NON-TECHNICAL SUMMARY

Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of FuturEnergy Glenard Designated Activity Company (DAC), who intends to apply to An Bord Pleanála for planning permission for the construction of a wind energy development in Glenard and adjacent townlands near Buncrana, Co. Donegal.

The townlands within which the proposed development (i.e. the main proposed wind farm site, the grid connection cabling route and proposed turbine delivery route works) is located are listed in Table 1-1.

Table 0-1 Townlands within which the proposed development is located

Townlands within which the proposed development is located:	
Glenard	Meenyanly
Illies	Sorne
Carrowmore or Glentogher	Meenakeeragh
Ballynahone	Tullydush Upper
Carnamoyle	Owenkillew and Barnahone
Annaslee	

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 An Bord Pleanála, as the competent authority.

Applicant

The applicant, FuturEnergy Glenard Designated Activity Company, is a subsidiary of FuturEnergy Ireland. FuturEnergy Ireland is a new joint venture company owned on a 50:50 basis by Coillte and ESB. Their ambition is to develop more than 1GW of renewable energy capacity by 2030 and make a significant contribution to Ireland's commitment to produce 80% of electricity from renewable sources by the end of the decade.

FuturEnergy Ireland has been involved in the development of 4 operating wind farms including Raheenleagh (Wicklow), Sliabh Bawn (Roscommon), Cloosh (Galway) and Castlepook (Cork), which have a combined total capacity of over 300 megawatts (MW). The company also has a number of proposed wind energy projects currently in the planning system. This project is part of a wider FEI ambition to support the delivery of a further 1 GW of renewable energy.

Brief Description of the Proposed Development

The proposed development comprises the construction of 15 No. wind turbines and all associated works. The proposed turbines will have a maximum blade tip height of up to 173 metres above the top of the foundation. The applicant is seeking a ten-year planning permission. The full description of the proposed development, as per the public planning notices, is as follows:

1. *Construction of 15 No. wind turbines and associated hardstand areas with the following parameters:*
    a. *a total tip height in the range of 162 metres minimum to 173 metres maximum,*
    b. *hub height in the range of 96 metres minimum to 107 metres maximum, and*
    c. *rotor diameter in the range of 132 metres minimum to 140 metres maximum*
2. *1 no. 110kV permanent electrical substation including a control building with welfare facilities, all associated electrical plant and equipment, security fencing, all associated underground cabling, wastewater holding tank and all ancillary structures and works;*
3. *All works associated with the permanent 110kV connection from the proposed substation to the national electricity grid, via underground cabling within permanent cable ducts in the townlands of Meenyanly, Carnamoyle, Sorne, Owenkillew and Barnahone, Meenakeeragh Tullydush Upper, Annaslee and Ballynahone to the existing Trillick 110kV substation in the townland of Ballynahone;*
4. *All associated underground electrical and communications cabling connecting the turbines to the proposed wind farm substation;*
5. *1 no. Meteorological Mast of 104 metres in height;*
6. *Upgrade of existing tracks and roads, provision of new permanent site access roads including a new site entrance (in the townland of Glenard);*
7. *1 no. borrow pit;*
8. *1 permanent no. peat and spoil repository area;*
9. *Permanent placement of peat and spoil along sections of site access roads as part of the peat and spoil management plan for the site;*
10. *2 no. temporary construction compounds;*
11. *Permanent recreation and amenity works, including marked trails, seating areas, amenity car park, and associated amenity signage;*
12. *All temporary works associated with the facilitation of turbine component and abnormal load delivery;*
13. *Construction of a permanent link road between the R240 Regional Road and the L1731 local road; construction of a second permanent link road on the L1731; permanent road widening at three locations along the L1731 (in the townlands of Carrowmore or Glentogher and Illies) all of which will facilitate the delivery of abnormal loads to the site during the construction period and may be used during the operational period if necessary or to facilitate the decommissioning of the wind farm. Following the construction period, access to the link roads will be closed off;*
14. *Site Drainage;*
15. *Site Signage;*
16. *Ancillary Forestry Felling to facilitate construction and operation of the proposed development; and*
17. *All associated site development works.*

This application is seeking a ten-year permission and 35 year operational life from the date of commissioning of the renewable energy development.

Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the proposed development, will have an operational lifespan greater than the 35 year operational life that is being sought as part of this application.

Modern wind turbine generators typically have an output of between 4 and 6.2MW. The export capacity of the proposed development will, therefore, range from a minimum of 60MW and a maximum of 93MW.

Need for the Proposed Development

Ireland faces significant challenges to its efforts to meet EU targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. Further detail can be found in Chapter 2, Section 2.2 of this EIAR.

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

The opportunity to generate local employment and investment associated with the Proposed Development would also be lost, and the local economy would continue to rely primarily on agriculture and commercial forestry as the main source of income.

In March 2019, the Government announced a renewable electricity target of 70% by 2030. The proposed development will 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 Glenard wind energy development is critical to helping Ireland address these challenges as well as addressing the country's over-dependence on imported fossil fuels.

The need for the proposed project is driven by the following factors:

1. *A legal commitment from Ireland to limit greenhouse gas emissions under the Kyoto protocol to reduce global warming (Section 1.5.1.1);*
2. *A requirement to increase Ireland's national energy security as set out in the Energy White Paper (Section 1.5.1.2);*
3. *A requirement to diversify Ireland's energy sources, with a view to achievement of national renewable energy targets and an avoidance of significant fines from the EU (the EU Renewables Directive) (Section 1.5.1.3 to Section 1.5.1.5);*
4. *Increasing energy price stability in Ireland through reducing an over reliance on imported fossil fuels; and*
5. *Provision of cost-effective power production for Ireland which would deliver local benefits (Section 1.5.1.6).*

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 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. Only 4.13GW is in place as of August 2020, therefore Ireland needs to double its installed capacity of 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. Further information relating to the Climate Action Plan can be found in Chapter 2, Section 2.2.

Section 2.1 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 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 Donegal County Council, will be redirected to the provision of public services within this county. 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 100-120 jobs during the construction phase and 2-3 jobs during the 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 €7 million will be made available over the lifetime of the project. The value of this fund will be directly proportional to the installed capacity and/or energy produced at the site and will support and facilitate projects and initiatives including youth, sport and community facilities, schools, educational and training initiatives, and wider amenity, heritage, and environmental projects.

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. The 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 An Bord Pleanála.

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 (excluding Birds)*
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, Architectural and Cultural Heritage*
14. *Material Assets (including Traffic and Transport, Telecommunications and Aviation)*
15. *Vulnerability of the Project to Natural Disasters*

16. *Transboundary Effects*
17. *Interactions of the Foregoing*
18. *Schedule of Mitigation and Monitoring Measures*

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

Background to the Proposed Development

This chapter of the Environmental Impact Assessment Report (EIAR) presents information on renewable energy and climate change policy and targets, the strategic planning context for the proposed development, the site selection and design process, a description of the proposed development site and planning history, the assessment of reasonable alternatives, scoping and consultation, and the cumulative impact assessment process.

Energy and Climate Change Targets

International and national policy consistently identifies the need to reduce greenhouse gas (GHG) emissions and stresses the importance of reducing global warming. The context of international policy has altered over the last 30-years from being of a warning nature to the current, almost universally accepted belief, that there is a climate change emergency occurring both within Ireland and at a broader global scale. The Intergovernmental Panel on Climate Change (IPCC)'s Sixth Assessment Report published in 2021 provides a stark assessment of global climate change and presents evidence that climate changes will increase in all regions of the globe over the coming decades and that much of the damage caused by climate change up to this point is now likely irreversible, such as the rise in sea levels over the 21st century. The Climate Status Report for Ireland 2020 similarly reflects on clear and distinct impacts arising from climate change effects within an Irish context:

The IPCC's Sixth Assessment Report does not, however, conclude that a climate catastrophe is inevitable, but rather, there remains a 'narrow path' to determine the future course of climate, mainly by cutting emissions down to net zero. the proposed substation and grid connection will contribute to the decarbonisation of the energy sector and reduce harmful emissions. In this regard, it is in compliance with national and international climate change policy and targets.

