



ARCUS

**BILBOA WIND FARM  
ENVIRONMENTAL IMPACT ASSESSMENT**

**VOLUME IV:  
NON-TECHNICAL SUMMARY**

**AUGUST 2022**



County Planning Authority - Inspection Purposes Only!

Carlow Planning Authority - Inspection Purposes Only!

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## 1 INTRODUCTION

This Non-Technical Summary (NTS) summarises the Environmental Impact Assessment Report (EIA Report) which accompanies the application by Boolyvannanan Renewable Energy Ltd (the Applicant) under Section 34 of the Planning and Development Act 2000, as amended<sup>1</sup> for consent to install and operate Bilboa Wind Farm (the Development) and associated infrastructure with a generation capacity of 22.5 megawatts (MW). The Development comprises of 5 wind turbines and is located approximately 8 kilometres (km) southwest of the town of Carlow, County Carlow within Carlow County Council (CCC).

The EIA Report contains the findings of the assessment of likely significant environmental effects of the Development and comprises of the following volumes:

- Volume I – EIA Report Text;
- Volume II – EIA Report Figures;
- Volume III – EIA Report Technical Appendices;
- Volume IV – EIA Non-Technical Summary.

In addition to the above, the EIA Report is accompanied by a Planning Report and Natura Impact Statement (NIS).

### 1.1 The Applicant

The Development is being proposed by Boolyvannanan Renewable Energy Ltd, part of the Statkraft group. Statkraft is Europe's largest generator of renewable energy, operating 11 wind farms in Ireland, the UK and the Nordics with a development pipeline of up to 1,300 megawatts (MW) with 1,000 MW of that located in Ireland. Ireland is one of Statkraft's selected growth markets for wind and solar power given its significant renewable energy resources, particularly in terms of wind energy. Statkraft is already playing a leading role in the transition to a low carbon future and believe that the company's experience and capabilities will be service to Ireland in this transition over the coming years.

Statkraft believe that renewable energy projects can bring long lasting benefits, not only to our country and our future generations, but also the local communities in which they are located. Through positive engagement with local communities and the public, we aim to develop renewable energy projects which are socially and environmentally appropriate for the benefit of all.

### 1.2 The Site

The Site red line boundary (the Site Boundary) extends to an area of approximately 25.2 hectares (ha), as detailed in Figure 2: Site Layout Plan.

The Site is wholly located within Carlow County Council (CCC) and extends approximately 25.2 ha across a gentle slope of 0 to 4 degrees and an elevation ranging between 290 m Above Ordnance Datum (AOD) to 300 AOD.

No public roads are located within the Site; however, there are stretches of existing forest track. The southern boundary of the Site runs adjacent to the L7130 public road. The Site Boundary lies within the upstream surface water catchment of the River Dinin, a major tributary of the River Nore, and the River Barrow. There are no major watercourses or residential properties located within the Site Boundary; however, 25 residential properties can be found within approximately 1 km of the Site Boundary. The settlement is the village of Bilboa located approximately 1.1 km north of the Site.

<sup>1</sup> Government of Ireland, (2000), Planning and Development Act, 2000 [Online] Available at: <https://www.irishstatutebook.ie/eli/2000/act/30/enacted/en/html> (Accessed 17/08/2022)

There are no statutory designations within or adjacent to the Site, specifically no Special Areas of Conservation (SAC); Special Protection Areas (SPA); and Natural Heritage Areas (NHA).

The nearest statutory designation, located downstream of the Development is the River Barrow and River Nore SAC, located approximately 2.3 km west of the Site at its closest point.

There are also no landscape designations within the Site. The Site, is located in a CCC Landscape Character Area ("LCA") classified as 'Killeshin Hills' and a landscape type classified as 'Uplands'. The key characteristics of the Killeshin Hills LCA include its rural character with few settlements and open views and vistas with extensive views across the entire CCC. There are no archaeological or cultural heritage designations within the Site; however, the Bilboa Church of Ireland church which is in the National Inventory of Architectural Heritage (NIAH) is located 1.5 km north the Site.

## 2 EIA PROCESS AND METHODOLOGY

EIA is a process which aims to ensure that planning permission for particular types of development is only granted following assessment of the likely significant environmental effects. In accordance with best practice, the assessment should be carried out following consultation with statutory consultees, other interested bodies and members of the public.

EIAs are undertaken in response to the requirements of the EU Directive 2014/52/EU<sup>2</sup> (the EIA Directive), which amends Directive 2011/92/EU<sup>3</sup>, on the assessment of the effects of certain public and private developments on the environment. The enabling Statutory Instruments (S.I.) which transpose the EIA Directive into Irish law are the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. 296/2018)<sup>4</sup>; the Planning and Development Act 2000<sup>5</sup>, as amended (the Planning Act); and Planning and Development Regulations 2001 (S.I. 600 of 2001)<sup>6</sup>, as amended (the Planning Regulations). These regulations, when combined alongside the EPA 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' 2022<sup>7</sup>, form the EIA Regulations applicable to the Development. The EIA Regulations outline the classes of projects subject to EIA and the statutory format and content of an EIA Report.

Section 172(1) of the Planning Act and Article 93 of the Planning Regulations detail the criteria under which a planning application is required to be supported by an EIA Report.

According to Schedule 5 Part 2 of the Planning Regulations, an EIA is required for:

"3. *Energy Industry*

...

*Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts."*

<sup>2</sup> European Commission (2014) Directive 2014/52/EU [Online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0052&from=EN> (Accessed 17/08/2022)

<sup>3</sup> European Commission (2011) Directive 2011/92/EU [Online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0092&from=EN> (Accessed 17/08/2022)

<sup>4</sup> Government of Ireland (2018) European Union (Planning and Development) (Environmental Impact Assessment) Regulations [Online] Available at: <http://www.irishstatutebook.ie/eli/2018/si/296/made/en/print> (Accessed 17/08/2022)

<sup>5</sup> Government of Ireland, (2000), Planning and Development Act, 2000 [Online] Available at: <https://www.irishstatutebook.ie/eli/2000/act/30/enacted/en/html> (Accessed 17/08/2022)

<sup>6</sup> Government of Ireland (2001), Planning and Development Regulations, 2001 [Online] Available at: <http://www.irishstatutebook.ie/eli/2001/si/600/made/en/print> (Accessed 17/08/2022)

<sup>7</sup> Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports [Online] Available at: [https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR\\_Guidelines\\_2022\\_Web.pdf](https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf) (Accessed 17/08/2022)

Accordingly, an EIS and EIA were prepared for the Consented Wind Farm in accordance with Section 172(1) of the Planning Act and Schedule 5 of the Planning Regulations. As the Development will result in an output greater than 5 MW, as per Schedule 5, Part 2 of the Planning Regulations, in the interests of best practice and providing a comprehensive assessment for all relevant environmental considerations, the Application for the Development is supported by this holistic EIA Report.

