NON-TECHNICAL SUMMARY

Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of Slieveacurry Ltd, who intends to apply to Clare County Council for planning permission to construct a renewable energy development and all associated infrastructure in the townland of Glendine North and adjacent townlands, in Co. Clare.

The townlands in which the Proposed Development is located are listed in Table 1.

Table 1 Townlands within which the Proposed Development is Located

Development Works	Townland
Wind turbines and access roads, Construction Compounds, Borrow pits & Underground cabling.	Glendine North, Fahanlunaghta More, Curraghodea, Letterkelly, Cloghaun More, Tooreen and Silverhill
Underground Cabling only	Doonsallagh East and Knockalassa
Substation Extension	Knockalassa

This EIAR complies with the EIA Directive 2011/92/EU as amended by Directive 2014/52/EU. The Environmental Impact Assessment (EIA) of the proposed project will be undertaken by Clare County Council, as the competent authority.

Applicant

The applicant for the Proposed Development, Slievacurry 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.

In Q3 of 2021, Enerco and its associated companies have over 640 Megawatts (MW) of wind generating capacity in commercial operation and have 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 up to 8 No. wind turbines and all associated works. The proposed turbines will have a maximum ground to blade tip height of up to 175 metres. The full description of the Proposed Development, is as follows:

i. *8 No. wind turbines with an overall ground-to-blade tip height in the range of 175 metres maximum to 173 metres minimum; a blade length in the range of 75 metres maximum to 66.5 metres minimum; and hub height in the range of 108.5 metres maximum to 100 metres minimum;*
ii. *A thirty-year operational life from the date of full commissioning of the development and subsequent decommissioning;*
iii. *A Meteorological Mast with a height of 30 metres;*

iv. *All associated underground electrical cabling (33kV) connecting the proposed turbines via Ring Main Unit (RMU) to the 110kV substation in the townland of Knockalassa;*
v. *Permanent extension to the 110kV substation at Knockalassa comprising extension to the existing substation compound, provision of a new control building with welfare facilities and all associated electrical plant and equipment for an additional 110kV bay and security fencing;*
vi. *Upgrade of access junctions;*
vii. *Upgrade of existing tracks/ roads and provision of new site access roads and hardstand areas;*
viii. *2 no. borrow pits;*
ix. *2 no. temporary construction compounds;*
x. *Site Drainage;*
xi. *Forestry Felling;*
xii. *Operational stage site signage; and*
xiii. *All associated site development ancillary works and apparatus.*

This application is seeking a ten-year permission.

The layout of the Proposed Development has been led by consideration of constraints and facilitators, thereby avoiding the environmentally sensitive parts of the site. The roads layout for the Proposed Development maximises the use of the existing onsite access roads and tracks where possible, with approximately 2.8 kilometres of existing roadway/ tracks requiring upgrading and approximately 3.8 kilometres of new access road to be constructed.

All elements of the Proposed Development, which includes forestry felling, as well as the associated replanting have been assessed as part of this EIAR.

Modern wind turbine generators typically have a generating capacity in the 3 to 5 MW range. For the purposes of this EIAR it is assumed that the wind turbine model installed as part of the proposed renewable energy development will have an output of 4.2MW. Therefore, based on 8 no. wind turbines, the proposed wind turbines will have a combined output of approximately 33.6MW.

Need for the Proposed Development

In March 2019, the Government announced a renewable electricity target of 70% by 2030. The Proposed Development is likely to be operational before 2030 and would therefore contribute to this 2030 target. More recently, the EPA reported that Ireland is set to fall far short of all of its carbon emissions reduction targets for 2030, despite climate action measures in the National Development Plan (EPA, June 2019). As such, the Proposed Development is critical to helping Ireland address these challenges as well as addressing the country's over-dependence on imported fossil fuels.

The Climate Action Plan 2019 (CAP) was published on the 1st of August 2019 by the Department of Communications, Climate Action and Environment (DoCCAE). The CAP sets out an ambitious course of action over the coming years to address the impacts which climate change may have on Ireland's environment, society, economic and natural resources. This Plan clearly recognises that Ireland must significantly step up its commitments to tackle climate disruption. The CAP identifies a need for 8.2GW of onshore wind generation. The CAP presents clear and unequivocal support for the provision of additional renewable energy generation and presents further policy support for increased wind energy. More recently, the Climate Action and Low Carbon Amendment Bill 2021 was passed into law in July 2021. The Bill, entitled an Act, will manage the implementation of a suite of policies to assist in achieving a 7% average yearly reduction in overall greenhouse gas emissions over the next decade. Further information relating to the Climate Action Plan can be found in Chapter 2, Section 2.2.3.

Section 2.2 in Chapter 2 of this EIAR on Background to the Proposed Development, presents a full description of the international, national and regional renewable energy policy context for the proposed

project. Section 2.2 also addresses climate change, including Ireland's current status with regard to meeting greenhouse gas emission reduction targets.

Economic Benefits

The Proposed Development will have several significant long-term and short-term benefits for the local economy including job creation, local authority commercial rate payments and a Community Benefit Scheme.

The annual commercial rate payments from the Proposed Development to Clare County Council, will be redirected to the provision of public services within Co. Clare. These services include items 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 project will create approximately up to 70 jobs during the construction, operational and maintenance phases of the Proposed Development. During construction, additional employment will be created in the region through the supply of services and materials to the development. In addition to this, there will also be income generated by local employment from the purchase of local services i.e. travel 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. Based on the current proposal, a Community Benefit Fund in the region of €3 million will be made available over the lifetime of the project. The value of this fund will be directly proportional to the level of installed MWs 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. Further details on the proposed Community Gain proposals are presented in Section 4.5 and Appendix 2-2 of this EIAR.

Purpose and Structure of this EIAR

The purpose of this EIAR is to document the current state of the environment in the vicinity of the Proposed Development site and to quantify the likely significant effects of the Proposed Development on the environment. This EIAR submitted by the applicant provides the relevant environmental information to enable the Environmental Impact Assessment (EIA) to be carried out by the competent authority, in this case Clare County Council.

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. *Consideration of Reasonable Alternatives*
4. *Description of the Proposed Development*
5. *Population and Human Health*
6. *Biodiversity*
7. *Ornithology*
8. *Land, Soils and Geology*
9. *Hydrology and Hydrogeology*
10. *Air and Climate*
11. *Noise and Vibration*
12. *Landscape and Visual*
13. *Archaeological and Cultural Heritage*

14. *Material Assets (including Traffic and Transport, Telecommunications and Aviation)*
15. *Interactions of the Foregoing*
16. *Schedule of Mitigation*

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

Background to the Proposed Development

This section of the EIAR presents policy information on Energy and Climate Change policy and targets, the strategic, regional, and local planning context for the Proposed Development, scoping and consultation, and the cumulative impact assessment process. A description of reasonable alternatives studied by the developer, relevant to the project including renewable energy technologies, turbine numbers, layout and design is included at Chapter 3 of this EIAR.

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 the provision of wind turbines which will generate renewable energy and provide it for use onto the national grid. Ireland's mandatory target under EU Directive 2009/28/EC is for renewable resources to account for 16% of total energy consumption by 2020. At national level, the targets within the Government's 2007 White Paper, Delivering a Sustainable Energy Future for Ireland: The Energy Policy Framework 2007 – 2020, set a target of 33% electricity from renewable sources by 2020, a target that was subsequently increased to 40%.

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 published by the Government in 2019 has clearly identified the need for and urgency of change, it states:

> *"The accelerating impact of greenhouse gas emissions on climate disruption must be arrested. The window of opportunity to act is fast closing, but Ireland is way off course.... The shift in climate is bringing profound shifts of desertification, rising sea levels, displaced population, profound challenges to the natural world, and economic and social disruption. We are close to a tipping point where these impacts will sharply worsen. Decarbonisation is now a must if the world is to contain the damage and build resilience in the face of such a profound challenge."*

Furthermore, the Programme for Government released in June 2020 also highlights the need for a clean and reliable supply of energy:

> *"Energy will play a central role in the creation of a strong and sustainable economy over the next decade. The reliable supply of safe, secure and clean energy is essential in order to deliver a phase-out of fossil fuels. We need to facilitate the increased electrification of heat and transport. This will create rapid growth in demand for electricity which must be planned and delivered in a cost-effective way."*

The primary driver behind the Proposed Development is the need to provide additional renewable energy to offset the use of fossil fuels within the electricity generating sector. Increasing electricity generation from wind power represents the most economical renewable option to reduce emissions within the power generation sector and is the most mature technology available to achieve national targets that have been established for decarbonisation.

