

NON-TECHNICAL SUMMARY

Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by McCarthy Keville O’Sullivan Ltd. (MKO) on behalf of Hibernian Wind Power Ltd. (Hibernian) who intend to apply to Wexford County Council (WCC) for planning permission to extend the operational life of the existing Carnsore Wind Farm and all associated infrastructure in the seven townlands of Bunarge, Burrow, Bush, Nethertown, Shilmore, St. Vogue’s and Summerstown, County Wexford (the Proposed Development).

The Proposed Development is located approximately 8 kilometres (km) south of Rosslare Harbour and approximately 15km east of Kilmore Quay in Co. Wexford. The approximate grid reference location for the centre of the site is E711919, N604394.

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

Applicant

The applicant for the Proposed Development is Hibernian Wind Power Limited (Hibernian), a wholly owned subsidiary company of ESB. ESB are the oldest and largest state-owned Irish energy utility, responsible for power generation, transmission and distribution, and supply. ESB are committed to the development of renewable energy as part of the transition to a low-carbon future, including onshore wind. They currently own, operate and maintain 17 onshore wind farms within the Republic of Ireland, with 10 additional onshore sites throughout the United Kingdom, capable of supplying approximately 1 gigawatt (GW) of energy in total. ESB have a proven track record of delivering wind energy projects in Ireland for over 20 years.

Brief Description of the Proposed Development

Hibernian is seeking planning permission to extend the operational lifetime of the existing Carnsore Wind Farm, a 14 turbine wind energy development on a 78.8 hectare (ha) site at Carnsore Point, Co. Wexford. The existing wind farm was first commissioned in 2002 and has been operated successfully by Hibernian since that time, producing renewable energy for the National Grid. The Proposed Development (all elements pre-existing) comprises:

- a. 14 no. Vestas 850 kilowatt (kW) wind turbines with a maximum overall blade tip height of 75 metres (m);
- b. 1 no. 38 kilovolt (kV) permanent electrical substation and control building with total footprint of approximately 575 square metres (m²), including welfare facilities, associated electrical plant and equipment, security fencing, associated underground cabling and a 1,000 litre septic tank;
- c. 1 no. permanent meteorological mast with a maximum height of 50m, an associated 153m² fenced compound containing an 18m² site cabin, with an air monitoring mast of 10m total height;
- d. All associated underground electrical and communications cabling connecting the turbines to the on-site substation;
- e. Existing site tracks of circa of 4.0 kilometres (km) total length, 5 no. car parking spaces, and 14 no. turbine hardstands;
- f. Existing gated site entrance way from Nethertown Lane (local public road);
- g. Site drainage; and,
- h. Associated site fencing and signage.

This application seeks a fifteen (15) year planning permission for extension of the operational life of the existing wind farm from the date of expiration of the current An Bord Pleanála (ABP) permission (ABP Ref. PL26.116487).

The Carnsore Wind Farm is connected to the National Grid via an existing medium voltage 38 kilovolt (kV) underground cable of approximately 1.2km, and a 38kV overhead transmission line of approximately 11.2km, running from the on-site substation, in a general north and northwest direction from the wind farm to the Killinick 38kV substation, located at the junction of the R740 and N25, approximately 9.4km northwest of the wind farm (straight-line distance). The grid connection is assessed as a cumulative project only within this EIAR, as it is subject to a separate planning permission and does not form part of the Proposed Development.

Hibernian have demonstrated that the existing turbine technology (Vestas V52 850kW) on the site is capable of continuing to operate efficiently for a further 15 years without a significant loss in the total current generating capacity of 11.9MW.

When originally designed, the layout of the Carnsore Wind Farm was constraints-led, thereby avoiding environmentally sensitive parts of the site. No change or upgrade to the existing site roads or layout is proposed. The Proposed Development makes use of the existing on-site access roads and tracks, with approximately 4.0km of existing roads/tracks within the wind farm site boundary.

There are five no. residential dwellings located within 500m of a turbine. Of these five dwellings, two were granted planning permission in the 1970's, one was granted permission in 2001 at the same time as the wind farm construction, and two were granted permission in 2006 and 2010, post wind farm commissioning. The visual amenity setback distance to residential dwellings will achieve the proposed 4-times turbine tip-height of 300m in all cases. A full assessment of relevant setback distances is included in Chapters 5, 11 and 13 of this EIAR.

Need for the Development

In March 2019, the Government announced a renewable electricity target of 70% by 2030 as part of the governments Climate Action Plan. The Proposed Development would likely be operational until 2037 and would therefore contribute to this 2030 target. More recently, the EPA reported that Ireland is set to fall far short of all of its carbon emissions reduction targets for 2030, despite climate action measures in the National Development Plan (EPA, June 2019). The proposed extension of operation of the Carnsore Wind Farm is key to helping Ireland address these challenges as well as addressing the country's over-dependence on imported fossil fuels.

In the recent Sustainable Energy Authority of Ireland (SEAI) report, 'Renewable Energy in Ireland – 2019' (SEAI, January 2019) it was reported that the share of renewable electricity (RES-E) was recorded at 30.1% in 2017, as compared to the national 40% target, confirming that Ireland failed to meet its 2020 renewable energy target. More recently, new analysis from EirGrid, has shown that 32% of electricity demand in Ireland during 2018 was met by renewable sources. This shows a positive increase in renewable energy in Ireland from that previously recorded in 2017, but still highlights the progress required to meet our current 2030 targets.

Sections 2.1 and 2.2 in Chapter 2 of this EIAR on Background to the Proposed Development, presents a full description of the international, national and regional national renewable energy policy context for the proposed project. Section 2.3 addresses climate change, including Ireland's current status with regard to meeting greenhouse gas emission reduction targets.

Economic Benefits

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

It is estimated that the proposed extension of operation will maintain approximately 2-3 part-time roles in the wind farm's operation and maintenance which will endure throughout the project's lifetime. Additional employment will be created in the region through the supply of services and materials to the development. In addition, income will also be generated by local employment from the purchase of local services i.e., travel and lodgings.

Carnsore Wind Farm is expected to contribute €2.9 million in county council rates through the proposed extension of operation. The annual commercial rate payments from the proposed development to Wexford County Council, will be redirected to the provision of public services within Co. Wexford. These services include items such as road upkeep, fire services, environmental protection, street lighting, footpath maintenance etc. along with other community and cultural support initiatives.

