

1. NON-TECHNICAL SUMMARY

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of Umma More Ltd, who intends to apply to An Bord Pleanála for planning permission to construct a renewable energy development which will comprise 9 No. wind turbines, and associated infrastructure in the townland of Umma More, and adjacent townlands, in Co. Westmeath, and a 110kV on-site substation and associated works, including underground 110kV cabling to connect to the national grid at Thornsberry 110kV substation, in the townland of Derrynagall or Ballydaly, near Tullamore, Co. Offaly. The townlands in which the Proposed Development is located are listed in Table 1-1.

Due to the nature of the proposed renewable energy development, which will have a potential generating capacity of greater than 50 megawatts (MW) and requires the provision of 110 kV infrastructure which will form part of the national electricity transmission network, two separate planning applications are required.

One planning application will be submitted to An Bord Pleanála seeking permission for the proposed 9 No. wind turbines and associated infrastructure with a potential generating capacity of greater than 50 megawatts (MW). The application meets the threshold for wind energy set out in the Seventh Schedule of the Planning and Development Act 2000, as amended (being ‘*An installation for the harnessing of wind power for energy production (a wind farm) with more than 25 turbines or having a total output greater than 50 megawatts*’) and is therefore being submitted directly to An Bord Pleanála as a Strategic Infrastructure Development (SID) in accordance with Section 37E of the Planning and Development Act, 2000 as amended. This approach has been confirmed following consultations with the Board under the provisions of Section 37B of the Planning and Development Act 2000 as amended (case reference ABP-313351-22). This EIAR accompanies the planning application for the proposed 9 No. wind turbines and associated infrastructure submitted to the Board. The planning application is also accompanied by a Natura Impact Statement (‘NIS’). The grid connection 110kV infrastructure and associated works will not form part of this planning application, however, it is assessed in this EIAR.

Should the planning application submitted to the Board under Section 37E of the Planning and Development Act, 2000 as amended, receive successful grant of planning permission, a second planning application regarding the grid connection 110kV infrastructure and associated works will be submitted to An Bord Pleanála in accordance with Section 182A of the Planning and Development Act 2000, as amended. This approach has been confirmed following consultations with the Board under the provisions of, Section 182E of the Planning and Development Acts 2000 as amended (case reference ABP-313352-22). An updated EIAR and NIS will accompany the planning application for the grid connection 110kV infrastructure however, as clarified above, it is assessed in this EIAR.

The EIAR complies with the EIA Directive of 2011/92/EU. The Environmental Impact Assessment (EIA) of the Proposed Development will be undertaken by An Bord Pleanála, as the competent authority.

Applicant

The applicant for the Proposed Development, Umma More Ltd, is an associated company of Enerco Energy Ltd., which is an Irish-owned, Cork-based company with extensive experience in the design, construction and operation of wind energy developments throughout Ireland, with projects currently operating or in construction in Counties Cork, Kerry, Limerick, Clare, Galway, Mayo and Donegal.

By the end of 2023, Enerco and its associated companies had over 825 Megawatts (MW) of wind generating capacity under construction or in commercial operation, with a further 400MW of projects at various stages in its portfolio to assist in meeting Ireland's renewable energy targets.

Brief Description of the Proposed Development

The Proposed Development will comprise the construction of 9 No. wind turbines with a blade tip height of 185 metres and all associated works, and a 110 kV substation and associated works, including underground 110kV cabling to connect to the national grid at Thornsberry 110kV substation. The full description of the Proposed Development is detailed in Chapter 4 of this EIAR. The current planning application, relating to the Wind Farm Site, is being made to An Bord Pleanála under Section 37E of the Planning and Development Act, 2000, as amended.

The development description for the current planning application as appears in the public notices is as follows:

The Proposed Development will consist of the provision of the following:

- i. 9 No. wind turbines with an overall ground-to-blade tip height of 185 metres; a rotor blade diameter of 162 metres; and hub height of 104 metres, and associated foundations and hard-standing areas;*
- ii. A thirty-year operational life from the date of full commissioning of the wind farm and subsequent decommissioning;*
- iii. A meteorological mast with a height of 30 metres, and associated foundation and hard-standing area;*
- iv. Junction accommodation works and temporary access roads to facilitate turbine delivery to an existing entrance on L5363.*
- v. Upgrade of existing entrance on L5363 for provision of site entrance;*
- vi. Upgrade of existing tracks/ roads and provision of new site access roads, junctions and hardstand areas;*
- vii. Underground electrical (33kV) and communications cabling;*
- viii. A temporary construction compound;*
- ix. Spoil Management;*
- x. Site Drainage;*
- xi. Tree Felling;*
- xii. Operational stage site signage; and*
- xiii. All ancillary works and apparatus.*

The application is seeking a ten-year planning permission.

The Grid Connection, which will be subject to a separate planning application, includes for a 110kV on-site substation compound (2 no. control buildings with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, waste water holding tank, site drainage and all ancillary works), a temporary construction compound and approximately 31km of underground 110kV electrical cabling connecting the proposed on-site substation to the existing Thornsberry 110kV substation, near Tullamore, Co. Offaly.

Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the Proposed Development, will have an operational lifespan greater than the 30-year operational life that is being sought as part of the planning application.

Modern wind turbine generators currently have a typical generating capacity in the 4 to 7 MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by the turbine manufacturers. For the purposes of this EIAR it is assumed that the wind turbine model installed as part of the Proposed Development will have an output of 6.2MW. Therefore, on this basis, the proposed 9 no. wind turbines would have a combined generating capacity of 55.8MW. The actual

turbine procured as part of a competitive tender process may have a power output that is marginally lower or greater than the 6.2MW turbine described in the EIAR. Irrespective of the power output of the actual turbine procured, the conclusions of the EIAR will not be materially affected.

Need for the Proposed Development

Ireland faces significant challenges to its efforts to meet EU targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. Further detail can be found in Chapter 2 of this EIAR.

The Proposed Development provides the opportunity to capture an additional part of County Westmeath's valuable renewable energy resource. If the Proposed Development were not to proceed, this opportunity would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

Economic Benefits

The Proposed Development will have both long-term and short-term benefits for the local economy including income to local landowners, job creation, work opportunities for local businesses and service providers, local authority commercial rate payments and a Community Benefit Scheme.

Commercial rate payments from the Proposed Development will be provided to Westmeath County Council each year and to Offaly County Council during the construction phase, which will be redirected to the provision of public services within Co. Westmeath and Co. Offaly. These services include provisions such as road upkeep, fire services, environmental protection, street lighting, footpath maintenance etc. along with other community and cultural support initiatives.

It is estimated that the Proposed Development has the potential to create up to 100 jobs during the construction phase and 3-4 jobs during operational and maintenance phases of the Proposed Development. During construction, additional indirect employment will be created in the region through the supply of services and materials to the renewable energy development. There will also be income generated by local employment from the purchase of local services i.e. travel, goods and lodgings.

Should the Proposed Development receive planning permission, there are substantial opportunities available for the local area in the form of Community Benefit Funds. The value of this fund will be directly proportional to the installed capacity and/or energy produced at the site and will support and facilitate projects and initiatives including youth, sport and community facilities, schools, educational and training initiatives, and wider amenity, heritage, and environmental projects.

Purpose and Structure of this EIAR

The purpose of this EIAR is to document the current state of the environment on and in the vicinity of the Proposed Development site and to quantify the likely significant effects of the Proposed Development on the environment. The compilation of this document served to highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from the possibility of any negative impacts arising from the Proposed Development.

The EIAR project team comprises a multidisciplinary team of experts with extensive experience in the assessment of wind energy developments and in their relevant area of expertise. Each chapter of this EIAR has been prepared by a competent expert in the subject matter. The chapters of this EIAR are as follows:

- 1. Introduction*
- 2. Background to the Proposed Development*
- 3. Considerations of Reasonable Alternatives*
- 4. Description of the Proposed Development*
- 5. Population and Human Health*
- 6. Biodiversity (excluding Birds)*
- 7. Birds*
- 8. Land, Soils and Geology*
- 9. Water*
- 10. Air and Climate*
- 11. Noise and Vibration*
- 12. Landscape and Visual*
- 13. Cultural Heritage*
- 14. Material Assets (including Traffic and Transport, Telecommunications and Aviation)*
- 15. Interactions of the Foregoing*
- 16. Major Accidents and Natural Disasters*
- 17. Schedule of Mitigation Measures*

A Natura Impact Statement has also been prepared in line with the requirements of the Habitats Directive and will be submitted to the Planning Authority as part of the planning application documentation.

Background to the Proposed Development

This section of the EIAR sets out the energy and climate change related policy and targets along with the strategic, regional, and local planning policies relevant to the Proposed Development. It also summarises EIA scoping undertaken and the cumulative impact assessment process undertaken.

The policies and targets which have been put in place at the various levels of Government in relation to renewable energy and climate change illustrate the need for the Proposed Development to assist Ireland in meeting its national targets and European commitments in relation to climate change and decarbonisation.

The Proposed Development comprises 9 no. wind turbines, with the capacity to generate in the region of 55.8MW (assuming a rated output of 6.2MW per turbine). The need to decarbonise the economy and reduce emissions has always been imperative, however in recent years the urgency involved has become clearer to all stakeholders. The Climate Action Plan (CAP) published by the Government in 2023 sets out the detail for taking action to achieve a 51% reduction in overall greenhouse gas emissions by 2030, and to reach net-zero emissions by no later than 2050. Central to this is the set of measures set out to increase the proportion of renewable electricity to up to 80% by 2030 and a target of 9GW from onshore wind. The CAP places front and centre the facts that without urgent action, global warming is likely to be more than 2°C above pre-industrial levels, threatening the health and livelihoods of people across the globe. Urgency of action is also a key focus of the CAP. All sectors will have to further their efforts from those outlined in the CAP if the core and further measures are to be achieved.

A gradual shift towards increasing our use of renewable energy is no longer viable. There is an urgency now to ensure real changes happens. Renewable energy development is recognised as a vital component of Ireland's strategy to tackle the challenges of combating climate change and ensuring a secure supply of energy. Ireland is heavily dependent on the importation of fossil fuels to meet its energy need. 70% of energy used in Ireland is imported from abroad, higher than the EU average of almost 60% (National Energy Security Framework 2022). This high dependency on energy imports is highly risky and Ireland is currently extremely vulnerable both in terms of meeting future energy needs and ensuring price stability. As such, expanding indigenous renewable energy supply is critical for energy security and price stability.