Energy and Climate Change Targets

Relevant to the Proposed Development, Chapter 7 of the Climate Action Plan 2019 (CAP) details the Plan's views surrounding electricity generation. Within Ireland, electricity accounted for 19.3% of Ireland's greenhouse gases in 2017. The CAP places emphasis on the importance of decarbonising electricity *"by harnessing our significant renewable energy resources by doing this we will also become less dependent on imported fossil fuels*." In 2017, a total of 30.1% of electricity produced in Ireland came from renewable sources whilst the target to be achieved by 2020 is set at 40%. The CAP goes on to note that "*given our 40% target is based on a percentage of total energy demand, rising demand makes meeting our 2020 target even more challenging and latest forecasts indicate we may miss this target by 3 to 4 percentage points'*. Specifically, the rapid growth of electricity demand in the country is projected to increase by 50% above existing capacity in the next decade. The continued decarbonisation of the energy network remains an essential component of this strategy in the context of 2030 and 2050 targets. Section 7.2 of the CAP seeks an increase in electricity generated from renewable sources to 70%, with onshore wind delivering 8.2GW.

Achieving 70% renewable electricity by 2030 will involve increasing renewable electricity generation, reinforcing the existing grid network (including greater interconnection to allow electricity to flow between Ireland and other countries) and putting systems in place to manage intermittent sources of power, especially from wind. Ultimately, the measures needed to deliver the 2030 targets centre on the increased harnessing of renewable energy. As noted above the Climate Action Plan sets out the need to deliver up to 8.2GW total of onshore wind capacity. As of 2019, there was 4.1GW of installed wind capacity in Ireland; therefore, Ireland needs to more than double its installed capacity of wind generation. The addition of the Proposed Development to Ireland's deployable onshore wind farm fleet would result in a direct positive impacts on current output, and furthermore, the continued progression towards future targets.

The EPA's emission projections were in part collaborated by the Sustainable Energy Authority of Ireland (SEAI)'s Report on Energy-related CO2 Emissions in Ireland 2005 – 2018 (February 2020) which concludes with an overview of the outstanding challenges associated with the emerging CO2 trends and, relevant to the Proposed Development, a clear directive for further action:

> *"This report shows us once again the challenges we face in reducing our CO_2 emissions from energy use. CO_2 emissions from travel and heating our homes and businesses increased again in 2018. While emissions from electricity decreased, we have a hill to climb if we are to make meaningful inroads in the other sectors. The data in this report pre-dates the release of the Government's Climate Action Plan. The ambitious course of action plotted in that plan has the potential to turn these trends around."*

In July 2020 the Environmental Protection Agency (EPA) published Irelands' *Greenhouse Gas Emissions Projections 2019-2040*. The report provides an updated assessment of Ireland's total projected greenhouse gas emissions out to 2040 which includes an assessment of progress towards achieving its emission reduction targets out to 2020 and 2030 set under the EU Effort Sharing Decision and Effort Sharing Regulation.

In relation to decarbonisation of electricity generation, the Projections state:

> "*A 70% contribution of renewable energy in electricity generation by 2030 will be achieved by approximately tripling the 2018 renewable generation capacity, while phasing out coal and peat use. Increased renewables, and greater interconnection, are projected to result in energy industries emissions decreasing by over 34% by 2030 compared to the most recent figures in 2018."*

The Climate Change Advisory Council notes within their *2019 Annual Review* that while the share of renewable electricity generation, particularly wind, is increasing in Ireland, the pace of decarbonisation of the electricity generation sector is not compatible with a low-carbon transition to 2050. As such,

Ireland can continue to 'comply' with EU targets by purchasing emission allowances; however, the expenditure of public funds to do so would not result in any domestic benefit, and furthermore, would result in a more difficult and expensive challenge for the county to meet its future 2030 targets and beyond. The Review concludes that continued and additional investment in capacity and technologies in the renewable energy sector is required to reach these said targets.

Drawing on the 2030 Climate and Energy Framework and the CAP 2019, EirGrid's '*All Island Generation Capacity Statement 2021 – 2030' (*September 2021) states that the national power system will require unprecedented change over this decade, "*a fundamental transition for our electricity sector",* in order to accommodate at least 70% of electricity from renewable sources by 2030. The retiring of traditional fossil fuel plant (coal, peat and oil-fired generators), c. 1,650MW of generation over the next 5-years within Ireland, further emphasises the need for a deliberate and swift transition to a low-carbon power system based on renewable energy, natural gas and ancillary supporting infrastructure. With regard to wind energy, the *All Island Generation Capacity Statement 2021 – 2030* states that,

> *"It can be assumed that Ireland's renewable targets will be achieved largely through the deployment of additional wind powered generation."*

New onshore wind farms commissioned in Ireland in 2020 brought the total wind capacity to 4,300MW, contributing to the increase in overall RES percentage to 43.3%. This value is set to increase as Ireland endeavours to meet its 2030 renewable targets; specifically, the *All Island Generation Capacity Statement 2021 – 2030* estimates that onshore wind energy will increase by 1,000MW between 2020 and 2025. EirGrid have also released their *Strategy 2020-2025: Transform the Power System for Future Generations* which is driven by climate change and the need to transform the electricity sector. currently, the electricity grid can operate with up to 65% of renewable power but by 2030 this must increase to 95%.

The additional wind energy output from the Proposed Development will further assist Ireland's overall capability to meet its future targets.

Local Policy

The site of the Proposed Development is entirely within the administrative area of Clare County Council. As such the extant Clare County Development Plan 2017-2023 (as varied) is relevant.

Clare County Development Plan 2017-2023 (as varied)

In relation to energy, the Clare County Development Plan 2017 – 2023 ('CDP') recognises that an attractive environment for industry and therefore investment depends on the areas ability to deliver *"a competitive and uninterrupted energy supply."* A strategic plan-led approach has been employed in the CDP via the Clare Renewable Energy Strategy ('RES') in relation to renewable energy production. The Development Plan also includes a dedicated Wind Energy Strategy ('WES'). Both are presented in the context of what is a supportive overarching policy framework within the Development Plan.

The Plan is clear regarding the importance of wind energy in the Plan area. It states that the county "*has one of the best wind resources in the world – almost the entire county has either an excellent or very good wind energy resource*." It also recognises however that wind energy development must be balanced against potential impacts on landscape, ecology and amenities of local communities.

Volume 5 of the Development Plan contains the Clare Wind Energy Strategy ('WES'). The Strategy (CWES) divides County Clare into four areas with regard to their capacity to accommodate wind energy developments on the basis of the County Landscape Character Assessment. The proposed wind turbines are located in a '**Strategic Area'** and other infrastructure in an area 'Acceptable in Principle" for wind farm development.

Set out under WES Eight, **Strategic Areas** are considered to be eminently suitable for wind farm development and are classified as having strategic importance by the WES due to good / excellent wind resources, access to the national grid, distance from properties and are located outside any Natura 2000 sites. The target wind energy generation from Strategic Areas within the County is 400MW of the overall 550MW target. Notwithstanding the policy basis to site wind energy infrastructure within these areas, the WES states that the onus will be on applicants to demonstrate that Proposed Development will:

- Conform with existing and approved wind farms to avoid visual clutter;
- Be designed and developed in line with the Wind Energy Development Guidelines, Guidelines for Planning Authorities (DoEHLG, 2006) in terms of siting, layout and environmental studies;
- Provide a Habitats Directive Assessment under Article 6 of the Habitat Regulations if the site is located in close proximity to a Special Area of Conservation or Special Protection Area; and
- Be developed in a comprehensive manner avoiding the piecemeal development of the areas designated as 'strategic'.