Should the Proposed Development receive planning permission, there are substantial opportunities available for the local area in the form of Community Benefit Funds. Based on the current proposal, a Community Benefit Fund in the region of €179,000 will be made available over the lifetime of the project. The value of this fund is proportional to the level of installed capacity (megawatts) at the site and will support and facilitate projects and initiatives including youth, sport and community facilities, schools, educational and training initiatives, and wider amenity, heritage, and environmental projects. Further details on the proposed Community Benefit Fund are presented in Section 2.6.3 of Chapter 2 of this EIAR.

Purpose and Structure of this EIAR

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

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

1. *Introduction*
2. *Background to the Proposed Development*
3. *Consideration of Reasonable Alternatives*
4. *Description of the Proposed Development*
5. *Population and Human Health (including Shadow Flicker)*
6. *Biodiversity (Flora and Fauna)*
7. *Ornithology (Birds)*
8. *Land, Soils and Geology*
9. *Water (Hydrology and Hydrogeology)*
10. *Air and Climate*
11. *Noise and Vibration*
12. *Archaeological, Architectural and Cultural Heritage*
13. *Landscape and Visual*
14. *Material Assets (including Traffic and Transport, Telecommunications and Aviation)*
15. *Interactions of the Foregoing*
16. *Schedule of Mitigation*

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

Background to the Proposed Development

This section of the EIAR presents policy information on Energy and Climate Change policy and targets, the strategic, regional, and local planning context for the proposed development, scoping and consultation, and the cumulative impact assessment process.

Energy and Climate Change

The proposed development comprises of the continued use of the Carnsore Wind Farm. The site of the Proposed Development is currently an operational wind farm which has been supplying renewable energy to the national electricity grid since being commissioned in 2002. Planning permission is being sought from Wexford County Council (WCC) to enable the existing wind farm to continue operating in its current form (with maintenance and minor upgrades to the turbines and electrical components, if required) for an additional 15 years. The existing wind farm has been contributing to Ireland's energy and climate targets over the past 19 years. The primary driver behind the Proposed Development is continue to provide renewable energy to offset the use of fossil fuels within the electricity generating sector. Generation from wind power represents the most economical renewable option to reduce emissions within the power generation sector and is the most mature technology available to achieve national targets that have been established for decarbonisation. The need to decarbonise and reduce greenhouse gas emissions has always been imperative, however, in recent years the urgency involved has become clearer to all stakeholders. The Climate Action Plan published by the Government in 2019 has clearly identified the need for and urgency of change, it states:

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

The SEAI's 'Energy in Ireland 2020' report provides the most up to date figures available in relation to energy production and consumption in Ireland. In terms of energy generation in 2019, the share of renewables in the generation fuel mix increased to 25.7%, compared with 22.3% in 2018 due, mainly, to increased wind generation. In 2019, electricity generated from renewable sources amounted to 11,780 GWh, accounting for 37.6% of gross electricity consumption (compared with 33% in 2018). Wind again accounted for the largest renewable energy generator, furthermore wind energy was the second largest source of electricity generated in 2019 after natural gas. It is clear based on the findings of SEAI's Energy in Ireland 2020 report the overall importance which wind energy has in meeting energy demands within Ireland.

Local Policy

Wexford County Development Plan 2013-2019

The Wexford County Development Plan 2013-2019 (WCDP) sets out Wexford County Council's intentions for the future development of land, including measures for the improvement of the natural and physical environment and the provision of infrastructure. The WCDP sets out the ability to deliver a secure and uninterrupted sustainable energy supply at a competitive cost is critical for the county to continue to attract inward investment and to provide a supportive environment for industry. The WCDP also encourages the development of renewable energy resources. In terms of wind energy the WCDP works towards a target of 255 MW of wind energy, the Proposed Development through its continued operation can aid in ensuring that this target is met. The following relevant objectives are listed:

- **Objective EN01:** *To facilitate the achievement of a secure and efficient energy supply and storage for County Wexford.*

- **Objective EN02:** *To promote County Wexford as a low carbon county by 2019 as a means of attracting inward investment and to facilitate the development of energy sources which will achieve low carbon outputs.*
- **Objective EN03:** *To raise awareness of the need to reverse fossil fuel dependency, to mitigate the effects of peak oil and reduce carbon emissions, to mitigate the effects of climate change.*

Wexford Wind Energy Strategy 2013-2019

The Wind Energy Strategy forms part of the Wexford County Development Plan 2013-2019. The key objectives of the Wind Energy Strategy are as follows:

- *Ensure the security of energy supply by supporting, in principle and at appropriate scales and locations, the development of wind energy resources in the county.*
- *Promote the development of wind energy and other renewable energy sources in the county to meet national renewable energy targets (supplying a minimum of 40% of electricity consumption from renewable sources by 2020).*
- *Work towards a target of 255 MW of wind energy, to enable County Wexford to make the initial steps toward a low carbon economy by 2020 and generate the equivalent of 70% of its electricity needs from wind energy.*

The wind energy strategy identifies strategic areas in the county where wind energy developments are generally acceptable, open for consideration or not normally permissible. The county has been divided into three areas for the purposes of wind energy development: Acceptable in Principle, Open for Consideration and Not Normally Permissible. The subject site is located within an area which has been designated as ‘*not normally permissible*’. With respect to the sites designation as ‘not normally permissible’ there is clear acceptance within the WCDP to provide for re-powering and/or extension of existing/permitted wind farms, in that each will be assessed by the Planning Authority on its own merits on a case-by-case basis. The following objectives have been included under the wind energy strategy:

- **Objective WE01:** *Ensure the security of energy supply by supporting the development of wind energy resources in County Wexford at appropriate scales and in appropriate locations, subject to compliance with normal planning and environmental criteria and the development management standards contained in Section 5.*
- **Objective WE02:** *Aim to achieve a target of 255 MW of wind energy, to enable County Wexford to make the initial steps toward a low carbon economy by 2020.*
- **Objective WE03:** *Facilitate wind energy development on appropriate sites in the county and work with the relevant agencies to encourage investment in research and technology associated with wind farms and other renewable energy technology.*
- **Objective WE04:** *Favourably consider proposals for the development of infrastructure for the production, storage and distribution of electricity through the harnessing of wind energy in appropriate sites and locations, subject to relevant policy, legislation and environmental considerations and the development management standards contained in Section 5.*
- **Objectives WE09:** *Consider the re-powering (by replacing existing wind turbines) and extension of existing wind farms. Applications on such sites will each be assessed on their merits and will be subject to the development management standards contained in Section 5 (see Table 4).*

Planning History

The relevant planning history of the proposed development site, the planning applications in the vicinity of the site along with other wind energy applications within the wider area are provided under Section 2.5 within this EIAR.