Local Policy

The site of the Proposed Development is located in the administrative area of Westmeath County Council. As such, the Westmeath County Development Plan 2021-2027 (WCDP) which came into effect on the 3rd May 2021 is relevant. The WCDP incorporates the aims, objectives, policies and guidelines to provide for the proper planning and sustainable development of County Westmeath. Map 69 in Volume 2 of the County Development Plan presents The Wind Energy Development map for Co. Westmeath is based on the Landscape Character Assessment map for the County, which defines 11 no. distinct Landscape Character Areas (LCAs). Each LCA is classified by the Plan in terms of its capacity for wind energy development, according to the following terms:

- Low Capacity: 10 no. LCAs
- No Capacity: 1 no. LCA;

All but one LCA of the county are classified as 'Low Capacity' for wind energy development. The Western Lowlands LCA, in which the Wind Farm Site is located, is one of the 10 No. LCAs classified as 'Low Capacity' for wind energy development. The Western Lowlands LCA was designated as 'Medium Capacity' for wind energy development in the Westmeath County Development Plan (2014-2020) that was adopted on the 18th February 2014. This designation was subsequently changed to 'Low Capacity' by way of variation no. 1 to the Development Plan (2014-2020) on 23rd September 2016. The Wind Energy Capacity designations remain unchanged in the recently adopted Westmeath County Development Plan (2021-2027).

On the 16th April 2021, the Minister for Local Government and Planning issued a notice to Westmeath County Council pursuant to section 31AM(8) of the Planning and Development Act, as amended, on the basis that, having considered the Westmeath County Development Plan 2021-2027, the Office of the Planning Regulator is of the opinion that:

“...the Office [of the Planning Regulator] remains of the view that the inclusion of the policy objective CPO 10.132 (renumbered CPO 10.143) and an unchanged Wind Energy Capacity Map in the adopted Development Plan create a significant limitation or constraint on renewable energy projects which is inconsistent with the SPPR [Specific Planning Policy Requirements] and would also significantly restrict other policy objectives supporting wind energy development such as policies CPO 10.139, CPO 10.142 and CPO 10.144.”

The Wind Farm Site is located within an area zoned for wind energy development within the WCDP, although this is classified as ‘Low Capacity’, the site specific design and EIAR findings shows that this is not the case. The Proposed Development is therefore considered wholly in line with local, regional and national policy in the provision of renewable energy.

The WCDP provides for the development of indigenous energy resources, with an emphasis on renewable energy supplies. The Council acknowledges the importance of renewable energy in reducing anthropogenic greenhouse gas emissions and the contribution of renewable energy in achieving national and EU target net zero greenhouse gas emissions by 2050.

Wind Energy Development Guidelines

The relevant considerations under the ‘Wind Energy Development Guidelines for Planning Authorities’ (Department of the Environment, Heritage and Local Government (DOEHLG, 2006) ‘*the Guidelines*’ have been taken into account during the preparation of this EIAR.

The aim of these guidelines is to assist the proper planning of wind power projects in appropriate locations around Ireland. The Guidelines highlight general considerations in the assessment of all planning applications for wind energy. They set out advice to planning authorities on planning for wind energy through the development plan process and in determining applications for planning permission. They contain guidelines to ensure consistency of approach throughout the country in the identification of suitable locations for wind energy development. Each wind project has its own characteristics and defining features, and it is therefore impossible to write specifications for universal use. Guidelines should be applied practically and do not replace existing national energy, environmental and planning policy. While the Guidelines remain the relevant guidelines in place at the time of lodgement, and decision makers (Planning Authorities and An Bord Pleanála) are required to have regard to them, they are not bound to apply their provisions and they can (and do), where there is sufficient justification, consider updated standards/requirements/specifications in assessing impacts and the proper planning and sustainable development of the area.

Planning History

The Chapter presents an overview of the planning history of the Proposed Development site.

Scoping and Consultation

The Chapter presents detail of the EIA Scoping undertaken with regards the Proposed Development. A scoping report, providing details of the Proposed Development, was prepared by MKO and circulated in August 2021. In February 2022, another letter was sent informing the relevant bodies of a revision to the EIA Scoping Document for the Proposed Renewable Energy Development, with particular attention to the amendments to the Grid Connection. MKO requested the comments of the relevant personnel/bodies in their respective capacities as consultees with regards to the EIAR process. As part of the constraints mapping process, which is detailed in Section 3.5.1 of Chapter 3 of this EIAR, telecommunications operators were contacted between May 2021 in order to determine the presence of

telecommunications links either traversing or in close proximity to the Wind Farm Site. The Chapter includes a list of scoping consultees and responses received, with full copies of all scoping responses received set out in Appendix 2-1 of the EIAR.

Community engagement has been undertaken by the Applicant, with Appendix 2-2 of the EIAR containing a full and detailed Community Report. In summary, the report was prepared to record the consultation carried out with the local community in respect of the Proposed Development. The applicant has carried out consultation in relation to the Proposed Development with local residents and interested parties in the wider community. The objective of the consultations was to ensure that the views and concerns of all were considered as part of the Proposed Development design and EIA process.

The Proposed Development has the potential to have significant benefits for the local economy, by means of job creation, landowner payments and commercial rate payments. An important part of any renewable energy development, which Umma More Ltd. has been at the forefront of developing, is its Community Benefit Package. The concept of directing benefits from wind farms to the local community is promoted by the National Economic and Social Council (NESC) and the Wind Energy Ireland (WEI) among others. While it may be simpler and easier to put a total fund aside for a wider community area, the applicant is endeavouring to develop new ways to direct increased gain towards the local community with particular focus on those living closest to the Proposed Development.

Chapter 2 also includes details of the pre-planning meetings undertaken prior to the planning application being lodged, including engagement with An Bord Pleanála under the provisions of Section 37B (and 182E) of the Planning and Development Act 2000, as amended.

Cumulative Impact Assessment

The EIA Directive and associated guidance documents state that as well as considering any direct, indirect, secondary, transboundary, short-, medium-, and long-term, permanent and temporary, positive and negative effects of a proposed development or project (all of which are considered in the various chapters of this EIAR), the description of likely significant effects should include an assessment of cumulative impacts that may arise. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to a proposed development or project. The factors to be considered in relation to cumulative effects include population and human health, biodiversity, land, soil, water, air, climate, material assets, landscape, and cultural heritage as well as the interactions between these factors.

To gather a comprehensive view of cumulative impacts on these environmental considerations and to inform the EIA process being undertaken by the consenting authority, each relevant chapter within this EIAR includes a cumulative impact assessment where appropriate.

Consideration of Reasonable Alternatives

This chapter of the EIAR introduces the reasonable alternatives studied by the developer which are relevant to the Proposed Development and its specific characteristics and an indication of the main reasons for the option chosen, taking into account the environmental effects. The consideration of alternatives typically refers to alternative design, technology, location, size and scale. A 'Do Nothing Scenario' i.e., an outline of what is likely to happen to the environment should the Proposed Development not be implemented, has also be considered.

Alternative Locations

The process of identifying a suitable wind farm site is influenced by a number of factors. While wind speeds, the area of suitable or available land, proximity to a grid connection point and planning policy are all very important, a wind farm project must be commercially viable/competitive, as otherwise it will never attract the necessary project finance required to see it built.

Sites selected for the development of a wind farm must be suitable for consideration under a number of criteria, such as:

- Site location relative to Westmeath County Development Plan Wind Energy Capacity's classification of areas considered that have capacity for wind farm development from a planning policy perspective;
- Access to the national electricity grid possible within a viable distance;
- Located outside areas designated for protection of ecological species and habitats;
- Sufficient area of unconstrained land that could potentially accommodate a wind farm development and turbine spacing requirements;
- Consistently high average annual wind speeds;
- Low population density; and
- Visual Amenity.

From the review of the criteria set out above, the Wind Farm Site was identified as a suitable location for the provision of a renewable energy development of the scale proposed. The Wind Farm Site is located on agricultural land and existing commercial forestry which allows the site to take advantage of existing access roads (which will be upgraded) and highlights the suitability of the Wind Farm Site as it can make sustainable use of these established items of infrastructure. Although, the Wind Farm Site is designated as being within a 'Low Capacity' area within the functional area of Westmeath County Council for the provision of wind farm development, the site specific design and findings of the EIAR show that this is not the case. The site does not overlap with any environmental designations and is located in an area with a relatively low population density with appropriate annual wind speeds.

From the review of the criteria set out above, the Grid Connection was identified as a suitable location for the provision of a connection of the Wind Farm Site to the National Grid. The underground electrical cabling route is located primarily in the public road corridor and does not overlap with any environmental designations.

Alternative Renewable Energy Technologies

During the initial stages of the Proposed Development design, a combination of solar energy and wind energy were considered for the Proposed Development at this site, however this was subject to land availability at the time and the proposed Wind Farm Site was progressed. To achieve the same electricity output from solar energy as is expected from the proposed Wind Farm Site (c. 55.8MW), a larger development footprint would be required. As detailed in Section 1.1.1 in Chapter 1, the EIAR Site Boundary encompasses an area of approximately 949 hectares and the permanent footprint of the Proposed Development measures approximately 8.2 hectares, which represents approximately 0.9% of

the Site. In order to achieve a c. 55.8MW output using solar PV arrays, there would be a requirement of approximately 86.4 ha, which represents approximately 9.1% of the Site.

Alternative Turbine Numbers and Model

The proposed wind turbines will have a potential power output in the 4 and 7 megawatt (MW) range. It is proposed to install 9 turbines at the Wind Farm Site which could achieve approximately 55.8 MW output (mid-range capacity). Such a wind farm could also be achieved on the proposed Wind Farm Site by using smaller turbines (for example 2.5 MW machines). However, this would necessitate the installation of over 22 turbines to achieve a similar output. Furthermore, the use of smaller turbines would not make efficient use of the wind resource available having regard to the nature of the Wind Farm Site. A larger number of smaller turbines would result in the wind farm occupying a greater footprint within the Wind Farm Site, with a larger amount of supporting infrastructure being required (i.e., roads etc) and increasing the potential for environmental impacts to occur.