WES Nine defines areas designated as '**Acceptable in Principle'** as having sufficient wind speeds, access to the national grid network and established patterns of inquiries on the development of wind energy infrastructure. Similar to 'Strategic' areas, projects sited in areas considered 'Acceptable' will also need to demonstrate that the Proposed Development will conform with existing infrastructure, avoid cumulative visual clutter, comply with Planning Guidelines with regard to siting, layout and environmental studies and provide a Habitats Directive Assessment, if required to do so. Target wind energy generation from 'Acceptable in Principle' areas is 150MW of the overall 550MW target.

The RES acknowledges that that Co. Clare has the natural resources needed to maximise energy generation by renewable means: geographical location on the Shannon Estuary and its Atlantic coastline, strong wind resource, undulating topography and a significant grid network. These attributes present opportunities for both on-shore and off-shore wind, wave and tidal energy, and pumped freshwater hydro energy storage. The RES notes that "*energy needs in County Clare are expected to rise by 2020...*" which is balanced against a recognition that "*the County has considerable capacity to produce energy from renewable and indigenous resources*". In this regard, **Policy RES 2.1** states that "*it is an objective of Clare County Council to meet the County's energy needs from 100% indigenous renewable energy sources.*"

The RES aims to, in conjunction with the Development Plan, *"position the County as the national leader in renewable energy generation, supporting energy efficiency and conservation, with an accessible modern telecommunications infrastructure, achieving balanced social and economic development and assisting Ireland's Green Energy target.*"

The RES notes that "*the County has considerable capacity to produce energy from renewable and indigenous resources.*" Policy RES 2.1 of the Strategy is that "*it is an objective of Clare County Council to meet the County's energy needs from 100% indigenous renewable energy sources.*"

The Proposed Development will directly assist in meeting the areas energy needs as noted in the Plan should it be consented.

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) have been taken into account during the preparation of this EIAR.

The '*Wind Energy Development Guidelines for Planning Authorities*' (DoEHLG, 2006) are currently the subject of a targeted review. The Department of Housing, Planning and Local Government published the *Draft Wind Energy Guidelines* (referred to as the Draft Revised Guidelines) in December

2019 and these Draft Guidelines were under public consultation until 19th February 2020. Following the previous 2013 consultation and subsequent detailed engagement between the relevant Government Departments, a "preferred draft approach" to inform and advance the conclusion of the review of the 2006 guidelines was announced in June 2017.

The EIAR is cognisant of the *Draft Revised Wind Energy Development Guidelines* and will address each key matter (e.g. noise and shadow flicker standards) in turn within the relevant sections of this EIAR. As demonstrated in the subsequent chapters, the Proposed Development will not result in any likely significant effects on the receiving environment. In relation to Shadow Flicker, the Proposed Development can satisfy any guidelines requirement as this is an operational matter that can be controlled by the SCADA system if necessary. In relation to noise , it is this section of the Draft Guidelines that has given rise to the most scrutiny from industry experts who have sought significant amendments and clarifications. While the outcome of the public engagement process on the Draft Revised Guidelines is not yet known, the operational noise parameters can be controlled using the SCADA system, and therefore, the Proposed Development will ultimately comply with future guidelines should they be adopted/finalised during the consideration period of the current application.

Planning History

The relevant planning history of the Proposed Development site, the planning applications in the vicinity of the site along with other wind energy applications within the wider area are set out at Section 2.4 of Chapter 2 Background to the Proposed Development, of this EIAR.

Scoping and Consultation

Scoping is the process of determining the content, depth and extent of topics to be covered in the environmental information to be submitted to a competent authority for projects that are subject to an Environmental Impact Assessment. This process is conducted by contacting the relevant authorities and Non-Governmental Organisations (NGOs) with interest in the specific aspects of the environment with the potential to be affected by the proposal. These organisations are invited to submit comments on the scope of the EIAR and the specific standards of information they require. Comprehensive and timely scoping helps ensure that the EIAR refers to all relevant aspects of the subject development and its potential effects on the environment and provides initial feedback in the early stages of the project, when alterations are still easily incorporated into the design. In this way scoping not only informs the content and scope of the EIAR, it also provides a feedback mechanism for the proposal design itself.

A scoping report, providing details of the application site and the subject underground cable route, was prepared by MKO and circulated in February 2020 to relevant parties. The scoping report issued provided information on the topics below and is included in this EIAR.

- Description of the Proposed Development Site, including Site Location and Access; Land-Use, Designated Areas and Landscape Policy;
- Planning Context;
- Site Selection;
- Description of the Proposed Development; and
- Scope of the EIAR and Natura Impact Assessment.

MKO requested the comments of the relevant personnel/bodies in their respective capacities as consultees with regards to the EIA process. Details of that scoping progress can be found at Section 2.5 of this EIAR.

Scoping responses received are set out in the EIAR at Section 2.5.1 of Chapter 2, Background to the Proposed Development. The recommendations of the consultees have informed the EIAR preparation process and contents of same.

In addition, Section 2.5..3 of Chatper 2 of the EIAR details the community engagement undertakne in relation to the Proposed Development. Section 2.5.5 of the Chapter sets out the pre-planning engagement undertaken with Clare County Council. This Section of the Chapter also sets out engagement with An Bord Pleanala in relation to the proposed extension ot the Slievecallan substation. As the proposed extension comprises 110kV infrastructure a determination was required from the Board under Section 182A of the Planning and Development Act, 2000, as amended, as to whether this element of the proposals constituted Strategic Infrastructure Development (SID).

Consideration of Reasonable Alternatives

This chapter of the EIAR includes a description of the reasonable alternatives studied by the developer which are relevant to the project and its specific characteristics and provides an indication of the main reasons for the option chosen, taking into account the environmental effects. The consideration of alternatives includes alternative design, technology, layout, 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, is also included.

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

The final proposed turbine layout takes account of all site constraints and the distances to be maintained between turbines and from houses, roads, etc. The layout is based on the results of all site investigations and baseline assessments that have been carried out during the EIAR process. As information regarding the site of the Proposed Development was compiled and assessed, the proposed layout has been revised and amended to take account of the physical constraints of the site and the requirement for buffer zones and other areas in which no turbines could be located.

It was decided at an early stage during the design of the Proposed Development that maximum possible use would be made of existing roadways and tracks where available to minimise the potential for impacts by using new roads. An alternative option to making maximum use of the existing road network within the site would be to construct a new road network, having no regard to existing roads or tracks. This approach was not favourable, as it would require unnecessary disturbance to the site and create the potential for additional environmental impacts to occur. It would also result in an unnecessary requirement for additional cut and fill material to be used in the construction of new roads.

There were several reviews of the specific locations of the various turbines during the optimisation of the site layout. The initial constraints study identified a significant viable area within the overall study area of the Proposed Development. The initial turbine layout comprised 11 no. turbines within a larger study area, however the proposed 8-turbine layout was refined following feedback from the project team, landowners, neighbours and the need to ensure sufficient separation distances are maintained for on-site constraints.

The use of a two temporary construction compounds as opposed to a single large compound will result in shorter distances for traffic movements within the site during construction. As a result, vehicle emissions and the potential for dust arising will be reduced.

The proposed underground cabling route was one of two underground cabling routes considered at the outset of the design process of the Proposed Development. The final underground cabling route takes account of all site constraints and design constraints. The route also takes account of the findings from the site investigations and baseline assessments that have been carried out during the EIAR process.

The proposed borrow pit locations were selected due to the presence of competent or usable rock at an acceptable level below existing surface level. An alternative to using onsite borrow pits was the option

of sourcing stone and hardcore materials from a licensed quarry in the vicinity. The movement of such material would result in a significant increase in construction traffic and heavy loads and was therefore considered the least preferable option.

The alternatives considered for the port of entry of wind turbines into Ireland for the Proposed Development include Port of Galway, Shannon Foynes Port, County Limerick 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.

Description of the Proposed Development

The overall layout of the Proposed Development is shown on Figure 4.1. This drawing shows the proposed locations of the wind turbines, electricity substation extension, borrow pits, construction compounds, internal roads layout and the main site entrance. Detailed site layout drawings of the Proposed Development are included in Appendix 4.1 to this EIAR.