Scoping and Consultation

A comprehensive scoping and consultation exercise was undertaken during the preparation of this EIAR. A scoping report, providing details of the application site and the Proposed Development, was prepared by McCarthy Keville O'Sullivan Ltd. (MKO) and circulated in May 2021. MKO requested the comments of the relevant personnel/bodies in their respective capacities as consultees with regards to the scope and preparation of the EIAR.

Pre-application consultations were also held with Wexford County Council on two occasions in which the proposed development was introduced, detailed discussions were held with regards to the proposed development. Items discussed at the meetings included an overview of the proposal, the planning history of the site, planning policy context, site selection, planning application approach, Environmental Impact Assessment Report, visuals/landscape, community engagements and cumulative projects. Engagement with the public and community took place in many forms during the project design and preparation of the EIAR.

Consideration of Reasonable Alternatives

This chapter of the EIAR contains a description of the reasonable alternatives that were studied by the developer, which are relevant to the proposed project and its specific characteristics and provides an indication of the main reasons for the option chosen, taking into account the environmental effects. The consideration of alternatives includes alternative design, technology, layout, size and scale. A 'Do-Nothing Scenario' i.e., an outline of what is likely to happen to the environment should the Proposed Development not be implemented, is also included.

The initial design of the existing Carnsore Wind Farm, prior to its construction in 2002, was an informed and collaborative process involving the designers, developers, engineers, environmental, hydrological and geotechnical, archaeological specialists and traffic consultants. This proposal for the extension of operation of the wind farm was informed by site-specific information and experience gained during the 19-year operational history.

The proposed extension of operation of the wind farm does not include for any significant alterations to the existing site design or layout. The aim of the current multidisciplinary Project Team in extending the lifespan of the wind farm is to continue from the past successful operation of the wind farm, whilst ensuring any new processes or methods to reduce the potential for environmental effects are incorporated into the future operation.

It is considered appropriate to extend the operational phase of the existing wind energy development at the current site for a number of reasons including the successful operational history at its current location since 2002. The site has proven to have reliably good wind speeds and maintained a good generating capacity. In addition, the existing wind turbine models can continue to operate efficiently for a further 15 years without a significant loss in the total generating capacity of 11.9 megawatts (MW).

The existing wind farm infrastructure on the site, including the substation, site roads and met mast, can continue to be used for the extended operational period, which reduces environmental effects when compared to an undeveloped greenfield site, particularly in relation to landscape and visual effects and effects on locally important habitats. The existing wind farm site entrance, via Nethertown Lane on the northern site boundary, can continue to be used without any significant alterations or road works required.

Hibernian has collected a significant amount of site-specific data relating to the characteristics of the site and the local area, and this information was used during the development's operational review process, in particular in considering the feasibility of alternative renewable technologies, such as solar energy.

The Development can contribute to the achievement of national energy targets and can continue to provide significant social and economic benefits for the local area (direct and indirect employment, community development fund, recreational amenity) and the wider region.

Having been previously permitted by An Bord Pleanála, the principle for wind energy development at this site is already well established and has been proven to be in accordance with the proper planning and sustainable development of the area.

It is noted that of the total current wind farm development lands (approximately 78.7 hectares), the development footprint accounts for approximately 1.72 hectares, or 2% of the total area. The remainder of the site is currently either used for agricultural pasture and rough grazing or remains undeveloped. The existing agricultural uses can, and will, continue in conjunction with this proposed use of the site.

Description of the Proposed Development

The overall layout of the Proposed Development is shown on Figure 4-1. This drawing shows the locations of the wind turbines, electricity substation, internal roads layout and the main site entrance. Detailed site layout drawings of the Proposed Development are included in Appendix 4-1 to this EIAR.

The Proposed Development is limited to an extension of the operational life of the existing wind farm. As such there are no changes proposed to the existing development components. The various elements of the existing wind farm will remain in their current condition and will be subject to ongoing routine maintenance.

The existing wind turbines have a tip-height of up to 75m, a hub height of 50m, rotor diameter of 50m, and a ground to blade tip-height of 25m. The wind turbines that are installed on the site are conventional three-blade turbines, that are geared to ensure the rotors of all turbines rotate in the same direction at all times. The existing wind turbines at the Carnsore Wind Farm were manufactured by the leading Danish turbine manufacturer, Vestas with each turbine capable of producing 850kW of electricity, resulting in an installed capacity of 11.9MW.

Each wind turbine is secured to a reinforced concrete foundation that has been installed below the finished ground level. The turbine foundation transmits any load on the wind turbine into the ground. The existing turbine foundations are square in plan with each side measuring 9.8 metres in length, and with founding levels from 1.2 to 3.0 metres below ground level.

Hard standing areas consisting of levelled and compacted hardcore are in place around each turbine base to facilitate access and maintenance and generally provide a safe, level working area around each turbine position. The hard-standing area is intended to accommodate a crane if necessary during maintenance works. There will be no changes to the existing hardstanding areas required as part of the Proposed Development. Turbine hard stand areas are approximately 240 square metres at each turbine base.

No changes are proposed to the existing site access roads and tracks of approximately 4.0 kilometres (km) total length which provide vehicular access to all turbines from the main entrance gate at the north of the site. Site roads are constructed of consolidated gravel with a running width of 4m. The existing wind farm is accessed from the north, via the existing site entrance from the Nethertown Lane L71061 local road. Vehicles turn onto the L71061 from the L7106 local road, located to the east of the site.