The EIA Report has been prepared following a systematic approach to EIA and project design. The process of identifying environmental effects is both iterative and cyclical, running in tandem with the iterative design process.

The EIA process follows a number of stages broadly in line with the following:

- Screening;
- Scoping;
- Consideration of Alternatives;
- Project Description;
- Description of Receiving Environment;
- Identification and Assessment of Impacts;
- Mitigation and Monitoring Proposals;
- Scrutiny and Consent;
- Enforcement and Monitoring.

### 3 PLANNING

Chapter 3 of the EIA Report identifies the relevant European, national and local policy context within which to determine the Application. This Application is made under Section 34 of the Planning Act.

The statutory Development Plan relevant to the Development is the Carlow County Development Plan 2022-2028<sup>8</sup> (CCDP). Consideration has been given to the relevant policies contained within the CCDP throughout the design of the Development. The policies most relevant to the Development relate to renewable energy developments.

In addition to the CCDP, there are a number of recent and relevant European and Irish directives, reports and bills in order to contextualise the framework within which the Development should be considered.

These include the following, amongst others:

- Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources<sup>9</sup>;
- Government of Ireland's Wind Energy Development Guidelines<sup>10</sup>;
- Government of Ireland's Draft Wind Energy Development Guidelines<sup>11</sup>;
- Climate Action Plan 2021<sup>12</sup>
- Irish National Mitigation Plan<sup>13</sup>;

<sup>8</sup> Carlow County Council (2021) *Draft Carlow County Development Plan 2022–2028* [Online] Available at: <https://consult.carlow.ie/en/consultation/draft-carlow-county-development-plan-2022-2028> (Accessed 17/08/2022)

<sup>9</sup> Official Journal of the European Union (2018) Directive (EU) 2018/2001 of the European Parliament and of the Council [Online] Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2018.328.01.0082.01.ENG&toc=OJ:L:2018:328:TOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG&toc=OJ:L:2018:328:TOC) (Accessed 17/08/2022)

<sup>10</sup> Department of Housing, Planning and Local Government (2006) Wind Energy Development Guidelines [Online] Available at: <https://www.gov.ie/en/publication/f449e-wind-energy-development-guidelines-2006/> (Accessed 17/08/2022)

<sup>11</sup> Department of Housing, Planning and Local Government (2019) Draft Wind Energy Development Guidelines [Online] Available at: [https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft\\_revised\\_wind\\_energy\\_development\\_guidelines\\_december\\_2019.pdf](https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_revised_wind_energy_development_guidelines_december_2019.pdf) (Accessed 17/08/2022)

<sup>12</sup> Government of Ireland (2021) Climate Action Plan [Online] Available at: [gov.ie - Climate Action Plan 2021 \(www.gov.ie\)](http://gov.ie - Climate Action Plan 2021 (www.gov.ie)) (Accessed 17/08/2022)

<sup>13</sup> Department of Communications, Climate Change & Environment (2017) National Mitigation Plan [Online] Available at: <https://www.dccae.gov.ie/documents/National%20Mitigation%20Plan%202017.pdf> (Accessed 17/08/2022)

- National Adaptation Framework<sup>14</sup>;
- National Renewable Energy Action Plan<sup>15</sup>;
- Energy in Ireland Report<sup>16</sup>; and
- The White Paper "Ireland's Transition to a Low Carbon Energy Future 2015-2030"<sup>17</sup>.

## 4 SITE SELECTION AND ALTERNATIVES

The selection of an appropriate site which has the potential to support a commercial wind farm development is a complex and lengthy process. It involves examining and balancing a number of environmental, technical, planning and economic issues. Only when it has been determined that a site is not subject to major known environmental, technical, planning or economic constraints is the decision made to invest further resources in developing the proposal and conducting an EIA.

In accordance with the EIA Regulations, the design alternatives need to be studied with key reasoning, taking into account the potential environmental effects.

### 4.1 Alternative Methodology

As detailed in the Environmental Protection Agency's (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' 2022<sup>18</sup> (the EPA Guidelines), the consideration of alternatives investigated is an essential part of the overall EIA process.

*However, the EPA Guidelines recognise that some of the alternatives noted above, may not be applicable to all proposed developments – "... e.g. there may be no relevant 'alternative location' for the upgrading of an existing road".*

### 4.2 Alternative Locations

As the Consented Wind Farm demonstrated a proven capability to accommodate a large-scale wind development and a suitable grid connection has been established and consented, the Applicant assessed the Consented Wind Farm site as the optimal location for the Development.

The alternative would have been to identify and assess a new wind farm site which could have resulted in significant environmental effects.

### 4.3 Alternative Layout and Design

As all component infrastructure has been assessed as part of the Consented Wind Farm and deemed acceptable in its current layout and design, it was not deemed necessary to explore an alternative design.

The current layout and design, as applied for in this Application, forms the Consented Wind Farm. The purpose of this submission is not to redesign the Consented Wind Farm, which has already been considered acceptable, but rather to ensure that the construction and operation programme can be sufficiently carried out.

<sup>14</sup> Department of Communications, Climate Change & Environment (2018) National Adaptation Framework: Planning for a Climate Resilient Ireland [Online] Available at: <https://www.nwra.ie/wp-content/uploads/2020/05/national-adaptation-framework.pdf> (Accessed 17/08/2022)

<sup>15</sup> Government of Ireland (2010) National Renewable Energy Action Plan [Online] Available at: <https://www.ifa.ie/wp-content/uploads/2020/08/2013-National-Renewable-Energy-Action-Plan-2010.pdf> (Accessed 17/08/2022)

<sup>16</sup> Sustainable Energy Authority of Ireland (2021) Energy in Ireland 2021 Report [Online] [https://www.seai.ie/publications/Energy-in-Ireland-2021\\_Final.pdf](https://www.seai.ie/publications/Energy-in-Ireland-2021_Final.pdf) (Accessed 17/08/2022)

<sup>17</sup> Department of Communications, Energy & Natural Resources (2015) Ireland's Transition to a Low Carbon Energy Future: 2015-2030 [Online] Available at: <https://www.gov.ie/en/publication/550df-the-white-paper-irelands-transition-to-a-low-carbon-energy-future-2015-2030/> (Accessed 17/08/2022)

<sup>18</sup> Environmental Protection Agency (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports [Online] Available at: [https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR\\_Guidelines\\_2022\\_Web.pdf](https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf) (Accessed 17/08/2022)

#### 4.4 Alternative Rotor Type and Diameter Designs

Any alternative turbines would either need to be larger or smaller, and/or the number of turbines on Site would change. The use of smaller turbines would not make efficient use of the wind resource available having regard to the nature of the Site and a larger number of smaller turbines would result in the Development occupying a greater footprint within the Site due to the requirement for an increased amount of supporting infrastructure (access tracks, crane hardstands etc.) which increases the potential for significant, adverse environmental impacts to occur.