Development Components

The turbine model to be installed on the site will have an overall ground-to-blade tip height in the range of 175 metres maximum to 173 metres minimum; blade length in the range of 75 metres maximum to 66.5 metres minimum and hub height in the range of 108.5 metres maximum to 100 metres minimum. 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. The wind turbines that will be installed on the site will be conventional three-blade turbines, that will be geared to ensure the rotors of all turbines rotate in the same direction at all times.

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. The turbine foundation transmits any load on the wind turbine into the ground. The maximum horizontal and vertical extent of the turbine foundation will be 25m (minimum of 20m) and 4m (minimum of 2.7m) respectively, which has been assessed in the EIAR. Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are typically used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position.

Site Roads

To provide access within the site of the Proposed Development and to connect the wind turbines and associated infrastructure, approximately 3.8 kilometres of new access roads will need to be constructed with approximately 2.8 kilometres of existing roadway/ tracks requiring upgrading.

Rock Extraction

It is proposed to develop 2 No. on-site borrow pits as part of the Proposed Development. It is proposed to obtain the majority of all rock and hardcore material that will be required during the construction of the Proposed Development from the on-site borrow pits. Usable rock may also be won from other infrastructure excavations.

Substation Extension

It is proposed to extend the existing Slievecallan 110kV substation to accommodate the connection of the Proposed Development. The works will consist of the construction of a new control building with welfare facilities, associated electrical plant and equipment and security fencing.

Site Underground Cabling

Each turbine will be connected to the national grid via an underground electricity cable. The electricity generated from the turbines will connect to the substation extension in underground cable ducts within an approximately 1.2 metres deep trench. The electricity generated by the proposed turbines will be combined at a Ring Main Unit (RMU) located adjacent to T6. The underground cabling will connect from the RMU to the substation located in the townland of Knockalassa, predominately following proposed and existing wind farm/ forestry roads measuring approximately 4.28km, with a short 0.94 km section over agricultural and forestry land, 0.28km along an access road and a 1.6 km section within the public road corridor (R460). The total length of cabling between RMU and the proposed substation extension measures approximately 7.1km.

Meteorological Mast

One meteorological mast is proposed as part of the renewable energy development. The meteorological mast will be equipped with wind monitoring equipment at various heights. The mast will be a slender free-standing structure up to 30 metres in height.

Temporary Construction Compounds

Two temporary construction compounds are proposed as part of the Proposed Development. The construction compounds will consist of temporary site offices, staff facilities and car-parking areas for staff and visitors.

Peat and Spoil Management Plan

It is estimated that approximately 110,500 m^3 of peat and spoil will be excavated during the construction of the Proposed Development. This peat and spoil will be managed by means of placement within the proposed borrow pits, used for landscaping or alongside designated access roads.

Tree Felling and Replanting

A total of 26.59 hectares of forestry will have to be permanently felled within and around the footprint of the Proposed Development. An additional 1.9 hectares of trees will be required to be temporarily felled around all turbines in order to facilitate infrastructure construction and for bat mitigation. It is not anticipated that turbulence felling will be required, however, for the purposes of assessment, an additional 30 hectares of temporarily felling is assumed. The actual requirement of turbulence felling will be determined by the turbine manufacturer. The area of forestry that will be permanently felled for the footprint of the turbines and the other infrastructure and turbine erection will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that might be issued in respect of the Proposed Development. In the case of the area to undergo temporary felling, there is a requirement for replanting on a hectare for hectare basis within the site plus an additional 10% offsite should the area to be temporary felled exceed 20ha. This can occur anywhere in the state subject to licence. Three forestry replacement sites have been identified for the purposes of assessment in this EIAR. These sites are located in Counties Longford, Mayo & Roscommon and all three have been granted technical approval for afforestation by the Forest Service.

Access and Transportation

It is proposed to access the site of the Proposed Development via an existing access track off the local road to the northwest of the site. The local road will be upgraded and the entrance will be widened to facilitate the delivery of the construction materials and turbine components. The proposed works will result in a permanent upgrade of this current site access from the local road, which will also form the northern entrance to the Proposed Development during the operational phase. An existing road to the southwest will also facilitate non-HGV operational access to the site.

It is proposed that large wind turbine components will be delivered to the site of the Proposed Development, from the selected Port, via the N85 National Secondary Road. From Ennis the turbines will be transported northwest along the N85 National Secondary Road to Inagh before turning left on to the R460 Regional Road and transported west for 4.2km to the junction with the L1074 Local Road. The turbines will be transported west/northwest for 4.2km before turning left onto a local road at Fahabeg. At Fahabeg, the turbines will be transported southwest for 2km after which the route will take a sharp left onto a local road approaching the Proposed Development site from the northwest.

Community Gain Proposal

The community benefit scheme proposes to provide a fund of €100,000 per annum over the lifespan of the Proposed Development based on the current estimated generating capacity. This will equate to potential funding of €3 million to the local community which is a substantial contribution. The number and size of grant allocations will be decided by a Community Fund liaison committee with various groups and project benefiting to varying degrees depending on their funding requirement.

Site Drainage

The protection of the watercourses within and surrounding the site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the Proposed Development. The Proposed Development's drainage design has therefore been proposed specifically with the intention of having no negative impact on the water quality of the site and its associated rivers and lakes, and consequently no impact on downstream catchments and ecological ecosystems. No routes of any natural drainage features will be altered as part of the Proposed Development and turbine locations and associated new roadways were originally selected to avoid natural watercourses, and existing roads are to be used wherever possible. There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Development.

Construction Phasing and Timing

It is estimated that the construction phase will take approximately 12 to 18 months from starting onsite to the full commissioning of the Proposed Development. The construction phase can be broken down into three main phases, 1) civil engineering works: 10 months, 2) electrical works: 6 months, and 3) turbine erection and commissioning: 8 months.

Operation

During the operational phase, each turbine will be subject to a routine maintenance programme involving a number of checks and changing of consumables, including oil changes. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. The electricity substation and site tracks will also require periodic maintenance.

Decommissioning

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 30 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Development may be decommissioned. The substation extension will remain in place as it will be under the ownership of the ESB Eirgrid and will form a permanent part of the national electricity grid.

Population and Human Health

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct, indirect or cumulative impacts arising from the construction and operation of a development. The key issues examined in this section of the EIAR relate to population and human health and incorporate population statistics, employment and economic activity, land-use, residential amenity (shadow flicker, noise, visuals and telecommunications), community facilities and services, tourism, property values, accidents/natural disasters, health and safety and other environmental hazards such as water contamination, air pollution, traffic and flooding.

The Proposed Development is located approximately 5 kilometres to the east of Miltown Malbay and approximately 7 kilometres to the south of Ennistimon Co. Clare. The majority of amenities and community facilities, including GAA and other sports clubs, youth clubs and recreational areas available in the area are located in the centres of settlement throughout the wider area. Retail and personal services within the vicinity are provided in the larger settlements such as Ennistimon and Ennis. There are no key identified tourist attractions pertaining specifically to the site of the Proposed Development itself.

The Study Area for the Population and Human Health assessment was defined by the 5 No. District Electoral Division (DED)s within and adjacent to the Proposed Development site. The population of the DEDs within the Study Area increased by 0.6% between 2011 and 2016, rising from 2,061 to 2,074 persons, respectively, with the rate of population change unevenly distributed between the DEDs. The highest level of employment within the Study Area was recorded in the Farmer category. The levels of employment within the Employer/Manager, Higher Professional, Non-Manual, Skilled Manual, Semi-skilled, Un-skilled, and Other categories in the Study Area were lower than those recorded for the State and County Clare, while those recorded within the Lower Professional, Own Account, and Farmer, categories were higher. The level of employment in the Agricultural Worker category were lower than those recorded for the State and the same as those recorded for County Clare.

As stated above, up to 70 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. The provision of underground electric cables is common practice throughout the country and installation to the required specification does not give rise to any specific health concerns. The extremely low frequency (ELF) electric and magnetic fields (EMF) associated with the operation of the proposed cables fully comply with the international guidelines for ELF-EMF set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a formal advisory agency to the World Health Organisation, as well as the EU guidelines for human exposure to EMF.