COP21 Paris Agreement

COP21 was the 21st session of the Conference of the Parties (COP) to the UNFCCC. Every year since 1995 (excluding 2020 due to COVID-19), the COP has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments. COP21 was organised by the United Nations in Paris and held from 30th November to 12th December 2015. COP21 closed with the adoption of the first international climate agreement (concluded by 195 countries and applicable to all). The 12-page text, made up of a preamble and 29 articles, provides for a limitation of the global average temperature rise to well below 2°C above pre-industrial levels and to limit the increase to 1.5°C. It is flexible and takes into account the needs and capacities of each country. The IPCC's 6th Assessment Report (2021) further collaborates this need to limit any increase in global average temperature to 1.5°C, stating that (underlined for emphasis),

"Humanity has emitted 2,560 billion equivalent tons of CO2 since 1750, and we only have a budget of 500 more if we want to limit warming to 1.5°C.

By following a trajectory of very low GHG emissions (SSP1-1.9), the threshold of 1.5°C will be reached in the short term, between 2021 and 2040, before being very slightly exceeded (1.6°C anticipated over the period 2041-2060) then respected in the long term (1.4°C anticipated over the period 2081-2100).

Everything is not lost, but we must pursue the Paris Agreement's most ambitious goal of limiting warming to 1.5°C."

An article published by the IPCC on the 6th October 2018 titled 'Global Warming of 1.5oC', notes the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways; in the context of mitigation pathways, strengthening of the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. This special report is part of an invitation contained in the Decision of the 21st Conference of Parties of the United Nations Framework Convention on Climate Change to adopt the Paris Agreement, and provides an update on the impact of climate change if emissions are not reduced.

Climate Action Plan 2021

The Climate Action Plan 2021 published on the 4th of November 2021, sets out the detail for taking action to achieve a 51% reduction in overall greenhouse gas emissions by 2030, and to reach net-zero emissions by no later than 2050. The 2021 Plan builds on the measures and technologies set out in the 2019 Climate Action Plan to deliver greater ambition. The greater ambition requires a greater range of measures under the 2021 Plan, reflected in two categories of 'core measures' and 'further measures. 'Core measures' set out to meet the 2030 targets cover the fundamentals of decarbonisation and include the development of a renewable energy electricity supply. These 'core measures' are not, by themselves sufficient to deliver the ambitions set out and so a series of 'further measures' will also be necessary which are more technically challenging or not yet available in Ireland at the scale required, e.g. Biogas/biomethane, green hydrogen, carbon capture and storage. While deploying all the core measures would reduce emissions by 10-11 MtCO2eq. by 2030, undertaking further measures could close the gap. All sectors will have to further their efforts from those outlined in the 2019 CAP if the core and further measures are to be achieved. Figure 4.3 of the CAP, copied below illustrates the impacts across the sectors.

With regards electricity, the Plan aims to increase the proportion of renewable electricity up to 80% by 2030. The Plan highlights that "sustained efforts across sectors will be required to meet targets" and for electricity "The proposed pathway includes a more rapid build-out of renewable generation capacity (wind and solar power generation technologies), increased storage, and the deployment of zero-emissions gas. The decarbonisation pathway for the electricity sector is challenging given the rapid growth in demand for power, as well as the need to ensure security of supply through the decarbonisation journey." To achieve the 80% renewable electricity envisioned, the indicative onshore wind capacity is set in the Plan at up to ~8GW.

Programme for Government (2020)

The Programme for Government 2020 (June 2020) places specific emphasis on climate change, stating that the next ten years are a critical period in addressing the climate crisis, and therefore, a deliberate and swift approach to reducing more than half of Ireland's carbon emissions over the course of the decade (2020-2030) must be implemented. The programme states that the government are committed to reducing greenhouse gas emissions by an average 7% per annum over the next decade in a push to achieve a net zero emissions by the year 2050.

With regard to energy generation, the programme notes that the government is committed to the rapid decarbonisation of the energy sector. As such, the necessary steps will be taken to deliver at least 70% of renewable electricity by the year 2030 as per the Climate Action Plan 2019.

Local Policy

The Donegal County Development Plan 2018-2024 (CDP) is the principal policy instrument used to manage change in land use within the County. The Plan sets out the Planning Authority's strategic land use objectives and policies for the overall development of the County over the 6 year life of the Plan (to 2024) and beyond to a 20 year timeframe (to 2038).

The CDP outlines that in terms of wind speed and its consistency the County is 'ideally located on the North-West Atlantic coast'. Under the County Development Plans Economic Development Strategy it is the express target to maximise appropriate development to support and create a sustainable local renewable energy marketplace as follows:

- ED-O-9: To maximise the appropriate development of the county's renewable energy resources and to support and facilitate the creation of a sustainable local renewable energy market place in Donegal from where energy operators can transport, store, trade and export their "local renewable energy product" to domestic and non-domestic markets subject to environmental designations and amenity considerations.

The Wind Energy Map (Map 8.2.1) of the County Development Plan was included in the plan which identified three policy/zone areas for the development of wind farms within the county. In November 2018, a judicial review of the plan resulted in the High Court omitting Map 8.2.1 from the County Development Plan. The following note was listed within the County Development Plan

which references the above:

"By Order made on the 5th day of November, 2018, in proceedings bearing Record Number 2018/533JR between Planree Limited, Applicant and Donegal County Council, Respondent, certain provisions of the County Donegal Development Plan 2018-2024, being Section 6.5(c) and (f) of the Wind Energy standards at Part B: Appendix 3, Development Guidelines and Technical Standards and Map 8.2.1 as contained in the County Donegal Development Plan 2018-2024 as published were ordered to be deleted and/or removed from the County Donegal Development Plan 2018-2024. The Development Plan should be read in light of the Order in question pending any possible future variation of same."

Although it is fully acknowledged that map 8.2.1 has been set aside and is no longer part of the CDP the current site is located wholly within an area which was designated as 'Open to Consideration'.

There are a range of provisions within the CDP that support the provision of renewable energy, including the following objectives:

- E-O-1: "To develop sustainably a diverse renewable energy portfolio to meet demands and capitalize on the County's competitive locational advantage."
- E-O-4: "To facilitate a sustainable and diverse mix of developments which limit the net adverse impacts associated with global warming such as promoting renewable energy, the growth of local farm produce and the promotion of sustainable modes of public transport."
- E-O-5: "To ensure that wind energy developments meet the requirements and standards set out in the DEHLG Wind Energy Development Guidelines 2006, or any subsequent related Guidelines (or as may be amended)."
- E-O-6: "To ensure that wind energy developments do not adversely impact upon the existing residential amenities of residential properties, and other centres of human habitation (as defined at Para. 6.6, 'Wind Energy', Appendix 3, Development Guidelines and Technical Standards, Part B, Objectives and Policies of the Plan)."
- E-P-10: "It is a policy of the Council that development proposals for wind energy shall be in accordance with the requirements of the Wind Energy Development Guidelines: Guidelines for Planning Authorities, 2006 (or as may be amended)."

The following is also a relevant consideration:

- E-P-2: "It is a policy of the Council to facilitate the appropriate development of renewable energy from a variety of sources, including, hydro power, ocean energy, bioenergy, solar, wind and geo-thermal and the storage of water as a renewable kinetic energy resource, in accordance with all relevant material considerations and the proper planning and sustainable development of the area."

The following policies are also is listed within the Plan specifically in relation to Wind Energy and renewable energy:

- E-P-10: "It is a policy of the Council that development proposals for wind energy shall be in accordance with the requirements of the Wind Energy Development Guidelines: Guidelines for Planning Authorities, 2006 (or as may be amended)."

- E-P-14: "It is a policy of the Council to support voluntary initiatives from developers/renewable energy operators for local community benefits, in accordance with other policies of this Plan and the proper planning and sustainable development of the area. (Examples could include; shared ownership of development proposals, financial dividends, the development of improved local infrastructure, the donation of land for community use, such as playing fields, the development or refurbishment of local community facilities, the creation of rights of way/cycle, walking and bridleways, educational tours and promotional days)."

