Environmental Impact Assessment Report

Keerglen Wind Farm, Co. Mayo

Volume 1 Non-Technical Summary

ABO Energy Ireland Ltd.

August 2024

Table of Contents

Note:

The EIAR comprises five volumes and is accompanied by this Non-Technical Summary. Volume 1 of this EIAR contains a Non-Technical Summary, which gives a brief non-specialist outline of the project. Volume 2 of the EIAR and contains the main text of the EIAR. Volume 3 contains the figures associated with the various sections in Volume 1 and 2, these should be referred to where noted. Volume 5 contains landscape photomontages associated with Chapter 10. The appendices are contained in Volume 4.

Cover Photograph: MacroWorks (2024) *Montage of proposed Keerglen Wind Farm*

1.0 Introduction

This Non-Technical Summary (NTS) is part of an Environmental Impact Assessment Report (EIAR) which accompanies the planning application for Keerglen Wind Farm. The NTS provides a non-technical summary of the results and conclusions within the EIAR.

Environmental Impact Assessment (EIA) is a process for anticipating the effects on the environment caused by a development. An Environmental Impact Assessment Report (EIAR) is the document produced as a result of that process. An EIAR is defined as a statement of the effects, if any, which the proposed development, if carried out, would have on the environment.

This EIAR has been prepared to accompany a planning application by ABO Energy Ireland Ltd., hereafter referred to as 'the applicant', to Mayo County Council. The applicant is applying for a ten-year permission for the development of a wind energy project.

For the purposes of the planning application the proposed development will consist of:

- Construction of up to 8 No. wind turbines with a maximum overall tip height of between 176-180m, comprising rotor diameters ranging between 133-150m and hub heights ranging between 105-112m high;
- Associated Wind Turbine foundations and hard stand areas at each turbine;
- 1 No. 38kV electrical substation building, compound and associated infrastructure works;
- 1 No. temporary welfare site compound and associated works;
- 20kV underground cables facilitating the connection of turbines to 38kV electrical substation and all associated infrastructure and works;
- Provision of a new temporary roadway connecting the R315 and the L51723 in the townland of Ballinglen to facilitate the delivery of turbine components and other abnormal loads;
- Widening and ancillary works to sections of the L51723 in the townlands of of Keerglen and Ballykinlettragh;
- Provision of new permanent site access of the L51723;
- Upgrading of existing agricultural tracks and drainage infrastructure, and construction of new internal site tracks and all associated works as required;
- Construction of a clear-span bridge crossing the Keerglen River within the development area;
- 1 no. borrow pit;
- Designated peat storage areas alongside internal side roads;
- Site drainage;

- Ancillary forestry felling to facilitate construction and operation of the proposed development;
- All associated infrastructure and site development works.

For the purposes of the EIA Directive[1], the EIAR further considers:

- Temporary minor off-site works along the turbine delivery route;
- Approximately c. 22km of 38kV underground electricity export connection works and associated works along public roads and private lands to include horizontal directional drilling at bridge locations;
- Temporary met mast of between 100-112m in height and all associated infrastructure and works;

The proposed wind energy project, to be known as 'Keerglen Wind Farm', is located in the townlands of Keerglen, Ballinglen and Ballykinlettragh on a site measuring a combined c.81.88 ha. The site location is illustrated in more detail in the Drawing Pack submitted as part of the planning application.

ABO Energy Ireland Ltd. are managing and coordinating the production of the EIAR and have engaged a team of specialist and competent consultants to carryout baseline survey work and conduct impact statements. Table 1.4 of the EIAR provides a summary of the professional team and their area of contribution.

All volumes of the EIAR submitted in support of the planning application are available for viewing at Mayo County Council, Civic Offices, Castlebar during their public opening hours. An electronic copy of all documentation can be accessed via the Mayo County Council planning portal, available at http://www.eplanning.ie/MayoCC/searchtypes

2.0 Alternatives, Scoping & Public Consultation

The section of the EIAR, prepared by ABO Energy Ireland Ltd., outlines the wide range of practices and procedures used to help facilitate the responsible and sustainable development of the proposed Keerglen Wind Farm. The section has been largely informed and guided by the:

- *'Guidelines on The Information to be Contained in Environmental Impact Assessment Reports'* (Environmental Protection Agency, 2022),
- Environmental Impact Assessment of Projects - *Guidance on the preparation of the Environmental Impact Assessment Report (European Union, 2017)*;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018)

[1] Please note there are differences in what is being applied for under Part III of the *Planning and Development Act 2000, as amended* and what is being presented under Part X of the same statute.

- DoHPLG (2019) *Draft Revised Wind Energy Development Guidelines* (hereafter referred to as DWEDG)*;*
- DCCAE (2016) *Code of Practice for Wind Energy Development in Ireland: Guidelines for Community Engagement;*
- IWEA (2018) *Community Engagement – Partnership and Progress*

The Applicant has taken the necessary measures to ensure that, before submitting an application for development, an examination of alternative solutions, scoping exercises and public consultation was carried out in full. An extensive site finding exercise to identify suitable green field sites in Co. Mayo and surrounding area for wind energy development. Ideally and primarily, any green field site which is identified should be in an area with a suitable wind resource and address a number of other constraints. An ordered approach involved a *sieve mapping analysis* of the receiving environment; potential constraints associated with an area and any likely impacts which must be balanced in order to identify the most suitable location for wind energy development. Within each site, there can be a number of different options as to how the processes or activities of the development can be carried out. At Keerglen, consideration of environmental factors has influenced the selection of processes which avoid adverse impacts. The design process considered a number of different site layouts, following various constraints to wind farm development being identified and surveyed in detail. The primary mitigation measure employed by the applicant is mitigation by avoidance. A constraints map was compiled taking into account all sensitive environmental concerns. The Constraints Map limited the buildable area of the development within the EIAR study site, thereby limiting the number of turbines and associated infrastructure. All proposed turbines are sited outside of the sensitive environmental areas.

The carrying out of scoping or pre-application consultations is an informal but widely practised means of ensuring that all relevant issues associated with a proposed development are considered and addressed prior to the submission of a planning application. This consultation offers the opportunity to gain advice and help from a wide range of state-bodies, organisations, individuals, local communities and interest groups on a formal and informal basis. Appropriate consultation is usually an essential part of the process of Environmental Impact Assessment, without which the effectiveness of the process as a whole may be greatly diminished. The scoping process identifies the issues that are likely to be important during EIA and eliminates those that are not. The feedback and scope of issues raised by statutory and non-statutory consultees have guided the design of the proposed development. This process has allowed the applicant to fully anticipate the effects on the environment caused by a development and avoid or reduce the impact where relevant. The evolution of the design and alternatives explored reflects this.

ABO Energy Ireland Ltd. are committed to public consultation and stakeholder engagement, which recognises the right of residents to have a meaningful role in developments that affect their community. To ensure a comprehensive public consultation, the Applicant has been guided by the IWEA (2016) Code of Practice for Wind Energy Development in Ireland: Guidelines for Community Development and section 4.3.2 of the DWEDGs which highlight the importance of early and meaningful community consultation in advance

of and in addition to the statutory public consultation as part of the planning process. Further details of the public consultation are included in the Community Report in Appendix 2.3, however in brief the process included the following methods:

- Door to Door consultation with nearest neighbours of the site;
- Distribution of Project Newsletters;
- Provision of a dedicated of a Project Website;
- Phone Calls and Written Communication with local residents;
- Written Communication with key Community Groups and Clubs;
- Meetings, Phone Calls and Written Communication with Elected Public Representatives;
- Meetings, Phone Calls and written communication with the local media (Western People);
- A Town Hall Public Consultation Meeting

ABO Energy Ireland Ltd. intends to continue consultations and engage with the community throughout the construction and operations periods, should the application be granted. The following measures are proposed post planning stage:

- The Community Liaison Officer (CLO) will continue to be accessible to the local community throughout the construction to the commission stages to allow for dialogue and communication and to keep the public informed about the progress of the project.

- A community benefit fund will be rolled out with members of the local community to successfully implement the fund, and ensure it meets the needs of the local community.

3.0 Development Description

This section of the EIAR, which was prepared by ABO Energy Ireland Ltd., describes the component parts as well as the physical elements of the wind farm, outlining the anticipated construction programme, operation and decommissioning phases.

Keerglen Wind Farm will comprise eight turbines a maximum overall tip height of between 176-180m, comprising rotor diameters ranging between 133-150m and hub heights ranging between 105-112m high. The specifications of wind turbines are undergoing a continuous process of development. On this basis and as the project is at the early planning stage, a decision on the final turbine model selection has not been made. However, a number of candidate turbines which fit within the hub height range, rotor blade and maximum tip height parameters defined in the development description have been considered enabling design flexibility whilst allowing a worst-case assessment for each environmental factor.

Closer to the construction stage should planning permission be granted, and when a definite date for connection to the national grid has been confirmed by the network operator, the applicant will be in a position to select the most appropriate turbine for the site within the constraints of the planning permission based on the latest technological developments. At that point the final specification of the proposed turbines shall be submitted to the planning authority for written agreement. It is important to note that the final choice of turbine will comply with the requirements of the planning permission and the relevant planning policy and wind energy guidance in place at that time. The applicant therefore welcomes the inclusion of a suitably worded planning condition requiring that the final specification of the proposed turbines are submitted to the planning authority for their assessment and agreement.