Alternative Turbine Layout and Development Design

The design of the Wind Farm Site has been an informed and collaborative process from the outset, involving the designers, developers, engineers, landowners, environmental, hydrological and geotechnical, archaeological specialists and traffic consultants. The aim being to reduce potential for environmental effects while designing a project capable of being constructed and viable.

Following the mapping of all known constraints, detailed site investigations were carried out by the project team. The ecological assessment of the Wind Farm Site encompassed habitat mapping and extensive surveying of birds and other fauna. This assessment, as described in Chapter 6 of this EIAR on Biodiversity, optimised the decision on the siting of turbines and the carrying out of any development works, such as the construction of roads. The hydrological assessment of the Wind Farm Site encompassed site specific flood modelling for 100-yr and 1000-yr events. This assessment, as described in Chapter 9 of this EIAR on Water, optimised the decision on the siting of turbines, roads and the onsite substation. Where specific areas were deemed as being unsuitable for the siting of turbines or roads, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out of consideration. The final proposed layout takes account of the results of all site investigations and baseline assessments that have been carried out during the EIAR process. The final chosen layout is considered the optimal layout given it has the least potential for environmental effects.

Alternative Grid Connection Underground Electrical Cabling Route Options

A key consideration in determining the grid connection method for a proposed wind energy development is whether the cabling is undergrounded or run as an overhead line. While overhead lines are less expensive and allow for easier repairs when required, underground lines will have no visual impact. For this reason, it was considered that underground lines would be a preferable alternative to overhead lines. The Guidelines also indicate that underground cables are the preferred option for connection of a wind energy development to the national grid.

Initial grid studies identified that Mullingar 110kV substation is already congested and therefore it was discounted as a viable option. Therefore, an underground grid connection cabling route to both Athlone 110kV substation (Option 1) and Thornsberry 110kV substation (Option 2) were considered and assessed in order to determine which route would be brought forward as part of the planning application. The preferred option, Option 2 to Thornsberry 110kV Substation, was considered the most viable option for connecting the Proposed Development to the national grid. The chosen Option 2 to Thornsberry 110kV substation is considered the optimal route given it has the least potential for environmental effects when compared to Option 1, particularly when considering the location of Option 1 within an area designated for ecological protection, i.e the Natura 2000 site, Lough Ree SAC and SPA and proposed nationally designated site, Lough Ree pNHA. The final underground cable

route also takes account of the findings from all site constraints (e.g., ecology, archaeology, hydrology, peat depths etc.), site investigations and baseline assessments, and design constraints (e.g., third party lands) that have been carried out during the EIAR process.

Alternative Port of Entry and Site Access

The alternatives considered for the port of entry of wind turbines into Ireland for the Proposed Development include Port of Galway, Shannon Foynes Port and Dublin Port. Shannon Foynes Port is the principal deepwater facility on the Shannon Estuary and caters for dry bulk, break bulk, liquid and project cargoes. Port of Galway and Dublin Ports also offers a roll-on roll-off procedure to facilitate import of wind turbines. All three ports and indeed others in the state, offer potential for the importing of turbine components. The primary chosen port of entry is Galway Port due to its proximity from the port to the M6 motorway, in which the exit to the national and regional roads towards the Wind Farm Site is accessible.

In assessing the most suitable route for turbine transport, two options were considered for the turn from the R390 Regional Road south onto to the L5363 Local Road:

- Option 1: On approach from west, provision of a temporary road to take the turn before reaching the existing R390/L5363 junction via private lands
- Option 2: On approach from west, provision of a temporary road to take the turn after the existing R390/L5363 junction via private lands

Option 2 is the preferred turning option. This turbine option would have a reduced footprint when compared to Option 1. Option 1 would also require the removal of mature treeline, whilst Option 2 does not require any removal of mature treeline.

This route has been proven suitable for the transport of turbine components, and the transport analysis (as presented in Section 14.1 of this EIAR), shows that only minor accommodation works will be required to accommodate the proposed turbines. The turbine transport route will utilise the national and primary roads available to ensure the road network holds the capacity to manage large loads.

Alternative Mitigation Measures

Mitigation by avoidance has been a key aspect of the Proposed Development's evolution through the selection and design process. Avoidance of the most ecologically sensitive areas of the site limits the potential for environmental effects. As noted above, the site layout aims to avoid any environmentally sensitive areas. Where loss of habitat occurs in the Site, this has been mitigated with the proposal of habitat enhancement and improved habitat connectivity with hedgerow replanting on the Wind Farm Site. Any forestry felled within the footprint of the Wind Farm Site will be replaced offsite, with no net loss. The alternative to this approach is to encroach on the environmentally sensitive areas of the Site and accept the potential environmental effects and risk associated with this.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the site and any identified environmental receptors. The alternative is to either not propose these measures or propose measures which are not best practice and effective and neither of these options is sustainable.

Description of the Proposed Development

The overall layout of the Proposed Development is shown on Figure 4-1, this includes the Wind Farm Site and Grid Connection. The Wind Farm Site layout is shown in Figure 4-2. The Grid Connection layout is shown in Figure 4-3. Detailed site layout drawings of the Proposed Development are included in Appendix 4-1 to this EIAR.

This section of the Environmental Impact Assessment Report (EIAR) describes the Proposed Development and all its component parts. Consultation with An Bord Pleanála confirmed that the Proposed Development will be subject to a dual consenting process, with development relating to the Grid Connection subject to a separate planning application under Section 182A of the Planning and Development Act, 2000, as amended. The current planning application, relating to the Wind Farm Site, is being made to An Bord Pleanála under Section 37E of the Planning and Development Act, 2000, as amended. Further detail in relation to the dual consenting process is provided in Chapter 1 of this EIAR.

The development description for the current planning application as appears in the public notices is as follows:

The Proposed Development will consist of the provision of the following:

- i. 9 No. wind turbines with an overall ground-to-blade tip height of 185 metres; a rotor blade diameter of 162 metres; and hub height of 104 metres, and associated foundations and hard-standing areas;*
- ii. A thirty-year operational life from the date of full commissioning of the wind farm and subsequent decommissioning;*
- iii. A meteorological mast with a height of 30 metres, and associated foundation and hard-standing area;*
- iv. Junction accommodation works and temporary access roads to facilitate turbine delivery to an existing entrance on L5363.*
- v. Upgrade of existing entrance on L5363 for provision of site entrance;*
- vi. Upgrade of existing tracks/ roads and provision of new site access roads, junctions and hardstand areas;*
- vii. Underground electrical (33kV) and communications cabling;*
- viii. A temporary construction compound;*
- ix. Spoil Management;*
- x. Site Drainage;*
- xi. Tree Felling;*
- xii. Operational stage site signage; and*
- xiii. All ancillary works and apparatus.*

The application is seeking a ten-year planning permission.

The Grid Connection, which will be subject to a separate planning application, includes for a 110kV on-site substation compound (2 no. control buildings with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, waste water holding tank, site drainage and all ancillary works), a temporary construction compound and approximately 31km of underground 110kV electrical cabling connecting the proposed on-site substation to the existing Thornsberry 110kV substation, near Tullamore, Co. Offaly.

All elements of the Proposed Development, i.e. the Wind Farm Site and Grid Connection, have been assessed as part of this EIAR.

The proposed wind turbine layout has been optimised using wind farm design software (WindPro) to maximise the energy yield from the Wind Farm Site, while maintaining sufficient distances between the

proposed turbines to ensure turbulence and wake effects do not compromise turbine performance. The Grid Reference coordinates of the proposed turbine locations are listed in Table 4-1 below.

Table 1-1 Proposed Wind Turbine Locations and Elevations

| Turbine | ITM Coordinates | | Top of Foundation Elevation (m OD) |
|---------|-----------------|----------|------------------------------------|
| | Easting | Northing | |
| T1 | 619119 | 747703 | 56m |
| T2 | 619001 | 747158 | 56m |
| T3 | 618946 | 746605 | 56m |
| T4 | 618737 | 746080 | 56m |
| T5 | 619623 | 745904 | 58m |
| T6 | 620224 | 745898 | 60m |
| T7 | 620874 | 745730 | 58m |
| T8 | 620067 | 745325 | 69m |
| T9 | 620500 | 745103 | 70m |

The turbine model to be installed on the Wind Farm Site will have an overall ground-to-blade tip height of 185 metres; blade rotor diameter of 162 metres and hub height of 104 metres. Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one from another. For the purposes of this EIAR, a rated output of 6.2 MW has been chosen to calculate the power output of the proposed 9-turbine renewable energy development, which would result in an estimated installed capacity of 55.8 MW.

The Wind Farm Site makes use of the existing road network insofar as possible. It is proposed to upgrade approximately 1.1 kilometres of existing site roads and tracks, and to construct approximately 7.4 kilometres of new access road on the Wind Farm Site. It is proposed to construct passing bays along the proposed access road network. A temporary construction compound measuring approximately 4,250 square metres in area will be located in the northern section of the Wind Farm Site, adjacent to the proposed new road junction at Turbine No. 1.

One metrological (met) mast is proposed as part of the Wind Farm Site. The met mast will be equipped with wind monitoring equipment at various heights.

Each turbine will be connected to the on-site electricity substation via underground 33 kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the onsite substation. The electricity and fibre-optic cabling connecting to the onsite substation compound will be run in cable ducts approximately 1.2 metres beneath ground level, along the sides of roadways or under the roadways..

It is proposed to construct an onsite 110 kV substation within the Wind Farm Site and to connect from here via a 110 kV underground electrical cable connection to the existing 110 kV Thornsberry

substation in near Tullamore, Co. Offaly. The underground electrical cabling route originates at the proposed onsite 110kV substation within the Wind Farm Site and before reaching the 110kV Thornsberry substation property and is illustrated in Figure 4-3. The underground electrical cabling route is approximately 31km in length and is located primarily within the public road corridor, with a short section of underground cabling (approximately 0.2km) within an agricultural field within the Wind Farm Site.

The proposed onsite 110kV substation is located within agricultural land and will be accessed via the internal Wind Farm Site proposed road network. The footprint of the proposed onsite 110kV substation compound measures approximately 11,100 square metres in area, and will include 2 no. control buildings and the electrical substation components necessary to consolidate the electrical energy generated by each wind turbine, and export that electricity from the onsite 110kV substation to the national grid. A temporary construction compound measuring approximately 3,150 square metres in area will be located in the southern section of the Wind Farm Site, located adjacent to the western boundary of proposed onsite substation.