- E-P-17: "It is a policy of the Council to ensure that all roads associated with the development of wind farms are maintained or repaired at the developer's expense to the satisfaction of the Council."

- E-P-18: "It is a policy of the Council that potential impacts on natural, built and cultural heritage including impacts on archaeological monuments and watercourses are assessed as part of renewable development proposals. Where such impacts are identified, mitigation measures such as buffer zones, separation distances and access arrangements should be employed as appropriate."

- E-P-19: "It is a policy of the Council to facilitate the development of combined wind and wave, tidal and/or hydro proposals in areas where there are no significant environmental, heritage or landscape constraints, to generate and export renewable energy and to generate local revenue subject to the proper planning and sustainable development of the area."

- E-P-20: "It is the policy of the Council that all proposals for renewable energy development will have regard to the cumulative effect of the development on the environment when considered in conjunction with other existing and permitted developments in the area."

- E-P-21: "It is the policy of the Council that all applications for renewable energy projects will ensure that details of the proposed grid connection and all associated infrastructure are considered in the Environmental Impact Statement (EIS) and Natura Impact Statement as may be required."

Part B, Appendix 3, Section 6 of the CDP sets out the development guidelines and technical standards for wind energy. Within this section the following considerations are set out:

- "6.1- Wind energy proposals shall be screened for Environmental Impact Assessment and Appropriate Assessment of the potential impacts of the proposal on the host environment. Where a development does not require an EIA then an Environmental Report should be prepared".

In this regard an Environmental Impact Assessment Report (EIAR), Natura Impact Statement (NIS) and Appropriate Assessment Screening Report (AASR) have been prepared in relation to the proposed development and have been included with the application for the consideration of An Bord Pleanála.

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 also 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 proposed changes to the assessment of impacts associated with onshore wind energy developments are outlined in the document '*Proposed Revisions to Wind Energy Development Guidelines 2006 – Targeted Review*' (December 2013), the '*Review of the Wind Energy Development Guidelines 2006 – Preferred Draft Approach'* (June 2017), and the Draft Wind Energy Development Guidelines (December 2019). A consultation process in relation to the 2019 document concluded on the 19th of February 2020.

At time of writing, the Draft Guidelines have not yet been adopted, and the relevant guidelines remain those published in 2006. Notwithstanding this, however, due to the timelines associated with the planning process for renewable energy projects, it is possible that a version of the draft guidelines may be finalised during the consideration period for the current proposed development. Towards this end it is anticipated that the Glenard Wind Farm will be capable of adhering to the relevant noise and shadow flicker standards.

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 provided under Section 2.3 within this EIAR.

Scoping and Consultation

A comprehensive scoping and consultation exercise was undertaken during the preparation of this EIAR. A scoping report, providing details of the application site and the proposed development, was prepared by MKO and circulated in August 2019, with follow up requests issued in March 2020. MKO requested the comments from relevant personnel/bodies in their respective capacities as consultees with regards to the EIAR process.

Pre-application consultations were also held with An Bord Pleanála (ABP) in which the proposed development was introduced, detailed discussions were held with regards to the proposed development. On the18th January 2022 the proposed development was deemed Strategic Infrastructure Development (SID) by ABP.

Coillte has undertaken a comprehensive community engagement programme over the 2019-2022 period liaising with near neighbours and those in the wider area with regard to the proposed wind farm. Community engagement commenced in 2019 with the appointment of a community liaison officer (CLO) for the proposed project. The full scope of the community consultation is provided under Section 2.5 and Appendix 2-2 of this EIAR.

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 an indication of the main reasons for the option chosen, taking into account the environmental effects. The consideration of alternatives typically refers to alternative design, technology, location, size and scale. A 'Do Nothing Scenario' i.e. an outline of what is likely to happen to the environment should the Project not be implemented, should also be included.

In 2014, Coillte's Renewable Energy Development Team (now FuturEnergy Ireland, refer to Section 1.3 of Chapter 1) undertook a detailed screening process, through Geographical Information Spatial software (GIS), using a number of criteria and stages to assess the potential of a large number of possible sites, on lands within its stewardship (c. 441,000 hectares), suitable to accommodate a wind energy development. The GIS database drew upon a wide array of key spatial datasets such as forestry data, ordnance survey land data, house location data, transport, existing wind energy and grid infrastructure data and environmental data such as ecological designations, landscape designations and wind energy strategy designations available at the time. The application of the above criteria to identify a site relevant to the project and its specific characteristics, resulted in the selection of a site known as Glenard, located north of Eskaheen Mountain, Inishowen in Co. Donegal as a candidate site to be brought forward for more detailed analysis. Four other sites, located in Clare, Leitrim/Sligo, Cork and Kilkenny, also emerged from the site selection process which Coillte intend to bring forward for wind energy development.

Although the 2014 screening exercise was based on identifying lands for wind development; a reasonable alternative source of renewable electricity generation, namely solar, was considered based on the scale and current land-use of the Glenard site that emerged. A wind energy development was considered to be the most efficient method of electricity production at this site. A solar array development would have a higher potential environmental effect on Hydrology and Hydrogeology, Traffic and Transport (construction phase) and Biodiversity and Birds (habitat loss, glint and glare) at the site.

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 design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory organisations, near neighbours / the local community and local authorities as detailed in Sections 2.4 and 2.5 of this EIAR. 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 a combination of the results of all site investigations and surveys that have been carried out during the EIAR process, the community engagement process that began in July 2019 (e.g., landscape and visual sensitivities of nearby residents was taken into consideration) and the scoping with statutory and non-statutory consultees. 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 availability of land as well as cumulative impacts.

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 and where possible, to minimise the potential for impacts by using new roads as an alternative. An alternative option of constructing an entirely new road network, having no regard to existing roads or tracks was not favourable, as it would create the potential for additional significant environmental effects to occur in relation to land, soils and geology (increased excavation and aggregate requirements), hydrology (increased number of new watercourse crossings) and biodiversity (increased habitat loss).

The use of multiple temporary construction compounds was deemed preferable to the alternative of a single large compound at the site for a number of reasons. Principally, it will facilitate more efficient construction practices and 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.

One alternative substation location was considered at a very early stage of the design of the proposed development, as shown in Figure 3-6 of the EIAR. While this alternative location was more centrally located within the site and would have slightly decreased the length of internal cabling between the turbines and the substation, it would have led to an increase in the length of grid connection cabling to

the nearest existing substations. The construction of the substation compound at the alternative location, situated on a steep slope, would have required a significant volume of rock to be broken or blasted out. Therefore, the footprint of the substation compound would be larger relative to the chosen location and the potential for noise and dust emissions during the construction phase would increase. Due to its position on an elevated slope, the alternative location would also be more visually exposed to the nearest residential dwellings when compared to the chosen location which is screened by a combination of forestry and topography.

While overhead lines are less expensive and allow for easier repairs when required, underground lines will have no visual impact. For this reason, it was considered that underground lines would be a preferable alternative to overhead lines. The proposed underground grid connection route was one of three grid connection routes considered at the outset of the design process of the proposed development. The proposed underground grid connection route to the existing Trillick substation was chosen due to the fact that it runs along a road under the control of the applicant and then local public roads for the remainder of the route.

The proposed borrow pit location was selected due to the presence of competent or usable rock at an acceptable level below existing surface level. Developing borrow pits at the alternative locations that were subject to site investigations, would result in a significant increase in the volumes of peat and spoil to be excavated in order to access the usable rock underneath and therefore much higher volumes of excavated material that would need to be managed onsite. The excavation of such increased volumes of peat and spoil has the potential to lead to adverse environmental effects in relation to peat instability and dust emissions.