The turbine comprises a horizontal, modular and tubular steel tower upon which is mounted a nacelle containing a rotor hub. Off this will be of the three generic blades bolted to the central hub, which is connected to a gearbox located in the nacelle. Earthing and isolation protect all components from lightning strikes. The finished level of all turbine foundations shall be below existing ground level at the location of each turbine. The turbines have multiple coatings to protect against corrosion and shall be finished in a matt off-white or light grey finish. All service cables and power lines from the turbines to the substation and any other cabling shall be either internal to the turbine or run-in underground ducts. The turbine will be lit in accordance with IAA recommendations. The typical lifetime of a turbine is approximately 30 years, however recent technological advancements, are serving to elongate the lifespan of turbines beyond 30 years.

Keerglen Wind Farm will have one permanent site entrance, entering from the L51723. The development provides a new temporary roadway connecting the R315 and the L51723 in the townland of Ballinglen to facilitate the delivery of turbine components and other abnormal loads. The access onto the public road will be adequately set back from the road edge to enable other users to see traffic emerging from the entrance. The proposed development will construct new internal access tracks circa 3.7km in length and the upgrade of existing tracks circa 3.5m in length. A clear-span bridge crossing the Keerglen River will be constructed within the development area.

The proposed development seeks the provision of one no. borrow pit located to the centre of the proposed wind farm, a designated peat storage areas alongside internal side roads, the provision of a temporary welfare site compound, measuring circa.50m x 50m; associated site drainage; ancillary forestry felling to facilitate construction and operation of the proposed development and all associated infrastructure and site development works.

For the purposes of the EIA Directive[2], the EIAR for the proposed development further considers temporary minor off-site works along the turbine delivery route; approximately c. 22.8km of 38kV underground electricity export connection works to the existing Tawnaghmore ESB Substation or to a Large Energy

[2] Please note there are differences in what is being applied for under Part III of the *Planning and Development Act 2000, as amended* and what is being presented under Part X of the same statute.

User at Killala Business Park and associated works along public roads and private lands to include horizontal directional drilling at bridge locations and temporary met mast of between 100-112m in height and all associated infrastructure and works;

Separate, individual planning applications will be made for the underground electricity export connection works, turbine delivery route and temporary meteorological mast in the future.

Following the planning stage, the project will have three distinct phases: Construction; Operation; Decommissioning. It is anticipated that the construction, erection and commissioning of all wind turbines would last approximately 15 months. Construction would be progressive over a year, minimising the number of simultaneously active locations and ensuring that traffic is kept to a minimum. The operational period for the proposed wind farm is 30 years from the date of commissioning of the wind turbines. Regardless of when the commissioning occurs, the planning authority will be notified of the date, giving effect to the timelines of a Decommissioning Plan included in Appendix 3.4

4.0 Policy and Legislation

This section was prepared by ABO Energy Ireland Ltd. It describes the existing policy environment for the proposed Keerglen Wind Farm, Co. Mayo. It addresses relevant policy, legislation and planning guidance which relate to the proposed development. The chapter is structured to cover international, European, national and regional level policies and legislation on climate change, energy and planning relevant to the project.

Ireland, like many modern economies, is facing a wide range of challenges in energy policy due to a number of factors, including: rising prices of primary inputs (especially fossil fuels), energy and fuel price risk and volatility, energy supply security, greenhouse gas emissions, non-greenhouse gas emissions, rising demand, the requirement to invest/replace grid and infrastructure, and the creation of energy market competition and a single EU market. With these challenges to the fore, renewables policy is an important issue for Ireland. Accordingly, over the past decade, energy and environment policies have been adopted and realigned to reflect new concerns at national and international levels, to address the new realities in these areas and provide a focus for future actions.

The development of wind energy in Ireland has therefore primarily come as a response to EU Directives and policies and the road map[3] set out by the EU towards achieving targeted reductions in emissions of greenhouse gases by 2050. These EU requirements have been translated into national policy with targets set for the electricity sector in terms of the proportion of electricity generated through renewable means by 2030.

[3] European Commission (2011) *A Roadmap for moving to a Competitive Low Carbon Economy in 2050*

Having regard to the portfolio of possible renewable energy solutions, within Ireland onshore wind energy is the most optimal given it benefits from one of the most favourable climates for harnessing wind energy in Europe and ultimately provides the lowest cost to the consumer.

In July 2021 the Climate Action and Low Carbon Development (Amendment) Act 2021 was signed into law. The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'.* The 2021 Climate Act has set a target of a 51% reduction in the total amount of greenhouse gases over the course of the first two carbon periods ending 31 December 2030 relative to 2018 annual emissions. The 2021 Climate Act defines the carbon budget as *'the total amount of greenhouse gas emissions that are permitted during the budget period'.*

The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan and a series of National Long Term Climate Action Strategies.

The Climate Action Plan 2023 (CAP 23), launched in December 2022, is the second annual update of the Climate Action Plan 2019 and the first plan to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021. The CAP 23 implements the carbon budgets and sectoral emission ceilings and sets a roadmap for taking decisive action to halve Ireland's GHG emissions by 2030. The CAP 2023 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

Among the most important measures in CAP 23, is to increase the proportion of renewable electricity to 80% by 2030 and a target of 9 GW (or 9,000MW) from onshore wind, 8 GW from solar, and at least 5 GW of offshore wind energy by 2030.

The Climate Action Plan 2024 (CAP 24) is the third annual update to Ireland's Climate Action Plan was approved on 21 May 2024. CAP 24 sets out a roadmap of actions which seek to achieve our national climate objectives by no later than the end of the year 2050. It aligns with the legally binding economy-wide carbon budgets and sectoral emissions ceilings that were agreed by Government in July 2022. Similar to CAP 23, CAP 24 details strong policy support for the provision of additional renewable energy developments, such as that proposed with the Keerglen Wind Farm.

Accordingly, the development of the Keerglen Wind Farm will therefore contribute significantly to meeting binding EU targets and ambitious Government targets for 2030 and beyond. The proposal further accords with the policies and objectives of the Regional Spatial and Economic Strategy (RSES) for the Northern and Western Regional Assembly and Mayo County Council's Renewable and Wind Energy Strategies as set out in the Mayo County Development Plan 2022 – 2028 (as varied)

5.0 Ornithology

BioSphere Environmental Services (BES) carried out the ornithological component for the EIAR for the proposed wind farm development at Keerglen, Co. Mayo. Bird surveys were carried out over a 34 month period. Vantage point surveys were in accordance with the methodology used for assessing impacts of wind farms on bird communities published by Scottish Natural Heritage. Two Vantage Point (VP) locations provided extensive views of the wind farm site and surrounding areas. Walkover or transect surveys were undertaken targeting passerine bird species within the proposed wind farm site. Bird surveys were also carried out along the underground electricity export connection route corridor and in the wider hinterland of the site. Survey limitations are not identified for the ornithological study.

No part of the Keerglen site is within or adjoins a site designated for the protection of birds.

Construction work during the bird breeding season has potential to have localised disturbance effects on bird species. A pre-construction surveys will be undertaken for these species to confirm the breeding status in the area by the time of construction. It is noted that passerine species, including species such as meadow pipit, are not perceived as being prone to displacement as a result of the presence of wind turbines (SNH 2017). As a result, the of the species being fairly tolerant of disturbance, it would be expected to be disturbed only if nesting very close to the works. For these species, the effect of the potential loss of some pairs for one season is rated as adverse but given the temporary nature the significance of the effect is deemed to be Not Significant.

The baseline surveys showed that while sparrowhawk was scarce within the Wind Farm Site it is expected to breed within the hinterland (1-2 km distance) of the Wind Farm Site. As sparrowhawk is a woodland species that nests in woodland and hunts largely along woodland margins and over scrub, it is expected that the species will not be displaced from suitable habitat in the vicinity of turbines at the Wind Farm Site - significance of potential effect rated as Not significant.

While there was only one record of golden eagle passing through the site for the proposed wind farm during the baseline surveys, the habitat in the wider area is likely to be suitable for foraging by eagles. It is expected that the species will not be displaced from suitable habitat in the vicinity of turbines at the Wind Farm Site - significance of potential effect rated as Not significant.

The baseline surveys showed that while buzzard is scarce on the Wind Farm Site it is expected to breed within the hinterland (1-2 km distance) of the Wind Farm Site. As buzzards from local breeding pairs may forage in the area proposed for the wind farm at Keerglen, it is expected that the species could show some signs of displacement around the turbines at the proposed development site. It is likely that any displacement effect would be highest in the early period of operation, with some degree of habituation occurring over time (Pearce-Higgins *et al.*, 2012). Significance of potential effect is rated as 'Slight' and of short to medium-term duration.

Kestrel was recorded regularly during the baseline surveys, with breeding expected to occur in the local area (1-2 km distance). The species uses the Wind Farm Site for hunting purposes. For kestrel, the significance of a potential displacement effect is rated as Not significant.

The baseline surveys showed that red grouse is resident within the Wind Farm Site. From the available information, it is considered that for red grouse the potential displacement effect due to the presence of turbines is Not significant, and the presence of the proposed development is likely to be a Neutral or even Positive effect of Moderate Significance in the Long-term.

The baseline survey data showed that golden plover breeds on blanket bog which adjoins the wind farm site (*i.e.* within NHA) and is also a winter visitor and passage migrant within the area of the Wind Farm. It is considered unlikely that the presence of the wind farm would have adverse effects on golden plover landing on the local bog in winter or during migration seasons as in these seasons the birds are highly mobile and tend to settle only for short periods in any one particular location – significance of potential effect rated as Imperceptible or Not significant.

