM01: A suitably qualified **geotechnical engineer** will review and approve the civil contractor's method statements and final detailed design prior to the commencement of construction works.

Example 2

SM02: **Confirmatory surface water quality monitoring** will be carried out prior to the commencement of construction works at the water quality monitoring locations to determine the current status of surface water quality in downstream watercourses. This monitoring will include **laboratory analysis** of water samples which will be carried out by an independent and appropriately certified laboratory. The monitoring of water quality parameters and collection of samples will be undertaken by the **Environmental Clerk of Works**, who will be appropriately trained on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used. The surface water monitoring locations and sampling programme are defined in the **Surface Water Management Plan** which forms part of the Ballynalacken Windfarm Project **Environmental**

Management Plan. Records will be kept of biological and chemical monitoring undertaken carried out prior to the commencement of construction works.

Example 3

SM08: In advance of construction works taking place, **licenced advance archaeological surveys/investigations** will be carried out at identified locations within the construction works area boundary. These surveys will include photographic surveys, townland/civil parish boundary surveys, wade and detection surveys, built heritage surveys, geophysical surveys and archaeological test trenching. The nature and scope of **these surveys will be agreed with the National Monuments Service (NMS)**.

NTS of EIAR Sec.19.2.2 During Construction Surveying & Monitoring

Example 1

SM12: All construction works will be **monitored** for compliance with the **Environmental Management Plan** by the project **Environmental Management Team** which will include an **Environmental Clerk of Works**, the **Project Ecologist** and specialists such as a **hydrologist**, who are independent of the site contractors. The Environmental Management Team will report to the owner's Project Manager.

Example 2

SM13: A **Landowner Liaison Officer (LLO)** will be appointed and will monitor the erection and maintenance of the Construction Works Area boundary fences and will liaise with the landowners regarding the location of access gate ways along the fence, and of livestock water supply pipes and livestock water supply sources (agricultural landowners only). The LLO will keep the landowners up to date with relevant construction work schedules.

Example 3

SM20: The **Project Ecologist** will liaise with the Contractors on a weekly basis regarding the upcoming schedule of works and will advise the Contractors of any particular ecological protection requirements at specific locations on site.

NTS of EIAR Sec.19.2.3 Construction Phase Mitigation Measures

Mitigation Measure (MM), three examples are shared from the list to illustrate how the full list can be consulted in the EIA report.

Example 1

MM01: The boundaries of the Construction Works Area will be **fenced** to prevent the encroachment of construction phase personnel, machinery or materials beyond this boundary. In agricultural lands, livestock proof fencing will be used, with landowner access maintained through the provision of gates along the boundary fences.

Example 2

MM10: At the windfarm site, at works locations within 50m of watercourses or existing drainage features there will be additional mitigation measures deployed including double silt fencing prior

to the commencement of the works, temporary drain blocking in existing drains, placement of silt trapping arrangements along preferential surface water flow paths and, where necessary, the use of matting to prevent ground erosion and rutting. Works will **not take place within this zone during prolonged heavy or exceptional rainfall events.**

Example 3

MM41: 1.5km of **new hedgerows** will be planted during the construction phase. These new hedgerows will include c.43no. trees (i.e. a new tree will be planted at 35-40m intervals in new hedges). 4.1km of existing hedgerow will be improved by interplanting new hedging into gaps in existing field boundaries. All new hedgerows and enhancement of hedgerows will take place outside of bat buffer zones. Hedgerows will be located to encourage bats to commute away from the turbines. These hedgerows will also be used to screen visibility of the turbines from cultural heritage sites in the locality. A mix of native fruiting hedge species will be used for any new hedgerows and will comprise of hawthorn, along with blackthorn, holly, hazel, guelder rose, spindle, crab apple, and bird cherry. **New trees** will comprise a mix of native species such as oak, alder, birch, crab apple bird cherry and rowan. Hedging and trees will be of Irish provenance. Hedging plants will be sourced from Department of Agriculture approved nurseries.