The alternatives considered for the port of entry of wind turbines for the proposed development include Foyle Port in Derry and Killybegs Harbour in Donegal due to their proximity to the site. Foyle Port is the principal seaport for the northwest of the country handling approximately 2 million tonnes of cargo per annum. Killybegs Harbour also offers a roll-on roll-off procedures to facilitate import of wind turbines. Both ports have been considered for this project given that they are the closest commercial ports to the site of the proposed development, however, others in the State (including Dublin, Galway, Cork and Shannon-Foynes), offer potential for the importing of turbine components and therefore are also viable alternatives.

An assessment of two site access route options was carried out, taking account of criteria such as third-party land requirements, existing road upgrade and new road construction requirements and associated environmental effects. The proposed site access route between Foyle Port and the site was the chosen option as it is over four times shorter than the alternative route from Killybegs Harbour. Therefore, there is reduced potential effects in relation to impacts for other road users and vehicular emissions.

Description of the Proposed Development

The overall layout of the proposed development is shown on Figure 4-1 in Chapter 4 of the EIAR. This drawing shows the proposed locations of the wind turbines, electricity substation, construction compounds, internal roads layout and the site entrances. Detailed site layout drawings of the proposed development are included in Appendix 4-1 to this EIAR.

The proposed wind turbine layout has been optimised using industry standard wind farm design software to maximise the energy yield from the site, while maintaining sufficient distances between the proposed turbines to ensure turbulence and wake effects do not compromise turbine performance.

The proposed wind turbines to be installed on the site will have a ground-to-blade tip height, hub height and blade length within the following, limited, ranges:

- Turbine Tip Height – Maximum height 173 metres, Minimum height 162 metres
- Hub Height – Maximum height 107 metres, Minimum height 96 metres

- Blade Length: - Maximum length 70 metres, Minimum length 66 metres.

Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one from another. 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. It is proposed that the turbines would be of an off-white or light grey colour so as to blend into the sky background.

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The turbine foundation transmits any load on the wind turbine into the ground. The hard standing areas at each turbine consist of levelled and compacted hardcore are required around each turbine base. These will facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine. The hardstands also allow for the offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. Levelled assembly areas will be located on either side of the hard-standing area. These levelled assembly areas are required for offloading turbine blades, tower sections and hub from trucks until such time as they are ready to be lifted into position by cranes.

To provide access within the site of the Proposed Development and to connect the wind turbines and associated infrastructure approximately 6.6 kilometres of existing roads and tracks will need to be upgraded and approximately 9.7 kilometres of new access roads will need to be constructed.

It is proposed to construct a 110kV electricity substation within the site of the Proposed Development as shown in Figure 4-1. The proposed substation site is located within an area of forestry adjacent to an existing access road in the southern part of the site.

Each turbine will be connected to the on-site electricity substation via an underground 33 kV (kilovolt) electricity cable. A connection between the proposed development and the national electricity grid will be necessary to export electricity from the proposed wind farm. This connection will originate at the proposed onsite substation and will be connected to the national grid via an underground grid connection cable which will connect into the existing 110 kV Trillick substation, located approximately 6.2km from the proposed development.

One permanent meteorological mast is proposed as part of the wind farm development. The meteorological mast will be equipped with wind monitoring equipment at various heights. The mast will be a slender free-standing structure of 100 metres in height.

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.

The peat and spoil that will be excavated during the construction of the proposed development. will be managed by means of placement within the proposed borrow pit (used for sourcing stone), the proposed peat and spoil repository area or designated placement areas alongside access roads. Crushed stone is required for the construction of the proposed development it is proposed to source the majority of this stone from the on-site borrow pit. It is anticipated that a certain volume of finer, crushed stone, used to provide the final surface layer for site roads and hardstanding areas will be brought to the site from local, appropriately authorised quarries.

A total of approximately 80.5 hectares of forestry will be permanently felled within and around the footprint of the Proposed Development in order to facilitate infrastructure construction and turbine erection. 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 wind farm. This can occur anywhere in the state subject to licence.

During the construction phase, the proposed development site will be accessed via a proposed new entrance off the local access road (L7131-1) which runs along the northern boundary of the development site in the townland of Glenard. The local access road is, in turn, accessed via the L1731 Local Road. This entrance will be used as the primary site entrance for HGVs, turbine component deliveries and other abnormal loads during the construction phase of the proposed development. Once the proposed Glenard Wind Farm is operational, this entrance will remain in place and will be used for forestry operations.

It is intended that the port of entry for large turbine components will be the Foyle Port and Harbour. Specialised delivery vehicles will transport turbine components to the site via the Northern Irish road network through Derry City and then along the regional and local road network in co. Donegal.

The applicant expects that for each megawatt hour (MWh) of electricity produced by the wind farm, the project will contribute €2 into a community fund for the RESS period i.e. first 15 years of operation and €1 per MWh for the remaining lifetime of the wind farm. If this commitment is improved upon in upcoming Government Policy it will be adjusted accordingly .If this project is constructed as currently designed we estimate that a total of approximately €7 million will be available in the local area for community funding over the lifetime of the project.The Community Benefit Fund belongs to the local community. The premise of the fund is that it should be used to bring about significant, positive change in the local area. To make this happen, the first task will be to form a benefit fund development working group that clearly represents both the close neighbours to the project as well as nearby communities. This group will then work on designing the governance and structure of a community entity that would administer the Community Benefit Fund. Coillte aim to commence this work in autumn 2020.

In addition to the economic benefits of the proposed development, there will be potential social and recreational benefits associated with the recreational and amenity proposals that will form part of the project. The proposed development and all its associated infrastructure creates a unique opportunity to develop an amenity area for use by members of the local and wider community alike. The upland nature of the site is attractive to both locals and visitors to the area. It is proposed to develop some recreational walks as part of the Glenard Wind Farm project. These proposed walks will utilise existing forest tracks, new wind farm roads and proposes trails, The proposed amenity facilities will allow for a safer and improved visitor experience and allow the site to be more openly available to walkers, trail runners, cyclists and other recreational users, as outlined in Section 4.6 of Chapter 4 of this EIAR.

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 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 have been 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.

It is estimated that the construction phase will take approximately 12 to 18 months from starting onsite to the full commissioning of the wind farm. The construction phase can be broken down into three main phases, 1) civil engineering works: 18 months, 2) electrical works: 18 months, and 3) turbine erection and commissioning: 9 months.

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.

The wind turbines proposed as part of the proposed development are expected to have a lifespan of approximately 35 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 onsite substation will remain in place as it will be under the ownership of the ESB/Eirgrid.

Population and Human Health

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

The proposed wind turbines are located within existing commercial forestry in north Co. Donegal on the Inishowen Peninsula. The proposed wind farm site is located approximately 5.9km east of the coastal town Buncrana, the largest town on the Inishowen peninsula, and approximately 6.2km west and 6.7km northwest of the coastal villages Quigley's Point and Muff, respectively. All three centres provide retail, recreational, educational, and religious services.

The proposed development site is located approximately 5.9km east of Buncrana which overlooks Lough Swilly and 6.2km west of Quigley's Point village which overlooks Lough Foyle. 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 7 No. District Electoral Division (DED)s within and adjacent to the development site. The population of the DEDs within the Study Area decreased by 1.8% between 2011 and 2016, falling from 11,558 to 11,347 persons, respectively, with the rate of population change unevenly distributed between the DEDs. The percentage labour force for the Study Area population was 59.4% which is lower than for the State as a whole (61.4%), but higher than for Co. Donegal (57.3%). The percentage of the Study Area labour force who are unemployed is higher than the State and lower than County Donegal, at 15.5%.

As stated above, approximately 100 – 120 jobs could be created during the construction, operation and maintenance phases of the proposed development with most construction workers and materials sourced locally, thereby helping to sustain employment in the construction trade. This will have a Short-Term Significant Positive Impact.