As part of the Proposed Development, tree felling will be required within and around the Proposed Development footprint to allow for the construction of the turbine bases, access roads underground cabling, and the other ancillary infrastructure. Further details on tree felling required within and around Proposed Development footprint on the Wind Farm Site is detailed in Chapter 6 of this EIAR. A small section of the Wind Farm Site is located on commercial forestry, namely Turbine no. 4 and its associated infrastructure. A total of 6.4 hectares of commercial forestry will be permanently felled within and around Turbine No. 4 and its associated infrastructure, along with existing treeline boundaries as detailed in Chapter 6. The commercial forestry felling activities required as part of the Proposed Development will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments.

It is proposed to manage any excess overburden generated through construction activities locally within the Wind Farm Site, in identified spoil management areas, and in linear berms along access roads where appropriate.

It is proposed to access the Wind Farm Site via an existing agricultural site entrance off the L5363 local road to the west of the Wind Farm Site. This entrance will be widened to facilitate the delivery of the construction materials and turbine components. The Wind Farm Site entrance was subject to Autotrack assessment to identify the turning area required, as described in Section 14.1 of the Traffic and Transport Assessment.

In order to facilitate the construction of the Proposed Development, the majority of all rock and hardcore material that will be required during the construction will be sourced from local, appropriately authorised quarries.

It is estimated that the construction phase of the Proposed Development will take approximately 18-24 months from starting on Site to the commissioning of the electrical system. The construction phase can be broken down into three main phases, which overlap partially and will take approximately 18-24 months to complete 1) civil engineering works - 10 months, 2) electrical works including grid connection works - 9-12 months, and 3) turbine erection and commissioning - 8 months.

The Proposed Development is expected to have a lifespan of approximately 30 years. As part of the Wind Farm Site planning application, permission is being sought for a 30-year operation period commencing from the date of full operational commissioning of the Proposed Development. During the operational period, on a day-to-day basis the wind turbines will operate automatically, responding by means of meteorological equipment and control systems to changes in wind speed and direction.

The wind turbines proposed as part of the Wind Farm Site are expected to have a lifespan of approximately 30 years. Following the end of their useful life, the equipment may be replaced with a



new technology, subject to planning permission being obtained, or the Wind Farm Site may be decommissioned fully. The Grid Connection underground electrical cabling route and onsite substation will remain in place as it will be under the ownership and control of the ESB and EirGrid.

Population and Human Health

One of the principal concerns in the development process is that individuals or communities, should experience no significant diminution in their quality of life from the direct, indirect or cumulative effects arising from the construction, operation and decommissioning of a development. Ultimately, the impacts of a development have the potential to impinge on human health, directly and indirectly, positively and negatively. The key issues examined in this chapter of the EIAR include population, human health, encompassing employment and economic activity, land-use, residential amenity (noise, visuals, setbacks), community facilities and services, tourism, property values, shadow flicker and health and safety.

The Wind Farm Site is located approximately 2 kilometres southwest of Ballymore, Co. Westmeath, 6.6 kilometres to the north of Moate, Co Westmeath and 12.2 kilometres northeast of Athlone, Co. Westmeath. It is proposed to access the Wind Farm Site via an existing access track off the L5363 Local road to the northwest of the Wind Farm Site. The Wind Farm Site is served by a number of existing agricultural roads and tracks.

The Grid Connection includes a proposed onsite 110kV substation within the Wind Farm Site and underground 110kV cabling connecting to the existing Thornsberry 110kV substation in the townland of Derrynagall or Ballydaly, County Offaly. The underground electrical cabling route, measuring approximately 31 km in length, is primarily located within the public road corridor.

Current land-use on the Wind Farm Site comprises coniferous forestry, and agriculture. Current land-use along the Grid Connection comprises public road corridor, public open space, discontinuous urban fabric and agriculture. Land-use in the wider landscape of the Proposed Development site comprises a mix of agriculture, peat cutting, quarrying, low density residential and commercial forestry.

As stated above, up to 100 jobs could be created during the construction, operation and maintenance phases of the Proposed Development with most construction workers and materials sourced locally, thereby helping to sustain employment in the construction trade. This will have a Short-Term Significant Positive Impact.

There is currently no published credible scientific evidence to positively link wind turbines with adverse health effects. The main publications supporting the view that there is no evidence of any direct link between wind turbines and health are summarised in Chapter 5 of this EIAR. Although there have been no empirical studies carried out in Ireland on the effects of wind farms on property prices, it is a reasonable assumption based on the available international literature that the provision of a wind farm at the proposed location would not impact on the property values in the area.

Shadow flicker is an effect that occurs when rotating wind turbine blades cast shadows over a window in a nearby property. Shadow flicker may be experienced by an occupant sitting in an enclosed room when sunlight reaching the window is momentarily interrupted by a shadow of a wind turbine's blade. Shadow flicker effect lasts only for a short period of time and happens only in certain specific combined circumstances. Current guidelines recommend that shadow flicker at neighbouring dwellings within 10 x rotor diameter of a proposed turbine should not exceed a total of 30 hours per year or 30 minutes per day. It is further noted that at distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low, and therefore the shadow flicker study area is set at 1.62km (10 x rotor diameter of 162m). There are 115 no. dwellings located within the 1.62km Shadow Flicker Study Area of the Proposed Development turbines, with 113 of these being inhabitable dwellings and 2 being derelict properties.

The potential will occur at houses located within the area surrounding the Proposed Development was calculated using the WindFarm software package and a regional sun factor of 30.07% was applied. Of the 115 No. properties modelled; it is predicted that 70 properties may experience daily shadow flicker

levels in excess of the Guidelines threshold of 30 minutes per day. However, this prediction does not consider wind direction or screening provided by intervening vegetation and topography.

Where shadow flicker exceedances are experienced, suitable mitigation measures as outlined in Chapter 5 will be employed at the potentially affected properties to ensure that the Guidelines limits are not exceeded at any dwelling within the 1.62km Shadow Flicker Study Area. However, it should also be noted the Proposed Development can be brought in line with the requirements of the Draft Wind Energy Development Guidelines (December 2019) (referred to as the draft Guidelines), should they be adopted while this application is in the planning system, through the implementation of the mitigation measures outlined.

Impacts on human beings during the construction and operational phases of the Proposed Development are described in Chapter 5 in terms of health and safety, employment and investment, population, land-use, noise, dust, traffic, tourism, residential amenity, renewable energy production and reduction in greenhouse gas emissions, shadow flicker and interference with communication systems. Where a negative impact was identified, the appropriate mitigation measures will be put in place to ensure that there will be No Adverse Impacts on human health in the surrounding area.

Following consideration of the residual effects (post-mitigation), the Proposed Development will not result in any significant effects on population and human health. Provided that the Proposed Development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant effects on population and human health are not anticipated at international, national or county or local scale.

Biodiversity

This chapter assesses the likely significant effects (both alone and cumulatively with other projects) that the Proposed Development may have on Biodiversity, Flora and Fauna, and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified.

To inform the assessment, a comprehensive desk study and suite of field surveys has been carried out. Multidisciplinary walkover surveys were undertaken on the 29th July 2021, 4th August 2021, 17th February, 2022, 11th March 2022, 19th August 2022. Habitat surveys of the Proposed Development site covered the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). Dedicated species/habitat specific surveys including for, bats, and protected mammals and detailed habitat assessment surveys were carried out, during which any incidental records of other species were also recorded. In addition, macroinvertebrate surveys have been undertaken as part of the detailed baseline assessment, the detailed results of which are provided in technical appendices to this EIAR

The multi-disciplinary walkover surveys comprehensively covered the lands within the EIAR Site Boundary and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. These surveys were carried out in accordance with NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009).

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

The habitats on the Proposed Development site were the subject of a detailed survey and assessment and habitat mapping. This habitat mapping and assessment was undertaken following the '*A Guide to Habitats in Ireland*' (Fossitt, 2000). Grassland habitats have also been categorised to plant communities from the National Survey of Upland Habitats (Perrin *et al.* 2014) and the Irish Vegetation Classification.

Grasslands makes up a significant proportion of the habitats within the Proposed Development site. The Wind Farm Site comprises large areas of improved agricultural grassland (Fossitt code GA1). The areas of improved agricultural grassland have primarily been intensively managed for livestock grazing, and almost all fields surveyed have been reseeded with perennial ryegrass. A network of hedgerows (WL1), Treelines (WL2) and Drainage Ditches (FW4) occur throughout the Wind Farm Site and delineate the field boundaries.

The majority of the lands on either side of the road along the length of the Grid Connection underground electrical cabling route is made up of improved agricultural grassland, with associated Stonewalls and other stonework (BL1), hedgerow (WL1) Treelines (WL2), spoil and bare ground (ED2), associated buildings with depositing lowland rivers (FW2) and drainage ditches (FW4) crossing the underground electrical cabling route.

The construction of the Proposed Development will result in the direct loss of approximately 6.17 hectares of species-poor Improved agricultural grassland (GA1); this habitat has been assessed as being of low ecological importance and no specific mitigation is required for the loss of the proposed habitat (1.2%) of the total habitat of this nature within the Wind Farm Site.

Approximately 2,338m of hedgerow/scrub will be permanently removed within and around the footprint of the Proposed Development to facilitate some elements of infrastructure and new access roads. Removal of this combined length hedgerow/treeline is also required to achieve the required buffer distance for the protection of bats, from the turbines to the canopy of the nearest habitat feature, as recommended by the Natural England (2014) and NatureScot (2021). It is proposed to plant 3,350m of new hedgerow to offset this potential loss and to provide additional habitat connectivity within the

Wind Farm Site. Overall, the proposed replanting will result in a net gain of approximately 1,012m in the linear landscape features within the Wind Farm Site.

Bat species composition and abundance was found during detailed bat surveys undertaken at the Proposed Development site to be typical of the geographic location and the largely open nature of the Wind Farm Site, and the Wind Farm Site is utilised by a regularly occurring bat population of Local Importance. Following the implementation of mitigation no potential for residual significant effects with regard to loss of commuting and foraging habitat, loss or damage to roosts, displacement or other construction phase impacts have been identified; the proposed net gain in linear landscape features within the site will result in a long-term positive impact on bats at the local level. In relation to potential collision risk and injury with operational turbines, a bespoke adaptive monitoring and mitigation strategy has been devised for the Proposed Development in line with NatureScot (2021) Guidance, which will ensure that there is no potential for significant residual effects on local bat populations during the operational phase of the Proposed Development.