The existing 38kV electricity substation is located in the northern portion of the site adjacent to the site entrance. The existing substation and electrical components were constructed by and will be maintained to Hibernian specifications. The footprint of the existing on-site electricity substation compound measures approximately 575 square metres. The substation compound includes a wind farm control building and the electrical components (e.g. transformers) necessary to consolidate the electrical energy generated by each wind turbine, and export that electricity from the wind farm substation to the National Grid.

Each turbine is connected to the on-site electricity substation via an underground 20kV electricity cable. Copper communication cables also connect each wind turbine to the wind farm control building in the on-site substation compound. The electricity and communication cables running from the turbines to the on-site substation compound run in cable trenches approximately 0.8 metres below ground level, typically along the side of roadways and through cable ducts at road crossings. The route of the cable follows the access track to each turbine location.

One existing permanent metrological mast is included as part of the Proposed Development, located adjacent to the southwest site boundary. The metrological mast is equipped with wind monitoring equipment at various heights. The mast is a self-supporting slender structure of 50m in height. Also included is an existing associated 153m² fenced compound containing an 18m² site cabin, with an air monitoring mast mounted on the cabin to a total height of 10m.

The topography across the site slopes generally east-southeast towards the coastline with a maximum elevation of 16 metres Ordnance Datum (m OD) in the south-centre of the site, between turbine T4 and T5. No significant watercourses were recorded within or adjacent to the site boundary. There are no ground disturbing works proposed as part of the Proposed Development. Therefore, no existing natural drainage features will be altered as part of the Proposed Development and there will be no direct or indirect discharges to natural watercourses. The Proposed Development will not result in any changes to the existing drainage within the project site.

Each turbine will be subject to a routine maintenance programme involving a number of checks and changing of consumables, including oil changes. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. The electricity substation and site tracks will also require periodic maintenance. The wind farm manager will continue to attend the site regularly to perform inspections and oversee maintenance works.

Hibernian have determined that the existing wind turbines at the Carnsore Wind Farm have a remaining lifespan of at least 15 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Development will be decommissioned fully.

Population and Human Health

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

Information regarding human beings, population, and employment and general socio-economic data were sourced from the Central Statistics Office (CSO), the Wexford County Development Plan 2007 - 2013, Fáilte Ireland and any other literature pertinent to the area. The study includes an examination of the population and employment characteristics of the area. This information was sourced from the results of the Censuses of Ireland 2011 and 2016 which are available on the CSO website, www.cso.ie. Census information is divided into State, Provincial, County, Major Town and District Electoral Division (DED) level but may not be available for all levels.

In order to assess the population in the vicinity of the Proposed Development, a Population Study Area was defined in terms of 4 no. DEDs; Lady's Island, where the wind farm is located, and adjacent DEDs including Tacumshin, Kilsoran and St. Helen's, which may be affected by the Proposed Development. The Population

Study Area has a population of 4,342 persons, as of 2016 and comprises a total land area of 54.8 square kilometres.

The primary settlements (population centres) within the Study Area include Rosslare Harbour, Tagoat, Kilrane and Lady's Island. Rosslare Harbour, located approximately 8 kilometres to the north, contains the main services and local amenities within a reasonable driving distance from the Proposed Development. The majority of amenities and community facilities, including GAA and other sports clubs, youth clubs and recreational areas available in the area are located in the centres of settlement. There are currently no key identified public tourist attractions pertaining specifically to the site of the Proposed Development.

The majority of the proposed wind farm site comprises farmland (pasture and rough grazing), with a small proportion of vegetated scrub and grassland also within the site boundary. The predominant surrounding land use within the Population Study Area is that of farmland.

The population of the Study Area increased by 4.4% between the 2011 and 2016 census, from 4,159 to 4,342 persons respectively, with the rate of population increase unevenly distributed within the Study Area DEDs. The highest level of employment within the Study Area was recorded in the 'Non-Manual' category. The levels of employment reported for the Study Area within the 'Employer/Manager', 'Unskilled', 'Own Account' and 'Agricultural Worker' categories were similar to those recorded for the State and County Wexford. It is estimated that the proposed extension of operation will maintain approximately 2-3 part-time roles in the wind farm's operation and maintenance which will endure throughout the project's lifetime.

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

Shadow flicker is an effect that occurs when rotating wind turbine blades cast shadows over a window in a nearby property. Shadow flicker is an indoor phenomenon, which may be experienced by an occupant sitting in an enclosed room when sunlight reaching the window is momentarily interrupted by a shadow of a wind turbine's blade. Shadow flicker effect lasts only for a short period of time and happens only in certain specific combined circumstances. Current guidelines recommend that shadow flicker at neighbouring dwellings within 500 metres of a proposed turbine location should not exceed a total of 30 hours per year, or 30 minutes per day.

The study area for the shadow flicker assessment is ten times rotor diameter from each turbine as set out in the *Wind Energy Development Guidelines for Planning Authorities* (Department of Environment, Heritage and Local Government, 2006). All residential properties located within ten rotor diameters, i.e., 500 metres, have been included in the assessment. There are a total of 5 No. residential dwellings located within 500 metres of the existing turbine locations. There are no residential dwellings located closer than 300 metres (4 times tip height) from the nearest proposed turbine location. The closest dwelling to any turbine is 314 metres from turbine no. T13.

The WindFarm computer software was used to model the predicted daily and annual shadow flicker levels in significant detail, identifying the predicted daily start and end times, maximum daily duration and the individual turbines predicted to give rise to shadow flicker.

Of the 5 No. dwellings modelled, it is predicted that one of these locations may experience daily shadow flicker levels in excess of the guideline threshold of 30 minutes per day. This prediction assumes worst-case scenario conditions (i.e., 100% sunshine on all days where the shadow of the turbines passes over a house, wind blowing in the correct direction, no screening present, etc.). The guideline limit of 30 hours per year is not predicted to be exceeded at any of the residential dwellings.

With the implementation of mitigation measures proposed, there will be no significant effects related to shadow flicker from the continued operation of the wind farm.

The provision of 20 kilovolt (kV) underground electric cables required at the Proposed Development to connect the turbines to the substation is common practice throughout the country and installation to the required specification does not give rise to any specific health concerns. The extremely low frequency (ELF) and electric and magnetic fields (EMF) associated with the operation of the proposed cables fully comply with the international guidelines for ELF-EMF set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a formal advisory agency to the World Health Organisation, as well as the EU guidelines for human exposure to EMF.