Turbines of a similar height with a reduced rotor would be similar to that of the Original Wind Farm, which would mean an installed capacity of approximately 2 MW per turbine, which is ~45% less generation than the 117 m rotor diameter proposed.

### 5 PROJECT DESCRIPTION

This section of the NTS provides a description of the Development which forms the basis of the summary presented. It provides a summary of the construction phase, the 30-year operational phase and decommissioning phase of the Development, as well as the Developments components.

#### 5.1 Development Components

The Development would comprise of 5 three-bladed horizontal axis turbines of 136.5 metres (m) tip height and 117 m rotor diameter, and all associated infrastructure, including substation, crane hardstandings, underground cabling, Temporary Construction Compound (TCC), one borrow pit and permanent met mast.

The components of the Development are summarised in Table 1 below.

**Table 1: Key Parameters of the Development**

Element	Details
<b>Wind Turbines</b>	5 turbines, each with a tip height of 136.5 m, a rotor diameter of 117 m and hub heights of 78 m.
<b>Access Track</b>	Approximately 2.8 km of existing access tracks within the Site will be reused as far as possible, although these may need to be upgraded during construction. There are also approximately 0.4 km of proposed tracks that will have a maximum width of 8 m.
<b>Substation and Temporary Compound</b>	The principal element of the substation compound will contain the electrical infrastructure and control elements of the Development. This will be in a free standing unit approximately 50 m by 25 m with a capacity of 21 MW. Underground cabling, laid where possible alongside the access tracks, will link the turbine transformers to the Substation Compound.
<b>Crane Hardstanding Areas</b>	Crane hardstandings will be required adjacent to each turbine. These will consist of an area of approximately 30 m x 62.5 m at each turbine.
<b>Borrow Pit</b>	The Development includes access tracks, which, in practice, require earthworks and cut materials. As such, one on-site borrow pit is proposed.
<b>Anemometer Mast</b>	A permanent mast is proposed to be located at approximately Irish Tranverse Mercator (ITM) 664,018 671,120. The met mast will be a free-standing lattice tower up to 81 m in height.

Element	Details
<b>Forestry Felling</b>	As part of the project construction process, a small amount of tree felling will have to be undertaken. Sitka Spruce is the predominant tree species on the site. Approximately 18 hectares of forestry will be felled as part of the Development. All felling measures will be conducted in line with best practice guidelines.

## 5.2 Construction Phase

The on-site construction period is estimated at approximately 19 working months in duration and would comprise the principal operations:

- Extraction of stone from the on-site borrow pit;
- Upgrade of existing access tracks and construction of new access tracks,
- Construction of turbine foundations;
- Construction of crane hardstandings;
- Delivery, erection and commissioning of wind turbines;
- Construction of the Substation and Control Buildings;
- Excavation of shallow cable trenches approximately 1 m from the edge of the access tracks and cable laying adjacent to the access tracks where possible;
- Crane hardstandings for drainage;
- Connection of on-site electrical distribution cables;
- Commissioning of the site equipment; and
- Reinstatement of the borrow pits and the TCC.

The site working hours are expected to be 07:00 to 19:00 Monday to Friday, and 07:00 to 13:00 on Saturdays with no site work generally on Sundays and bank holidays, except in circumstances where contractors see suitable weather windows outside of these times for the construction of the wind turbines. Material deliveries may be taken outside these times on certain occasions.

Work outside these hours is not usual, though if it was required to meet specific short-term demands, the planning authority would be informed, as required.

A Construction Environmental Management Plan (CEMP) has been provided as an appendix to the EIA Report. Measures incorporated into the CEMP include the adoption of best practice guidance; the appointment of an Ecological Clerk of Works to oversee correct implementation of agreed commitments; completion of a Traffic Management Plan presenting detailed access routes and delivery timings, car parking arrangements, temporary signage etc.; development of an infrastructure monitoring programme to identify any requirement for remedial work; and an exclusion of equipment from watercourses.

## 5.3 Operational Phase

The Development will have an operational lifespan of up to 30 years from full commissioning of the proposed turbines.

## 5.4 Turbine Maintenance

Each turbine manufacturer has specific maintenance requirements, but typically, routine maintenance or servicing of turbines is carried out twice a year, with a main service at twelve monthly intervals and a minor service at six months. In the first year, there is also an initial three-month service after commissioning. The turbine being serviced is switched off for the duration of its service. At regular periods through the project life, oils and components would require changing, which would increase the service time on-site per machine. Gearbox oil changes are required approximately every 18 months.

Blade inspections would occur as required; it could take approximately two weeks to inspect the turbines at the Development.

Ongoing track maintenance will be undertaken to ensure safe access is maintained to all parts of the Development all year round.

All wastes arising as a result of servicing and maintenance (e.g., lubricating oils, cooling oils, packaging from spare parts or equipment, unused paint etc.) will be removed from the Site and reused, recycled or disposed of in accordance with best practice.

## 5.5 Decommissioning Phase

The Development has been designed with an operational life of 30 years. At the end of the operational period, it would be decommissioned and the turbines dismantled and removed. Any alternative to this action would be subject to further consenting process.

## 6 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

The potential effects on the landscape and visual receptors that would arise as a result of the Development have been assessed in Chapter 6 of the EIA. The EIA considers the likely significant effects on landscape character and visual amenity associated with the construction, operation and decommissioning of the Development.

The Development will introduce wind turbines into the Killeshin Hills LCA, an open expansive, working rural landscape, a man modified landscape with conifer plantations, and isolated quarries.

The landscape character of the Site and immediate surrounding area is within the Uplands Landscape Character Type (LCT). Given the proximity of the operational Gortahile Wind Farm, the Uplands LCT would be able to accommodate the Development, without undue adverse effects, taking account of the existing character and quality of the landscape.