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

Shadow flicker is an effect that occurs when rotating wind turbine blades cast shadows over a window in a nearby property. Shadow flicker may be experienced by an occupant sitting in an enclosed room when sunlight reaching the window is momentarily interrupted by a shadow of a wind turbine's blade. Shadow flicker effect lasts only for a short period of time and happens only in certain specific combined circumstances. Current guidelines recommend that shadow flicker at neighbouring dwellings within 500

metres of a proposed turbine location should not exceed a total of 30 hours per year or 30 minutes per day. Just 7 No. dwellings are located within 1km of any proposed wind turbine location with five of these dwellings being occupied, the nearest is located 750m from the nearest proposed turbine.

The potential flicker that will occur at houses located within the area surrounding the proposed development was calculated using the WindFarm software package and a regional sun factor of 28.82% was applied. Of the 22 No. residential properties modelled, it is predicted that 10 No. properties may experience daily shadow flicker in excess of the 2006 DoEHLG guideline threshold of 30 minutes per day. However, this prediction does not consider wind direction or screening provided by intervening vegetation and topography.

Where shadow flicker exceedances are experienced, suitable mitigation measures as outlined in Chapter 5 will be employed at the potentially affected properties to ensure that the current adopted 2006 DoEHLG guidelines are complied with at any dwelling within the 1km study area. The same mitigation strategies also demonstrate that the proposed Glenard Wind Farm 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.

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

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

Biodiversity

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

Multidisciplinary walkover surveys and detailed botanical surveys were undertaken on the13th June 2017, 14th May 2019, 28th May 2019, 27th June 2019, 8th July 2019, 14th August 2019, 15th August 2019, 4th September 2019, 17th September 2019, 2nd December 2019, 16th April 2020, 28th April 2020, 17th June 2020, 2nd July 2020, 18th August 2020, 1st September 2020, 2nd June 2021, 3rd June 2021, 30th November 2021 and 1st December 2021. The survey timings were targeted to generally fall within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith et al., 2011), as well as to carry out targeted protected species surveys. A comprehensive walkover of the entire site was completed.

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

The majority of the study area (580 hectares/86.3% of the study area) is dominated by plantation forestry, comprising mainly of Sitka spruce (*Picea sitchenis*) and Lodgepole pine (*Pinus contorta*). Turbines T1, T2, T3, T4, T5, T6, T7, T8, T9, T11, T13, T14 and T15, the substation and the two proposed construction compounds all occur entirely within conifer plantation habitat. Peatlands occurring within the site comprise mainly of Upland blanket bog (PB2) with some small areas of Cutover bog (PB4). Some areas of Upland blanket bog (PB2) are intact, however in many areas the peatland is degraded, for example where these adjoin conifer plantation. Historic and some recent peat extraction has been undertaken in small areas of peatland within the north and south of the EIAR study area. Therefore, those peatland habitats within the site have been assessed as Cutover bog (PB4). Part of turbine no. Turbine T12 is located on Upland blanket bog (PB2), with T10 located adjacent to this habitat within an area of forestry. The peat depth at T12 was between 1.1 and 1.9 metres. In addition, the vegetation composition at both T12 and to the west and further to the north of T10 was typical of blanket bog habitat with some signs of historic drainage evident in the wider area. Some signs of grazing (sheep droppings) and historic burning (old dead heather) was evident in some areas. Such activities have resulted in part of this habitat within the site becoming degraded, with a greater abundance of grasses becoming established and heather reducing. In some areas of the site, Sitka spruce has also become established within the blanket bog in the western area of the site as a result of natural seed dispersal from the nearby forestry. In wetter areas, the peatland habitat formed a mosaic with Poor fen and flush (PF2).

The construction of the proposed windfarm and associated infrastructure will result in the direct loss of approximately 0.25 hectares of Upland blanket bog (PB2) and Cutover bog (PB4) as a result of the proposed Turbine no. T12 (degraded bog), sections of the new site access track between T10 and T14 (the area of blanket bog in this area of the site also forms an intimate mosaic with small areas of Poor fen (PF2)) a narrow strip of cutover bog between T13 and T14, and a small area of degraded bog at the site of the new access road between T1 and T9. The remaining area of peatland habitats within the EIAR study area boundary have been entirely avoided in the design of the project with no potential for any effect thereon. The proposed development provides for the replacement of peatland habitat through the restoration of a 2.7-hectare area of forestry (WD4) back to peatland, located adjacent to the north of Turbine T10. It is additionally proposed to undertaken enhancement of an adjacent area of peatland, covering an area of 2.7 hectares, through drain blocking and the removal of encroaching conifers (establishing as a result of natural seed dispersal).

In order to accommodate the proposed road widening works at the northern site entrance to facilitate turbine delivery approximately 75 linear meters of hedgerow is proposed to be cleared. As compensation for the loss of hedgerow it is proposed to carry out hedgerow planting further to the north along this road. Approximately 270m of hedgerow planting will be carried out along this area, which will result in a net gain in this habitat within the site and will improve connectivity between the existing tree cover and linear habitat features in this location.

Following the implementation of the Biodiversity Management Plan, the proposed development has the potential to result in a positive impact on biodiversity within the study area.

In general, given the highly modified nature of the site, dominated by commercial coniferous forestry (WD4), limited suitable habitat occurs on site for protected faunal species. Signs of badgers activity was recorded during the surveys undertaken; however no badger sett was recorded within the EIAR study area boundary (two badger setts were recorded outside of EIAR boundary one recorded over 600 metres to the south of the EIAR study area boundary and the other over 480 metres south of T13). Evidence of fox, red squirrel, pine marten, Irish hare and otter was also recorded within the site. In addition, detailed bat and aquatic invertebrate assessments have been undertaken as part of the detailed baseline assessment. The detailed results of which are provided in technical appendices to this EIAR. No evidence of populations of these species being significant at more than a local level was recorded. No signs of any additional protected fauna were recorded within the study area during the field surveys.

No significant effects on surface water quality, groundwater quality or the hydrological/ hydrogeological regime were identified during either construction nor operation.

Provided that the proposed development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant residual impacts on 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 (KORs) and the assessment of effects follow a precautionary approach.

The potential for effects on designated sites is fully described in the Natura Impact Statement (NIS) that accompanies this application. The 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). With the exception of hen harrier and curlew, for which long-term moderate negative effect (EPA, 2017) and high effect

significance (Percival, 2003) were predicted. However, as detailed in Section 7.9, of Chapter 7 of this EIAR, a robust mitigation plan is proposed to reduce the magnitude of the impact from long-term moderate negative effect (EPA, 2017) and high effect significance (Percival, 2003) to 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 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

The geology of the site predominately comprises blanket peat overlying glacial subsoil deposits which in turn are underlain by shist bedrock. Trial pits and visual inspections were undertaken to investigate the subsoil conditions below the peat. Peat depths were determined by probing.

Peat depths recorded at the wind farm site ranged from 0 to >5.6m with an average of approximately 2m. The peat depths recorded at the turbine locations varied from 0.5 to 3.2m with an average depth of 2m. 30% of the peat depths were between 2 and 2.5m with 56% below 2.5m and 85% below 3.5m.

With respect to the existing and proposed access roads, peat thicknesses are typically less than 2m with localised depths of 4m.

Construction of the wind farm infrastructure will require the removal of peat, soil and rock to competent foundation. Excavation of bedrock from the proposed on-site borrow pit will provide material for access road, turbine bases and general hard-standing construction. Removal of soil, peat and bedrock represents a permanent direct impact on the geology of the 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. Refuelling 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.

The peat stability assessment undertaken at the site shows that the site has an acceptable margin of safety for the proposed development. A number of control measures are given in the peat stability assessment to manage all risks associated with peat instability.

A Peat Management Plan has been prepared for the development which details management of peat during construction works and long term storage thereafter. Peat removed during the excavation works will be deposited in the proposed on-site borrow pit and peat repository.

The potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

No significant impacts on land, soil and geological environmental are anticipated during the construction, operation or decommissioning phases of the Proposed Development.

The geological impact assessment undertaken in this chapter outlines that significant effects will not occur due to the localised nature of the construction works and therefore there is no potential for cumulative effects.

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 Croagh Wind Farm development on water aspects (hydrology and hydrogeology) of the receiving environment.