A wind farm is not a recognised source of pollution. Should a major accident or natural disaster occur the potential sources of pollution onsite during both the construction and operational phases are limited. Sources of pollution with the potential to cause significant environmental pollution and associated negative effects on health such as bulk storage of hydrocarbons or chemicals, storage of wastes etc. are limited.

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 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.

Shadow Flicker

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 500 metres of a proposed turbine location should not exceed a total of 30 hours per year or 30 minutes per day. The study area for the shadow flicker assessment is ten times rotor diameter from each turbine as set out in the DoEHLG guidelines, at distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low. There is a total of 67 No. properties including inhabitable dwellings and derelict properties, within a distance of 10 rotor diameters (assumed at 1,500 metres) from the proposed turbine locations.

The potential flicker that will occur at houses located within the area surrounding the Proposed Development was calculated using the WindFarm (ReSoft) software package and a regional sun factor of 29.4% was applied. Of the 67 No. properties modelled; it is predicted that 28 properties may theoretically experience daily shadow flicker levels in excess of the DoEHLG guideline threshold of 30 minutes per day. This prediction is assuming worst-case conditions (i.e. 100% sunshine on all days where the shadow of the turbines passes over a house, wind blowing in the correct direction, no screening present, etc.) and in the absence of any turbine control measures. Of these 28 No. properties: 23 No. properties are inhabitable dwellings (4 of which are participating properties); and 5 No. properties are derelict properties. Of the 67 no. properties modelled, when the regional sunshine average (i.e. the mean number of sunshine hours throughout the year) of 29.4% is taken into account, the DoEHLG guideline limit of 30 hours per year will be exceeded at 6 of the modelled properties, where 5 No. properties are inhabitable dwellings and 1 No. properties are derelict.

Where shadow flicker exceedances are predicted, suitable mitigation measures as outlined in Chapter 5 will be employed at the potentially affected properties to ensure that the current adopted 2006 DoEHLG guidelines are complied with at any dwelling within the 1.5km study area. The same mitigation strategies also demonstrate that the Proposed Development can be brought in line with the shadow flicker requirements of the Draft Revised Wind Energy Development Guidelines (2019) should they be adopted while this application is in the planning system.

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 prevent, reduce or offset any potential significant effects that are identified.

Multidisciplinary walkover surveys were undertaken on the 25th May, 16th June, 7th and 25th July, 14th August, 25th & 26th September, 6th and 23rd October 2017, 8th October 2018, 20th May, 13th June and 4th September 2019, and the 30th & 31st July 2020, 4th March 2021 and 30th September 2021. The majority of the survey timings fall within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith et al., 2011). A comprehensive walkover of the entire site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys including otter *(Lutra lutra),* badger *(Meles meles),* bats and marsh fritillary *(Euphydryas aurinia)*.

The habitats on the site of the Proposed Development were the subject of a detailed survey and assessment. This habitat mapping and assessment was undertaken following with 'A Guide to Habitats in Ireland' (Fossitt, 2000). The study area comprises of areas of plantation forestry (WD4), dominated mainly by Sitka spruce (*Picea sitchenis*) and Lodgepole pine (*Pinus contorta*), and areas of degraded peatland dominated by Cutover bog (PB4), Upland blanket bog (PB2) and Wet heath (HH3). The remainder of the Proposed Development infrastructure is dominated by Wet grassland (GS4) and Scrub (WS1).

Turbines 1, 2 and 4, the temporary construction compounds and borrow pit 1 are all located within Conifer plantation (WD4) habitat. Turbines 7 and 8 are partially located within conifer forestry habitat. The extent of the proposed infrastructure located on degraded peatlands within the EIAR study area boundary has therefore been kept to a minimum. The degraded peatland habitats on which the Proposed Development is located consists primarily of a mosaic of Cutover bog (PB4), Upland blanket bog (PB2) and Wet heath (HH3) mosaic. The areas of deep peat within the study area have been avoided in the design of the development and all areas that are within the construction footprint have been degraded through extensive grazing of sheep or cattle, drainage, peat cutting, forestry or scrub encroachment.

There will be some loss of degraded peatland habitat to the Proposed Development footprint. This is associated with associated with Turbines T3, T5 & T6, part of T7 & T8 and a proposed borrow pit to the south of T5 (borrow pit 2). There will be no significant habitat loss associated with the Proposed Development and a Biodiversity Management and Enhancement Plan has been prepared. Following the implementation of the measures outlined in this report, to offset the loss of degraded peatland habitat, there will be no residual net loss of peatland habitats on the site. In addition, the proposed forestry reinstatement to peatland has the potential to result in a long-term positive effect on 2.12 ha in peatland habitat overall.

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 impacts on ecology are not anticipated.

Ornithology

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 (EIAR) 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 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 study area. The identification of Key Ornithological Receptors 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 findings presented in the NIS are that the Proposed Development, by itself or in combination with other plans and projects, in light of best scientific knowledge in the field, will not adversely affect the integrity of the relevant European sites and no reasonable scientific doubt remains as to the absence of such effects.

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, 2017) and low effect significance (Percival, 2003).

The implementation of the prescribed mitigation measures will render any potential effects on avian receptors to low significance. In addition, it is proposed to create enhanced lands for the benefit of hen harrier. In conclusion, no significant effects as a result of the Proposed Development are foreseen on key ornithological receptors of the study area.

Land, Soils and Geology

This chapter assesses the likely significant effects that the Proposed Development may have on land, soils and geology and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified.

The geology of the Proposed Development site predominately comprises poorly draining soil or blanket peat overlying mineral subsoil which in turn is underlain by sandstone and siltstone bedrock.

Peat depths at the wind farm site ranged from 0 to 2.7m with an average of 0.6m. Over 95 percent of peat depth probes recorded peat depths of less than 2.0m. The peat depths recorded at the turbine locations varied from 0.2 to 2.1m with an average depth of 0.9m.

With respect to the existing and proposed access roads, peat thicknesses are typically less than 1.5m with localised depths of 2.5m.

The average peat depth across the cable route is 0.34m with most peat depths being 0.1m or less.

Construction of the wind farm site, underground cable route infrastructure and substation extension will require the removal of peat, soil and rock to competent foundation. Excavation of bedrock from 2 no. on-site borrow pits will provide material for access road, turbine bases and general hard-standing construction. Removal of soil, peat and bedrock represents a direct impact on the geology of the Proposed Development site which is considered to be an acceptable part of economic progression and development.

During the construction phase sources of contaminants (such as oil-based substances or other hazardous chemicals) will not be stored at the site except where this is done within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into soil, peat and bedrock. Refueling will be done with a double skinned bowser with spill kits on the ready in case of accidental spillages. The risk is considered to be low once mitigation measures are implemented. Drainage and erosion prevention measures will be put in place at all works locations.

The peat stability assessment undertaken at the site shows that the wind farm site and underground cable route have a low risk of slope failure or mass movements. Peat removed during the excavation

works will be deposited in the on-site borrow pits and also cast aside. This will reduce the requirement for stock piling and potential slope failure and erosion. The handling and management of peat will be undertaken in accordance with the Peat & Spoil Management Plan.

If the mitigation measures presented in the EIAR are put in place no significant residual impacts on the land, soils and geological environmental are anticipated.

The land and soils impact assessment undertaken in this EIAR outlines that significant effects are unlikely due to the direct, localized nature of the construction works. Therefore, no cumulative effects will occur with other local developments.

The proposed forestry replanting lands are located in counties Longford, Mayo & Roscommon and therefore will not contribute to potential cumulative impacts with the Proposed Development site in terms of impacts on land, soils and geology.

Hydrology and Hydrogeology

Hydro-Environmental Services (HES) was engaged by MKO to undertake an assessment of the potential direct, indirect and cumulative effects of the Proposed Development on water aspects (hydrology and hydrogeology) of the receiving environment.