NTS of EIAR Section 19.3 Operational Phase Mitigation Measures and Monitoring Arrangements

The following Environmental Protection Measures will apply during the operational phase of the Ballynalacken Windfarm Project. Three examples are shared from the list to illustrate how the full list can be consulted in the EIA report.

NTS of EIAR Sec.19.3.1 Operational Phase Surveying, Monitoring and Supervision

Example 1

OMM13: The **bat buffer zone will be maintained** during operation by trimming existing trees and hedgerows, removing any scrub and additionally no new trees or hedgerows will be planted within the buffer zones. In the buffer zones in forestry areas, following the forestry felling and removal of the brush, the ground surface will be levelled, and the buffer zone will be sown with grass species. A low grass sward will be maintained within this zone to minimise its value as hunting habitat for Kestrel and other birds of prey. This will also minimise the value of these buffer zones to foraging bat species.

Example 2

OMM17: A **noise curtailment strategy** will be developed and implemented to ensure that the operating windfarm complies with the prescribed operational noise criterion. In order to develop this strategy: (i) a pre-construction **noise survey** will be carried out to establish the background noise levels and to confirm the applicable wind turbine noise criteria at identified Noise Sensitive Locations (NSL) and (ii) following the commissioning of the Project and the commencement of operation of the wind farm, a second noise survey will be carried out at the NSLs to establish compliance with the noise limit conditions applied to the development. This survey will be carried out according to the IOA GPG and Supplementary Guidance Note 5: Post Completion Measurements (July 2014). Where exceedances are confirmed during surveys, then appropriate sound power operating modes will be activated for specified turbines operating in specified wind

conditions as required to reduce noise output when exceedance at a NSL is predicted by the wind turbines computer SCADA software. A third noise survey will be carried following the activation of sound power modes to confirm the effectiveness of the curtailment strategy.

Example 3

OMM19: The wind turbines will be **fitted with a Shadow Flicker Control Module**, comprising a central processing unit (CPU) and light sensors. Should a complaint regarding shadow flicker be received from a neighbouring resident, the occurrence of shadow flicker at the receptor (house) will be investigated and the Control Module can be set to **automatically turn off the turbine** if the defined parameters for shadow flicker events, at a given sensitive receptor (house), are predicted to occur. This will **eliminate shadow flicker** at the residence in question.

NTS of EIAR Section 19.4 Decommissioning Phase Mitigation Measures and Monitoring Arrangements

The following Environmental Protection Measures will apply during the decommissioning of the Ballynalacken Windfarm. Three examples are shared from the list to illustrate how the full list can be consulted in the EIA report.

NTS of EIAR Sec.19.4.1 Decommissioning Phase Monitoring and Mitigation Measure (DMM)

Example 1:

DMM08: Following the completion of decommissioning, the hardcore areas at the turbines and at widened site entrances and haul route works locations will be covered over, using the soil in the deposition area. The area will be reseeded/replanted as appropriate to the location. And if in agricultural lands, the area will be fenced from livestock until revegetation has occurred. **Land reinstatement works** will not take place during periods of prolonged heavy rain or exceptional rainfall events or when the soil is waterlogged.

Example 2:

DMM13: A **Community Liaison Officer (CLO)** will be appointed and will be the point of contact for local residents formatters relating to decommissioning works, noise and transportation timing.

Example 3:

DMM14: During the decommissioning of the windfarm, the **Environmental Management Plan (EMP)** will be updated, and the decommissioning works will be carried out in accordance with the updated Environmental Management Plan (EMP). A suitably qualified **Environmental Manager** will be appointed by the Project Promoter, and it will be their responsibility to ensure that the EMP is implemented through liaising with the Asset Manager and the decommissioning Contractor(s) and by carrying out regular audits on Environmental Management Plan (EMP) compliance. The EMP will be an important contract document for the decommissioning contractor(s) who will be contractually obliged to comply with the Environmental Management Plan (EMP) and the requirements of the Environmental Manager.

NTS of EIAR Section 19.5 Environmental Management Plan

An Environmental Management Plan (EMP) has been prepared for the Ballynalacken Windfarm Project. The Environmental Management Plan describes the approach to environmental management during the construction, operation stage and decommissioning stage of the Ballynalacken Windfarm Project.