Regionally the proposed wind farm site including the grid connection are located in the Lough Swilly surface water catchment. Some of the turbine delivery route works, which includes the 2 no. link roads at the L1731, are located in the Culdaff – Clonmany – Donagh coastal regional catchment (i.e. Lough Foyle catchment).

On a more local scale, the northern half of the wind farm site (including 9 no. of the proposed 15 no. turbines) is located in the Crana River surface water sub-catchment. The southern half of the wind farm site (including 6 no. of the proposed 15 no. turbines, substation and the grid connection cable) is located in the Mill River surface water sub-catchment. Both the Crana River and the Mill River drain to Lough Swilly.

Along with the local internal stream network, there are numerous manmade drains that are in place predominately to drain the forestry plantations. The integration of the proposed wind farm infrastructure with the existing forestry drainage in a manner that avoids water quality impacts in downstream water bodies is a key component of the wind farm design.

The bedrock underlying the Proposed Development site is classified as poor in terms of well water yield potential. The bedrock has little or no open cracks which means groundwater movement within the aquifer is very 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 sensitive to pollution than groundwater at this site. There will be no impact on private wells as a result of the development.

Designated sites that receive surface water runoff from the proposed wind farm development or grid connection route include Lough Swilly SAC and Lough Foyle SPA. These designated sites can be considered very sensitive in terms of potential impacts. Comprehensive surface water mitigation and controls are proposed to ensure protection of all downstream receiving waters. Any introduced drainage works at the site will mimic the existing drainage regime thereby avoiding changes to flow volumes leaving the site.

Due to the nature of wind farm developments, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site would be from hydrocarbon spillage and leakages at the borrow pit or during refuelling. 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 local 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. 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. No impacts on surface water quality are anticipated during the operational phase.

In terms of the potential impacts of developments on downstream surface water bodies, the period of greatest risk is during the construction phase of the Proposed Development as this is the phase when earthworks and excavations will be undertaken at the sites. However, within the Crana River and the Mill River catchments the vast majority of the other windfarm developments are operational (84% of turbines in the Crana River catchment are existing and 73% are existing in the Mill River catchment). Therefore, construction phase cumulative impacts with the proposed Glenard Wind Farm development are not likely if the development is permitted.

Overall, the proposed development presents no significant impacts to surface water and groundwater quality provided the proposed mitigation measures are implemented.

No significant cumulative impacts on any of the regional surface water catchment or groundwater bodies will occur from the Proposed Development associated grid connection or forestry replacement sites.

With the exception of some of the TDR works, the Proposed Development (including all of the wind farm site and grid connection infrastructure) drains into Lough Swilly which is Republic of Ireland owned waters and therefore no trans-boundary effects are likely.

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 4-3 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 June 2021, the Environment Protection Agency released 'Ireland's Greenhouse Gas Emissions Projections 2020-2040' which highlighted that emissions have trended upwards since 2011 with an overall peak in emissions reported in 2018. Ireland exceeded its cumulative 2020 greenhouse gas emissions target by 12 million tonnes, which is characterised by the EPA as being a 'wide margin'. Growing electricity demand over the next ten years (c. 19% - 50%) will further compound this challenge. In order to meet emission targets while ensuring the security of electricity supply, and a cost-effective delivery of new electricity generation on the system, Climate Action Plan (CAP) 2021 has set out a target a renewable energy target of up to 80% with onshore wind targeted for up to 8GW.

The proposed development will have an export capacity in the range of 60MW to 93MW and therefore will help contribute towards this target. As well as this, it will provide much needed grid infrastructure, and the capacity to offset 3,652,600 tonnes of CO_2 in its operational lifetime thereby reducing the Greenhouse Gas effect and improving air quality as we transition to cleaner energy industries. Please see Section 10.3.4 for details on Carbon offset calculations.

The carbon balance of proposed wind farm developments in peatland habitats has attracted significant attention in recent years. When developments 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, locally, 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. The model also calculates the carbon savings associated with the proposed wind farm development.

In total, it is estimated that **3,652,600** tonnes of carbon dioxide will be displaced over the proposed 35-year lifetime of the wind farm.

Construction of the proposed development will have a Short-Term, Imperceptible Negative Effect as a result of greenhouse gas emissions from construction plant and vehicles. Operation of the proposed development will have a Direct Long-Term Moderate Positive 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 Glenard wind farm development (the 'Proposed Development').

The background noise environment has been established through noise monitoring surveys undertaken at several noise-sensitive locations (NSLs) 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). Prevailing noise levels are primarily attributable to local noise sources including wind noise in foliage, agricultural activities and anthropogenic sources in the area including a degree of road traffic. 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 two stages: the short-term construction phase and the long-term operational phase.

The assessment of construction 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 (NSLs) is expected to be well below recommended significance threshold values. The associated construction noise and vibration impacts are not expected to cause any significant effects.

Based on detailed information on the site layout, the likely turbine noise emissions and turbine hub height for the proposed development, a series of 'worst-case' turbine noise prediction models have been prepared for review. The predicted turbine noise levels have been calculated at all NSLs in accordance with the IOA GPG recommendations. The predicted turbine noise levels associated with the Proposed Development in isolation are predicted to be within the best practice noise criteria curves recommended in Irish guidance document 'Wind Energy Development Guidelines for Planning Authorities 2006 at all non-involved NSLs. There are seven NSLs where the omni-directional turbine noise levels exceed the applicable noise criteria. With consideration of the effects of wind direction on noise propagation and a small degree of turbine curtailment, it is demonstrated that the predicted noise levels are within the criteria. 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 site.

In summary, the noise and vibration impact of the proposed development is not significant considering national guidance for wind farm developments.

Landscape and Visual

This chapter addresses the potential landscape and visual impacts of the Glenard Wind Farm. The emphasis in this chapter is on the likely significant effects of the proposed development, including the grid connection. It covers the assessment methodology, a description of the proposed development and the existing landscape based on relevant guidance. It includes a description of the landscape policy of Counties Donegal and Derry (as part of the study area extends into Northern Ireland, see Section 12.3.1 of Chapter 12 of the EIAR) with specific reference to wind energy and the study area in which the proposed development site is located.

Landscape Effects

The proposed wind energy development site is located in an area with a long history of wind energy development with wind turbines having been a feature of this landscape for some time. Therefore, while the proposed turbines add to the existing wind turbines, they do not introduce a new landscape element.

In the Donegal CDP the landscape of County Donegal has been categorised into three layers of value Areas of Especially High Scenic Amenity (EHSA), Areas of High Scenic Amenity (HSA) and Areas of Moderate Scenic Amenity (MSA). Of the proposed 15 No. turbines eight will be located in the lowest tier of category, MSA, and seven in the middle tier, HSA, with one turbine on the boundary between the two. Although Map 8.2.1 is not currently part of the Donegal CDP, in their designation of the area as 'Open to Consideration' for wind farm development, Donegal County Council included considerations of the landscape sensitivities of the area.

The majority of the area designated as 'High Scenic Amenity' within the EIAR site boundary is covered with non-native commercial coniferous plantation. This type of landcover would not usually be considered of scenic amenity as the colour, shape and uniform texture of this landscape element appears as incongruous to the existing landscape.

Furthermore, in their response to a preplanning enquiry Donegal County Council responded on the 9th of September 2015 and stated that the 'proposal was considered worthy in principal' due to, amongst other facilitators, the 'robust nature of the landscape'.

Other than Areas of Natural Beauty (AONB) there are no landscape designations in County Derry. The Nearest of these is over 19 kilometres away and will not be affected by the proposed turbines.

In terms of landscape character, the greatest magnitude of change (medium) will be experienced in the Co. Donegal's LCA 9 Scalp Mountain, in which the proposed development is to be located. In in all other LCAs the magnitude of change is considered Negligible to Low.

When the landscape sensitivities to wind farm development are taken into consideration for all the County Donegal LCAs the significance of effects on landscape character is deemed 'Slight' in the case of three LCAs and 'Not Significant' for one LCA.