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

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

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

Biodiversity

The biodiversity chapter of the EIAR was prepared by RSK Biocensus and assesses the potential impacts on habitats, bats and other mammals. The habitats, flora and fauna of the site including species and habitats protected under the Habitats Directive (92/43/EEC) were assessed by means of a desk study of literature pertinent to the site and surrounding area, and field surveys including a survey of habitats and flora and walkover faunal surveys along with general observation work.

The key objectives of the Biodiversity assessment are to (i) Undertake a review of desktop and field survey information to inform an assessment of the current baseline ecological characteristics of the operational wind farm in relation to biodiversity, (ii) Evaluate the ecological significance of the proposals to extend the operational life of the wind farm in the context of biodiversity; and (iii) Assess the potential for direct, indirect and cumulative impacts of the proposals in the context of biodiversity.

Habitat, bat and other mammal surveys were undertaken between July and October 2020, and April and May 2021, to inform the current biodiversity baseline for the operational wind farm. Habitats within the site were classified based on vegetation present and management history. During the multi-disciplinary ecological walkover surveys, the potential for the study area to support protected birds, mammals, amphibians and additional fauna was assessed.

Habitat types identified as Key Ecological Receptors (KERs) on the site of the Proposed Development include *Rocky sea cliffs (CS1)*, *Reed and large sedge swamps (FS1)*, *Dry calcareous and neutral grassland (GS1)*, *Dry meadows and grassy verges (GS2)*, *Wet grassland (GS4)*, *Shingle and gravel shores (LS1)*, *Moderately exposed rocky shores (LR2)* and *Mixed substrata shores (LR4)*.

The most sensitive habitats identified on the site are coastal habitats such as *Rocky sea cliffs (CS1)*, *Shingle and gravel shores (LS1)*, *Moderately exposed rocky shores (LR2)* and *Mixed substrata shores (LR4)*. These habitats were classified as Local Importance (higher value) and identified as particularly sensitive to changes in water quality. As no new works are proposed as part of the extension of operation of the existing wind farm, and best

practice methods in combination with mitigation measures will be in place to protect water quality, the potential for impacts to the habitat Key Ecological Receptors was not significant.

The Proposed Development lies within the boundary of Lady's Island Lake Special Area of Conservation (SAC) and Carnsore Point SAC, with Tacumshin Lake SAC located 3.8km to the west. As these designated European sites are adjacent to, and downgradient of the wind farm site the potential for hydrological connectivity exists. Potential impacts in the form of surface water deterioration will be prevented by adherence to the mitigation described in Chapter 9 of the EIAR.

Effects upon European Sites are discussed within the Natura Impact Statement (NIS) which accompanies this report. The NIS concluded that the Proposed Development, by itself or in combination with other plans and projects, in light of best scientific knowledge in the field, did not adversely affect the integrity of any European sites.

Protected mammal species such as six bat species, Irish stoat, Irish hare, Badger, Pygmy shrew and Otter were recorded within the site, and the site was valued as Local Importance (higher value) for mammals. Potential impacts to bats and other species from the continued operation of the wind farm was assessed as not significant.

During the habitat survey of the Proposed Development, a localised stand of the non-native invasive plant species Montbretia (*Crocsmia x crocosmiiflora*) was identified in the northernmost area of the site. No other invasive non-native species were recorded during the survey.

Provided that the proposed development is operated in accordance with the best practice and mitigation that is described within this application, significant individual or cumulative effects on biodiversity are not anticipated at the international, national or county scales.

Ornithology

The ornithology chapter of the EIAR was prepared by RSK Biocensus and assesses the likely significant effects that the proposed development may have on bird species, including species protected under the Birds Directive (2009/147/EC). Firstly, a brief description of the Proposed Development is provided. This is followed by a comprehensive description of the methodologies that were followed in order to obtain the information necessary to complete a thorough assessment of the potential effects of the proposed development on bird species. The survey data is presented in full in the EIAR Appendices, with a summary of the information presented within this chapter. An analysis of the results is then provided, which discusses the ecological significance of the birds recorded within the study area. The potential effects of the Proposed Development are then described in terms of the operational and decommissioning phases of the development. An accurate prediction of the effects is derived following a thorough understanding of the nature of the Proposed Development along with a comprehensive knowledge of bird activity within the study area. The identification of Key Ecological Receptors (KERs) and the assessment of effects followed a precautionary approach.

The potential for effects on designated sites is fully described in the Natura Impact Statement that accompanies this application. The findings presented in the NIS are that the Proposed Development, by itself or in combination with other plans and projects, in light of best scientific knowledge in the field, will not adversely affect the integrity of the relevant European sites, and no reasonable scientific doubt remains as to the absence of such effects.

As the wind farm has been operational since 2002 bird species are likely to have become habituated to the presence of the turbines and during monitoring undertaken in 2020 some bird species showed some avoidance of flying over the airspace immediately above the turbines, suggesting habituation has occurred.

Based on the detailed assessment, it is considered that the potential effects of the Proposed Development upon birds will not be significant. The magnitude of change associated with collision risk, and disturbance and

displacement effects during the wind farm operational phase have been assessed as low and not significant for all species. The ornithology assessment also concluded that the extended operation of the wind farm is unlikely to cause a significant effect on bird species.

Land, Soils and Geology

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

A desk study of the Proposed Development site and the surrounding study area was completed in June 2021. The desk study involved an assessment of all the relevant geological data for the wind farm site and study area. In addition, a visual walkover survey of the site was undertaken in April 2021. The site was visually inspected for any surface indications of residual impacts to land, soils, and geology resulting from the historic construction and operation of the wind farm. Particular attention was paid to identifying any potential areas of soil erosion that might be the result of incorrect backfilling of excavations, or that may have arisen from operation of machinery and vehicles on the site.

There are no known areas of soil or ground contamination on the site. During the site walkover, no areas of particular contamination concern were identified. No evidence of any residual impacts to land, soils, and geology were observed.

There is one recorded Geological Heritage site adjacent to the development area, the Carnsore Point geological heritage site (WX012) incorporates the low-lying coastline forming the eastern and south/southwestern site boundary.