Snipe was recorded both breeding and wintering within the Wind Farm Site in the baseline surveys. It is considered unlikely that the presence of the Development would have significant adverse effects on snipe utilising the bog. This is particularly so in winter when snipe is a widespread species of wet or partly improved fields within active agricultural lands - significance of potential effect on wintering snipe rated as Not significant.

Collision risk posed to bird species is one of the main environmental concerns associated with wind energy developments (Drewitt & Langston 2006, Band *et al.* 2007, Drewitt & Langston 2008). However, bird species differ widely in their susceptibility to collision mortality. Essentially, birds are at risk of collision only when their flight path overlaps with the rotor blade sweep area of a turbine. It follows that birds whose flight heights coincide with the height of the turbine rotor sweep are most at risk.

Collision risk posed to bird species is one of the main environmental concerns associated with wind energy developments. At the wind farm site, the following four species recorded flights within the rotor sweep height and inside the 2 km arc of the selected vantage points during the Vantage Point surveys (Kestrel, Golden plover, Buzzard, Sparrowhawk). Other species of conservation concern were recorded in the vantage point surveys but were excluded from consideration in the collision risk analysis due to the low frequency of recorded flights, as follows (Golden eagle (1 record), Peregrine (2 records), Lesser black-backed gull (1 record), Great black-backed gull (1 record)). Due to the low frequency of recorded flights for the above four species, the collision risk can be assumed to be effectively zero and the species are excluded from further consideration. In the present assessment, the predicted collisions risks are relatively low for all the target species, with only golden plover being predicted to have more than 1 collision per year.

For sparrowhawk, the estimated collision rate (0.071 birds per year) is negligible and such a loss would not be significant in the context of the local, county or national populations. Taking into account the favourable conservation status of sparrowhawk (Green-list), the significance of collision risk is rated as Not Significant The estimated collision rate was similar for kestrel (0.195 birds per year) and buzzard (0.194 birds per year).

For buzzard, the size of the bird and its tendency to fly relatively low and within the potential collision risk zone makes buzzard prone to collision. Watson et al. (2018) identify Buteo species, including Buteo buteo, as showing high risk of collision globally. In Ireland, however, buzzard has a favourable conservation status, which limits the potential for ecologically significant effects to result at the population level. Taking into account the favourable conservation status of buzzard (Green-list), the significance of collision risk is rated as Not Significant.

Golden plover had an estimated collision risk of 1.93 birds per year or 57.89 birds over the lifetime of the project. While the predicted collision rate for golden plover (i.e. 1.93 birds per year) is relatively low in the context of the estimated All-Ireland wintering population, the significance of the effect of the collision risk is rated as 'Long-term Adverse Effect of Moderate Significance' due to the high conservation importance of the species (Annex I, Red-list) and the recent significant long-term decline in the wintering population.

The Underground Electricity Export Connection Works and Turbine Delivery route corridors are along local roads and there is no potential for the occurrence of bird species of significant conservation importance, i.e. Annex I listed or Red-listed, along these routes.

The proposed development is not expected to have any residual effects on the Special Conservation Interests of any Special Protection Area (as detailed in the Natura Impact Statement).

It is considered that when such other wind farm projects and landuse activities are considered along with the proposed Keerglen wind farm development there will not be any in-combination effect on the birds of the Keerglen and wider area.

Mitigation measures are required to avoid disturbance to breeding birds, including A range of passerine bird species breed within the site, including meadow pipit (Red-listed) and sky-lark (Amber-listed) in the immediate area. Post construction bird monitoring will take place during the wind farm operation. The monitoring will determine (i) flight activity surveys, and (ii) distribution and abundance surveys and (iii) collision searches.

With the recommended mitigation applied, it is considered that the proposed wind farm project will not have any significant residual adverse effects on bird species within the site or in surrounding areas.

6.0 Biodiversity

O'Donnell Environmental Ltd. carried out detailed desktop and field studies of the terrestrial and aquatic ecology to inform an assessment of the potential impacts of Keerglen Wind Farm on the receiving environment (see Chapter 6 of the EIAR). The potential impact on avian ecology is presented separately in Chapter 5 of the EIAR.

The ecological assessment considers the potential effects of the project with regard to each phase of the development: construction phase, operational phase and decommissioning phase. Potential cumulative effects (in combination with other plans and projects) are also fully assessed.

A constraints-based approach was taken to the design of the wind farm and assessment of both the underground electricity export connection route and assessment of the Turbine Delivery Route, with early involvement of ecologists. Mitigation by avoidance was incorporated into the design of Keerglen Wind Farm.

The proposed wind farm site consists of an undulating rural landscape, dominated by agricultural pasture, with a number of low-lying hills, small watercourses and scattered farm settlements.

The proposed wind farm site itself does not lie within any EU Natura 2000 or nationally designated conservation sites, nor does the GCR cross any designated sites. The TDR crosses multiple Natura 2000 sites and a number of pNHAs. The potential impacts on the designated conservation sites and their qualifying interests are considered in detail in the Natura Impact Assessment that accompanies the EIAR. The assessment concludes that with the implementation of the environmental controls and reinstatement plans in the construction phase, that there will be no significant adverse impacts upon any of the Natura 2000 sites, or their qualifying interests, arising from the development of Keerglen Wind Farm.

The proposed wind farm site does not lie within any Natura 2000 sites. Ten Natura 2000 sites (one Special Protected Area (SPA) and nine Special Areas of Conservation (SAC)), are located within 15km of the proposed wind farm site. No additional SAC sites, beyond those identified are considered relevant to the current assessment due to the nature and scale of the proposed development, and the lack of a viable source-receptor pathway.

The proposed GCR lies outside the boundaries of any European designated sites. The facilitation works will involve inroad works as well and possibly off-road HDD works.

The TDR crosses the River Moy SAC at various locations and a number of other Natura 2000 sites, namely Unshin River SAC, Lough Eske and Ardnamona Wood SAC, Lough Melvin SAC, Cummeen Strand / Drumcliff Bay (Sligo Bay) SAC and Donegal Bay SPA. This route will generally follow existing road infrastructure and cross rivers via existing bridges. Facilitation works will be required at certain locations and those required at POI 'S3' will occur in close proximity to the River Moy SAC but not within the

designated site. Similarly, facilitation works at POI 'W3' and 'W6' may involve works within existing minor watercourses.

The potential impacts of the proposed development on Natura 2000 sites are considered in the accompanying AA Screening Report and Natura Impact Statement.

An aquatic ecological evaluation of each survey site was based on the results of desktop review (i.e., presence of species of high conservation value), fisheries assessments and habitat assessments, the presence of protected or rare invertebrates (e.g. freshwater pearl mussel, white-clawed crayfish), the presence of rare macrophytes and aquatic bryophytes and or associated representations of Annex I habitats.

Site B10 Cloonaghmore River was evaluated as County Importance given the presence of Annex I floating river vegetation [3260], respectively. None of the remaining 26 no. survey sites were evaluated as greater than Local Importance (Higher Value) in terms of their aquatic ecology.

A total of 17 sites on the Keerglen River (A2, A4 & A6) and unnamed tributaries (A1, A5, A7, A7b, A7c, A7d & A8), Ballinglen River (A9 & B4), Annagh Beg River (B7), Farmhill Stream (B9), Magherabrack River (B12), Duvowen River (C1), Garrynagran River (C2) and the Cloonaghmore River (C3) were evaluated as being of Local Importance (Higher Value) in terms of their aquatic ecology due to the presence of species and or habitats of higher conservation value. This was primarily due to the presence of higher conservation value species such as Atlantic salmon (six sites), European eel (eight sites) or otter (two sites).

The remaining nine sites on the Keerglen Stream (A3), unnamed Keerglen River tributaries (A5, B1, B2 & B3), Annagh More Stream (B5), unnamed Ballinglen River tributaries (B6 & B8) and the Farragh River (B11) were evaluated as being of Local Importance (Lower Value), given the absence of aquatic species or habitats of high conservation value. Site A6 on an unnamed Ballinglen River tributary was dry at the time of survey (August 2022) and did not support aquatic habitats or species at the time of survey.

Active and passive bat surveys were carried out across the study area. Overall, a low level of activity was recorded at the wind farm site, and a moderate level of species diversity. Eight of the nine resident Irish bat species were recorded. The Annex II species Lesser Horseshoe Bat was not recorded during any of the passive surveys. The proposed wind farm site generally lacks bat roosting opportunities and primarily represents a sub-optimal foraging and commuting habitat. Four species comprised the majority of registrations across the site and across all survey seasons. These species include Common Pipistrelle (25.6%), Soprano Pipistrelle (24%), Leisler's Bat (23.5%) and Natterer's Bat (20.1%). These species are all considered common and widespread within and Irish context and are largely considered generalist foraging species, despite their general avoidance of peatland habitat (Roche et al., 2014; Lundy et al., 2011). The notable exception is Natterer's Bat which tends to select more strongly for areas of woodland and riparian habitat (Lundy et al., 2011). Brown Long-eared Bat comprised the remaining majority of registrations (6.6%),

with Daubenton's Bat, Whiskered Bat and Nathusius' Pipistrelle comprising less than 0.1% respectively and only recorded in a subset of seasons.

Activity levels and diversity of non-volant mammals in the study area was relatively low. A low level of Badger activity was recorded within the proposed wind farm site. A single print was located on an existing track road proximal to T1. Badgers were recorded on trail cameras within the site boundary on one occasion, two badger setts were recorded proximal to the proposed development site, outside of the redline boundary. Outlier setts are unlikely to be used by badgers for breeding purposes. No evidence of underground dwellings belonging to protected non-volant mammal species (e.g. Badger or Otter) were recorded within the redline boundary.