In respect of the two County Derry LCAs brought forward for full assessment, the significance of effects on landscape character was found to be 'Not Significant' and 'Imperceptible'

Cumulative Landscape Effects

Although, it was found that the proposed turbines would add to the cumulative landscape status, it would not change the character of the individual LCAs in terms of wind energy development and therefore the cumulative landscape effects are considered Low for all the County Donegal and County Derry LCAs.

Visual Effects

Due to the topography of the study area and in particular the upland areas around the site, the turbines will be screened by landform from most areas within the study area as illustrated by Zone of theoretical Visibility (ZTV) mapping. As can be seen in Chapter 3: Consideration of Reasonable Alternatives, the site was designed to avail of the topographic surrounds with the intention of minimising the potential for visual effects.

Additionally, mature hedgerows and trees in other areas will provide additional screening. The forestry plantation, in the proposed development site and in the areas surrounding it, while subject to cyclical felling are only felled in limited areas, leaving adjacent mature or semi-mature trees to provide continued screening.

Key visual receptors, such as scenic routes and views, settlements, recreational destinations and routes as well as major transport routes were identified within the study area, after which those where visibility could be excluded due to there being no potential for visibility (identified in Zone of Theoretical Visibility (ZTV) mapping or site surveys) were screened out. For the remaining visual receptors, viewpoints were selected for which photomontages were prepared to assess the visual effects on the visual receptors.

There are many County Donegal designated scenic views within the 20-kilometre study area, however, the majority are directed away from the proposed development site or are shown to have no visibility of the proposed development by ZTV mapping. Only four were approximately directed to the proposed turbines and had sufficient theoretical and actual visibility to merit viewpoint selection. At all four the residual visual effects will be 'Slight'.

The vast majority of settlements within the study area will have no visibility of the proposed development due to topographic screening and distance. Potential visibility of the proposed development could only be established in two settlements in County Donegal, Buncrana and Malin and two settlements in County Derry, Derry City and Greysteel Village.

None of the recreational or tourist destinations identified in the 20-kilometre study area will experience any visual effects.

Viewing points marked on Ordnance Survey maps were identified. The majority will have no visibility of the turbines and in the case of many others the scenic views are in a different direction.

All major transport routes in Counties Donegal and Derry were assessed. Only one, the A2 in County Derry, had sufficient theoretical visibility to merit viewpoint selection. Here, the residual visual effects were considered 'Imperceptible' due to views being obscured by topography and distance.

There will be no visibility from the majority of recreational routes identified within the study area, Donegal Cycle Route, the Wild Atlantic Way and the Causeway Coastal Route.

Cumulative Visual Effects

Cumulative visual effects were assessed, using the viewpoints, in terms of increase in spatial extent of turbines within the views, the perceived difference of scale or design between the existing/permitted turbines and the proposed turbines and visual separation of the proposed turbines from the existing/permitted turbines.

The proposed development will, in most cases, not extend the spatial extent of turbines in the view or only slightly. In the cases where the spatial extent is increased this is mainly due to the fact that the proposed turbines bridge a gap between two permitted or existing wind farms rather than extending the spatial extent of turbines overall.

Although there is contrast with regard to scale and design, this is not greatly discernible outside 5 kilometres of the proposed turbines. In the four viewpoints within 5 kilometres, visual incongruity does occur where nearby windfarms overlap or are seen alongside the proposed turbines. However, there are instances where existing turbines appear visually very similar to the proposed turbines.

A comparative ZTV map (Figure 12-8) shows that the cumulative theoretical visibility of wind turbines in the study area over that of the existing and permitted turbines will increase only in some small areas.

Therefore, within five kilometres the proposed turbines give rise to noticeable cumulative visual effects, but for the study area as a whole, in terms of increase in spatial extent, visual separation and difference in scale the cumulative visual effects are less pronounced.

Archaeology and Cultural Heritage

This chapter comprises an Environmental Impact Assessment Report (EIAR) of the potential impact of the proposed Glenard wind farm development on the Cultural Heritage resource. Cultural heritage includes archaeology, architectural heritage and any other tangible assets. The assessment was based on Geographic Information System-based mapping, ZTV and Viewshed analysis to assist with the assessment of impacts on setting. Desktop analysis of all baseline data and a comprehensive programme of field inspection of the EIAR site boundary also took place.

Monuments within the EIAR Site Boundary – Direct Effects

No recorded monuments, National Monuments, RPS or NIAH are located within the EIAR boundary. A 19th century house and associated outbuilding were recorded along an existing road due to be upgraded in Glenard townland and this will be fenced off prior to groundworks in the vicinity and will be preserved in situ. No direct impacts to any of the aforementioned sites will occur therefore. Six bridges were recorded along the grid connection cable route. Two of the structures, which are now largely modernised, will have their road decks replaced. The cables will be buried within the road surfaces and excavation works along the grid route will be monitored by an archaeologist.

The sub-surface archaeological potential of the Proposed Development area is considered to be slight. Peat removal, topsoil removal will take place during groundworks associated with the proposed development including the grid connection cable route and the proposed delivery route. Archaeological monitoring will take place during construction of areas in undisturbed ground and will aim to identify and record any previously unknown potential sub-surface archaeological finds, features or deposits.

Transboundary Effects

Although the proposed turbine delivery route to the proposed windfarm originates and travels along public roads in Northern Ireland, no groundworks are proposed within Northern Ireland and therefore there will be no direct or indirect impacts on any cultural heritage features located therein. Areas where groundworks are proposed (such as road widening) are confined to County Donegal and a full assessment of such areas was undertaken. No Northern Ireland Sites and Monuments Record (NISMR) sites are located within 5km of the nearest proposed turbines and therefore no transboundary effects on NISMRs sites will take place as a result of the proposed turbines. No monuments in State Care or Scheduled monuments (Northern Ireland) are located within the 10km study area for State Care monuments and therefore there will be no trans-boundary effects on setting as a results of the proposed turbines. No trans-boundary effects to the Cultural Heritage resource will take place therefore.

Indirect Effects on National Monuments

Indirect effects on the setting of National Monuments within 10km, was included in order to assess impacts on setting in the wider landscape. The proposed turbines have the potential to impact on the setting of National Monuments in the wider landscape. In order to ascertain the degree of potential impact, both Viewshed Analysis and ZTV were utilised. Where an impact has been identified, they are considered to be slight mainly due to the intervening distance and the varying degrees of visibility (Slight impacts being described as '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'). As it is not possible to mitigate the indirect effects of the turbines in the wider landscape setting there are no mitigation measures for this potential impact.

Indirect Effects on RMPs within 5km

All monument types within 5km of the nearest proposed turbines are discussed in Section 13.3.1.4 of the EIAR. Potential impacts on setting were identified through the Zone of Theoretical Visibility. Impacts on setting within the 5km study area are Slight. The majority of monuments are located in areas which have no visibility in the direction of the proposed windfarm. Overall only 18 of the 46 monuments within 5km of the nearest proposed turbines show some visibility of turbines with the majority showing no visibility.

Indirect Effects on Record of Protected Structures (RPS) structures

No built heritage structures which are subject to legal protection are located within the wind farm site boundary or immediately adjacent to same. Furthermore, none, are located within 5km of any proposed turbine with the nearest structures being located in excess of 7km from any proposed turbine. No impacts on setting will occur therefore.

Indirect Effects on NIAH structures

Fourteen structures on the National Inventory of Architectural Heritage (NIAH) are located within 5km of the nearest proposed turbine. The results show that 3 of the 14 structures within 5km of the nearest proposed turbine may have some potential visibility of between 13 and 15 turbines. Two of the 14 structures may have visibility of 9 to 12 turbines with no visibility from the remainder of the NIAH structures. This is a worst case scenario as the ZTV model does not take vegetation or natural screening into consideration.

These structures are located to the north of the proposed development and consist of Srath Bridge (Map ID 1 and the Fullerton Pollan Dam (Map ID 2) and a house (Map ID 5). The setting of bridges in their isolated rural location does not extend beyond their functional area and the setting of the house may only extend to the house, yard and associated boundaries. In this regard, impacts on setting are considered to be slight-imperceptible and may be significantly reduced by existing screening and vegetation.