Given that all felling will be located within the commercial forestry on Site, there will be no direct views of construction felling and visual impacts from felling were not included in the assessment.

An appraisal of visual effects was undertaken from eight viewpoints selected to represent typical views from key receptors at varying distances and orientations from the site.

Chapter 6 of the EIA Report presents the findings of a LVIA undertaken to evaluate the effects of the Development.

There are no landscape planning designations within 10 km of the Site. The closest landscape receptor is an area of ancient woodland, Clogrennane Woods, 4 km north-east of the Site.

The 'host' Landscape Character Area (LCA) for the Development is the Killeshin Hills LCA, within County Carlow. The 'host' Landscape Character Type (LCT) for the Development is the Uplands LCT. An assessment has been made of the potential for significant effects of the Development on landscape character and visual amenity, and summarised in Table 2:

**Table 2: Landscape Effects**

<b>Construction Phase</b>	
<b>Activity</b>	<b>Significance</b>
Construction of the Development	Not significant
<b>Operational Phase</b>	
<b>Receptor</b>	<b>Significance</b>
Killeshein Hills LCA	Not significant

Uplands LCT	Not significant
Development Site Area	Not significant

The assessment of visual effects identified is set out in Table 3 below.

**Table 3: Visual Effects**

<b>Construction Phase</b>	
<b>Activity</b>	<b>Significance</b>
Construction of the Development	Not significant
<b>Operational Phase</b>	
<b>Receptor</b>	<b>Significance</b>
Residential Properties	Not significant
Settlements	Not significant
National Inventory of Architectural Heritage (NIAH) Buildings	Not significant
Scenic Routes, Scenic Viewpoints, & the Barrow Way	Not significant
Transport Routes	Not significant

Mitigation of landscape and visual effects has been undertaken through design modifications and mitigation considered is embedded. Key embedded mitigation of the Development is the maintenance of all component infrastructure at the same location and scale as has been assessed as acceptable and consented (under planning applications Ref: 11/154 & 21/15).

There are no significant landscape and visual effects identified as a result of the Development.

Cumulative landscape and visual effects are assessed to be non-significant, and are restricted to within a 3 km radius within the landscape and visual detailed study area (5 km of the Site) where the visual influence of the Consented Wind Farm, and therefore the Development, is restricted by the local tree / hedgerow cover along the roadsides and local topography. This reduces the extent to which Gortahile Wind Farm, the closest existing wind farm to the Site, and the Development are viewed cumulatively, either statically from one location, or sequentially along the local road and scenic route and recreational route networks.

## 7 BIODIVERSITY

Chapter 7 of the EIA Report evaluates the effects of the Development on Biodiversity receptors. The key issues for the assessment are as follows:

- Temporary effects arising from the construction phase such as disturbance and displacement of species and changes in water quality.
- Permanent effects such as terrestrial habitat loss, degradation or alteration of aquatic habitats downstream; avoidance of turbines by birds (displacement); collision risk and barrier effect.
- Indirect effects, including disturbance/displacement, changes in water quality and the associated potential for the conveyance of pollutants to downstream habitats via hydrological links.
- Cumulative effects which could potentially occur in combination with other plans/projects

Effects are considered to be significant for the purposes of the EIA Regulations where the effect is classified as being of 'major' or 'moderate' significance. Following the

implementation of mitigation measures, there will be no significant effects from the Development on ecological receptors.

These mitigation measures include embedded measures / mitigation through design.

### 7.1 Existing Environment

The Site does not overlap any designated nature conservation site but is upstream of the River Barrow and River Nore SAC; a number of small streams drain the Site and surrounding lands towards the Dinin (tributary of the Nore) and also towards the Barrow. The Site straddles both the Barrow and Nore catchments. In total there is one European Site within 15 km of the Development. The Natura Impact Statement contained in Appendix A7.7 assesses the effects of The Development on European Sites. In terms of Nationally designated sites, there is one Natural Heritage Area (NHA) and three proposed Natural Heritage Areas (pNHAs) within 10 km of the Development.

### 7.2 Habitats and Flora

Conifer plantation is the most dominant habitat within the Site accounting for 94% of the study area. Habitats presents within and adjacent to the Site including the following:

- Eroding / Upland Rivers;
- Drainage Ditches;
- Conifer Plantation;
- Scrub;
- Buildings and Artificial Surfaces;
- Recolonising Bare Ground;
- Dense Bracken;
- Cutover Bog/Wet Heath Mosaic;
- [Degraded] Raised Bog;
- Artificial Lakes and Ponds;
- Wet grassland;
- Riparian Woodland; and
- Recently Felled Woodland.

No rare or protected flora species were recorded during the site surveys.

### 7.3 Ornithological Surveys

Ornithological surveys were carried out over two years for the Development. Flight activity (vantage point) surveys undertaken during both winter and breeding seasons covered the Site and surrounding area. Breeding bird surveys including common bird census, barn owl survey and breeding wader surveys were undertaken in 2020, while winter walkover surveys, hinterland surveys and hen harrier winter roost checks were carried out during winter 2019/2020.

A total of 49 bird species were recorded during both breeding and winter season surveys.

Target species and secondary species present within and outside of the Site included:

- Grey Heron;
- Golden Plover;
- Woodcock;
- Snipe;
- Sparrowhawk;
- Kestrel;
- Peregrine Falcon;
- Lesser Black-backed Gull;
- Buzzard; and

- Hen Harrier.

#### 7.4 Mammal Surveys

During mammal surveys the following mammals and/or their field signs were observed on or adjacent to the Site: badger, fox, red squirrel, pine marten, deer and American mink (an invasive species). While not observed during surveys, species such as hedgehog, otter, Irish hare, Irish stoat, wood mouse and pygmy shrew are likely to occur on site.

A total of eight bat species were recorded onsite during Static detector surveys during the 2020 bat activity season: common, Nathusius' and soprano pipistrelle, Leisler's bat, Natterer's bat, Daubenton's Bat, Brown Long-eared bat and Whiskered bat.

#### 7.5 Aquatic Ecology

The Site is located within the River Nore and River Barrow catchments. Aquatic survey sites were located on the Rathornan River, Boolyrathornan / Tomard stream, Dinin River, Un-named stream and Boolyvannanan Stream. Atlantic salmon were recorded downstream at Black Bridge (within the River Barrow and River Nore SAC). No other protected aquatic species including white-clawed crayfish and freshwater pearl mussel were recorded. Freshwater pearl mussel have not been historically recorded downstream of the Development in the Rivers Barrow and Dineen. There are isolated historical records of this species downstream along the Nore at Kilkenny (30 km downstream) and Thomastown (55 km downstream), however the main Nore population occurs between Durrow and Abbeyleix (not downstream of the Development).