Watercourses within the Wind Farm Site and along the Grid Connection underground electrical cabling route provide suitable habitat for otter, and evidence of the species was recorded in the form of spraint and feeding remains at a single location within the Wind Farm Site along the Dungolman watercourse. No otter holts or other resting places were recorded during any of the ecological surveys. There is no potential for direct loss or fragmentation of significant otter habitat including loss of breeding or resting places. Given that no otter holts or resting places were recorded within the Proposed Development site, no direct mortality, significant disturbance or any barrier to the movement of otter is anticipated. From a precautionary perspective, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works. In the unlikely event that an otter holt is identified within or immediately adjacent to the Proposed Development footprint, consultation will be undertaken with the National Parks and Wildlife Service and any additional mitigation required would be implemented, under a derogation licence where required.

Two single entrance outlying, and one subsidiary, badger setts were recorded within the Wind Farm Site, as well as a pine marten den recorded as being used for breeding during 2020. The Proposed Development has been sited to avoid direct damage or disturbance to these features. Additional measures including a pre-construction survey and additional monitoring where necessary to identify all active setts and dens within proximity of the Proposed Development at the time of construction will allow for any additional mitigation required to be implemented to ensure that no undue disturbance to badgers or pine marten takes place during the construction phase.

No signs of any additional protected fauna were recorded within the Proposed Development site during the survey work undertaken.

No significant effects on surface water quality, groundwater quality or the hydrological/ hydrogeological regime were identified during construction, operation, or decommissioning. A full hydrological assessment in relation to the Proposed Development has been carried out in Chapter 9 of the EIAR.

In relation to designated sites, two nationally designated sites (Lough Ree pNHA and River Shannon Callows pNHA) have been identified as being within the zone of impact, on a precautionary basis. These nationally designated sites are also designated as European Sites (SACs) have been fully assessed under those designations within the Appropriate Assessment Screening Report and Natura Impact Statement (NIS) that accompany this EIAR. These reports have been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment screening and an Appropriate Assessment for the Proposed Development in compliance with Article 6(3) of the Habitats Directive. The NIS concludes that the Proposed Development, individually or in-combination with other plans or projects, will not adversely affect the integrity of any European Site.



It is therefore judged that, provided that the Proposed Development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant residual impacts on biodiversity, flora and fauna will not occur.

Birds

This chapter assesses the likely significant effects that the Proposed Development may have on bird species. Firstly, a brief description of the Proposed Development is provided. This is followed by a comprehensive description of the methodologies that were followed in order to obtain the information necessary to complete a thorough assessment of the potential effects of the Proposed Development on bird species. The survey data is presented in full in the Environmental Impact Assessment Report (ELAR) appendices with a summary of the information presented within this chapter. An analysis of the results is then provided, which discusses the ecological significance of the birds recorded within the study area. The potential effects of the Proposed Development are then described in terms of the construction, operation and decommissioning phases of the Proposed Development. An accurate prediction of the effects is derived following a thorough understanding of the nature of the Proposed Development along with a comprehensive knowledge of bird activity within the Wind Farm Site. The identification of Key Ornithological Receptors (KORs) and the assessment of effects follow a precautionary approach.

The potential for effects on designated sites is fully described in the Natura Impact Statement (NIS) that accompanies this application. The NIS concluded that where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation and decommissioning of the Proposed Development will not adversely affect the integrity of any European sites.

Based on the detailed assessment, it is considered that the potential effects of the Proposed Development upon birds will not be significant. Effects associated with habitat loss, disturbance/displacement, collision risk and cumulative effects have been assessed to be no greater than long-term slight negative effect (EPA, 2022) and low effect significance (Percival, 2003). In conclusion, no significant effects as a result of the Proposed Development are foreseen on KORs of the Wind Farm Site

Land, Soils and Geology

Wind Farm Site

The geology of the Wind Farm Site has been characterised using desk study and site investigation data. Several walkover inspections of the site have been conducted as well as 8 no. trial pits and 5 no. Particle Size Distribution (PSD) analyses of granular subsoils.

Excavation of mineral soil and subsoil will be required for the installation of foundations for the access roads, turbine hardstands and bases, for landscaping, and cable trenching within the Wind Farm Site, and for the Grid Connection temporary construction compound, onsite substation and underground electrical cabling route. Minor excavations will take place at junction improvement works. The handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent soil and subsoil erosion during excavation, reinstatement and long-term storage will be undertaken to prevent erosion and potential water quality impacts.

An assessment of the construction, operational and decommissioning phase of the Proposed Development has been completed, along with a cumulative assessment for each phase. Based on the above, and with implementation of the outlined mitigation measures, no significant effects on the land, soils and geology environment will occur.

Grid Connection

Peat probing works and a walkover survey were carried out along a 1km section of the Grid Connection underground cabling route where the desktop study identified an area mapped as containing peat type subsoils. Only one recorded observation of peat (0.2m section) was observed in a series of peat probes taken ~20m from the road carriageway.

Excavation of soil, subsoil and bedrock will be required for the formation of trenches to accommodate the underground electrical cabling connection route. Excavated material will be utilised where possible to re-instate any excavations, however, some of the Grid Connection underground electrical cabling route materials will go to an appropriate licenced facility as required. This is dependent on the road makeup at locations along the underground electrical cabling route and the distance from the underground electrical cabling route to the Wind Farm Site. Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent soil and subsoil erosion during excavation, reinstatement will be undertaken to prevent water quality impacts.

No significant effects on the land, soil and geology on the site of the Grid Connection will occur during construction, operation, or during decommissioning phases.

Our assessment confirms there will be no cumulative effects on land soil and geology environment as a result of the Proposed Development when considered in combination with other identified plans/projects.

Water

Wind Farm Site

The Wind Farm Site is located approximately 3.5km southwest of Ballymore village and 14km northwest of Athlone (distance from EIAR Site Boundary). The Wind Farm Site comprises mainly improved grassland and agricultural pastures separated by hedgerows. A small area of forestry exists in the southwest of the Wind Farm Site. The topography of the Wind Farm Site is undulating with the Wind Farm footprint layout being spread over a series of small hills that range in elevation from 55 to 98m OD (Ordnance Datum), with greatest elevation occurring in the northwest of the Wind Farm Site. The overall slope of the land is towards the east/northeast. The Dungolman River dissects the south of the Wind Farm Site before running along the eastern boundary.

On a regional scale, the Wind Farm Site is located in the Inny River surface water sub-catchment, which is in the Upper Shannon catchment within Hydrometric Area 26 of the Irish River Basin District (SIRBD). The Inny River flows to the northwest approximately 8.2km northwest of the Wind Farm Site. The Inny River discharges into Lough Ree approximately 10.6km northwest of the Wind Farm Site.

Due to the nature of wind farm developments, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the Proposed Development site would be from oil spillage and leakages at turbine foundations or during construction plant refueling. These are common potential impacts to all construction sites (such as road works and industrial sites). These potential contamination sources are to be carefully managed at the site during the construction and operational phases of the Proposed Development and measures are proposed within the EIAR to deal with these potential minor local impacts.

The Lough Ree SAC, SPA and pNHA (Site Code: 000440) is considered to be hydrologically connected to the Wind Farm Site, as the Dungolman river, which dissects the Wind Farm Site, discharges to the Inny River, which in turn discharges to Lough Ree. Following implementation of the appropriate mitigation measures as outlined in the EIAR there will be no impact on this designated from a hydrological perspective.

Two methods will be employed to control drainage water within the Wind Farm Site during construction, thereby protecting downstream surface water quality and aquatic habitats. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the Proposed Development site that might carry silt, to allow settlement and cleaning prior to its release. During the construction phase, all runoff will be treated to a high quality prior to being released. There will be no risk of increased flooding down-gradient of the site as a result of the Proposed Development due to these drainage measures. Effects on water quality during the construction phase of the Proposed Development will be imperceptible to none. A surface water monitoring programme will be put in place during the construction phase.

During each phase of the Proposed Development (construction, operation and decommissioning) a number of construction related activities will take place on the Wind Farm Site which will have the potential to affect the hydrological regime or water quality at the Wind Farm Site or its vicinity. These potential effects generally arise from sediment input from runoff and other pollutants such as hydrocarbons and cement-based compounds, with the former having the most potential for impact. These potential effects are similar to any construction site.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the Proposed Development design to prevent adverse effects on water quality and

downstream designated sites. There will be no direct discharges to any existing natural watercourse from the Proposed Development construction, operation or decommissioning works.

An assessment of the Wind Farm Site construction phase, operational phase and decommissioning phase has been completed, along with a cumulative assessment for each phase. Based on the above, and with implementation of the outlined mitigation measures, no significant effects on the surface water and groundwater environments will occur.

Grid Connection

The Grid Connection encompasses a 110kV on-site substation and associated temporary construction compound within the Wind Farm Site, including underground 110kV cabling to connect to the national grid at Thornsberry 110kV substation, in the townland of Derrynagall or Ballydaly, near Tullamore, Co. Offaly. The underground electrical cabling route is 31km in length. The Grid Connection onsite substation and temporary construction compound are located within the Wind Farm Site and as such, are discussed above.

The underground electrical cabling route passes along the public road, through the village of Horseleap and bypassing the town of Kilbeggan until its termination point at the Thornsberry 110 kV substation, 2km northeast of Tullamore. The underground electrical cabling route is located within public roads, with elevation ranging between 60-80mOD.

The Grid Connection underground electrical cabling route is located within the Upper Shannon catchment (26) and Lower Shannon catchment (25A) of the Irish River basin district. The Grid Connection underground electrical cabling route is located within the Inny (Shannon) SC_090, the Brosna_SC_030, Brosna_SC_020, Silver[Tullamore]_SC_010 and Tullamore_SC_010 subcatchments. Apart from the Inny (Shannon) SC_090 subcatchment, all the associated subcatchment rivers flow generally southwest towards the Lower Shannon catchment.

Surface water quality at watercourses along the underground electrical cabling route is generally good, with 5 of the 8 no. identified EPA monitored waterbodies achieving Good status. 2 no. further waterbodies achieved Moderate status, while 1 no. waterbody is unassigned. Surface water monitoring has been completed by HES at 7 no. locations along the underground electrical cabling route, which mirrors the generally good status of these surface waters.