Other mammal species recorded included Pine marten, Irish hare, Red fox and Sika Deer. Evidence of Otter (spraint) was noted in multiple locations on the Keerglen River during targeted walkover surveys, but no evidence of Otter holts could be found in the relevant search area.

On considering the ecological value, distribution and/or scale of habitats and botanical species present within the proposed wind farm boundary, potential long-term impacts on habitats and botanical species at the site are regarded as imperceptible, negative. Furthermore, with adequate mitigation, potential impacts on habitats and watercourses and associated botanical species in the surrounding area resulting from the construction and operation of the proposed wind farm are considered imperceptible. Based on this conclusion and with reference to the nature, scale and location of other relevant existing developments and permitted and current planning applications from the wider area, there is no potential for significant cumulative impacts arising from the proposed Keerglen Wind Farm.

Based on the assessment of the location and scale of the constructed and permitted developments in the wider area there is no appreciable potential for cumulative impacts with other known projects on habitats and species of conservation importance.

Detailed mitigation measures have been produced to address potential negative impacts upon the receiving environment during all phases of the project. The proposed mitigation measures are expected to avoid or significantly reduce the likelihood of any significant impacts occurring on habitats and species as a result of the construction and operation of the proposed wind farm. Ongoing monitoring and implementation of the mitigation and monitoring measures described in the EIAR (and summarised in the site Environmental Management Plan (EMP)) will ensure the preservation and future stability of the surrounding habitats as a whole. In the "Do Nothing Scenario" the general pattern of land use of the site is likely to remain consistent. The general biodiversity on the site, as described in this chapter, would therefore likely remain similar to its current state, in the short term, as activity levels and land use (peat cutting and livestock grazing) would not change significantly.

The proposed Keerglen Wind Farm development has been designed with a mitigation-by-design approach was taken to siting of the principal features of the development to avoid areas of high sensitivity for key habitats and species occurring or likely to occur. It is concluded that with the implementation of the mitigation measures outlined in the EIAR it is concluded that, overall, the residual effect of the proposed scheme will be a slight, negative effect at a local level (following EPA, 2022), due to the loss of 1.2 ha of upland blanket bog as well as smaller areas of other peatland habitats.

7.0 Hydrogeology, Hydrology and Water Quality

This chapter assesses the likely significant effects that the proposed development may have on the hydrological and hydrogeological environment and sets out the mitigation measures prescribed to avoid, reduce or offset any potential significant effects which are identified.

The hydrological and hydrogeological environment of the proposed development site has been characterised using a combination of desk study information and site investigation data. To characterise the hydrological and hydrogeological environment, several walkover surveys including drainage mapping have been completed in addition to surface water sampling, surface water flow monitoring, groundwater level monitoring and the completion of a flood risk assessment.

Regionally, the majority of the proposed development site is located in the Blacksod-Broadhaven regional surface water catchment whilst the eastern section of the Underground Electricity Export Connection is mapped in the Moy and Killala Bay surface water catchment. The Wind Farm Site is drained by the Keerglen River and its tributaries, with the Keerglen River discharging into the Ballinglen River to the east. All waters draining the Wind Farm Site and the northern section of the Underground Electricity Export Connection eventually discharge into the Ballinglen River which in turn discharges into Bunatrahir Bay ~6.5km northeast of the Wind Farm Site. Meanwhile, the southern section of the Underground Electricity Export Connection underlying the Wind Farm Site and the Usnderground Electricity Export Connection is classified predominantly as Poor and Locally Important Aquifers. The underlying bedrock has little or no open cracks which means groundwater movement within the aquifer is very localised. Groundwater can be classed as sensitive in terms of potential effects from the Proposed Development. However, depth to bedrock is relatively deep across much of the Wind Farm Site. Furthermore, the presence of low permeability peat combined with the low potential for pollutant travel within the bedrock makes nearby surface water bodies such sensitive to pollution than groundwater. Therefore, there will be no impact on local private wells as a result of the Proposed Development.

A section of the Underground Electricity Export Connection along the R315 and the proposed temporary access junction and roadway between the R315 and the L51723 are underlain by a Regionally Important Karst Aquifer. However, there are no mapped karst features in the vicinity of the proposed development and no features were recorded during walkover surveys. Due to the minor and transient nature of the proposed works in these areas, combined with the prescribed mitigation measures there will be no effects on the local karst aquifer.

Ummerantarry Bog NHA is located to the west of the Wind Farm Site. However, there is no hydrological connection between the proposed development and this NHA with the Keerglen River acting as a hydrological barrier. This has been proven with groundwater level monitoring completed in 2 no. transects perpendicular to the SAC. Furthermore, Killala Bay/Moy Estuary SPA/SAC/pNHA are located downstream of the Underground Electricity Export Connection via the Cloonaghmore River. However, given the minor and transient nature of the proposed works along the Underground Electricity Export Connection, combined with the implementation of the prescribed mitigation measures, there will be no effects on these designated sites.

Due to the nature of wind farm developments, being near surface construction activities, effects on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater would be from oil spillage and leakages at turbine foundations or during construction plant 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.

During each phase of the wind farm development (construction, operation, and decommissioning) a number of activities will take place at the Wind Farm Site, some of which will have the potential to significantly affect the hydrological regime or water quality at or downstream of the Wind Farm Site. These significant potential effects generally arise from sediment input from runoff and other pollutants such as hydrocarbons and cement-based compounds.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the project design to minimise significant effects on water quality and downstream designated sites. A self-imposed 50m watercourse buffer was used during the design of the Proposed Development, thereby avoiding sensitive hydrological features. The surface water drainage plan will be the principal means of significantly reducing sediment runoff arising from construction activities and to control runoff rates. The key surface water control measure is that there will be no direct discharge of wind farm runoff into local watercourses or into the existing site drainage network. This will be achieved by avoidance methods (i.e. stream buffers) and design methods (i.e. surface water drainage plan). Preventative measures also include fuel and concrete management and a waste management plan which will be incorporated into the Construction and Environmental Management Plan.

No significant effects to surface water (quality and flows) and groundwater (quality and quantity, and any local groundwater wells) will occur as a result of the proposed development provided the prescribed mitigation measures are implemented. This EIAR presents proven and effective mitigation measures to mitigate the release of sediment which will reduce the concentration of suspended solids to acceptable levels. The storage and handling of hydrocarbons/chemicals will be carried out using best practice methods which will ensure the protection of surface and groundwater quality. The proposed wind farm drainage system will be designed to slow surface water runoff from the site by providing greater attenuation. This will ensure that the proposed development does not alter downstream surface water flows and will not contribute to downstream flooding.

A Water Framework Directive (WFD) Compliance Assessment has been completed for all waterbodies (surface water and groundwater bodies) with the potential to be impacted by the Proposed Development. With the implementation of the mitigation measures detailed in this EIAR there will be no change in the WFD status of the underlying groundwater body or downstream surface waterbodies as a result of the Proposed Development. The proposed development has been found to be fully compliant with the WFD and will not prevent any waterbody from achieving its WFD objectives.

An assessment of potential cumulative effects associated with the proposed development and other developments on the hydrological and hydrogeological environment has been completed. With the implementation of the mitigation measures detailed in this EIAR, the cumulative assessment found that there will be no significant effects on the hydrological and hydrogeological environments.

No significant effects on the water environmental will occur during the construction, operation or decommissioning of the Proposed Development.

8.0 Soils and Geology

This chapter assesses the likely significant effects that the proposed development may have on the soils and geological environment and sets out the mitigation measures prescribed to avoid, reduce or offset any potential significant effects which are identified.

To characterise the soils and geological environment several walkover surveys of the Wind Farm Site have been completed in addition to over 250 no. peat probes, 22 no. trial pits, laboratory analysis of recovered subsoil samples, geophysical surveys, and the completion of a peat stability risk assessment. In addition, a visual assessment of exposed soils, subsoil, bedrock and local topographic changes was completed along the underground electricity export connection route.

The Wind Farm Site is located in an upland setting with ground elevations ranging from ~200mOD (metres above Ordnance Datum) to 100mOD. The Wind Farm Site is dissected by the Keerglen River which has eroded a deeply incised valley. Land at the Wind Farm Site currently comprises of cattle grazing with some turbary peat cutting and some areas of coniferous forestry.

Based on site data, peat is present across the Wind Farm Site and ranges in depth from 0.2 to 4.8m with an average peat depth of 1.59m. Only 5 no. peat probes (1.8%) encountered peat depths greater than or equal to 4m. The peat is typically underlain by slightly sandy gravelly SILT with occasional cobbles and/or granular deposits of silty/gravelly SAND and sandy silty GRAVEL. According to GSI mapping, the Wind Farm Site is underlain by the Downpatrick Formation. Based on site investigations, bedrock is typically present at depths in excess of 5m. However, a ridge of hard rock was encountered at shallow depths (0.2m) at the proposed borrow pit location. Rock outcrops were also encountered in the Keerglen River valley and were noted to comprise of sandstones, siltstones and mudstones.

The proposed development will typically involve the removal of peat, subsoils (spoil) and the excavation of bedrock for the construction of the internal cable network, hardstanding emplacement, turbine foundations,

substation, crane hardstands and construction compound. Rock for construction purposes will be won from the proposed onsite borrow pit and any aggregate material due to a requirement for specific grade, quality or quantity may be sourced from suitable licenced quarries in the local area.