No signs of otter or otter holts were found during the current surveys of the study area. The small streams in the study area could potentially be used as commuting corridors by otters travelling between catchments. The surrounding river network provides some foraging and commuting habitat for otter but no prime foraging or breeding habitat.

#### 7.6 Other Fauna

The drains and ponds within the study area offer potential breeding habitat for frogs and newts, although none were recorded during current surveys. The presence of tadpoles in pools in recently felled woodland was noted during surveys for the Consented Grid Route application. Areas of scrub and peatland offer potential habitat for common lizard.

#### 7.7 Construction Effects

An evaluation of all habitats, bird species, mammal and other fauna, and aquatic species was conducted. Effects on biodiversity were then assessed.

The NIS submitted with this planning application addresses potential effects on European Sites resulting from the Development. There are no downstream hydrological links between the proposed development and the national sites located within 10 km.

Construction of the wind farm will lead to some permanent loss of habitat. The habitat loss will be the total area covered by the additional areas of the hard standing modification, additional swept path felling and turbulence/bat mitigation felling buffers. The total predicted habitat loss as a result of the proposed development is 19.16 Ha or ca. 15.9% of the study area; of this, 94% of the land take is from coniferous forestry plantation.

Without mitigation in place the following effects during construction include:

No badger setts or otter holts were recorded within the site therefore the potential effect to these species is relatively low. Two live sightings of red squirrel and evidence of the presence of pine marten were recorded. There is therefore the possibility that red squirrel and pine marten breeding or resting sites may be disturbed during any clear-felling operations. If in the future setts, red squirrel dreys, pine marten dens or otter holts were

established within the site this could result in a potential Significant Reversible Effect and therefore mitigation measures have been included as a precautionary approach to avoid the potential for these impacts to occur.

Due to the occurrence of bats onsite, the potential for Temporary Slight to Moderate Effects was identified and mitigation measures have been put in place to avoid the potential for these impacts to occur.

Indirect effects could arise due to disturbance to fauna; however, this will be temporary in nature and affected mammals will be able to move to other locations in the wider area until the disturbance has ceased.

The potential likely significant effects of the Development on birds are considered as:

- Possible loss or deterioration of habitats; and
- Disturbance or displacement of birds.

For target species, the effect of habitat loss was assessed and its significance without mitigation assigned. Indirect effects due to disturbance displacement was also assessed. Effects ranging from Imperceptible to Moderate were identified for species identified as key receptors, and mitigation measures were specified to avoid or reduce these effects to non-significant levels.

There is potential for releases of suspended solids and other substances associated with felling and construction activities. Felling, site and excavations and hard standing construction can without mitigation measures result in increased silt runoff.

Due to the low ecological and fisheries value of watercourse within and near the proposed site, no direct effects in this category are predicted. Potential indirect construction phase effects on aquatic ecology, in the absence of mitigation, are assessed as being Significant Negative, Short-Term and in the Local Context.

## 7.8 Operational Effects

The operational phase will have a lower potential to affect local habitats and fauna than the construction phase. The main potential operational effects arise from rotation of the blades of the wind turbines and, to a lesser extent, from vehicular movement through the site associated with wind turbine maintenance.

The NIS submitted with this planning application addresses potential effects on European Sites resulting from the proposed development. There are no downstream hydrological links between the Development and the national sites located within 10 km; as such no operational-phase effects linked to water quality are predicted in this category. Potential for effects on Mothel Church Coolcullen pNHA and Whitehall Quarries pNHA via their mobile species Natterer's Bat and Peregrine falcon was identified due to their occurrence onsite. Long-term Imperceptible to Slight Effects are predicted for these receptors prior to mitigation.

Human activity associated with the maintenance of the operational windfarm will be infrequent and minimal given that it will be monitored remotely. The proposed wind farm is located within a commercial forestry and agricultural area, so there is already disturbance caused by human activity associated with forestry and agricultural management. As a result, any negative effect to mammals during the operational phase of the windfarm is deemed to be a Long-term Slight Reversible Effect.

Collision risk is a potential issue in relation to bats. During 2020, Common pipistrelle was the most frequent species on site accounting for 54% of recordings, followed by Leisler's (20%) soprano pipistrelle (12%) and Daubenton's bat (2%). Nathusius' pipistrelle, Whiskered bat, Brown long-eared bat and Natterer's bat each accounted for <% pf

recordings. Mitigation measures have been specified to avoid or reduce the effects identified to non-significant levels.

In terms of avifauna, target species recorded within the core study area were considered in terms of collision risk based on their activity levels, and recorded flight heights and patterns. The species considered were: Buzzard, Golden Plover, Hen Harrier, Kestrel, Lesser Black-backed Gull, Peregrine Falcon, Snipe, Sparrowhawk and Grey Heron. The collision risk evaluation for these species ranged from Imperceptible to Slight.

The effect of disturbance and barrier effect was determined for each target species and the significance of the effect determined. The effect of disturbance and barrier effect evaluations for these species, excluding kestrel, ranged from Imperceptible to Not significant. For kestrel, effects from disturbance and barrier effect were evaluated as being long term moderate effects.

Operational wind farms are not normally considered to have the potential to significantly effect on the aquatic environment. Potential operational phase effects on aquatic ecology are assessed as being Moderate Short-term and in the Local Context.

Cumulative effects with other wind farms were assessed. The nearby (existing) Gortahile wind farm was identified as being of primary concern regarding cumulative effects. In terms of cumulative operational effects on avifauna, no significant cumulative collision risks are foreseen due to the relatively low levels of activity recorded, flight patterns and heights, and absence of migration flyways from the study area.