The purpose of this document is to communicate environmental protection measures that apply to the development of the Ballynalacken Windfarm Project to those with responsibility for carrying out works or activities onsite so that significant adverse effects on the receiving environment can be prevented.

The Environmental Management Plan will include all of the mitigation measures and monitoring arrangements for the Project, including those proposed as part of the EIA Report and AA Report, along with Traffic, Surface Water, Waste and Biodiversity Management Plans, Emergency Response Procedures, any additional measures, monitoring or procedures included in consent conditions.

An Environmental Clerk of Works will be appointed, independent of the main construction Contractor, and will carry out weekly audits of the construction works and process, reporting to the Project Manager on Environmental Management Plan compliance. If non-compliance is detected, then, prompt corrective action will be agreed and committed to by the Contractor, with a view to the swift and effective resolution of any deviations from the Environmental Management Plan requirements.

The Environmental Management Plan will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP and the requirements of the Environmental Clerk of Works. Furthermore, if a significant unforeseen environmental effect takes place, then, the Environmental Clerk of Works will have a 'stop-works' authority to temporarily stop works at the works location until the issue is resolved.

Following the completion of construction, the roles and responsibilities and the environmental commitments included in the Environmental Management Plan will be updated for the operational phase of the Project. Similarly, the Environmental Management Plan will be updated once again prior to decommissioning.

Non-Tech Summary: Ch20 Summary Conclusion

In summary the results of this study shows that the **Ballynalacken Windfarm Project is not likely to cause significant adverse residual effects to the local environment.**

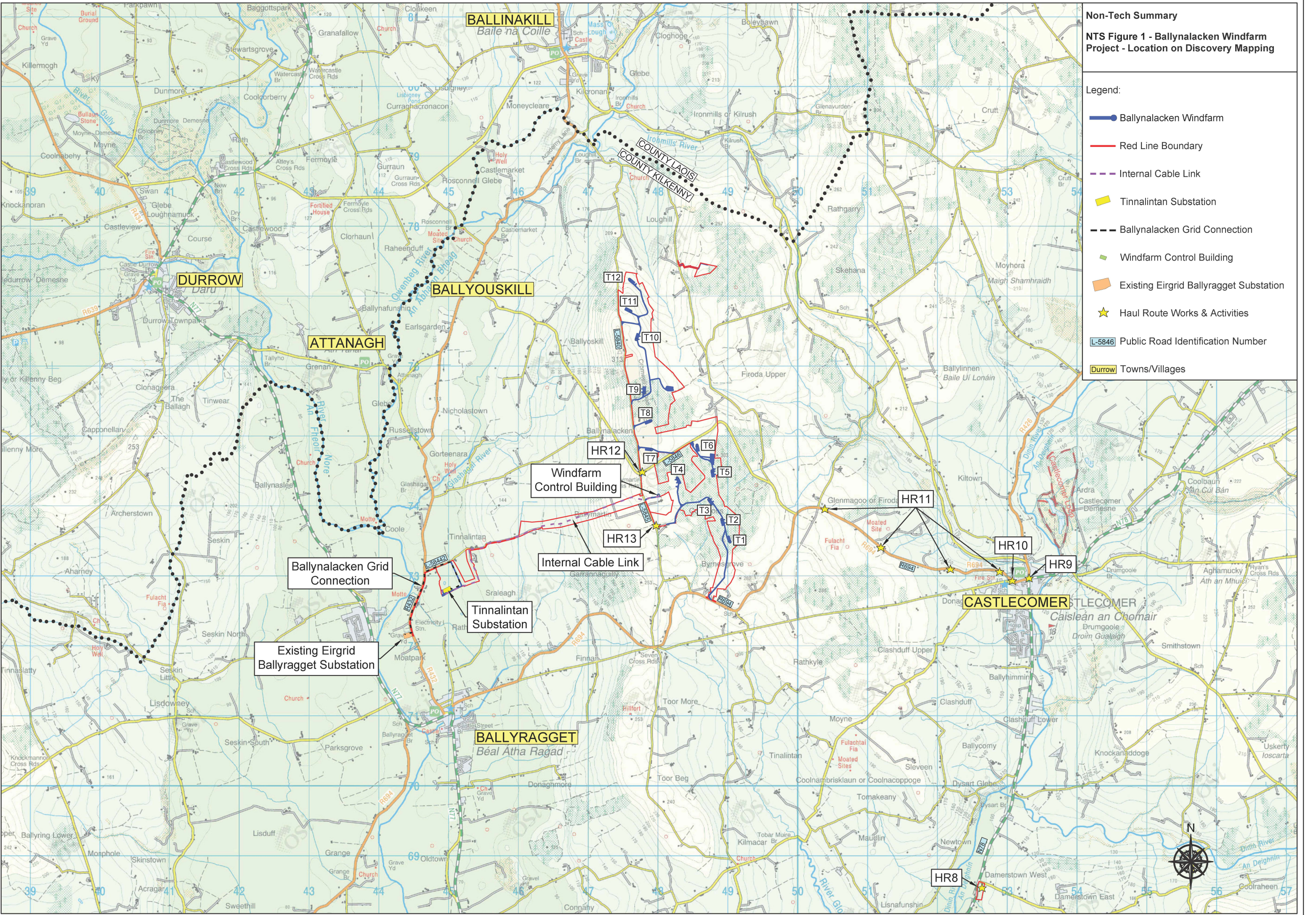
Effective mitigation measures and monitoring arrangements have been developed for aspects where there is potential for adverse impacts (before mitigation measures are deployed), for example effects on rivers and water quality, effects on natural areas designated for protection, effects on mammals such as bats and effects on the nearest houses to the site from noise and shadow flicker. Following the implementation of these mitigation measures, the residual impacts on the environment and local community to will not be significant.