Estimated volumes of peat and spoil to be excavated within the Wind Farm Site are in the region of 197,500m^3 and 41,100m^3 respectively. Excavated peat and spoil will be stored in the proposed onsite borrow pit, will be used for landscaping around the proposed turbines or will be stored on the peat placement areas along the site access roads. The handling and storage of peat and spoil will be done in accordance with the Peat and Spoil Management Plan which is included as Appendix 8.2 to the EIAR.

A Geotechnical and Peat Stability Assessment was undertaken for the Wind Farm Site, and it demonstrates an acceptable margin of safety, that the site is suitable for the proposed development and is considered to be at low risk of peat failure. A number of control measures are given in the peat stability assessment to manage all risks associated with peat instability.

The proposed development has a very small development footprint when compared to the overall area of the Wind Farm Site. Therefore, no significant effects on land will occur during the construction, operation or decommissioning phases of the proposed development.

The peat and mineral soil/subsoil deposits at the Wind Farm Site are not designated in this area (i.e. they do not form part of a designated site). For this reason, and with the implementation of the mitigation measures prescribed in this EIAR and the best practice measures detailed in the Peat and Spoil Management Plan, no significant effects on peat and soils will occur during the construction, operation or decommissioning phases of the Proposed Development.

Similarly, with the implementation of the mitigation measures outlined in this EIAR, no significant effects on the underlying bedrock geology will occur during the construction, operation, or decommissioning phases of the Proposed Development.

Excavation of soil, subsoil and bedrock will be required for the formation of trenches to accommodate the underground electrical cabling connection along the underground electricity export connection route. This will result in the removal of some soil and subsoil at most excavation locations, however the majority of the soil and subsoil will be reinstated within the trench. However, some of the excavated materials will be transferred to an appropriately licenced facility as required. Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent soil and subsoil erosion during excavation and reinstatement will be undertaken to prevent water quality impacts. No significant effects on the land, soil and geology along the underground electricity export connection route will occur during the construction, operation, or during decommissioning phases.

An assessment of potential cumulative effects associated with the proposed development and other developments on land, soils and geology has been completed. The land, soils and geology assessment confirms there will be no significant cumulative effects on land, soil and geology as a result of the Proposed Development.

9.0 Telecommunications and Aviation

This Aviation, Telecommunications and Electromagnetic Interference (EMI) chapter assesses the potential impact of the proposed Keerglen Wind Farm Development, on Aviation, Telecommunications and EMI broadcast signals. There are a number of Telecommunications Operators of communications services equipment in the vicinity of the proposed development.

The Keerglen Wind Farm site is situated in the vicinity of telecommunications mast sites and within 11km, 22km and 25km of airfields and aviation safety surveillance and airport communications networks respectively. All infrastructure would operate equipment used for communications which would include commercial, national, emergency services communications networks as well as including commercial, safety surveillance communications networks operated by aviation stakeholders.

A consultation process was undertaken with 17 aviation and telecommunications operators operating communications infrastructure networks in the vicinity of the wind farm development. The relevant operators were requested to raise any concerns they may have had regarding impacts to their networks due to the proposed wind farm development. The consultation process identified that all of the telecommunications operators operating commercial licensed networks would not be impacted. It was also identified that the operators of safety surveillance aviation networks would not be impacted. Consultation with the national broadcast operators, 2RN\RTE and BAI, also identified that there would be no impacts on Television and Radio broadcast networks resulting from the proposed wind farm development. The operators of the Emergency Services network, TETRA Ireland, stated that there would be no issues on the TETRA services in the vicinity of the proposed wind farm development.

The construction works associated with the proposed Keerglen Wind Farm development would have a negligible effect on the receiving environment for aviation, telecommunications and EMI networks. Implementation of the proposed mitigation measures will ensure that the residual effect of the proposed development is not significant.

During all stages of the consultation process software modelling was carried out and provided to the operators to show that there would be no impacts to the telecommunications networks operated within the vicinity of the wind farm. This software modelling was calibrated using survey data gathered from field signal surveys. There were no potential impacts following consultation with the major operator licenced networks from wind turbine operation.

There are existing telecommunications services in the surrounding area, primarily serving residential properties. No existing telecommunications services in the vicinity of the proposed development would have to be altered, reinforced or relocated as a result of the proposed development.

10.0 Landscape and Visual

The Landscape chapter describes the landscape context of the proposed Keerglen Wind farm and assesses the likely landscape and visual impacts of the scheme on the receiving environment. Although closely linked, landscape and visual impacts are assessed separately.

Landscape Impact Assessment (LIA) relates to assessing effects of a development on the landscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. **Visual Impact Assessment (VIA)** relates to assessing effects of a development on specific views and on the general visual amenity experienced by people. **Cumulative landscape and visual impact assessment** is concerned with additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.

The LVIA uses methodology as prescribed in the following guidance documents:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (Draft 2017) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (Draft 2015).
- Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment – Third Addition (2013).
- Scottish Natural Heritage (SNH) Guidance Note: Cumulative Effect of Wind Farms (2012).
- Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006).
- Scottish Natural Heritage (SNH) Visual representation of wind farms: Best Practice Guidelines (version 2.2 - 2017).

Study Area

The Wind Energy Development Guidelines published by the Department of the Environment, Heritage and Local Government (2006) specify different radii for examining the Zone of Theoretical Visibility of proposed wind farm projects (ZTV) based on turbine height. As the proposed turbines are greater than 100m tip height, the minimum ZTV radius recommended is 20 km from the outermost turbines of the scheme and this is also the study area in this instance.

Methodology

Production of this Landscape and Visual Impact Assessment involved baseline work in the form of desktop studies and fieldwork comprising professional evaluation by qualified and experienced Landscape Architects as detailed in the preceding Statement of Authority. This entailed the following:

Desktop Study

- Establishing an appropriate Study Area from which to study the landscape and visual impacts of the proposed wind farm;
- Review of a Zone of Theoretical Visibility (ZTV) map, which indicates areas from which the development is potentially visible in relation to terrain within the Study Area;
- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity;

Fieldwork

- Recording of a description of the landscape elements and characteristics within the Study Area.
- Selection of a refined set of VRP's for assessment. This includes the capture of reference images and grid reference coordinates for each VRP location for the visualisation specialist to prepare photomontages.

Appraisal

- Consideration of the receiving landscape with regard to overall landscape character as well as the salient features of the study area including landform, drainage, vegetation, land use and landscape designations.
- Consideration of the visual environment including receptor locations such as centres of population and houses; transport routes; public amenities, facilities and heritage features and; designated and recognised views of scenic value.
- Consideration of design guidance and planning policies.
- Consideration of potentially significant effects and the mitigation measures that could be employed to reduce such effects.
- Assessment of the significance of residual landscape impacts.
- Assessment of the significance of residual visual impacts aided by photomontages prepared at all of the selected VRP locations.
- Assessment of cumulative landscape and visual effects in combination with other surrounding developments that are either existing or permitted.

Receiving Environment

The proposed development site is located along a plateau of undulating low hills and ridges ranging between 170-190m AOD in the southern extents of the Slieveardagh range. A short distance to the east and south of the site, the terrain descends to the more typical low rolling plains found throughout the southeast midlands of Ireland, whilst further to the south again, Slievenamon rises up to a height of c. 721m AOD and is one of the most prominent landscape features within the study area and its wider surrounds. The rolling Slieveardagh Hills continue throughout much of the northern and western extents of the study area with some of its highest hills rising to c. 340m AOD (Knocknamuck Hill). Numerous streams and rivers also criss-cross the study area, the nearest which is a small stream that flows north of the village of Drangan.

The principal land use pattern within the study area is that of agricultural farmland comprising of fields of various sizes, the largest of which are primarily contained along elevated hilltops whilst a more condensed field network is apparent along the low lying valleys between the rolling hills. Blocks of conifer forest are also a notable component of the landscape pattern throughout the study area and some of these are located within the site boundary. The elevated areas of Slievenamon are also cloaked in extensive areas of mountain moorland whilst a considerable area of flat open peat bog is situated in the wider northwest quadrant of the study area. Wind energy development is also an established land use within the study area, although, all existing wind energy developments are contained within the wider northern half of the study area.

The nearest centre of population in relation to the proposed development is that of Drangan which is situated circa 1km north of the nearest turbine. The similar sized village of Cloneen is situated 2.3km southwest of the site whilst Mullinahone is some 3.5km east of the site. Clonmel is the largest settlement within the study area and is situated on its south-western periphery on the banks of the River Suir. The principal transport route within the study area is that of the M8 motorway which traverses the northwest quadrant of the study area and is situated over 17km northwest of the site at its nearest point. On the opposite side of the study area, the N76 national secondary route links Kilkenny City and Clonmel whilst the N24 follows the River Suir Valley in the southern half of the study area. The R692 regional road is the nearest major route to the proposed development site and located just over 1km south of the site where it connects the settlements of Fethard, Cloneen and Mullinahone.

In terms of tourism, amenity and heritage features that attract visitors to the study area, Slievenamon and the Comeragh Mountains are some of the most notable areas for walking and hiking within the study area. The East Munster Way is the most notable walking trail within the study area and traverses the corridor of the River Suir before ascending the foothills of the Comeragh Mountains.