Locally the Proposed Development site exits within four surface water sub-catchments. The north-western and southwestern sections of the wind farm site drain into the headwaters of the Glendine River and the Kildeema River respectively with both rivers entering the Atlantic Sea at the same point south of Spanish Point. The eastern section of the wind farm site drains into the headwaters of the Inagh River which enters the Atlantic Sea north of Lahinch. The substation upgrade works is located in the Annagh River catchment.

The underground cable route is located in the Kildeema River, Annagh River and Inagh River catchments.

The bedrock underlying the Proposed Development site is classified as locally important in terms well water yields. The bedrock has little or no open cracks which means groundwater movement within the aquifer is localised. Groundwater at the site can be classed as sensitive in terms of potential impacts from the Proposed Development. However, the majority of the bedrock is covered in peat which acts as a protective cover to groundwater quality. The low potential for pollutant travel within the bedrock groundwater makes surface water bodies such as streams more vulnerable to pollution than groundwater at this site. There will be no impact on private wells as a result of the development.

Ecologically protected sites downstream of the site include the Mid-Clare Coast SPA (Site Code 004182), Carrowmore Point to Spanish Point and Islands cSAC (Site Code 001021) and the Inagh River Estuary SAC. From a surface water quality perspective there will be no impact on these marine/estuarine designated sites.

Due to the nature of wind farm developments, being near surface construction activities, impacts on groundwater is generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site would be from hydrocarbon spillage and leakages at the borrow pits. 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 development and measures are proposed within the EIAR to deal with these potential minor impacts.

Two methods will be employed to control drainage water within the 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 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. A self-imposed 50m stream buffer was used during the layout of the proposed wind farm development site, thereby avoiding sensitive hydrological features where possible.

Other preventative measures also include fuel and concrete management and a waste management plan which will be incorporated into the overall Construction and Environmental Management Plan.

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. Impacts on water quality during the construction phase of the wind farm will be imperceptible to none. A surface water monitoring programme will be put in place during the construction phase.

During the operational phase drainage control measures will ensure that surface runoff from the developed areas of the site will continue to be of good quality and will therefore not impact on the quality of down-stream rivers and streams. The present drainage regime of the site will not be altered in any way. Impacts on water quality during the operational phase of the wind farm will be negligible to none.

In terms of potential cumulative hydrological impacts with other wind farm developments, the biggest risk is during the construction phase of the development as this is the phase when earthworks and excavations will be undertaken at the sites. However, no hydrological cumulative effects with respect other windfarm developments will occur due to the fact that majority of the other wind farm turbines are constructed and also due to the low turbine density within the two regional catchments.

The forestry replanting lands are located in counties Longford, Mayo & Roscommon and in a different water catchment and therefore will not contribute to potential cumulative impacts with the Proposed Development Site or underground cable route.

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 4-4 of the EIAR) and includes dust suppression measures. In addition, turbines and construction materials will be transported to the site on specified haul routes only. The agreed haul route roads adjacent to the 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 July 2020, the Environmental Protection Agency (EPA) published an update on Ireland's Greenhouse Gas Emission Projections to 2040. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2020, 2030 and 2040 set under the EU Effort Sharing Decision (Decision No 406/2009/EU) and Effort Sharing Regulation (Regulation (EU) 2018/842).

Projected greenhouse gas emissions up to 2040 are obtained using two scenarios; '*With Existing Measures'* and *'With Additional Measures'*. The '*With Existing Measures'* scenario assumes that no additional policies and measures, beyond those already in place by the end of 2017 are implemented. The *'With Additional Measures'* scenario assumes the implementation of the *'With Existing Measures'* scenario and further implementation of the governments renewable and energy efficiency policies including those set out in the National Renewable Energy Action Plan (NREA), the National Energy Efficiency Action Plan (NEEAP) and the National Development Plan 2018-2027.

The EPA Emission Projections Update notes that Ireland's non-Emissions Trading Scheme (ETS) emissions are projected to be 7% below 2005 levels in 2020 under the *'With Measures'* and *'With Additional Measures'* scenarios, respectively. The target for Ireland is a 20% reduction. Over the period 2013 – 2020, Ireland is projected to cumulatively exceed its compliance obligations by 12.2 Mt CO_2 (metric tonnes of Carbon Dioxide) equivalent under the *'With Existing Measures'* scenario and 12.6 Mt CO_2 equivalent under the *'With Additional Measures'* scenario.

The report concludes:

- *"Projections indicate that Ireland will exceed the carbon budget over the period 2021-2030 by 51 Mt CO_2 equivalent assuming LULUCF flexibilities described in the Regulation are fully utilised."*
- *"To determine compliance under the Effort Sharing Decision, any overachievement of the binding emission limit in a particular year (between 2013 and 2020) can be banked and used towards compliance in a future year. However, even using this mechanism Ireland will still be in non-compliance according to the latest projections."*
- *"A significant reduction in emissions over the longer term is projected as a result of the expansion of renewables (e.g. wind), assumed to reach 55% by 2030 under the 'With Existing Measures' scenario and 70% by 2030 under the 'With Additional Measures' scenario"*
- *"The projects reflect plans to bring Ireland onto a lower carbon trajectory in the longer term. However, Ireland still faces significant challenges in meeting EU 2030 targets in the non-ETS sector and national 2050 reduction targets in the electricity*

generation, built environment and transport sectors. Progress in achieving targets is dependent on the level of implementation of current and future plans."

The carbon balance of proposed wind farm developments in peatland habitats has attracted significant attention in recent years. When development such as wind farms are proposed for peatland areas, there will be direct impacts and loss of peat in the area of the development footprint. There may also be indirect impacts where it is necessary to install drainage in certain areas to facilitate construction. The works can either directly or indirectly allow the peat to dry out, which permits the full decomposition of the stored organic material with the associated release of the stored carbon as CO_2. It is essential therefore that any wind farm development in a peatland area saves more CO_2 than is released.

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 and forestry felling. The model also calculates the carbon savings associated with the Proposed Development.

In total, it is estimated that 1,371,807 tonnes of carbon dioxide will be displaced over the proposed thirty-year lifetime of the renewable energy development.

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 Long-Term Moderate Positive Impact on climate as a result of reduced greenhouse gas emissions.

Noise and Vibration

AWN Consulting Limited has been commissioned to conduct an assessment into the likely environmental noise and vibration impacts of the Proposed Development.

The background noise environment in the absence of existing operational wind farm developments has been established through noise monitoring surveys undertaken at five noise sensitive locations (NSL's) surrounding the Proposed Development. Typical background noise levels for day and night periods at various wind speeds have been measured in accordance with best practice guidance contained in the Institute of Acoustics document *'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'* (IoA GPG). The results of the background noise survey have been used to derived appropriate noise criteria for the development in line with the guidance contained in *'Wind Energy Development Guidelines for Planning Authorities 2006'*.

When considering a development of this nature, the potential noise and vibration effects on the surroundings must be considered for three stages: the short-term construction and decommissioning phases and the long-term operational phase.

The assessment of construction and decommissioning noise and vibration and has been conducted in accordance with best practice guidance contained in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration. Subject to good

working practice as recommended in the EIAR Chapter, it is not expected that there will be any significant noise and vibration impacts associated with the construction phase and the likely noise from construction activity at the nearest Noise Sensitive Locations (NSL's) is expected to be well below recommended threshold values. The associated construction noise and vibration impacts are not expected to cause any significant effects.

The predicted turbine noise levels have been calculated at all NSL's in accordance with the IOA GPG recommendations. The assessment has confirmed that the residual turbine noise levels associated with the Proposed Development, existing wind farm development and other proposed wind energy development will be within the best practice noise criteria curves. Therefore, it is not considered that a significant effect is associated with the Proposed Development.

No significant vibration effects are associated with the operation of the Proposed Development.

In summary, the noise and vibration impact of the Proposed Development is not significant considering best practice guidance for wind turbine developments.

Landscape and Visual

The Proposed development is located upon an elevated plateau (approximately 250 metres AOD) of moorland in an upland area of West-Clare. The proposed site is located approximately 6 km south-east of Liscannor Bay on the Atlantic coast and approximately 3 km north-west of Slieve Callan peak, which at 391 metres above Ordnance Datum is the highest peak in West-Clare. The town of Miltown Malbay is located 5.5 km west of the nearest proposed turbine and the village of Inagh is located 7.5 km to the east.