## 7.9 Mitigation Measures

### 7.9.1 Construction Stage

- Appointment of Project Ecologist/Ecological Clerk of Works (ECoW) for duration of construction phase;
- Minimise works footprint; habitat & species management plan;
- Ecological supervision of vegetation clearance;
- Construction operations limited to daytime to minimise disturbance to nocturnal fauna;
- Felling operations to avoid combined pine marten/red squirrel breeding period (January-April inclusive) where possible;
- Pre-construction mammal survey to confirm existing environment as described in EIA Report;
- Badger derogation/disturbance licence to be obtained to enact mitigation measures as informed by pre-construction survey;
- Tree/vegetation clearance to be carried out outside the bird breeding season (March-August inclusive) where possible;
- Felling to create vegetation-free buffer around turbines to reduce collision risk for bats (50m buffer between blade tip and top of surrounding trees);
- Toolbox talks with construction staff on disturbance to key species during construction;
- Pre-construction breeding bird survey to detect breeding territories. If construction works commence in these areas of the site during the breeding season, exclusion zones will be placed around any recorded nest sites April to July;
- Measures to protect water quality as detailed in Chapter 7 Biodiversity, Chapter 8 Hydrology and Appendix A4.1 CEMP; and

### 7.9.2 Operation Stage

- Measures to protect water quality as detailed in Chapter 7 Biodiversity, Chapter 8 Hydrology and Appendix A4.1 CEMP;

- Post construction bird monitoring programme to be implemented at subject site to confirm the efficacy of the mitigation measures; surveys to be carried out and results submitted to the competent authority and NPWS during years 1, 2, 3, 5, 10 and 15 post construction (Fatality monitoring, flight activity surveys, monthly wildfowl census, breeding bird surveys and breeding wader surveys);
- The vegetation-free (bat mitigation) buffer zones around turbines will be managed and maintained during the operational life of the development;
- Bat monitoring for first 3 years of operation to determine activity levels post construction
- Bat mortality searches (years 1, 2, 3, 5, 10 and 15 post construction- to be carried out in conjunction with bird mortality searches); and
- Implementation of feathering/increased cut-in speeds during conditions correlating with high bat activity pending outcome of post-construction monitoring and fatality searches.

### 7.10 Residual Effects

Following mitigation, the significance of residual effects has been reduced to levels ranging from Imperceptible to Not significant.

Therefore, the overall effect of the Development on Biodiversity is 'Not Significant'.

## 8 HYDROLOGY AND HYDROGEOLOGY

Chapter 8 of the EIA Report evaluates the effects of the Development on hydrological receptors on the Site and up to a downstream distance of 5 km from the Site Boundary.

Embedded measures include maintaining a 50 m buffer of surface watercourses and minimising the requirement for access tracks to be crossing watercourses, which will limit the potential for significant effects on the hydrological environment. These measures also include implementing the good practice construction methods provided in the outline WCEMP. These construction methods include mitigation measures to protect GWDE communities and PWS, which include water quality monitoring at the PWS.

Effects are considered to be significant for the purposes of the EIA Regulations where the effect is classified as being of 'major' or 'moderate' significance. No effects have been assessed as major or moderate and so there will be no significant effects in terms of the EIA Regulations.

The assessment considers the effects of the construction phase of the Development, including chemical pollution, sedimentation, physical alterations and impediments to flow of surface and groundwaters, increased run-off and effects on third-party water supplies. The operational phase is assessed with regards to a potential increase in surface water run-off as a result of permanent hardstanding.

Cumulative effects are also assessed for all other developments which are hydrologically connected to the Development, including the Consented Grid Route.

Regarding hydrology cumulative effects, the assessment concludes that the Development combined with the Consented Grid Route, and the Operational Gortahile Wind Farm results in non-significant cumulative effects.

## 9 LAND AND SOILS

Chapter 9 of the EIA Report evaluates the effects of the Development on Land and Soils. The assessment of Land and Soils has taken into account potential direct effects arising from proposed construction activities. Indirect effects associated with the operation of the Development are not anticipated for Land and Soils.

To inform the baseline, ground investigations were carried out in 2020 within the immediate vicinity of the areas of the crane hardstanding proposed as part of the Consented Modification application. The ground investigations recorded very weak and weak mudstone at depths varying and weak varying to strong, with depth, sandstone. Additionally, the ground investigations from 2020 recorded peat depths at the turbines to be between 0.45 m and 0.8 m conforming to the findings in the 2011 EIS.

Direct effects on land and soils would be limited to the Crane Hardstanding and any effects from felling. There are no significant direct effects likely on Land and Soils with recommendations to mitigate the potential for disturbance of peat and/or destabilisation of peat. The effects on Land and Soils from the Development were assessed as not significant.

A cumulative assessment which considered the Development in conjunction with the Consented Grid Route, and the Operational Gortahile Wind Farm identified that no significant cumulative effects on land and soils are likely.

## 10 CULTURAL HERITAGE AND ARCHAEOLOGY

Chapter 10 of the EIA Report evaluates the effects of the Development on archaeological and cultural heritage receptors. The assessment of archaeological and cultural heritage effects has taken into account both potential direct effects arising from proposed construction activities, as well as indirect (primarily visual) effects associated with the operation of the Development.

The assessment was informed by the baseline in the 2011 EIS with datasets updated with any new information since 2011. There are no significant direct effects likely upon known archaeological features with archaeological monitoring recommended to mitigate the potential for damage to or destruction of unknown buried archaeological remains.

The assessment considered the potential visual effect of the turbines in relation to national monuments and National Inventory of Architectural Heritage (NIAH) features within the 2 km Study Area. All visual effects are not significant. No mitigation is considered feasible for this effect. Any effect is considered temporary and reversible upon decommissioning. A cumulative assessment which considered the Development in conjunction with the Consented Grid Route, and the Operational Gortahile Wind Farm identified that no significant cumulative indirect (setting effects) are likely.

## 11 NOISE

Construction noise was considered in the EIA for the Development, with no significant effects expected, subject to best practice noise management methods which will be required of all contractors.

An assessment of operational noise effects associated with the Development has been carried out, both in isolation and in combination with the existing Gortahile Wind Farm. Operational noise has been assessed against the noise limits derived in line with current best practice guidance. It has been shown that both in isolation and cumulatively, the Development is compliant with current noise guidance and limits in terms of noise.

The level of noise produced during decommissioning is expected to be no greater than that during the construction phase. Any legislation, guidance or best practice relevant at the time of decommissioning would be complied with.

## 12 MATERIAL ASSETS – ROADS AND TRAFFIC

The Material Assets – Roads and Traffic Chapter of the EIA considered the effect of increased vehicles on routes within the vicinity of the Development. A total of 24,058 vehicle movements are expected over the duration of construction of the Development, made up of 19,240 car or van movements and 4,590 HGV movements. This is expected to

result, during the peak month, in an additional 3% total traffic at the worst location in the study and an increase in HGV traffic of 25% during the same period. On 5 non consecutive days of construction concrete will be delivered for foundation pouring and this would result in a worst-case traffic increase of 8% and 142% for cars and HGVs respectively.