Landscape and Visual Policy Context and designations

The Wind Energy Development Guidelines (WEGs) provide guidance on wind farm siting and design criteria for a number of different landscapes types. The site of the proposed development is considered to be located within a landscape that is most consistent with the 'Hilly and Flat Farmland' landscape type. The design of the proposed wind farm is considered to be in accordance with the relevant guidance for this landscape types. Within the Mayo Landscape Character Assessment 2016, the proposed wind farm is shown to be contained in the the landscape character area '14 – Slieveardagh Hills Farmland mosaic'. Chapter 5 of the landscape character assessment relates to landscape sensitivity and designates the landscape character areas '14 – Slieveardagh Hills Farmland Mosaic' as having a 'normal/transitional' sensitivity designation with the 'transitional' designation being the dominant one.

A number of designated scenic routes and views are identified in the Mayo, Kilkenny and Waterford Development Plans. Those considered to be potentially impacted by the proposed development have been

identified and included within the photomontage set so that they are addressed in the visual impact assessment.

Landscape Impact Assessment

In terms of landscape sensitivity, the site and its immediate context is a typical and robust rolling landscape that is dominated by productive rural land uses such as agriculture and small blocks of forestry. Whilst the main values associated with this landscape relate to rural productivity, there is also some localised sense of heritage in places in relation to Killaghy Castle and Isertkeiran Cemetery. There is also some degree of scenic amenity within the study area, however, this relates to backdrop views of Slievenamon which is located just outside of the central study area. There is also some localised sense of scenic amenity associated with the surrounding rolling terrain where the landscape presents with a traditional pastoral aesthetic. Overall, the landscape sensitivity of the site and its immediate surrounds (<5km) is considered to be Medium-low which reflects the non-distinct and robust nature of this landscape setting.

In terms of landscape impacts, there will be some physical disturbance to the landform and landcover of the site in order to construct the proposed turbines, ancillary structures and access tracks, but in the context of an already modified (commercially forested) site. There will be a noticeable effect on the landscape character of the site and its immediate surrounds from the introduction of proposed turbines. This relates to the introduction of a new form of development in this area and an associated increase in the intensity and scale of built development in this pastoral setting. However, the scale of the proposed development will be assimilated within the surrounding landscape context without undue conflicts of scale with underlying land form and land use patterns The significances of landscape impact is considered to be 'Moderate' within the site and its immediate context (<5km) reducing rapidly thereafter, as the proposed wind farm becomes a smaller component of the wider landscape and land use matrix.

Visual Impact Assessment

Visual impacts were assessed at 29 viewpoint locations representing a range of receptor types, viewing distances and viewing angles. A large proportion of these receptors where classified with a medium-low visual receptor sensitivity which further highlights the robust nature of the study area. Of the 29 views, 23 are deemed to have an impact significance in the lower order ranging from Moderate-slight to Imperceptible which principally reflects the landscape context of the study area, where the turbines will not appear over-scaled nor out of place.

The highest significance of impact typically relates to near distance views of the proposed turbines where they present in a visually dominant manner and will be defining features of the view. Whilst not the nearest viewpoint to the proposed development, VP12 has been categorised with a 'substantial-moderate' impact significance which is the result of a 'medium-low' sensitivity classification and a 'high' magnitude of visual impact. The visual presence of the turbines here is somewhat heightened by the slightly uphill nature of the view, albeit the turbines present in a legible manner with few instances of turbine overlap. Viewpoints VP8 and VP13 have been assigned a 'high-medium' visual impact magnitude and a subsequent 'moderate' impact significance due

to the near distance of the proposed turbines. In similar circumstances to VP12, both VP8 and VP13 have a clear view of the turbines where they will present in a highly dominant manner. Nonetheless, although the turbines are viewed at a considerable scale at both viewpoints, they do not present in an overbearing manner nor do they appear out of context.

'Viewpoints VP6 and VP11 are similarly classified with a 'Moderate' impact significance, although they are located slightly further from the turbines than the 3 other viewpoints described above. Whilst the turbines present with some minor aesthetic issues at both viewpoints, they will neither obstruct nor intrude on views of Slievenamon which are afforded to the south. VP19 is also deemed to have a moderate impact significance, although only 3 of the turbines are prominently visible, whilst the blade tips of the remaining turbines are viewed rotating against the near ridge. The turbines may generate some sense of visual irritation and ambiguity here, however, the turbines are viewed in the opposite direction to Slievenamon, which is the most sensitive aspect of this view.

Cumulative Impact Assessment

6 operational wind farms and 5 permitted wind farms are located within the study area, all of which are contained in the wider northern and western half of the 20km study radius. Only 1 operational wind farm consisting of 2 turbines is located within 10km of the proposed development. Even when viewed in combination with other developments from elevated portions of the study area, the proposed turbines will be considerably visually offset from any existing or permitted turbines, resulting in a limited potential for the proposed turbines to generate any overtly negative cumulative effects. Overall, the proposed turbines will be distinctly separated from any other existing and permitted wind farms within the study area. Consequently, it is not considered that the proposed development will result in adverse cumulative impacts with other existing or permitted wind farms with the 20km study extents.

In terms of sequential cumulative impacts, there is some potential for combined visibility of the proposed development and permitted and existing developments and to occur on the major routes, scenic routes, and cycling and walking routes that traverse the wider study area. Nonetheless, many of the most notable scenic routes, walking trails, and cycling routes occur within the wider southern half of the study area in the surrounds of the River Suir and along the foothills of the Comeragh Mountains, where visibility of the proposed development is limited. Some sequential cumulative impacts also have the potential to occur along major routes within the wider study area, most notably along the N76 national secondary route. Nonetheless, the turbines will be visually separated here and will not appear out of context in this robust rural context.

Overall, the proposed turbines have the potential to be viewed in combination with other existing and permitted developments located in the wider northern and western half of the study area. Much of the potential for cumulative intervisibility relates to the wider study area, along elevated hills and ridges, where the proposed turbines are distinctly offset from other permitted and existing developments in terms of both distance and viewing angle. Consequently, the proposed development is not considered to result in significant cumulative impacts.

11.0 Shadow Flicker

The potential for shadow flicker impact at the residential buildings surrounding the Keerglen Wind Farm has been assessed with reference to relevant legislation and guidance. Industry-standard methods and tools have been used for the calculations.

All residential buildings are located at a distance of either 500m or more than 500 m from the proposed turbines, and therefore the strong shadow flicker impacts, which may occur at short distances, are avoided.

The calculations indicate that some shadow flicker impact may occur at 44 of the surrounding residential buildings. The worst-case calculations suggest that an exceedance of 30 hours of shadow flicker per year and/or 30 minutes of shadow flicker in a day could occur at 32 of the buildings. Considering weather and wind conditions, an exceedance of 30 hours per year is expected at only one residential building.

Shadow flicker durations can readily be eliminated by equipping the wind turbines with a shadow flicker control system, which stops them at appropriate times. Accordingly, the operation of the installed shadow flicker control measures will ensure that there will be no impact from shadow flicker on residential buildings. The deployment of such a solution can bring the residual impact to a level that is considered acceptable.

12.0 Noise

Irwin Carr Consulting Ltd. has been commissioned to conduct an assessment into the likely environmental noise and vibration impacts of the proposed Keerglen Wind Farm development.

The background noise environment has been established through noise monitoring surveys undertaken at several noise sensitive locations (NSL's) surrounding the Proposed Development. Typical background noise levels for day and night periods at various wind speeds have been measured in accordance with best practice guidance contained in the Institute of Acoustics document 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (IoA GPG). Prevailing noise levels are primarily attributable to local road traffic noise and other agricultural and anthropogenic sources in the area. 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: 2009-1A;2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise and 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 Good Practice Guide recommendations. The predicted turbine noise levels associated with the proposed development in isolation are predicted to be well within the best practice noise criteria curves recommended in Irish guidance document 'Wind Energy Development Guidelines for Planning Authorities 2006 and noise limits attached as conditions to recent 2021 An Bord Pleanála decisions. The cumulative effects of all nearby wind turbines located within 2km have been assessed and found to be in compliance with the noise limits set in the Wind Energy Development Guidelines 2006.

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.

13.0 Archaeology and Cultural Heritage

Horizon Archaeology were commissioned to undertake an assessment of the potential impact of the proposed development on the archaeological, architectural and cultural heritage resource of the construction, operation and decommissioning of a proposed development. Cultural heritage includes archaeology, architectural heritage and any other tangible assets. The assessment was based on desktop research, GIS based mapping, and a comprehensive programme of field inspection of the proposed infrastructure within the proposed development site boundary and along the proposed underground electricity export connection route.

No National Monuments, Preservation Orders, World Heritage Sites, Recorded Monuments, Protected Structures, Potential Architectural Conservation Areas or items listed in the NIAH are located within the footprint of the proposed wind farm infrastructure and therefore no direct impacts to this resource as a result of the proposed development have been identified.

Mitigation in the form of pre-development testing has been recommended in order to minimise any potential impacts to any sub-surface archaeological features or deposits should they exist within the proposed wind farm site. Archaeological Monitoring will be carried out under Licence to the Department of Housing, Local Government and Heritage, the National Museum of Ireland, and to the satisfaction of the Mayo County Council Archaeologist. Further archaeological mitigation measures may be recommended pending the results of the monitoring programme, and in agreement with the Department of Housing, Local Government and Heritage and the Mayo County Council Archaeologist.

14.0 Traffic and Transportation

Traffic and Transportation matters relating to the proposed Keerglen Wind Farm consider the construction, operation and decommissioning phases of the project. This Traffic and Transportation chapter, prepared by Roughan & O'Donovan Consulting Engineers; considers the wind farm of up to 8 no. wind turbine generators, a substation compound and associated ancillary works.