Cumulative Effects on Setting of National Monuments within 10km

A slight effect on setting was identified as a result of the proposed Glenard project when considered on its own, this effect arising due to the potential ability to see the upper portion of two turbines from the National Monument (O Doherty's Keep).

When the other projects are added to the viewshed, the following projects also have theoretical visibility from the National Monument: Sorne Hill I and II, Crockahenny, Meenkeeragh I and II, Mackel, Colpey Rock, J. McCarron turbine, Lurganboy I and Meenaward. The ability to potentially see more turbines from the National Monument will result in cumulative effects on setting. The overall effects are

not likely to be significant however. Overall, in the wider landscape setting, the ability to view other turbines (permitted, proposed and existing) as well as two of the proposed Glenard turbines is such that cumulative effects on setting of cultural heritage assets will occur.

Cumulative Effects on setting of RMPs, NIAHs and RPS within 5km

The addition of other projects, in particular, those near to the proposed development, will result in more turbines potentially visible from various locations within the 5km study area including from some recorded monuments and other cultural heritage assets (RPS, NIAH). The majority of recorded monuments, however, are located in private lands with no public access and in this regard appreciation of views from such monuments will be limited to small numbers of observers. Since the ZTV is based on a bare landscape model this potential visibility is likely to be less when taking into consideration existing boundaries and natural vegetative screening. No Significant Cumulative effects on RMPs/NIAHs within 5km will occur.

Material Assets

Traffic and Transport

An assessment was undertaken of the traffic effects of the proposed Glenard Wind Farm Development, consisting of 15 turbines, located on a site situated in Co. Donegal approximately 6.2km west of Quigley's Point, and 13.1km north of Derry City. The assessment considered the likely impacts of the proposed development during both the construction and operational stages of the development. 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.

Traffic Route & Study Area

From the point of arrival in the Port of Derry the delivery route to the site for the abnormally sized loads required to transport the turbine components to the site (blades, towers and nacelles) turns right from Haw Road onto the Maydown Road just to the east of the Port of Derry, and then continues to the site via the A2, followed by the A515 over the River Foyle. The route then travels north on the A2 Culmore Road out of the city on the west bank of the river / lough onto the R238. On reaching the village of Quigley's Point the rout turns left onto the R240 heading in a northern direction for approximately 7 kms. At this point the abnormally sized turbine loads will turn left onto a new temporary link road approximately 0.4 kms long that will link the R240 with the L1731. The vehicles will then travel west on the L1731 for approximately 6 kms where there is another short new link road proposed, before turning left onto the local L-7131-1 Crockaheeny Road where a new steel bridge crosses the River Crana. The abnormal loads will then travel east on the L-7131-1 Crockaheeny Road for approximately 0.8 kms to the location of a proposed junction that provides access to the site Smaller turbine components delivered to the site using standard articulated HGVs will also use this route.

The delivery route for general construction traffic, including site staff and heavy goods vehicles (HGVs) may vary depending on the location of the suppliers used for concrete and other materials required to construct the proposed development. Based on the location of suppliers in the vicinity of the Proposed Development, it is estimated that concrete and general construction traffic may arrive to the site from 3 different directions, from Carndonagh, situated to the north of the site, Gransha and Burnfoot located locally to the south of site and, from Letterkenny to the southwest. General construction materials, felled timber, other miscellaneous items and waste may be delivered to/from the site from the direction of Moville in the north, or Quigley's Point and Derry in the south, which will be the most likely delivery route, or from Buncrana in the west.

Vehicle types and network geometry

The types of vehicles that will be required to negotiate the local network will be up to 74.4 metres long with a blade length of 68.5 metres. An assessment of the geometric requirements of the delivery vehicles was undertaken on the turbine 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 addition to the assessment presented, it is recommended that a dry run is undertaken by the transport company to check vertical and horizontal clearance on the transport route prior to construction.

Traffic impact on local network

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

- During the 15 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 +4.3% on the R238 south of Quigley's Point, to +8.1% on the R240 west of Quigley's Point to an increase of 1000% on the L1731 and by a factor of 18 on the L-7131-1 Crockaheeny Road approaching the site. It is noted that the high percentage increases forecast for the L1731 and the L-7131-1 Crockaheeny Road are due to the low volume of background traffic. The direct effect on all these roads will be temporary, and will be slight.
- During the remaining 367 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 +1.6% on the R238 south of Quigley's Point, to +3.0% on the R240 west of Quigley's Point to an increase of 75% on the L1731 and by a factor of 7 on the L-7131-1 Crockaheeny Road approaching the site. On these days, the direct effect will be temporary and will be slight.
- During the 27days 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 +1.4% on the R238 south of Quigley's Point, to +2.6% on the R240 west of Quigley's Point to an increase of 64% on the L1731 and by a factor of 6 on the L-7131-1 Crockaheeny Road approaching the site. These large turbine components being delivered during the day reflects the worst-case scenario. The direct effect will be reduced from moderate to slight as the delivery of the large plant will be done at night, as is proposed.
- During the 15 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 +0.5% on the R238 south of Quigley's Point, to +1.0% on the R240 west of Quigley's Point to an increase of 25% on the L1731 and by a factor of 3 on the L-7131-1 Crockaheeny Road approaching the site. The direct effect during this period will be temporary and will be imperceptible to slight.

It was determined that all links in the study area and the junction between the R238 and the R240 will operate within operational capacity for all days within the construction period.

Once the development is operational the traffic impact created by maintenance staff will be imperceptible as it will only involve a maximum of 2-3 trips per week to and from the site by vans.

The successful completion of this project will require significant coordination and planning, and a comprehensive set of traffic management measures will be put in place before and during the construction stage of the project in order to minimise the effects of the additional temporary traffic generated by the proposed wind farm. The range of measures are set out in the Traffic Management Plan which will be implemented during construction and these measures include the appointment of a

traffic management coordinator, agreement of a delivery programme with the relevant local authorities, use of temporary signage, management of site access and provision of information to local residents.

Telecommunications and Aviation

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

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

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

Vulnerability of the Project to Major Accidents and Natural Disasters

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

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

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

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

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

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

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

Transboundary Effects

This section of the EIAR describes the potential for transboundary effects of the proposed Glenard Wind Farm development, on Northern Ireland, during the construction, operation and decommissioning phases. This chapter draws on the consideration of potential transboundary effects in Chapters 5 to 14 of this EIAR.

The need to consider transboundary impacts has been embodied by The United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context, (referred to as the 'Espoo Convention') adopted in 1991. The Espoo Convention requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts. The Espoo Convention has been ratified by the European Union, Ireland and the United Kingdom of Great Britain and Northern Ireland.

The site of the Glenard Wind Farm development is located on the Inishowen peninsula in Co. Donegal, approximately 5.9km east of Buncrana, 6.3km west of Quigley's Point and approximately 7km north of the International border with Northern Ireland at its closest point on land. Refer to Figure 17-1 for context. The list of all townlands within which the development site and grid route are located can be found in Chapter 1 Table 1-1 of this EIAR. However, the intended route for turbine component delivery runs through Northern Ireland.

It is intended that the port of entry for large turbine components will be Foyle Port and Harbour in Northern Ireland. Vehicles delivering large turbine components and other abnormal loads to the site will depart from the Foyle Port and Harbour and travel east for a short distance along the Port Road and Temple Road before travelling south on the Maydown Road and then turning southwest onto the A2 road. The delivery vehicles will then turn onto the A515 road and cross the River Foyle before re-joining the A2 at the A2/A515 intersection. The vehicles will cross the International border into the Republic of Ireland at the village of Muff, Co. Donegal and will continue to the site of the proposed development.

The potential for transboundary impacts and their effects have been assessed throughout this EIAR and it has been concluded that there will be no significant transboundary effects on Northern Ireland due to the construction operation or decommissioning 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.