The soils on the Proposed Development site consist primarily of deep, well-drained mineral soils across the northern portion, and shallow, reasonably-drained mineral soils across much of the southern portion of the site. The geology of the Proposed Development site predominately comprises coarse granite till underlain by the notable Carnsore Granite, with some outcropping observed in the centre of the site.

As no new construction or groundworks are proposed as part of the extended operation of the wind farm, there is limited potential for impacts to the subsurface soils and geology. During the operational phase, works are likely to include minor upgrades or replacements of turbine components, and mechanical/electrical components related to the substation. There is potential for limited use of plant and machinery as part of this maintenance work.

With implementation of the outlined mitigation measures No significant direct effects on land, soils and geology are likely associated with the proposed extension of operation of the wind farm, and no significant cumulative effects were identified in combination with other infrastructure projects in the surrounding area.

Water

The water environment (hydrology and hydrogeology) aspects of the site have been characterised using available desk study information and a site walkover completed in April 2021.

The local topography across the site slopes generally east-southeast towards the coastline, with elevation on the site ranging from approximately 3m to 16 metres above Ordnance Datum (OD). The Proposed Development site lies within the South-Eastern River Basin District (RBD). With respect to regional hydrology the site, under the Water Framework Directive (WFD) the site is located entirely within the Ballyteigue-Bannow (13) surface

water catchment. The site is located within 1 no. regional surface water sub-catchment, the Kisha_SC_010 sub-catchment.

There are no named streams identified on the Environmental Protection Agency's WFD maps that drain the Proposed Development within the Kisha sub-catchment. The nearest identified surface water feature is Lady's Island Lake, a brackish coastal lagoon, located approximately 1.40km west-northwest of the western site boundary. The nearest stream to the Proposed Development is the Kisha River, which drains Lady's Island Lake to the sea, approx. 1.95km west of the western site boundary.

Surface water runoff on the Proposed Development site itself drains east-southeast to the sea via sheet flow into three existing manmade drainage channels, located along the eastern site boundary. A spring identified on historic OS maps as St. Vouge's well was observed on the southeast of the site, draining southeast to the sea.

Based on the GSI bedrock map of the region, the Proposed Development is underlain by the Carnsore Granite Formation which is classified by Geological Survey Ireland (GSI) as a 'Poor Aquifer - bedrock which is generally unproductive except for local zones (Pl)'. This aquifer classification extends north from the site to Rosslare and west to Kilmore Quay. Historic reports indicate that the depth to groundwater within the site varies from 1 to 4m below ground level (bgl) with groundwater flow generally following topography to the southeast.

Groundwater vulnerability is generally mapped as High to Extreme across the area of the Proposed Development.

The Proposed Development lies within the boundary of Lady's Island Lake Special Area of Conservation (SAC) and Carnsore Point SAC, with Tacumshin Lake SAC located 3.8km to the west. As these designated European sites are adjacent to, and downgradient of the wind farm site the potential for hydrological connectivity exists. There is limited potential for impacts in the form of surface water deterioration during the operational phase of the wind farm. Potential impacts will be prevented by adherence to the mitigation measures as described in Chapter 9. Therefore, no impacts are envisaged during the operational phase.

Mitigation measures currently in place at the operational wind farm to ensure the protection of all downstream receiving waters (surface and groundwater) will be continued should the application for extension of the operational period be granted. In conclusion, no significant effects on the water environment are envisaged during the operational stage of the Proposed Development.

Air and Climate

Air Quality

This chapter identifies, describes and assesses the potential significant direct and indirect effects on air quality and climate arising from the operation and decommissioning of the Proposed Development. The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

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

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

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

The production of energy from wind turbines has no direct emissions as is expected from fossil fuel-based power stations. Harnessing more energy by means of wind farms will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment.

Exhaust emissions associated with the operational phase of the Proposed Development will arise from machinery and vehicles that are intermittently required on-site for maintenance. This will give rise to a long-term, imperceptible, negative impact however with implementation of mitigation measures outlined, was assessed as having no significant direct or indirect effects upon air quality and human health.

Climate Change and Carbon Balance Calculations

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

The Climate Action Plan 2019 (CAP) was published on the 1st of August 2019 by the Department of Communications, Climate Action and Environment. The CAP sets out an ambitious course of action over the coming years to address the impacts which climate may have on Ireland's environment, society, economic and natural resources. This Plan clearly recognises that Ireland must significantly step up its commitments to tackle climate disruption. In order to help reduce carbon dioxide (CO₂) emissions and reach our 2030 and 2050 emissions targets, the CAP has set out a list of renewable energy goals which includes implementing up to 8.2 GW total of increased onshore wind capacity on the island.

The Environmental Protection Agency (EPA) publish Ireland's Greenhouse Gas Emission Projections and at the time of writing, the most recent report, 'Ireland's Greenhouse Gas Emissions Projections 2020–2040' was published in June 2021. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2020, 2030 and 2040 set under the EU Effort Sharing Decision (ESD) and Effort Sharing Regulation (ESR).

The Proposed Development can assist in reaching national targets not only by fulfilling the implementation of renewable energy (with an 11.9MW generating capacity), it has the capacity to offset 177,319 tonnes of CO₂ in its proposed 15-year operational lifetime, thereby reducing the GHG effect and improving air quality as we transition to cleaner energy industries.

The proposed project will assist in reducing CO₂ emissions that would otherwise arise if the same energy that the proposed wind farm will generate were otherwise to be generated by conventional fossil fuel plants. This is a long-term significant positive effect. The overall significance upon climate from the proposed extended operation of the wind farm was assessed as a direct, long-term slight positive effect.

Noise and Vibration

Amplitude Acoustics has been commissioned to conduct an assessment of the likely environmental noise and vibration impacts of the proposed extension of operation of the Carnsore Wind Farm.

The methodology adopted for assessing the noise impact of the wind energy development is based on the guidance in the document 'Wind Energy Development Guidelines for Planning Authorities' (WEDG06) published by the Department of Environment, Community and Local Government in 2006. The guidelines are based on the UK document ETSU-R-97 The Assessment and Rating of Noise from Wind Farms which describes a detailed method for deriving maximum values of wind turbine noise, when measured at an external location

in the vicinity of a house. Maximum values, or limits, are primarily based on the background noise levels and how it varies with wind speed, in the absence of wind turbine noise.