Designated sites located near the underground electrical cabling route with a defined hydrological connection include the River Shannon Callows SAC and Middle Shannon Callows SPA, which are situated ~20 km southwest of the underground electrical cabling route. Based on the distances involved, the hydraulic gradients, the roadside verge which acts as a buffer zone and the proposed mitigation measures outlined in Chapter 9 of the EIAR, there will be no significant effects on designated sites in terms of the hydrological and hydrogeological environment.

An assessment of the Grid Connection construction phase, operational phase and decommissioning phase has been completed, along with a cumulative assessment for each phase. Based on the above, and with implementation of the outlined mitigation measures, no significant effects on the surface water and groundwater environments will occur.

Air and Climate

This chapter identifies, describes and assesses the potential significant direct and indirect effects on air-quality and climate arising from the construction, operation and decommissioning of the Proposed Development.

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Clean Air for Europe (CAFE) Directive (as amended) and the Fourth Daughter Directive. The site of the Proposed Development lies within Zone D, which represents rural areas located away from large population centres.

Due to the non-industrial nature of the Proposed Development and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this EIAR.

The production of energy from wind turbines has no direct emissions as is expected from fossil fuel-based power stations. Harnessing more energy by means of wind farms will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some minor short term or temporary indirect emissions associated with the construction of the wind farm include vehicular and dust emissions.

A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-2 of the EIAR) and includes dust suppression measures. In addition, turbines and construction materials will be transported to the site on specified transport routes only. The agreed transport route roads adjacent to the Proposed Development site will be regularly inspected for cleanliness and cleaned as necessary.

Climate Change and Carbon Balance Calculations

Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of greenhouse gases in the atmosphere. These greenhouse gases come primarily from the combustion of fossil fuels in energy use. Changing climate patterns are linked to increased frequency of extreme weather conditions such as storms, floods and droughts. In addition, warmer weather trends can place pressure on animals and plants that cannot adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

In June 2022, the Environment Protection Agency released 'Ireland's Greenhouse Gas Emissions Projections 2020-2040'. The EPA projections show that currently implemented measures (With Existing Measures) will achieve a reduction of 5% on 2005 levels by 2030, significantly short of the 30% reduction target. If measures in the higher ambition (With Additional Measures) scenario are implemented, the 30% reduction target by 2030 can be achieved. In the With Additional Measures scenario, it is assumed that by 2030 renewable energy generation increases to approximately 80% of electricity consumption. However, increased coal use from 2021 and growing energy demand, including from data centres, threaten to negatively impact preferred scenario.

The Proposed Development will have an export capacity of approximately 55.8MW and therefore will help contribute towards this target. As well as this, it will provide much needed grid infrastructure and the capacity to offset 1,785,090 tonnes of carbon dioxide over its operational lifetime thereby reducing

the Greenhouse Gas effect and improving air quality as we transition to cleaner energy industries. Please see Section 10.2.4 for details on Carbon offset calculations.

A methodology for calculation carbon losses was published in June 2008 by scientists at the University of Aberdeen and the Macauley Institute with support from the Rural and Environment Research and Analysis Directorate of the Scottish Government, Science Policy and Co-ordination Division. This methodology was refined and updated in 2011 based on feedback from users of the initial methodology and further research in the area. The web-based version of the carbon calculator, which supersedes the excel based versions of the tool, was released in 2016. The tool provides a transparent and easy to follow method for estimating the impacts of wind farms on the carbon dynamics of peatlands and was used to assess the effects of the proposed wind farm in terms of potential carbon losses and savings taking into account peat removal, drainage and operation of wind farm. The model calculates the total carbon emissions associated with the proposed wind farm development including manufacturing of the turbine technology, transport, construction of the development and carbon losses due to peatland disturbance. The model also calculates the carbon savings associated with the proposed wind farm development. Previously guidance produced by Scottish Natural Heritage in 2003 had been widely employed to determine carbon payback in the absence of any more detailed methods.

Given the absence of peat underlying the Wind Farm Site, the Proposed Development will not give rise to any impact on peat habitat. The Macauley Institute methodology states that the total volume of peat impacted by the construction of a wind farm is strongly correlated to the extent of the peatland affected by drainage at a site. Therefore, in calculating the carbon loss/saving of the Proposed Development, all potential carbon losses associated with constructing a wind farm on peatland environments were discounted, but the carbon losses as a result of the manufacture, transportation and erection of the proposed turbines was included in the calculation, including as a result of the removal of vegetation.

Construction of the Proposed Development will have a Short-Term, Imperceptible Negative Effect as a result of greenhouse gas emissions from construction plant and vehicles. Operation of the Proposed Development will have a Direct Long-Term Moderate Positive Effect on climate as a result of reduced greenhouse gas emissions.

Noise and Vibration

A noise assessment was undertaken to determine the likely significant noise effects from the construction, operation and decommissioning phases of the Proposed Development.

Predicted construction noise levels at the nearest noise sensitive receptors during all phases of construction are below the threshold values within BS 5228 and are therefore deemed to be not significant.

A background noise survey was undertaken at six noise monitoring locations. The data was analysed in conjunction with on-site measured wind speed data and operational noise limits have been derived in accordance with the current '*Wind Energy Development Guidelines for Planning Authorities 2006*' (referred to as the Guidelines).

Predictions of wind turbine noise from the Proposed Development have been made in accordance with good practice using a 6.2 MW candidate wind turbine with serrated trailing edge blades, a 162 m rotor diameter and a hub height of 104 m. Predicted operational noise levels from the Proposed Development indicate that for noise sensitive receptors neighbouring the Proposed Development, wind turbine noise from the Proposed Development will meet the Guidelines Noise Limits at all assessed Noise Sensitive Receptors and are therefore deemed to be not significant.

The wind turbine model was chosen in order to allow a representative assessment of the noise impacts. Should the Proposed Development receive consent, the final choice of wind turbine will be subject to a competitive tendering process. The final choice of wind turbine will, however, have to meet the planning permission noise Condition, should the project be consented.

Landscape and Visual

The Landscape and Visual Chapter assesses the likely significant landscape and visual impacts arising as a result of the Proposed Development. Although all elements of the Proposed Development are assessed, the Chapter focusses upon the proposed turbines, as they are deemed to be the essential aspects of the proposal under assessment from a landscape and visual perspective. The Landscape and Visual Chapter describes the baseline landscape and assesses the direct effects on the landscape of the Wind Farm Site, as well as effects on landscape character and the impact on sensitive landscape receptors and Landscape Character Areas (LCAs). Visibility of the proposed turbines was assessed from receptors within a study area (termed the LVIA Study Area) extending 25km from the proposed turbines; and visual effects were determined from information gathered during multiple site visits as well as other tools such as ZTV mapping and photomontages.

The Wind Farm Site is located in a lowland landscape comprising undulating agricultural land. The immediate setting of the Wind Farm Site is a sparsely populated, working landscape, set back from large settlements and population centres. The proposed infrastructure of the Wind Farm Site was strategically sited in a small river valley where the landform characteristics limit visual exposure in the generally flat lowland landscape of the wider LVIA Study Area. Selection of the Wind Farm Site considered landscape and visual designations in the previous and recently adopted Westmeath County Development Plan(s). The proposed turbines are sited within Westmeath Landscape Character Area 7 (Western Lowlands), this LCA is deemed to be 'Low' sensitivity as there are no designated Co. Westmeath High Amenity Areas located within this LCA and does not comprise any unique landscape features of county or national interest. The landscape of this LCA was previously designated as 'Medium' capacity for wind energy within the Draft Westmeath County Development Plan 2021-2027 and in the previous 2014-2020 Westmeath County Development Plan. LCA 7 has historically been the only LCA with any designated capacity for Wind Energy in Co. Westmeath. In the final 2021-2027 Westmeath County Development Plan the area was designated as an area with 'Low' capacity for wind energy, as are all other LCAs in Co. Westmeath. In terms of location, spatial extent, spacing and layout, the siting and design of the Proposed Development adheres to the guidance for the siting of wind farms in Hilly and Flat Farmland Landscape Types, as set out in the '*Wind Energy Development Guidelines for Planning Authorities 2006*' (referred to as the Guidelines).

On-site visibility appraisals, ZTV mapping, a Route Screening Analysis and assessment of over 40 no. viewpoint locations (16 No. in the EIAR Volume 2: Photomontage Booklet and 25 No. in Appendix 12-5) determined that visibility of the proposed turbines will be very limited from locations beyond 5 km from the Wind Farm Site. Siting of the proposed turbines at low base elevation in a small valley bound by localised landform ridgelines largely restricts visual exposure in the wider landscape, which is generally - very flat. Visibility of the proposed turbines beyond the immediate landscape setting of the Wind Farm Site is limited to localised areas of high elevation where open views across the flat and highly vegetated landscape are available from elevated vantage points, which is in general not a common occurrence in the 25km LVIA Study Area.

The landscape value of the Wind Farm Site is deemed to be of 'Low' value and the sensitivity of this landscape to wind farm development is deemed to be 'Low'. The introduction of vertical man-made structures and ancillary infrastructure will substantially alter the landscape comprising the proposed infrastructure footprint at the Wind Farm Site. The proposed turbines amount to direct long-term 'Moderate' landscape effects upon the physical fabric of the landscape of the Wind Farm Site itself. In terms of effects on Landscape Character, the sensitivity of this landscape, located within Westmeath LCA 7 – Western Lowlands, to this form of development was deemed to be Low. The proposed turbines and other infrastructure will cause a 'Moderate' magnitude of change to result in a 'Slight' residual effect to the LCA. This is the only LCA that will experience direct effects on landscape character as a result of the proposed turbines, direct effects on the LCA will be very localised.

All other LCAs within 15km of the Wind Farm Site were comprehensively assessed in Appendix 12-2. Effects on landscape character from these LCAs only relate to impacts on perceptual and aesthetic

qualities. The proposed turbines will not materially alter these landscape receptors and likely effects upon landscape character were not deemed to be significant. Residual effects on landscape character were deemed to be ‘Slight’ from four other LCAs, and ‘Moderate’ from the Hill of Uisneach LCA, where turbines are only visible at distance. The proposed turbines are only likely to be visible from within other LCAs from elevated vantage points.