The **Ballynalacken Windfarm Project will cause significant positive impacts to Climate Change Action through the production of Renewable Electricity**, in addition to the following positive impacts; improvements in air quality due to the offset of greenhouse gas emissions; habitat protection due to the leasing of the Biodiversity Protection Area; habitat enhancement due to planting of existing field boundaries with hedgerow species; improvements in County Kilkenny budgets due to payments of commercial rates; and strengthening of the local economy as a result of the Community Benefit Fund and construction and operational expenditure.

Non-Tech Summary

NTS Figure 1 - Ballynalacken Windfarm Project - Location on Discovery Mapping

- Legend:
- Ballynalacken Windfarm
 - Red Line Boundary
 - Internal Cable Link
 - Tinnalintan Substation
 - Ballynalacken Grid Connection
 - Windfarm Control Building
 - Existing Eirgrid Ballyragget Substation
 - Haul Route Works & Activities
 - L-5846 Public Road Identification Number
 - Durrow Towns/Villages



Non-Tech Summary
NTS Figure 2 - Layout on Aerial Photography

- Legend:
- Turbine
 - Hardcore Area
 - Windfarm Control Building
 - Internal Windfarm Cabling
 - Tinnalintan Substation
 - Internal Cable Link
 - Ballynalacken Grid Connection
 - Temporary Construction Compound
 - Borrow Pit
 - Public Road Widening Works
 - Joint Bay
 - Met Mast
 - Telecom Relay Pole
 - Diverted Watercourse
 - Temporary Berm
 - Temporary Deposition Area
 - Temporary Road
 - Long Term Storage Berm
 - EPA Watercourse
 - Public Road Identification Number