Traffic surveys were obtained by IDASO Ltd. between 18/04/2024 and 24/04/2024 on the local regional roads on the approach to the wind farm site. The traffic survey consisted of seven-day Automatic Traffic Counts (ATCs) on the surrounding network as well as two Junction Turning Counts (JTC's). These surveys have been supplemented by traffic data obtained from the TII Traffic Count Data with a traffic counter is located on the N59, between Crossmolina and Bangor-Erris. The Annual Average Daily Traffic Flows and Percentage HGVs on N59 between Crossmolina and Bangor-Erris, Co. Mayo indicates that traffic flows on the N59 have rebound to pre-covid levels in the last two years with an AADT of 2,125 vehicles per day. HGVs account for 4% to 5% of the daily average traffic flow.

Data relating to any road collisions in the vicinity of the development site during the 5-year period between 2011 and 2016 was collected from the Road Safety Authority (RSA) online mapping tool and analysed. The records indicate that there was only one serious injury collision on the N59 between Ballina and Crossmolina in the five-year study period and zero fatal collisions. Zero fatal or serious injury collisions were recorded on the R315 between Crossmolina and the subject site in the same five-year period.

The frequency and dispersed nature of the recorded road collisions indicate that there are no particular traffic safety issues on the route between the Ballina and the proposed windfarm development.

A new Site Entrance along the L51723 is proposed to provide access to Keerglen Wind Farm. The proposed site entrance forms a simple T junction to provide ease of access for HGVs and abnormal loads into the site. Visibility splays at the entrance accord with the road design and safe access standards of Mayo County Development Plan.

The associated underground electricity export connection route being screened as part of this planning application involves the connection works between the subject site and the existing Tawnaghmore ESB Substation or to a Large Energy User at Killala Business Park (c.22.8km) to facilitate the proposed development.

All traffic management along the public roads and any local diversions will be agreed with Mayo County Council in advance of the construction stage and when applying for a Road Opening License.

The delivery route from Donegal Harbour primarily consists of national roads. Regional and local roads only form part of the route at the start and end of the route where there are no feasible alternatives. Notably, this

is the route partly taken for delivery of components to the nearby Oweninney and Sheskin Wind Farms. The route via N26 is only now viable following the completion of the N26 Cloongullane Realignment project. The route consists of:

- Killybegs Harbour to Donegal via Shore Road, R263 and N56,
- Donegal to Sligo via N15 through/ bypassing Ballyshannon and Bundoran,
- Sligo to Charlestown via N4 and N17
- Charlestown to Ballina via N5, N58 and N26 through/ bypassing Swinford and Foxford,
- Ballina to the proposed via N59, L1108 and R315

Deviations have been identified as alternatives to overcome obstacles or restrictions occurring on the main route.

A number of possible Points of interest (POI)'s have been defined on the route, mainly relating to 'pinch' points on regional roads and local roads that may require accommodation works to facilitate the delivery of the larger turbine components. The final route will be the responsibility of the chosen turbine supplier and subject to their detailed route assessments and agreement with the relevant road authority. The anticipated construction period for the project will last for approximately 15 months for the construction of wind farm including duct construction through to the installation of cables.

An assessment has been made of anticipated construction activities and construction quantities associated with the main construction elements. The stage 1 activities will generate an average of 80 vehicles per day including 20 HGVs per day. This increases to a peak of 187 vehicles per day including 127 HGVs per day for a 4-week period while the concrete foundations are being poured. The concreting activities for the foundations are required to be completed within a short timeframe (12 hrs) to ensure the integrity of the bases.

The traffic generated from activities in stage 2 and 3 is low with 60 vehicles per day by site operative and less than 5 HGVs movement per day generated by the delivery of materials.

The underground electricity export connection works will generate an average of 108 vehicles per day including 42 HGVs to point locations along the underground electricity export connection route. These underground electricity export connection works are likely to overlap with stage 1 activities generating a combined average of 188 vehicles per day on the R315 and N59 including 62 HGVs per day, and a peak average of 295 vehicles per day including 169 HGVs per day during the concreting works. The timing of the underground electricity export connection works on the local access road to the site entrance will not coincide with the delivery of concrete and other bulk materials to ensure the access of deliveries is not impeded by temporary works areas.

A key transport issue will be the delivery of large turbine components during stage 3. There will be approximately 10 delivers per week over an 8-week period. Several turbine components will be delivered at the same time in convoy arrangements.

The timetable for the delivery of abnormal loads will be developed following consultation and in conjunction with the Road Authority and require separate abnormal load movement permits that these activities can be coordinated with any other roads works or activities that may be taking place along the delivery route.

Traffic generated during the operational phase of the wind farm development will be minimal with only occasional visits by maintenance and monitoring vehicle anticipated. This impact of these vehicles is considered to have a imperceptible effect on baseline conditions.
The operational life of the wind farm is expected to be 30 years after which time it will be decommissioned. The impact of the decommissioning phase is considered to be similar in nature to but normally less than the construction phase of the wind farm and the delivery of the turbine components.

Procedures and timetables regarding the passage and escort of abnormal loads will be agreed in advance as part of a Construction Traffic Management Plan. The deliveries of abnormal loads will be carefully co-ordinated to avoid conflict with any other road works or neighbouring developments. The large turbine components will be transported at off peak times with Garda and safety vehicle escort as required.

Visual inspections will also be undertaken and recorded regularly and frequently throughout the construction phase. Evidence of any defects arise during the construction phase will be recorded and any necessary remedial actions will be carried out.

It is considered that any delays that may occur will not be significant; and will be minimised through the development and effective implementation of an appropriate Construction Traffic Management Plan. Negative or adverse effects on the receiving environment associated with the construction works on the wind farm site, the turbine delivery route, and the construction of the underground electricity export connection route are considered to be slight and short-term in duration following mitigation.

The traffic and transport effects resultant from the construction of the proposed wind farm and the underground electricity export connection works will be reduced to an acceptable level through the preparation and execution of a Construction Traffic Management Plan. In areas of constraint, appropriate mitigations measures have been proposed to reduce the residual impacts to a minimum.

15.0 Population and Human Health

Chapter 15 of the EIA report assessed the effects of the development on Population and Human Health receptors. The assessment considers the potential effects arising from all stages of the development on the Population and Human Health receptors. Existing baseline conditions were identified using a desk-based

collection of data, consultation with the relevant stakeholders and anecdotal site visit data provided by technical specialists within the wider EIA team.

Population

An assessment of effects on population regarding the development has been undertaken. During the construction phase there may be a temporary increase in population within the local study area as a result of construction workers temporarily migrating into the area, staying in accommodation within in the area in order to be close to the development.

This construction effect, would not constitute a significant change in the long-term population of the area, and therefore would be a temporary in nature, positive effect which is not significant in terms of the EIA Regulations. Population effects during the decommissioning phase are anticipated to be of similar nature and scale as during the construction phase.

The development does not contain a residential component therefore will not have any direct permanent increase in the general population or settlement patterns. The impact on population is considered to be moderate, positive and temporary.

The cumulative effect of the development in relation to other wind farms is unlikely to lead to a fundamental change in population within the area, and therefore, no significant cumulative effects are anticipated.

Employment

An assessment into the effects on employment regarding the development has been undertaken.

In relation to the wider economic benefits, the development provides opportunities for the involvement of local and regional Irish suppliers in a wide-range of activities. During the construction phase of the development there will be opportunities for those employed to develop skills that will be a benefit to the local economy and local businesses in the longer term; employment generated through the development will contribute to diversifying the local economy.

The construction of the development could potentially support an average c.30 jobs for on-site staff per day, with indirect effects likely arising from the manufacturing of required building materials and construction equipment. There will also likely be knock on effects from the direct employment during the construction phase as employees spend a proportion of their income on the wider economy.

During the construction phase of the development, in terms of employment and economy the impact is considered to Positive Significant and Temporary.

Operational Impacts on population are considered in terms of resident population, visiting population and economic population parameters. The proposed development will not give rise to any increase or decrease

in population or characteristics of the populations (i.e. age, gender, social needs etc.). Due to the remote location of the wind farm is not considered to give rise to disturbance / severance in local activities of the population. The wind farm will be maintained and serviced by ABO Energy Ireland Ltd., but will not give rise to direct permanent employment. Overall, the impact on population is considered to be Neutral and Permanent.

Employment effects during the decommissioning phase are anticipated to be of a similar nature and scale as construction effects thereby representing a temporary, slight, positive effect acting at local level.

Human Health, Tourism and Amenity

An assessment into the effects on human health and amenity regarding the development has been undertaken. As summarised earlier in this NTS, no significant effects where identified with regards to other assessments that may have an impact on human health and amenity, for any phase of the development, this includes: Noise; Land; Soils and Geology, Hydrology; and LVIA (including residential amenity), which are all considered as part of the human health assessment.

During operation, there is not considered to be any significant adverse effects on human health and amenity as the development has been designed to avoid residential properties as much as possible, with the closest residential buildings being located more than 1.2km from the nearest turbines.

Key effects on local amenity will be related to increases in construction traffic, noise levels and visibility of the construction works. Chapter 12: Noise concludes that due to the transient nature of the construction and cabling works there will be no significant effect as a result of construction noise on local residents. Chapter 14: Transport, Traffic & Access concludes that construction traffic is unlikely to cause an increase to the existing daily variation of traffic with those working on the construction phase of the proposed development will travel daily to the site from the wider area.

Construction effects on amenity and tourism are not expected to be significant as they will be localised and will only be temporarily detectable to visitors,

Therefore, given the short-term nature of the construction period, and the lack of significant effects identified in the related amenity chapters, it is not expected that there will be any adverse effects on the amenity in the local area due to construction.