The Hill of Uisneach was identified as a highly sensitive landscape and visual receptor assessed in the Landscape and Visual Chapter on account of protections in local planning policy and its national cultural heritage value. The nearest proposed turbine is located approximately 8.8 km from the peak of the Hill of Uisneach and 7.7 km from the LCA boundary. There will be no direct effects on the landscape of the Hill of Uisneach and there is a substantial physical buffer between the Hill of Uisneach and the Wind Farm Site. Assessments determined there will be a ‘Moderate’ residual effect on the landscape character of the hill and the Hill of Uisneach LCA. Residual visual effects on the designated scenic views will be ‘Moderate’. The archaeological complex at Clonmacnoise was also identified as a highly sensitive landscape receptor. Assessments determined that No Significant landscape or visual effects will occur from Clonmacnoise.

Photomontages were used to assess the visual effects arising as a result of the Proposed Development from 15 No. viewpoint locations and 1 No. Rendered Wireline from the Hill of Uisneach – Viewpoint 16. The assessment concluded that no ‘Profound’, ‘Very Significant’ or ‘Significant’ effects occurred at any of the 16 viewpoints. Residual effects of ‘Moderate’ occurred at six of the 16 No. viewpoints. All other viewpoints were assessed as resulting in ‘Slight’ residual effects (6) or ‘Not Significant’ (4).

Considering the limited visibility of the proposed turbines from distant receptors, the assessment of visual effects focussed on locally sensitive residential receptors and rural settlement clusters which will have views of the proposed turbines. A large number of viewpoints (9 of the 16) were captured within 3.5km of the Wind Farm Site, four of the nine recorded ‘Moderate’ residual visual effects within close proximity (3.5km) to the Wind Farm Site where most visibility and substantial change is likely to occur. VP07, VP09, VP10 and VP12 photomontage viewpoints are located within 1.5 km of the proposed turbines and were all taken from local roads in townlands adjoining the Wind Farm Site. These viewpoints were specifically selected to assess the visual effects on residential amenity and receptors of local community importance in close proximity to the Wind Farm Site.

Knockastia is a hill approximately 4.3km southeast of the proposed turbines and is a designated protected view in the Westmeath County Development Plan. Residual visual effects were deemed to be ‘Moderate’ from Viewpoint 06, which was captured from the peak of Knockastia. Residual visual effects were deemed to be ‘Slight’ from a location on the R390 Regional Road representing County Westmeath Protected View 28 as represented by photomontage Viewpoint 03. Visual effects were also assessed from designated scenic amenity and highly sensitive receptors in Counties Westmeath, Longford and Offaly. Other sensitivity receptors (Clonmacnoise, Lough Ree and the Royal Canal), were assessed separately above and in such instances, visual effects are significantly mitigated by distance and screening.

The assessments determined that no cumulative landscape and visual effects will occur with any other existing or permitted wind farm developments. There is a likelihood that the Proposed Development turbines may potentially be seen in combination or in succession with turbines of the proposed Kepak turbine or the proposed Lemanaghan and proposed Derryadd Wind Farms in a future scenario. However, this is only likely to occur from very few isolated areas in the LVIA Study Area and due primarily to substantial separation distances no significant cumulative landscape and visual effects are likely to occur.

The Proposed Development is suitably sited and scaled within the landscape. Considering the limited visual exposure of the proposed turbines and relatively limited number of sensitive landscape and visual receptors impacted within the LVIA Study Area, the Proposed Development is deemed to be acceptable from a landscape and visual perspective.

Archaeology and Cultural Heritage

The Archaeological and Cultural Heritage assessment was prepared by Tobar Archaeological Services. It presents the results of an archaeological, architectural and cultural heritage impact assessment of the Proposed Development.

Direct Effects

UNESCO sites

The Hill of Uisneach and Clonmacnoise are listed on the tentative list (2010) as part of the Royal Sites of Ireland. As they are located away from the Wind Farm Site, no direct effects will occur.

National Monuments in State Care

Three National Monuments in State Care are located within 10km from the nearest proposed turbines. As they are located away from the Wind Farm Site, no direct effects will occur.

Recorded Monuments

Four recorded monuments are located within the Wind Farm Site. Groundworks at the construction stage has the potential to directly impact the monuments thereby having a direct negative and permanent effect. The monuments are located an adequate distance from the proposed groundworks, however. Exclusion zones will be established around each monument in order to ensure their protection during the construction phase. This mitigation measure will remove the potential negative effect and include the following:

- 30m buffer zones will be maintained around the monuments the details of which appear in the CEMP.
- No ground works or storage of materials or tracking of machinery will take place within the buffer zones

A total of two hundred and twenty two (222) archaeological monuments are located within 5km of the nearest proposed turbine. Since they are located at a remove from the Wind Farm Site, no direct effects will occur.

All recorded monuments located within 100m either side of the underground electrical cabling route were assessed. Eleven monuments are located along the underground electrical cabling route. The measurements are based on the distance between the outermost element of the monument (identifiable from either aerial imagery or historic mapping) and the underground electrical cabling route. No monuments will be directly impacted by underground electrical cabling route as they are located off the public road. There are a number of instances where the underground electrical cabling route intersects the ZAP for some monuments and therefore mitigation measures will be implemented during construction works in order to avoid any negative effects arising during construction. Mitigation measured are as follows:

- Archaeological Monitoring will be carried out along the relevant sections of the Grid Connection cabling route where the route traverses through the Zone of Archaeological Potential (ZAP)
- A report on the monitoring should be compiled on completion of the work and submitted to the relevant authorities.
- Further mitigation such as preservation in situ (avoidance), preservation by record (excavation) may be required depending on the results of the monitoring.

Local Cultural Heritage

In terms of local cultural heritage assets, Umma House and associated outbuildings are located 295m west of the proposed turbine T8. The house is derelict and has been modernised with a slate roof and boarded windows. The setting of the structures will change but since the structure is not subject to statutory protection by way of inclusion in the Record of Protected Structures, it is not considered to be of high architectural value but of local cultural heritage merit. Impacts on setting will arise but are considered to be Not Significant.

Sub-surface Archaeology

Due to the nature and size of the Proposed Development in terms of excavation works the potential exists that sub-surface archaeological sites or features, if present, may be directly impacted by construction phase activities such as topsoil removal and other excavation works. This potential impact is likely to be significant, negative and permanent. The impact can be minimised if not removed altogether by the following mitigation measures detailed in Chapter 13.

Protected Structures

No Protected Structures subject to statutory protection are located within the Wind Farm Site, therefore no direct impacts to this resource are identified.

No Protected Structures within 5km will be directly impacted since they are located away from the site. The nearest protected structure is RPS 023-001 a single-arched road bridge over the Dungolman River, built c.1855 on the southern Wind Farm Site boundary. No direct impacts to this bridge or any other RPS structure will occur therefore.

Twelve RPS structures are located within 100m of either side of the underground electrical cabling route. The excavation of the trench for the underground electrical cabling route has the potential to impact directly on some structures. The majority, however, consist of houses and buildings and will not be directly impacted by cabling works. The impact can be minimised if not removed altogether by the following mitigation measures detailed in Chapter 13. Archaeological Monitoring will be carried out along the underground electrical cabling route adjacent to those structures.

Indirect Effects

UNESCO WORLD HERITAGE SITES (TENTATIVE LIST)

Visibility from the Hill of Uisneach

All turbines of the Proposed Development are likely to be visible from the top of the Hill of Uisneach where open views are permitted to the west. As shown by the Rendered Wireline as presented in Chapter 12, the proposed turbines appear as a linear array across the background of the view. At a distance of approximately 8.8km to the nearest proposed turbine, they are seen as small background features and comprise a small horizontal extent in the panoramic landscape view. This change is considered to be slight/moderate.

Visibility from Catstone

The Cat Stone is a National Monument as well as a feature of the landscape of the Hill of Uisneach and falls within an area of full theoretical visibility on the ZTV. Chapter 12, LVIA shows a Google Street View Image showing a view towards the Wind Farm Site from the Cat Stone. A scaled wireline image is shown below the Google Street View Image indicating the location, scale and form of the proposed turbines from the Cat Stone. The proposed turbines will be visible from this location but partially screened by the intervening ridgeline (and treeline upon the horizon) visible in the background of the image. This potential impact will be slight/moderate.

Clonmacnoise

The turbines (at the operational stage) have the capability to negatively impact on the setting of Clonmacnoise Archaeological complex. In this regard a number of tools were utilised to ascertain whether or not this is likely to occur. The assessment included the use of the ZTV and photowire visualisations in Chapter 12 LVIA. This assessment concluded that due to a number of factors, the overall impacts on setting would be negligible. These factors include the following:

- Clonmacnoise is located in a low-lying flat landscape therefore distant visibility from such a low-lying receptor is very limited at a distance of 23.5km.
- Many views towards the Wind Farm Site from within the site at Clonmacnoise are further limited by a line of evergreen trees enclosing the eastern graveyard as demonstrated by three photowire visualisations included in Appendix 12-5 (AltVP-L; AltVP-M; & AltVP-N).

A photowire was produced from Clonmacnoise and is presented in the LVIA in Chapter 12.

The photowire shows that if there are small areas of open visibility towards the Wind Farm Site, the proposed turbines would only just be discernible as small distant features and it would be very difficult to identify them within the long-ranging view. Considering the substantial set back distance, physical buffers in the intervening landscape and enclosed eastern boundary, the Proposed Development will cause an Imperceptible effect on the setting of Clonmacnoise. Although this is an asset of very high sensitivity, on balance, it is considered that no significant visual effects will occur from Clonmacnoise.

National Monuments in State Care

National Monument 223 Bealin Cross High Cross

The monument is just located in an area of the ZTV where one turbine may theoretically be visible. This is a theoretical precautionary scenario and in reality, localised screening will alleviate any potential impacts on setting. The photomontage shows no turbine visibility and therefore the potential impact is imperceptible.

National Monument 560 Dunnamona Motte

The monument is located in an area of the ZTV where eight turbines may theoretically be visible. This is a theoretical precautionary scenario as the model does not take natural screening and buildings into consideration which may in reality minimise and reduce any potential impacts on setting. The photomontage shows some limited visibility of some turbine blades and therefore the overall effect on setting is considered to be Not Significant.