All turbines of the Proposed Development are located in a 'Strategic Area' for Wind Farm Development in the County Clare Wind Energy Strategy. The entirety of the proposed site and EIAR study area is located in the Slieve Callan Uplands Landscape Character Area (LCA), which is recognised as having an overall Medium to Low sensitivity to wind farm developments in which "large" sized wind farms are deemed to be appropriate.

Using the landscape types in the Wind Energy Planning Guidelines (DoEHLG, 2006), 'Mountain Moorland' best describes the proposed site and the LCA in which the site is located.

In terms of landscape character, only LCA 17 The Slieve Callan Upland, in which the proposed Slieveacurry turbines are located will experience direct effects on landscape character as a result of the Proposed Development. Landscape effects were deemed to be of 'Slight' significance for LCA 17 in consideration of the low sensitivity of the site and the large spatial extent of the LCA designated as a 'Strategic Area' for wind energy development. An assessment of the effects on landscape character was undertaken for the five other Landscape Character Areas within the 20 km LVIA study area that were identified as having any substantial theoretical visibility of the Proposed Development. The significance of the effect upon landscape character was assessed as being 'Slight' in three (LCA 1, LCA 3 and LCA 16), with one 'Moderate' (LCA 20), and one 'Imperceptible' (LCA 15).

The Burren and The Cliffs of Moher are landscape receptors of national and international renown and were noted as being receptors of relatively high sensitivity. Implementation of the Proposed Development will not materially affect these landscapes. The proposed turbines will be visible from within these landscapes but in most cases at a significant distance, therefore, effects on landscape character are indirect and landscape effects were not deemed to be significant.

Visibility of the site is predominantly limited to areas in the flat coastal plain to the south-west of the site or on the southern slopes of the Burren to the north. Due to screening from the high elevation of Slieve Callan, no visibility is evident to the south-east of the LVIA study area and visibility from Ennis and the drumlin farmlands to the north-east of the site is also screened by intervening topography. Visual and

landscape effects in close proximity are mitigated by topographical and vegetation screening (approx. 54% full or partial screening found upon public roads within 2.5km of the proposed site) present in the hilly and flat farmland landscape surrounding the site and within the wider study area.

Prominent visual receptors with substantial visibility of the Proposed Development were identified within the LVIA study area, including designated scenic routes; settlements; viewing areas; tourism and recreational destinations; transport routes; recreational routes; and residential amenity in close proximity to the proposed site. Visual effects arising at these viewpoint locations, representative of these receptors, were assessed via a methodology based on photomontages.

The visual assessment concluded that residual visual effects of 'Moderate' significance was deemed to arise at eight of the 17 photomontage viewpoint locations. All other viewpoints were assessed as resulting in 'Slight' significance (8) and 'Not Significant' (1) residual visual effects.

No significant visual effects were deemed to arise as a result of the Proposed Development along the designated scenic routes (SR1, SR 3, SR6, SR15) assessed in the LVIA. In the case of designated Scenic Route 1 and designated Scenic Route 15, it is assumed that scenic views are intended towards the coast and not towards the Proposed Development site. Visual effects recorded from Scenic Route 6 were significantly mitigated by distance and shown to be insignificant.

The likely significant visual effects arising from local residential amenity was assessed from three viewpoints in very close proximity to the Proposed Development site. Residual visual effects were found to be 'Moderate', which is appropriate and acceptable for a wind energy development of this scale and type in consideration of the site being located in a designated 'Strategic Area' for wind energy development.

Several locations were identified as highly sensitive and were deemed key visual receptors due to their reputations as important centres for tourism and recreation (e.g. The Cliffs of Moher; The Burren National Park; Lahinch coastal and recreational amenities; the Trump Hotel and Links and Doughmore Beach), in all cases the likely visual and landscape effects were assessed via photomontages from representative viewpoints. It was found that the Proposed Development will not give rise to any significant visual effects from these locations and will not impact these locations as tourism and recreational hotspots.

Wind energy developments are now an integral part of the west Clare landscape, having been guided and directed by a plan-led approach over the last decade. The Proposed Development is intended to further deliver on the targets that have been set by the Clare Wind Energy Strategy for the specific policy area and landscape character areas in which the Proposed Development site is located.

A comparative cumulative ZTV shows that the Proposed Development will not significantly increase the areas from which turbines are visible from within County Clare. Although the Proposed Development will slightly increase the extent of turbines visible within the landscape, from most perspectives surrounding the site it will be viewed in conjunction with the existing Slievecallan Wind Farm. Visibility of both the Slievecallan Wind Farm and the Proposed Development does occur in differing fields of view from areas of residential amenity located between both wind farms, however, visual effects are mitigated by topographical screening and adequate set back distances. The Slievecallan Wind Farm is an established and accepted part of the landscape, therefore, implementation of the Proposed Development will not be introducing an entirely new visual element to the baseline landscape.

When viewed cumulatively with the other existing, permitted or proposed wind farms, the Proposed Development does not transform or redefine the baseline landscape character and is in keeping with current and emerging trends as clearly provided for in and envisaged by the planning policy for wind energy developments in west Clare. The Proposed Development when viewed cumulatively with existing wind energy developments in the vicinity and wider area consolidates the provision of wind energy infrastructure at this location which has been designated as a Strategic Area in the Wind Energy

Strategy for the County. Landscape and visual effects were among the primary considerations of the Planning Authority in designating this location as a Strategic Area. Accordingly this location has been identified by the Planning Authority as one of the most suitable and environmentally robust locations for the provision of wind energy in County Clare.

Archaeology and Cultural Heritage

This chapter comprises an Environmental Impact Assessment Report (EIAR) of the potential impact of the Proposed Development on the Cultural Heritage resource. Cultural heritage includes archaeology, architectural heritage and any other tangible assets. The assessment was based on GIS based mapping, ZTV and Viewshed analysis to assist with the assessment of impacts on setting followed by a desktop analysis of all baseline data and a comprehensive programme of field inspection of the EIAR site boundary.

Direct Effects

No National Monuments in State Care or those subject to preservation orders are located within or within close proximity to the Proposed Development and no direct effects will occur in this regard. One recorded monument (Stone circle RMP CL031-052) located at Curraghodea townland at ITM E512804, N680240 (Figure 13 17 and Figure 13 18: above) is located within the EIAR boundary. Groundworks associated with the proposed turbines, roads and borrow pit and the movement of machinery in the general vicinity may have a direct negative and permanent impact on the monument. This potential impact will be negated through the implementation of mitigation measures including a 30m exclusion zone. One RPS structure is located within the EIAR boundary but at a remove from the proposed turbines and associated infrastructure. It is subject to statutory protection by way of inclusion in the Record of Protected Structures and consists of a derelict national school (RPS ID 637). It is located on the north side of a trackway which extends East/West to the north of the regional road (R460). It is located 902m from the nearest proposed turbine (T7) and 272m from the proposed cable route where the latter will be constructed within the confines of the public road R460 to the south. The structure and its location will be highlighted in the Construction and Environmental Management Plan (CEMP) as an environmental constraint so that the area can be avoided during construction works. No NIAH structures are located within the EIAR boundary. Two structures of local cultural heritage merit were noted within the EIAR boundary including a bridge and a derelict stone house, both adjacent to the underground cable route alignment. No direct impacts to any of the aforementioned sites will occur and exclusion zones will be established prior to construction around the house structure. The bridge will be highlighted in the CEMP so that the area can be avoided during construction.

Potential impacts on sub-surface archaeological finds, features and deposits are dealt with through testing and monitoring thus avoiding any significant effects. All groundworks will be monitored during construction.