The background noise environment has been established through noise monitoring surveys undertaken at several noise sensitive locations (NSLs) surrounding the Proposed Development. Typical background noise levels for day and night periods at various wind speeds have been measured in accordance with best practice guidance contained in the Institute of Acoustics document 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (IoA GPG). Prevailing noise levels are primarily attributable to marine surf noise, wind noise in foliage, local road traffic noise and other agricultural and anthropogenic sources in the area.

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 decommissioning phase and the long-term operational phase.

The assessment of decommissioning noise and vibration and has been conducted in accordance best practice guidance contained in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration. Subject to good working practice as recommended in the EIAR Chapter, noise associated with the decommissioning phase is not expected to exceed the recommended limit values. The associated noise and vibration are not expected to cause any significant effects.

Based on detailed information on the site layout, turbine noise emission levels and turbine height, worst-case turbine noise levels have been predicted at NSLs for a range of operational wind speeds. One minor exceedance of the WEDG06 limits at the nearest noise sensitive location was identified. Predicted noise levels at the affected NSL for each of the turbines was analysed in combination with wind direction analysis to determine a suitable curtailment strategy to achieve compliance with the noise limits. No further mitigation measures are required.

Predicted noise levels associated with the Proposed Development will be within best practice noise limits recommended in Irish guidance, therefore it is not considered that a significant effect is associated with the development.

No significant vibration effects are associated with the operation of the site.

In summary, the noise and vibration impact of the proposed development is not significant in the context of current national guidance.

Cultural Heritage

The archaeological, architectural, and cultural heritage chapter was prepared by Tobar Archaeological Services. It presents the results of an archaeological, architectural and cultural heritage impact assessment for the extension of operation of an existing wind farm at Carnsore Point, County Wexford. The site comprises largely green field agricultural land. The purpose of this chapter is to assess the potential direct and indirect effects of the Proposed Development on the surrounding archaeological, architectural and cultural heritage landscape.

The assessment is based on both a desktop review of the available cultural heritage and archaeological data and a comprehensive programme of field walking of the study area. Planning permission is being sought from Wexford County Council to enable the existing wind farm to continue operating in its current form for an additional 15 years. It is not proposed to alter the current 14 turbine layout or infrastructure and no significant ground works are required.

An assessment of all National Monuments (State Care and Preservation Orders) within 10km of the turbines was undertaken to ascertain any potential impacts on their visual setting (See Section 13.2.5 for methodology of

assessment). No National Monuments are located within the Proposed Development site and none are located within close proximity to same. Monuments located within 10km of the turbines are detailed in Table 12-2 and Figure 12-4 in the EIAR chapter.

Ten archaeological monuments listed in the Sites and Monuments Record are located within the EIAR site boundary. They are listed in Table 12-3 and described in the same section of the EIAR chapter. Since no construction works are being proposed and the wind farm already exists, no negative effects were identified.

In terms of the general context within which the existing and Proposed Development is located, twenty-two monuments are located within 2km of the nearest turbines outside the EIAR site boundary. The majority of monument types are ringforts and enclosure (7) with 3 castles, two churches and a graveyard and two windmills. One each of the following monument types are represented: Ring-ditch, Barrow – unclassified, Megalithic structure, Standing stone, House - 16th/17th century, Excavation site and a Burnt mound. None will be impacted either directly or indirectly since nothing additional to the existing baseline environment is being proposed.

No built heritage structures which are subject to statutory protection in the Record of Protected Structures (RPS) or the National Inventory of Architectural Heritage (NIAH) are located within the Proposed Development boundary. RPS Structures within 2km are included in the assessment order to assess the wider context of the wind farm. The RPS is largely based on the NIAH and therefore some repetition/overlap occurs between both datasets. All RPS and NIAH structures within 2km of the nearest turbine are detailed in Table 12-5 in the EIAR chapter and are also represented on Figure 12-10. None will be impacted either directly or indirectly since nothing additional to the existing baseline environment is being proposed.

An assessment of cumulative impacts was also undertaken taking into consideration projects in the vicinity, particularly the Richfield Wind Farm. No direct impacts were identified during this assessment and therefore no cumulative direct effects will occur. Nothing additional is being proposed as part of the operational stage and therefore cumulative indirect effects will not occur.

Landscape and Visual

The landscape and visual section of the EIAR addresses the potential landscape and visual effects of the proposed extension of operation of Carnsore Wind Farm, Co. Wexford (Proposed Development). It includes a description of Wexford County Council's landscape policy and examines the site's landscape values and sensitivity. The landscape of the area is described in terms of its character. The visual impact assessment of the Proposed Development is based on the selection and representation of viewpoints. A study area of 15km radius from the site boundary was selected for assessment of both the landscape and visual effects.

The existing Carnsore Wind Farm is open land cover mostly comprised of arable grassland outlined by stone walls and small shrubs. The existing site conditions are mainly flat, dropping in elevation towards the coastline. In consideration of these factors, 'hilly and flat farmland' landscape character type is the most applicable descriptor of the Carnsore Wind Farm site.

There are no large settlements located within the physical landscape unit. Rosslare Harbour and Kilrane are identified as 'District Towns' in the Wexford County Development Plan 2013 - 2019 (WCDP) and are the largest settlements in the study area.

Predicted Impacts on Landscape

A study of the Wexford Landscape Character Areas in the study boundary concluded that the Carnsore Wind Farm development is located in LCU 4- Coastal Zone and the 15km boundary includes areas of LCU 2-Lowland Zone. LCU 4- Coastal in which the Proposed Development site is located is considered to have a Moderate landscape character effect due to the moderate changes that the Carnsore Wind Farm brought in the isolated area of both LCUs. These landscape effects are only limited to areas of the LCUs in close proximity to the

Carnsore Wind Farm development. Factors such as topographical screening, vegetation screening and distance greatly mitigate the effects of the Carnsore Wind Farm development on the landscapes of these LCUs.

Turbines of the existing Carnsore Wind Farm are located within a Landscape of Greater Sensitivity- Carnsore Point, which has a High Landscape Sensitivity Rating, as set out in the WCDP and Draft Wexford County Development Plan 2021-2027 (DCDP).