Existing Eirgrid
Ballyragget Substation

Ballynalacken
Grid Connection

Tinnalintan
Substation

Internal Cable Link

Windfarm
Control Building

T12

T11

T10

T9

T8

T7

T6

T4

T5

T3

T2

T1

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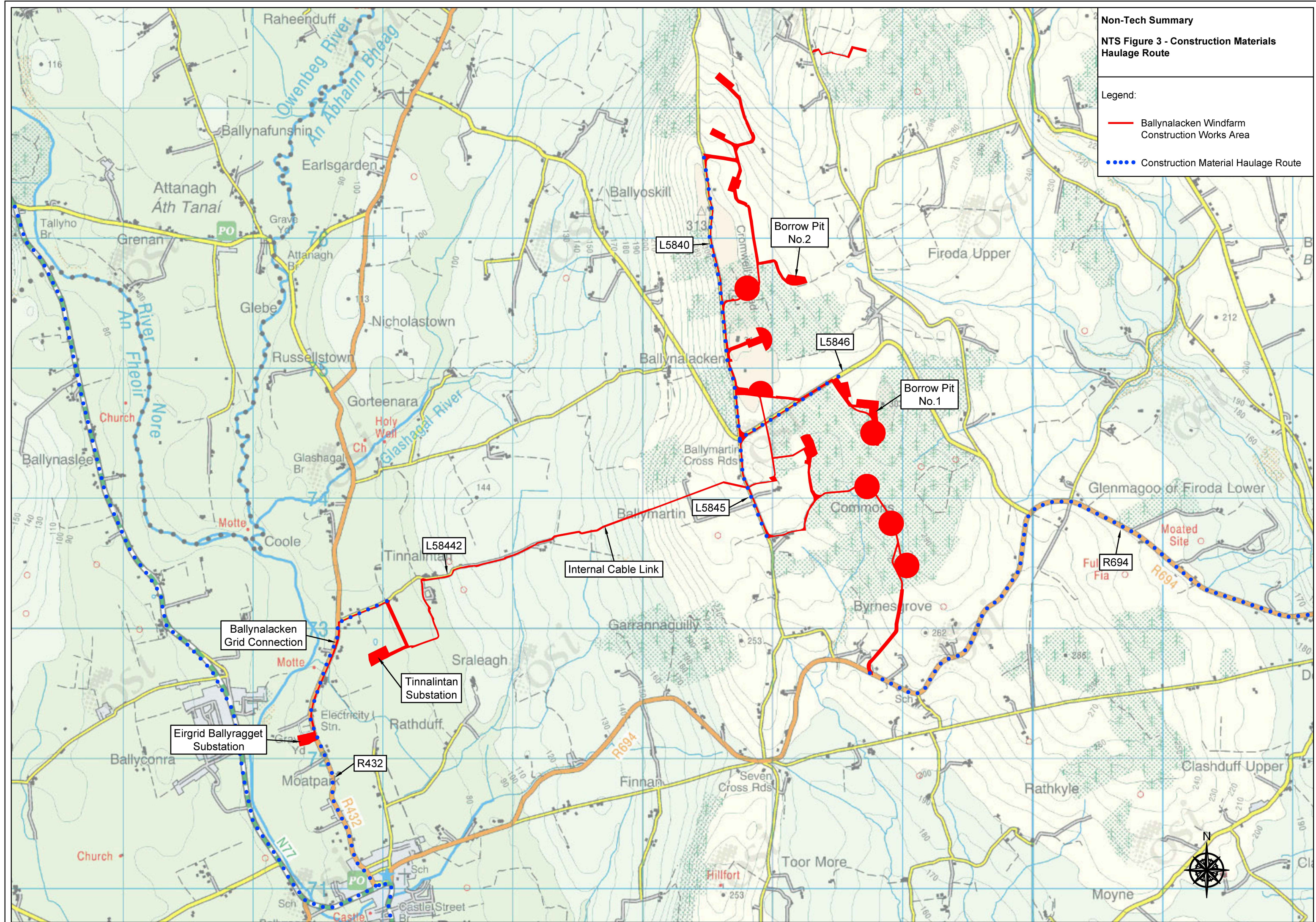
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Non-Tech Summary

NTS Figure 3 - Construction Materials Haulage Route

Legend:

- Ballynalacken Windfarm Construction Works Area
- Construction Material Haulage Route



Non-Tech Summary
NTS Figure 4 - Noise Sensitive Locations

- Legend:
- Ballynalacken Turbine
 - 2km Study Area from Ballynalacken Turbines
 - Noise Sensitive Locations within 2km of a Ballynalacken Turbine
 - 500m Study Area from Tinnalintan Substation
 - Noise Sensitive Locations within 500m of Tinnalintan Substation
 - Tinnalintan Substation