No significant effects as a result of the above traffic increases were identified in the study. The effect of the Development on traffic and transport is therefore low and not significant in terms of the EIA regulations.

Cumulatively, the assessment projected that if the Development, and the Consented Grid Route are constructed at the same time, none of the projected percentage increases in traffic exceed the threshold of significance. Therefore, no significant cumulative effects are anticipated.

The cumulative effect of the Development and Consented Grid Route is therefore negligible and not significant in terms of the EIA regulations.

### 13 AIR QUALITY & CLIMATE

Chapter 13 of the EIA Report assesses effects of the Development on the air quality and climate.

The key issues for the assessment of potential air quality and climate effects relating to the Development are:

- Permanent effects such as long term alterations to the climate (Influence of the Development on Climate);
- Cumulative effects, including the generation of renewable energy by the Gortahile Wind Farm and the Consented Grid Route; and
- Cumulative temporary effects, such as short term alterations to local air quality arising from construction traffic, as a result of the Development and the Original Wind Farm.

The baseline was determined using information and data available from EPA's Air Quality Website and Met Éireann, which is the national meteorological service in Ireland. The Development is situated in a rural location, with a largely agricultural environment. There is limited industrial activity and no individual source of substantial air pollution.

Air quality receptors in the area are residential properties, and construction workers that are working on the Development. These are considered high sensitivity receptors.

An assessment of the Development's effects on air quality was not undertaken due the nature of the Development, however an assessment of emissions arising from cumulative construction traffic relating to the Development in tandem with the Consented Wind Farm was undertaken. The predicted increase in traffic volumes resulting from the construction phase is predicted to be low and consequently it is anticipated that there will be a low magnitude of change of concentrations of pollutants, which is not significant as per the EIA Regulations. The CEMP, included within the EIA Report, provides mitigation on potential emissions of construction dust, and other pollutants, further reducing any effects on air quality.

During the operational phase, it is not expected that the Development will have any discernible effect on air quality. The design and nature of the Development are such that no pollutants would be released to the extent that they would have a discernible effect on local air quality.

An assessment of the Development's effects on climate was undertaken to determine the influence of the Development on Climate. The Development will have a positive effect on carbon savings and therefore on Climate. As a result of the Development 17,522 tonnes of CO<sub>2</sub> will be displaced per annum, resulting in 525,660 tonnes of displaced CO<sub>2</sub> during the

Development's 30 year lifetime. Additionally, the Development will contribute to Ireland's climate targets through the avoidance of fossil fuel energy alternatives and the Development's operational carbon payback. Climate, as the receptor, is assessed to be of Medium sensitivity to change in greenhouse gas emissions, and the magnitude of change is assessed as negligible (in the context of Ireland's carbon emissions), the Development is therefore assessed to have an imperceptible, positive effect on climate that is not significant under the EIA Regulations.

However, when considered cumulatively with Gortahile Wind Farm, and all other renewable energy producing developments in the Republic of Ireland, the cumulative effect of these developments is considered to be a fundamental change in the climate effects of Irish energy supply, which is a profound-substantial, positive effect, which is significant under the EIA Regulations.

## 14 POPULATION & HUMAN HEALTH

Chapter 14 of the EIA report assessed effects of the Development on population and human health resources.

The assessment considers the potential effects arising from the construction and operation phases of the Development on the population and human health resource. Existing baseline conditions have been identified from desk-based collection of data, site visits and consultation with relevant stakeholders.

### 14.1 Population

An assessment of cumulative effects on population, considering the Development, the Gortahile Wind Farm, and the Consented Grid Route, has been undertaken.

Construction workers will temporarily migrate into the area as a result of the Development; however, the 2011 EIS concluded no significant effects would occur on the population as a result of the Original Wind Farm; this remains the case for the Development as there will be no change to construction workers for the Consented Wind Farm as a result of the Development. The Consented Grid Route will result in an increase in volume of workers and length of construction; however, no significant effects on population as a result of the Grid Application were predicted.

These construction effects, when considered cumulatively and considering the negligible magnitude of change as a result of the Development, would not constitute as significant change in the long-term population of the area, and therefore would be a short-term, slight-imperceptible effect which is not significant in terms of the EIA Regulations.

The cumulative assessment of operational effects identified that population levels may change as a result of outward migration caused by visual, traffic and noise effects; for example, changes in the residential environment that would make the surrounding area an unpleasant place to live. The 2011 EIS for the Original Wind Farm concluded that the development would not contribute towards cumulative landscape and visual, traffic or noise effects. Likewise, the EIA Report for the Consented Grid Route Application concluded the same.

In terms of population, the magnitude of change as a result of the Development is not expected to contribute to any significant, negative cumulative effects on other existing and proposed developments in the vicinity. It is expected that the effects would be imperceptible, which is not significant in terms of the EIA Regulations.

### 14.2 Employment

An assessment on cumulative effects on employment, considering the Development and the Consented Grid Route, has been undertaken.

The construction of the Development will result in an increased benefit to the local area from indirect supply chain opportunities and direct employment opportunities. The 2011 EIS stated that approximately 20-25 jobs could be created during the peak construction phase, with indirect effects likely arising from the manufacturing of required building materials and construction equipment. It was concluded that this effect on employment would be not significant. The EIA Report for the Consented Grid Route application stated, the positive employment effects associated with the Consented Wind Farm would be increased and prolonged as a result of the construction of the Grid Application, which would have a short term, slight, positive effect on both the construction and energy generation sectors. However, it was concluded this would similarly not be significant under the EIA Regulations.

These conclusions would not change as a result of the Development. The Development will not result in any change to the jobs created from the Consented Wind Farm and there are no additional cumulative effects to consider.

Therefore, the cumulative effect would be considered unlikely to lead to a significant change in employment at a national or regional level. The potential exists in the future, should a large enough number of wind farms and other developments be consented in the area, for job creation to occur to support the industry. However, at a regional level, the sustaining of jobs, in construction in particular, is considered to be not significant.

The 2011 EIS for the Original Wind Farm identified that there would likely be at least one long-term position available for employment, and potentially an additional 2-3 permanent positions for maintenance work created during the operational phase. It is likely that operations and maintenance operations of the cumulative developments (including the Grid Application) will also provide 2-3 long-term positions; however, this is not significant in terms of the EIA Regulations.

Therefore, cumulatively, this would constitute a long term, slight, positive effect, which is not significant in terms of the EIA Regulations.

### 14.3 Human Health & Amenity

No significant effects were identified with regards to the other assessments that may have an impact on human health and amenity, for any phase of the Development. In relation to construction effects, this includes: noise, air quality and climate, LVIA (including residential amenity), traffic and transport, and material assets (including shadow flicker).