Recorded Monuments within the Wind Farm Site

Four recorded monuments are located within the Wind Farm Site. The proposed turbines have the capacity to impact on the setting of the monuments, however, field assessment shows that the monuments are largely levelled leaving no substantial trace of their outlines. In this regard, since the monuments are barely discernible, the turbines are not capable of effecting the settings since the monuments have no above ground expression. There will be no negative effect on setting therefore.

Recorded Monuments, RPS structure and NIAH in the wider study area of 5km

The overall significance of effects will vary between Slight - Significant. In reality the effect will be less severe since the ZTV model does not take natural screening and buildings into consideration which will alleviate if not remove the impact on setting altogether.

Cumulative Effects

Cumulative effects are also dealt with in the assessment according to each project type and cultural heritage asset (i.e. UNESCO sites, National Monuments, Recorded Monuments etc). There are no instances where significant cumulative effects will occur however.

Material Assets

Roads, Traffic, Transport & Access

Introduction

An assessment of the traffic effects was undertaken for the Proposed Development. The assessment considers the likely impacts resulting from The Proposed Development during the construction, operational and decommissioning phases. The impact that the additional traffic generated by the Proposed Development is assessed on the transport delivery routes, together with a swept path analysis of the route based on the geometric requirements of the abnormally sized vehicles required to deliver the turbine plant to the Wind Farm Site.

Traffic Route & Study Area

The delivery route to the site for the abnormally sized loads required to transport the turbine components to the site (blades, towers and nacelles) commences at the Port of Galway followed by a route through Galway City including the Monivea Road, Connolly Avenue and Tuam Road. The route then turns right onto the N6 heading east out of the city to the M6 motorway before becoming the N6 national road in Athlone. The turbine delivery route then exits the N6 national road via the eastbound slip road off the N6 at Junction 10, turning left onto the N55. The delivery route then travels north-east on the N55 passing through the N55 / R916 Cornamaddy Roundabout. The turbine delivery route then turns right off the N55 before travelling north east on the R390. The site access junction is then situated off the east side of local L5363 approximately 1km to the south of the R390.

Vehicle types and network geometry

The types of vehicles that will be required to negotiate the local network will be up to 87.5 metres long and will carry a blade 81.0 metres in length. At one location where the geometry is constrained (the left turn off the M6 slip road onto the N55 in Athlone) it is proposed to transport the blade using a blade lifter system.

An assessment of the geometric requirements of the delivery vehicles was undertaken on the delivery route. Locations where it was established that the existing road geometry will not accommodate all of the vehicles associated with the Proposed Development are highlighted, with the extent of remedial works identified. In addition to the assessment presented, it is recommended that a dry run is undertaken by the transport company to check vertical and horizontal clearance on the transport route prior to construction.

Traffic impact on local network

In terms of daily traffic flows it is estimated that the impact of the development traffic on the delivery routes will be as follows:

- During the 9 days when the concrete foundations are poured the effect on the surrounding road network will be negative, resulting in an increase in traffic levels ranging from +1.4% on the N6 west of Athlone, to +5.0% on the N55 north of the R390, to 15.0% on the R390 leaving Athlone, to 29.5% on the R390 approaching the site. On the L5363 leading to the site, it is forecast that traffic flows will increase by 188% on these 9 days. This will have a temporary imperceptible negative effect on the M6, a temporary slight negative effect on the R390, and a temporary slight to moderate negative effect on the L5363.
- During 341 days for the remaining site preparation and ground works, and grid connection underground electrical cabling route construction, it is forecast that the increase in traffic volumes on these days will range from +0.5% on the N6 west of

- Athlone, to +1.8% on the N55 north of the R390, to +5.3% on the R390 leaving Athlone, to 10.4% on the R390 approaching the Wind Farm Site. On the L5363 leading to the site it is forecast that traffic flows will increase by 66%. This will have a temporary negative effect on the M6, and a temporary slight negative effect on the rest of the delivery route.
- With respect to the traffic volumes that will be generated during the construction of the underground electrical cabling route, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and made by a minibus to transport construction staff, to and from the site. By its nature the impacts of these additional trips on the network will be transient, and will therefore be temporary and slight.
 - During the 24 days when the various component parts of the wind turbine plant are delivered to the site using extended articulated HGVs, the effect of the additional traffic on these days will be slight to moderate along the turbine delivery route due to the size of vehicles involved, resulting in increased traffic volumes ranging from +0.2% on the N6 west of Athlone, to +0.7% on the N55 south of the R390, to 2.7% on the R390 exiting Athlone, to +5.3% on the R390 approaching the site. On the L5363 leading to the site it is forecast that traffic flows will increase by +34%. It is forecast that impacts on the route during this phase will reduce in severity to imperceptible to slight if the delivery of the abnormally sized loads is undertaken at night.
 - During the 9 days of the turbine construction stage when general materials are delivered to the site, the increase in traffic volumes on these days will range from +0.1% on the N6 west of Athlone, to +0.4% on the N55 south of the R390, to 1.7% on the R390 leaving Athlone, to 3.2% on the R390 approaching the Wind Farm Site. On the L5363 leading to the site it is forecast that traffic flows will increase by 21%. This will have a temporary imperceptible negative effect on the N6, and temporary slight negative effect on the rest of the delivery route.
 - Of all of the links assessed on the delivery route it was determined that the N55 between Athlone and the R390 junction is forecast to operate over link capacity (174%) by the year 2028 for the do-nothing scenario. It is forecast that during the construction of the Proposed Development, the greatest impact will occur during the 9 days when cement is delivered for the construction of the turbine foundations, when it is forecast to increase the level of capacity on the N55 to 181%. This will reduce to a 176% for the majority of the construction phase. While the assessment indicates that this section of the N55 will operate over capacity by the year 2028, the impacts of the construction traffic generated by the Proposed Development will be negative, slight and will be temporary.

It was determined that the junction between the N55 and R390 will operate within capacity for all days within the construction period.

Once the Proposed Development is operational the traffic impact created by maintenance staff will be negligible.

Telecommunications and Aviation

Wind turbines, like all large structures, have the potential to interfere with broadcast signals, by acting as a physical barrier or causing a degree of scattering to microwave links. The most significant effect at a domestic level relates to a possible flicker effect caused by the moving rotor, affecting, for example, radio signals. The most significant potential effect occurs where the wind farm is directly in line with the transmitter radio path.

The Proposed Development will have no significant effects on Telecommunications and Aviation once mitigation measures, outlined in Chapter 14 of this EIAR, are implemented. During the development of any large project that holds the potential to effect telecoms or aviation, the Developer is responsible for engaging with all relevant Telecoms Operators and the relevant Aviation Authorities to ensure that the proposal will not interfere with television or radio signals by acting as a physical barrier. In the event of

any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigatory measures are in place.

In summary, there will be no significant impact on telecommunications and aviation as a result of the Proposed Development.

Other Material Assets

This section of the Material Assets chapter considers other utilities or built services in the area such as electricity supply and transmission, water, gas and underground telecommunications. This section also considers waste management during the construction, operational and decommissioning phases of the Proposed Development.

There are no overhead electricity cables on the Wind Farm Site. There are overhead electricity lines crossing the public road corridor in which the Grid Connection underground electrical cabling route is proposed. However, no impacts on overhead electricity lines are likely to occur due to the nature of the underground cabling installation works.

There are no known existing underground electricity cables present on the Wind Farm Site. There are existing underground electricity cables present along the Grid Connection underground electricity cabling route, and in the vicinity of the Proposed Development site. The Grid Connection underground electrical cabling route will pass over the existing Dublin to Galway Gas line. There are no other known existing services (i.e. water supply, sewage, telecommunications) present on the Wind Farm Site. There are existing services (i.e. water supply, sewage, telecommunications) present along the Grid Connection underground electricity cabling route, and in the vicinity of the Proposed Development site. Damage of underground services during construction operations could potentially result in disruption to those local services, and a risk to health and safety of site staff.

A detailed survey of the entire Grid Connection underground electrical cabling route was prepared, picking up all identified existing services and utilities along the route and the proposed underground electrical cabling route has been designed to avoid these existing services and utilities. Prior to commencement of construction the survey of the route will be repeated and updated, to ensure any new services and utilities will not be impacted by the Proposed Development.

A Waste Management Plan (WMP) has been prepared and forms part of the Construction and Environmental Management Plan (CEMP) in Appendix 4-2 of the EIAR. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Development. Disposal of waste will be a last resort.

Interactions of the Foregoing

Chapter 15 of this EIAR identifying the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity, Birds, Land, Soils and Geology, Water, Air and Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage and Material Assets, as a result of the Proposed Development. All potential significant effects of the Proposed Development and the measures proposed to mitigate them have been outlined in the main EIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them or have a neutral effect. A matrix is presented in Chapter 15 of the EIAR to identify interactions between the various aspects of the environment already discussed in the EIAR. The matrix highlights the occurrence of potential positive or negative impacts during both the construction and operational phases of the Proposed Development. Where any potential interactive impacts have been identified, appropriate mitigation is included in the relevant sections (Chapters 5–14) of the EIAR.

Major Accidents and Natural Disasters

This section of the Environmental Impact Assessment Report (EIAR) describes the likely significant effects on the environment arising from the vulnerability of the Proposed Development as detailed in Chapter 4 to risks of major accidents and/or natural disasters.

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Development and consequently have potential impacts on the environment. These include accidents during construction and operation caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster considers all factors defined in the EIA Directive that have been considered in this EIAR, i.e., population and human health, biodiversity, land, soil, water, air and climate and material assets, cultural heritage and the landscape.

A desk-study has been completed to establish the baseline environment for which the proposed risk assessment is being carried out. This will influence both the likelihood and the impact of a major accident or natural disaster. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations.

Further detail on the baseline environment is provided in Section 15.3 of this EIAR,

The scenario with the highest risk score in terms of the occurrence of major accident and/or disaster was identified as 'Contamination' of the Proposed Development site and risk of 'Industrial Accident-Fire/Gas Explosion' during the construction, operation and decommissioning phases.

The Proposed Development has been designed and built in accordance with the best practice measures set out in this EIAR and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design.

The risk of a major accident and/or disaster during the construction of the Proposed Development is considered 'low' in accordance with the '*Guide to Risk Assessment in Major Emergency Management*' (DoEHLG, 2010).