Cumulative effects on human health, tourism and amenity are not expected to be significant. The visual impact on sensitive receptors will not be significant and no significant impacts on human health are likely to occur.

Health and Safety

An assessment into the effects on health and safety regarding the development has been undertaken. Effects on health and safety during the construction and decommissioning phases are anticipated to be of a similar nature and scale. Given the nature of the development, the risk of major health and safety incidents occurring as a result of phases are highly unlikely and the risk of accidents as they relate to human health and safety would be covered in a Construction Environmental Management Plan (CEMP) and specific risk assessment method statements. These would include identifying site specific risks and preparing assessments to minimise and manage the risk.

During operation the development will pose no health and safety risk to human as there will be no public access to the development site.

16.0 Air Quality

AWN Consulting Ltd. has been commissioned to conduct an assessment into the likely impact on air quality associated with the proposed Keerglen Wind Farm (the 'Proposed Development'). A full description of the proposed development is provided in Chapter 3 of this EIAR. The wind farm is located approximately 5.5km south-west of Ballycastle, County Mayo. The windfarm has the capacity to have an installed capacity of up to 40 MW and 30-year project lifespan.

The assessment of baseline air quality in the region of the proposed development has shown that current levels of key pollutants are significantly lower than their limit values. Due to the size, nature and location of the proposed development, increased road traffic emissions resulting from the proposed development are expected to have a negligible impact on air quality.

The impact of the construction, operation and decommissioning of the windfarm and underground electricity export connection route on Ireland's total national greenhouse gas emission is compared to Ireland's 2024 total greenhouse gas emissions and obligations under Irelands EU commitments. Any adverse impacts are predicted to occur during the construction phase, with the dominant sources of greenhouse gas emissions as a result of the development due to the construction traffic and embodied energy for turbine construction.

The generation of electricity due to the installation of the wind farm will lead to indirect net savings in terms of NOX emissions. The wind farm will have an export capacity of approximately 40 MW and an assumed capacity factor of 32%, therefore the power generation from the development is expected to be approximately 112 GWh per annum.

A Dust Management Plan has been formulated for the construction phase of Wind Farm, as construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of

rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. Due to the rural location of the Keerglen Windfarm, there are very few sensitive receptors within 1 km of the site boundary reducing the potential for impacts greatly. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within several hundred metres of the construction area.

17. 0 Climate

AWN Consulting Ltd. has been commissioned to conduct an assessment into the likely impact on climate associated with the proposed Keerglen Wind Farm (the 'Proposed Development'). A full description of the proposed development is provided in Chapter 3 of this EIAR. The wind farm is located approximately 5.5km south-west of Ballycastle, County Mayo. The windfarm has the capacity to have an installed capacity of up to 40 MW and 30-year project lifespan.

The chapter provides a baseline assessment of the setting of the proposed development in terms of climate and discusses the likely and significant effects that the construction, operation and decommissioning of the proposed development will have. Where required, appropriate mitigation measures to limit any identified likely significant adverse impacts to climate are recommended.

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

During the construction stage the main source of climate impacts will be as a result of GHG emissions and embodied carbon associated with the proposed construction materials and activities for the proposed development.

During the operational phase, traffic accessing the site for maintenance purposes has the potential to impact on climate. However, this traffic will not be of the magnitude to cause a significant impact. From an operational climate perspective, the project is expected to lead to a beneficial impact on climate by displacing fossil-fuel derived electricity.

Vehicles related to the decommissioning phase will give rise to CO_2 emissions. It is not predicted that this development will involve the use of a significant number of vehicles during the decommissioning phase. Therefore, emissions from vehicular traffic are predicted to be imperceptible as a result of the decommissioning.

In the decommissioning phase, the turbines are dismantled and the site is remediated to the agreed state. End-of-life recycling of metals will be carried out at the wind farm in order to reduce the climate impact as per the lifecycle assessments for the chosen wind turbine manufacturer. Metal components that are primarily

mono-material (e.g. gears, transformers, tower sections, etc.) are assumed to be 98% recycled (Vestas, 2017; 2019). It is expected that the reinforced concrete foundation bases will remain in-situ.

The effect on climate due to decommissioning will be direct, temporary, negative and imperceptible if recycling of components is carried out where possible.

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. Best practice measures to reduce the embodied carbon of the construction works include:

- Appointing a suitably competent contractor who will undertake waste audits detailing resource recovery best practice and identify materials can be reused/recycled;
- Materials will be reused on site where possible;
- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods;
- Ensure all plant and machinery are well maintained and inspected regularly;
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site; and
- Sourcing materials locally where possible to reduce transport related CO_2 emissions.

In terms of impact on the proposed development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

During the operational phase of the proposed development, the works onsite will be limited to maintenance associated with the wind farm components. Although the intensity of activity will be only a small fraction of the construction phase, all employees and contractors that are on site will ensure that machinery used is properly maintained and is switched off when not in use to avoid unnecessary exhaust emissions from maintenance traffic. No other mitigation is proposed.

In relation to climate change vulnerability, it has been assessed that the effect on the proposed development as a result of climate change is direct, long-term, negative and imperceptible.

18.0 Interactions

This chapter was prepared by ABO Energy Ireland Ltd. Ireland having regard to the inputs, assessments and conclusions provided by the multi-disciplinary team of competent and expert consultants outlined in the preceding chapters of the EIAR. It serves to provide an understanding of the significant interaction and interdependencies in the existing environment. The assessment of indirect and cumulative impacts and impact interactions are considered to be an integral part of all stages of the process.

Each of the preceding sections fully describes the existing environment at the proposed Keerglen Wind Farm, Co. Mayo and examines the various elements of the construction, operational and decommissioning phases of the proposed development which have the potential to create impacts. All reasonable impacts have been outlined and examined in the Chapters 5 - 17. Where necessary, mitigation measures are proposed to avoid, prevent, reduce and where possible offset any significant impacts. It is considered residual impacts, where they arise are minor and, in many cases, temporary. The EIAR has not identified any severe or substantial long-term negative environmental effects. Adverse effects that do arise do not exceed recognised environmental standards, with the majority of impacts arising during construction, and are consequently of temporary duration. Mitigation measures are not repeated herein and only mitigation that is additional to that stated in individual topics are described.

There potential for interactions between one aspect of the environment and another are identified in Table 18.1, a matrix examining each aspect of the environment. It provides a summary of potential interactions of the various topics of the EIAR. They have been described in terms of occurring during construction: C, operation: O, decommissioning: D or a combination of all: COD.

Table 18.1 Summary of Potential Interactions

		5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
		Ornithology	Biodiversitry	Hydrogeology, Hydrology and Water Quality	Soils and Geology	Material Assets –	Landscape and Visual	Shadow Flicker	Noise	Archaeology, Architectural and Cultural Heritage	Traffic and Transportation	Population and Human Health	Air Quality	Climate
5.0	Ornithology			CO										
6.0	Biodiversity			CO										
7.0	Hydrogeology, Hydrology and Water Quality		CO				CO					CO		
8.0	Soils and Geology		COD							C				
9.0	Material Assets – Telecommunications											O		
10.0	Landscape and Visual			C						O		CO		
11.0	Shadow Flicker											O		
12.0	Noise										COD	COD		
13.0	Archaeology, Architectural and Cultural Heritage			C			O							
14.0	Traffic and Transportation								COD			COD	CD	CD
15.0	Population and Human Health			CO		O	CO	O	COD		COD		COD	COD
16.0	Air Quality										COD	COD		
17.0	Climate										COD	COD		

Construction: C, Operation: O, Decommissioning: D or a combination of all: COD

In terms of indirect and interaction of impacts no unacceptable environmental impacts are envisaged as a result of the construction, operation or decommissioning of the proposed Keerglen Wind Farm when mitigation measures are implemented.

19.0 Conclusion

The majority of the Keerglen Site is located in an area designated as *'Tier 1 - Preferred'* in the current Renewable Energy Strategy for Co. Mayo (2011-2020). Other than this the site is located in *'Tier 2 – Open for consideration'* and as such is located in an appropriate location in principle. Volume 2 of this EIAR examines in detail the potential environmental impacts that could occur as a result of the proposed development. From this it is concluded that no significant negative impacts will occur, principally through the employment of a mitigation by avoidance approach to design and the implementation of recommended mitigation measures during construction, operation and decommissioning as discussed in each of the supporting technical chapters of the EIAR.

Conversely, the development will generate certain significant positive impacts as the proposed development of Keerglen wind farm is being brought forward having regard to Ireland's International, European and National climate change targets and greenhouse gas reduction obligations. The operation of wind farms displaces the burning of fossil fuels, thereby reducing the amount of CO^2 emissions in the production of electricity. In this context new renewable wind energy developments are of the utmost importance to aid in facilitating Ireland's transition toward carbon neutrality. Keerglen Wind Farm will contribute towards this national effort and play a critical role in helping address Ireland's climate change and renewable energy targets.

In addition to these strategic benefits, the proposed development will provide further local benefits through the establishment of a dedicated community benefit fund for the local community. Through the establishment of the community benefit fund, ABO Energy Ireland Ltd. will commit to pay €2/MWh generated from the Keerglen wind farm to go towards local community initiatives and projects. For an onshore wind farm of circa 40MW, this payment could be in the region of €180,000[4] per year.

[4] *This is an indicative figure at this stage and will depend upon the final generation capacity of Keerglen Wind Farm. The figure can be influenced by a number of factors, including the number of turbines which receive planning permission, the type of turbine used on site and wind conditions in any given year etc