A search of placenames in the vicinity of the Proposed Development led to the discovery of information relating to the burial places of British Soldiers during the War of Independence. The bogs near Connolly are thought to be the burial place of a Private Robertson who is said to have been buried in the property of Colonel Frederick St Ledger Tottenham, a local Unionist landlord. Tottenham's bog was chosen as the site for Robertson's burial since it was felt that his lands were unlikely to be searched by the British forces. There are Tottenhams recorded in both the 1901 and the 1911 Census residing at Ballynoe, Fermoyle (National Archives: Census of Ireland 1911). Ballynoe is 3.6km to the south-east of the Proposed Development site. The potential for the discovery of human remains relating to the War of Independence can be mitigated by the presence of an archaeologist on site during construction works. Should human remains be uncovered, the archaeologist will follow all necessary procedures regarding the discovery of human remains.

Fahanlunaghtamore Bridge, Cloonanaha Bridge, Skagh bridge and Inagh Bridge (RPS Ref. 208) and NIAH (Reg. No. 20403203) are located along the delivery route. Since no works are proposed in these locations no impacts will occur.

Indirect Effects on visual setting

Indirect effects on the setting of National Monuments within 10km, RMPs within 5km and RPS/NIAH within 5km were included in order to assess impacts on setting in the wider landscape. Viewshed analysis, a review of the ZTV was undertaken to establish the nature and degree of impacts on the setting of such monuments.

Impacts on visual setting of National Monuments in State Care will not occur from 13 of the 14 monuments with the impact being 'Not Significant' from one monument where some turbines may theoretically be visible.

One monument subject to statutory protection as defined in the Record of Monuments is located within the EIAR site boundary for the Proposed Development. It consists of a multiple stone circle (CL031-052) located at Curraghodea townland. In summary, 4 of the 6 turbines will be visible from mid shaft to blade tip with 2 turbines not visible at all. No instances will occur whereby the full lengths of turbines will be visible from the monument. This will result in a moderate impact, a moderate effect arising where a change to an archaeological site is proposed which though noticeable, is not such that the integrity of the site is compromised and which is reversible. This arises where an archaeological site can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible. No significant effects will occur which would be regarded as an effect which would result in a permanent impact upon a site, leading to a loss of character, integrity and data about an archaeological site.

Impacts to setting of RMPs was undertaken and this included 85 monuments within 5km, the majority occurring at a remove from the nearest proposed turbine. Potential impact on visual setting of the RMPs within 5km of the Proposed Development is considered to be slight (An effect which causes changes in the character of the environment which are not high or very high and do not directly impact or affect an archaeological site).

The National School (RPS 637) is located within the EIAR study area boundary. Although the structure is located within the EIAR boundary, it is not located within the footprint of any proposed infrastructure and is located 902m from the nearest proposed turbine (T7). The structure will not be directly impacted by any of the proposed construction works. Some effects on setting may occur however but given the separation distance to the nearest turbine this impact will be 'Slight'.

Five structures on the NIAH/RPS are located within 5km of the nearest proposed turbine outside the EIAR site boundary. The distance of the proposed turbines from the structures is such that no direct impacts will occur. The ZTV suggests that all turbines may theoretically be visible from the locations where the structures are located but at a distance. The ZTV is based on a bare landscape model with no vegetation or tree cover. Impacts are therefore considered to be 'Slight'

Cumulative Direct Effects

Any potential direct physical impacts that were identified as part of the Proposed Development have been dealt with by way of mitigation measures such as avoidance, buffer zones, monitoring and testing programmes. Should the Proposed Development receive a favourable response from the planning authority, all mitigation measures will be implemented through planning conditions thereby avoiding direct impacts. In this regard when the Proposed Development is added to other surrounding projects there will be no increase in direct impacts and therefore no cumulative effects (direct).

Cumulative Indirect Effects

Of the 14 National Monuments in State Care considered in terms of impacts on their visual setting, one example has some visibility of both the Proposed Development turbines and other turbines and in this regard cumulative effects on the visual setting will occur (based on theoretical visibility). No cumulative effects will occur on the remaining 13 since there are no other instances where both the Proposed Development turbine and other turbines can both be seen from the various monuments.

In terms of RMPs, RPS and NIAHs considered within 5km of the Proposed Development turbines, when the Proposed Development turbines are added to the other permitted, proposed and existing windfarms more turbines will be visible from various monuments within 5km of the windfarm, in particular the existing Slievecallan turbines since they fall within the 5km study area. The ability to see an increased number of turbines will result in a cumulative impact on setting in the wider landscape. No significant cumulative impacts will occur however.

Material Assets

Traffic and Transport

An assessment of the traffic effects of the Proposed Development was undertaken for both the construction and operational stages of the development. The Proposed Development consists of up to 8 turbines located in the townland of Glendine and adjacent townlands in County Clare, The assessment considered the impact that the traffic generated by the Proposed Development would have on the local highway network, and also presents an assessment of the route geometry with respect to accommodating the abnormally sized vehicles required to deliver the turbine plant to the site.

The delivery route for the abnormally sized loads turns off the western bypass of Ennis (N85) at the Claureen Roundabout onto the N85 heading northwest towards Inagh. The route then turns left in the village of Inagh heading west on the R460 before veering right onto the local L1074. The routes continues westbound on the L1074 before taking a left hand bend on the same road and continuing in a southwest direction. At this point the route turns left onto the local Fahanlunaghta More Road heading in a southern direction. Access to the site is then gained by turning left onto an existing forest track heading in an eastern direction towards the site.

The types of vehicles that will be required to negotiate the local network will be up to 81.0 metres long with a blade length of 75.0 metres. Any other blade length within the proposed range (66.5m to 75m) will be shorter and therefore the autotracks present the worst case scenario. An assessment of the geometric requirements of the delivery vehicles was undertaken on the proposed 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 indicated.

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 8 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 between +1.8 on the N85 to the west of the Claureen Roundabout, to +6.0% on the N85 passing through Inagh, to +5.8% on the R460 to the west of Inagh. On these days traffic flows are forecast to increase by +36.3% on the L1074 approaching the site. It is forecast that the direct effect will be temporary, and will be slight.

- During the remaining 247 days for the site preparation and ground works when deliveries to the site will take place, the effect on the surrounding road network will be negative, resulting in an increase in traffic levels ranging from between +0.5% on the N85 to the

west of the Claureen Roundabout, to +1.5 on the N85 passing through Inagh, to +1.5% on the R460 to the west of Inagh. On these days traffic flows are forecast to increase by +9.0% on the L1074 approaching the site. On these days, the direct effect will be temporary and will be slight.

- During the 8 days of the turbine construction stage when general materials are delivered to the site, the delivery of construction materials will result in a negative impact on the surrounding road network, increasing traffic levels ranging from +0.3% on the N85 to the west of the Claureen Roundabout, to +0.9 on the N85 passing through Inagh, to +0.9% on the R460 to the west of Inagh. On these days traffic flows are forecast to increase by +5.7% on the L1074 approaching the site. The direct effect during this period will be temporary and will be slight.

- During the 22 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 moderate due to the size of vehicles involved, resulting in increased traffic volumes of between +0.5% on the N85 to the west of the Claureen Roundabout, to +1.5 on the N85 passing through Inagh, to +1.5% on the R460 to the west of Inagh. On these days traffic flows are forecast to increase by +9.4% on the L1074 approaching the site. The direct effect will be temporary and may be reduced to slight if the delivery of the large plant is done at night, as is proposed.

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

The design life of the Proposed Development is 30 years. If the site is decommissioned, cranes will disassemble each turbine tower and all equipment. All turbine infrastructure including turbine components will be separated and removed off-site for re-use, recycling and waste disposal. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. It is proposed to leave the access roads and hardstanding areas in situ at the decommissioning stage. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential impacts

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.

Of the scoping responses received from telephone, broadband and other telecommunications operators, all operate links either outside the Proposed Development site or do not operate any links in the area.

In March 2020, scoping responses were received from the Department of Defence (DoD) and the Irish Aviation Authority (IAA), which set out lighting requirements for turbines

All of the above requirements outlined by DoD and IAA will be complied with should the Proposed Development receive a grant of planning permission.

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

Interactions of the Foregoing

Chapters 5 to 14 of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity, Ornithology, Land, Soils and Geology, Hydrology and Hydrogeology, Air and Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage and Material Assets, as a result of the Proposed Development. All of the 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.