The Proposed Development is well screened from view within the surrounding landscape except for limited visibility along the local roads within 5km of the turbines.

The existing Carnsore Wind Farm has been in place for 19 years and has not impacted negatively on the LCU (LCU4), therefore cumulative landscape effects are considered Low.

Predicted Visual Impacts

The scale of the turbines and the flatness of the local landscape significantly mitigates likely visual effects occurring in the majority of the landscape to the north, west and north-west beyond 5km of the site. Beyond 5km, areas to the west and north where visibility of the site could potentially occur will be restricted to remote, slightly elevated locations where there is a notable absence of sensitive visual receptors and visibility is significantly mitigated by distance, therefore, resulting visual effects in these areas will be insignificant.

The highly vegetated landscape in the study area significantly reduces visibility of the turbines with distance, therefore resulting in limited visibility of the turbines beyond 5km. While some visual impacts might arise in locations where there is very little screening, the wind turbines are located in a small, isolated area and are only visible locally. They will not obscure views or vistas of the coast or sea.

An assessment of the visual effects of the Carnsore Wind Farm development was undertaken from the twelve photomontage viewpoint locations. The significance of the residual visual effects was not considered to be 'Profound', 'Very Significant' or 'Significant' at any of the twelve (12) viewpoint locations. A residual visual effect of 'Moderate' was deemed to arise at four (4) of the twelve (12) viewpoint locations. All other viewpoints assessed resulted in 'Slight' (5) and 'Not Significant' (3) residual visual effects.

No construction activities or alterations to the existing wind farm are proposed beyond routine maintenance during the operational phase of the Proposed Development. Therefore, no construction landscape or visual effects will arise from the continued operation of Carnsore Wind Farm.

Material Assets

Traffic and Transport

The existing wind farm is accessed from the north, via the existing site entrance from the Nethertown Lane L71061 local road. Vehicles turn onto the L71061 from the L7106 local road located to the east of the site.

Since the Carnsore Wind Farm is currently operational, and since no changes to the wind farm are proposed, there is no construction phase associated with the proposed extension of life of the wind farm. There will therefore be no new traffic generated by the Proposed Development.

During the operational phase, the wind farm will continue to be unmanned during operation and will be remotely monitored. Traffic associated with the operational phase of the wind farm will be from ESB personnel visiting the substation, and maintenance personnel who will visit individual turbines.

It is estimated that the traffic volumes that will be generated by the development during its continued operation will be minimal. The site will generate maintenance trips, with approximately two maintenance staff travelling to site at any one time.

During the operational phase the majority of maintenance works on the site will be completed by small teams travelling in a light goods vehicle. For approximately 5-10 days per year multiple maintenance crews will be required on-site to complete major component replacements (e.g. substation maintenance). Typically, there are no more than two trips per day to the site made by car or light goods vehicle. The direct effect on the surrounding road network will be neutral, and long-term, given the very low volume of daily trips to the site.

With the implementation of a Traffic Management Plan during future decommissioning works at the site, there will be no significant effect on traffic and transport resulting from the decommissioning phase.

Telecommunications and Aviation

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

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example tower-to-tower microwave communication links, and airborne and ground radar systems. Interference with radar systems occurs when wind turbines are located close to an airport or directly in line with the instrument landing approach. These effects are generally easily dealt with by detailed micro-siting of turbines in order to avoid alignment with signal paths or by the use of repeater relay links out of line with the wind farm.

The existing Carnsore Wind Farm has been operational for 19 years. To date the ESB are aware of no complaints from telecommunications service providers regarding interference to service associated with the wind farm. In a response to Scoping received from the Broadcasting Authority of Ireland (BAI) they stated “...we are not aware of any issues from existing wind farms into existing FM networks. Also, the proposed wind farms are not located close to any existing or planned FM transmission sites”. There will be no significant direct or indirect effect on telecommunications from the Proposed Development.

To date no scoping response has been received from the Irish Aviation Authority (IAA). However, Carnsore Wind Farm has been operational for 19 years and no aviation issues have arisen in that time. No changes to the existing wind farm layout or dimensions are proposed. There will be no significant direct or indirect effects on aviation operations due to the Proposed Development.

Interaction of the Foregoing

The preceding Chapters 5 to 14 of this Environmental Impact Assessment Report (EIAR) identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity (Flora and Fauna) Ornithology (Birds), Land, Soils and Geology, Water (Hydrology and Hydrogeology), Air and Climate, Noise and Vibration, Cultural Heritage (Archaeological, Architectural and Cultural Heritage), Landscape and Visual, and Material Assets (Roads and Traffic, Telecommunications and Aviation) as a result of the Proposed Development.

All of the likely significant effects of the development and the measures implemented to mitigate them were outlined in the relevant sections of this report. However, for any development with the potential for significant environmental effects there is also the potential for interaction amongst these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them or have a neutral effect.

A matrix is presented in Table 15-1 of Chapter 15 to identify potential interactions of impacts between the various aspects of the environment already assessed in this EIAR. The matrix highlights the occurrence of potential positive or negative effects of the Proposed Development. The matrix is symmetric, with each environmental component addressed in the previous sections of this EIAR being placed on both axes of a matrix, and therefore, each potential interaction is identified twice.

Potential interactions have been identified between effects on Population and Human Health and effects on Noise and Vibration, Air and Climate, Water, Land, Soils and Geology, Traffic, and Landscape. Potential interactions have been identified between effects on Biodiversity, Flora and Fauna with effects on Water, Land, Soils and Geology, Noise and Vibration, Air and Climate and Landscape. Potential interactions have been identified between effects on Ornithology with effects on Land, Soils and Geology, Water, Air and Climate, and Noise and Vibration. Potential interactions have been identified between effects on Lands, Soils and Geology with effects on Water, Cultural Heritage and Landscape. Potential interactions have been identified between effects on Air and Climate with effects on Traffic, and finally potential interactions were identified between effects on Landscape with effects on Cultural Heritage.

Where any potential interactive negative impacts have been identified in the above Chapter 15, a full suite of appropriate mitigation measures has already been included in the relevant sections (Chapters 5-14) of the EIAR. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual impacts and the significance of effects, is also presented in each relevant chapter.