Overall, the Development result in a negligible magnitude of change with no significant effects on the aforementioned topic areas. When considering the potential for in-combination construction effects on human health and amenity to occur from the aforementioned topics, given the limited individual magnitude of change identified in each chapter, the combined magnitude of change of these impacts on health human health and amenity, is a slight-imperceptible effect which is not significant in terms of the EIA regulations.

As previously stated, no significant effects were identified with regards to the other assessments that may have an impact on human health and amenity, for any phase of the Development. In relation to operational effects, this includes: air quality and climate, LVIA (including residential amenity), and material assets (including shadow flicker).

When considering the potential for in-combination operational effects on human health to occur from the aforementioned topics, given the limited individual magnitude of change identified in each chapter, the combined magnitude of change of these impacts on human health and amenity, a high sensitivity receptor, will be negligible. This will result in a slight-imperceptible effect which is not significant in terms of the EIA regulations.

Cumulatively, with the Consented Grid Route, the Development's effects on human health and amenity are considered negligible and not significant, for all phases of the Development.

## 15 OTHER CONSIDERATIONS

The Other Issues Chapter evaluated the effects of the Development, on the other considerations, not covered in Chapters 6 – 14. This included an assessment on the following topics:

- Tourism and Recreation;
- Electromagnetic Interference, Television and Communication Signals;
- Air Navigation; and
- Shadow Flicker.

### 15.1 Tourism and Recreation

The surrounding area of the Site Boundary has little by way of formal, designated tourism assets, and are largely centred on cultural heritage and the natural landscape. No tourism activities are currently promoted within the Site, and there are no designated footpaths within the Site.

The 2011 EIS for the Original Wind Farm identified no direct or indirect effects on tourism or recreation. All tourism assets within the Study Area are considered low sensitivity as they are of local importance. The Development would result in a negligible magnitude of change and therefore, the effects on tourism and recreation are considered to be imperceptible which is not significant in terms of the EIA Regulations.

No cumulative effects on tourism are expected during construction or operation.

### 15.2 Electromagnetic Interference, Television and Communication Signals

Following a desk-based search and consultation, there were no gas utilities or overhead lines within the Site.

The 2011 EIS for the Original Wind Farm states no significant effects are predicted as a result of the Original Wind Farm; this conclusion and the mitigation stated within the 2011 EIS remains valid and applicable to the Development.

Prior to construction, a further search for all television and communication links and utilities would take place to identify any new or updated services. Adverse effects would be avoided through the implementation of safe systems of work, which would include consideration of any additional identified electricity lines and cables.

There will therefore be no significant effects as a result of the Development.

No cumulative effects on Electromagnetic Interference, Television and Communication Signals are expected during construction or operation.

### 15.3 Air Navigation

The Development is not located within any areas or zones identified by the Irish Aviation Authority.

The 2011 EIS identified no direct or indirect effects, and as the Development does not result in any changes to the locations of the turbines or tip heights, the assessment of direct and indirect effects within the previous 2011 EIS remains valid. Therefore, no significant effects are predicted on air navigation as a result of the Development.

The Irish Aviation Authority (IAA) confirmed that the Consented Wind Farm would not have any consequences for the safety of air navigation if all IAA requirements were met in full. The Applicant has since consulted with the IAA who confirmed that in the interests of air

navigation safety, turbines marked T1, T3 and T5 will require to be fitted with Fixed Red Obstacle lighting to be visible in all directions at all times.

The IAA also confirmed that the Development should be fitted with incandescent (or of a similar type of night vision lighting) obstruction lighting.

All IAA mitigation requirements will be designed to ensure that adverse impacts are remedied such that any residual effects will be non-existent or insignificant. Specifically, the lighting scheme will be designed in accordance with the IAA requirements such that safety is maintained in the area.

No cumulative effects on Air Navigation are expected during construction or operation.

#### **15.4 Shadow Flicker**

Following a desk-based search, a total of 25 potential residential dwellings were identified within the shadow flicker study area.

One residential dwelling has the potential to experience shadow flicker effects as a result of the Development, as the residential dwelling theoretically could potentially experience up to 21 minutes per day and 31 hours per annum of shadow flicker effects; this exceeds the 30 hours per year or 30 minutes per day identified within the relevant guidelines.

Consequently, the Applicant proposes to agree a shadow flicker mitigation plan with CCC. Mitigation will involve the shutting down of turbine(s) during certain times/weather conditions to reduce shadow flicker effects.

The exact design of the shadow flicker mitigation system will be subject to final turbine procurement. However, it is anticipated that following the application of agreed mitigation the Development would operate within the Wind Energy Development Guidelines for shadow flicker and that residual shadow flicker effects are deemed to be not significant in terms of the EIA Regulations.

No cumulative effects on shadow flicker are expected during operation.

### **16 INTERACTIONS AND INTER-RELATIONSHIPS**

Effects and their significance are assessed within the frame of singular resource assessment; however, all environmental factors are intrinsically linked to each other, potentially resulting in positive or negative impacts with varying level of significance.

Chapter 16 of the EIA Report identifies and assesses which environmental resources have the potential to have interaction or share inter-relationships as a result of the Development.

In summary, there are no predicted significant effects as a result of the interaction or inter-relationship of environmental resources.

### **17 SUMMARY**

An EIA for the Development has been carried out in accordance with the regulatory requirements and relevant good practice guidance, which involves the compilation, evaluation and presentation of any potentially significantly environmental effects resulting from the Development.

The design strategy has created a wind farm that represents optimum fit within the technical and environmental parameters of the Site.

Through embedded design and proposed mitigation, major and significant adverse effects as a result of the construction and operation of the Development have been avoided.

The Development presents an important environmental benefit as a renewable energy generator contributing to Ireland's renewable energy targets and offsetting fossil fuel energy sources which produce CO<sub>2</sub> and contribute to climate change. Beyond the payback

periods, the Development will make a positive net contribution to CO<sub>2</sub> emissions savings for the remainder of its operational period.

The renewable industry is an important economic asset to the Republic of Ireland, and supports a substantial and growing number of employment opportunities. The Development will further contribute to the positive effects of renewable energy, and associated skills base within the Republic of Ireland, and the spend and employment is positive for the local area.

Overall, this EIA shows that, given the iterative design process, and with the committed good practice measures and proposed further site-specific mitigation in place, potential environmental effects associated with the construction and operation of the Development can be avoided or minimised.

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