White Hill Wind Farm

Environmental Impact Assessment Report

Non-Technical Summary

White Hill Wind Limited

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Contents

1.0 Introduction

White Hill Wind Limited ('the Developer') has prepared this Environmental Impact Assessment Report (EIAR) for the construction of a 7 no. turbine wind farm project, associated site development works together with approximately 15 kilometres (km) of underground electricity line which will connect to the existing 110kV Kilkenny electricity substation.

The wind farm is located in west County Carlow and east County Kilkenny, approximately 13km southwest of Carlow, approximately 14km northeast of Kilkenny City and approximately 4km west of Oldleighlin; while the proposed grid connection infrastructure will be located within public roads between the wind farm and the Kilkenny 110kV electricity substation.

Planning legislation requires that that planning applications for such projects be accompanied by an EIAR. An EIAR is a statement of the effects, if any, which the project, if carried out, would have on the environment. It provides information which a planning authority, in this case An Bord Pleanála ('the Board'), can use in undertaking a formal Environmental Impact Assessment (EIA) and in informing their decision making process. The EIAR can also be used by third parties to evaluate the project and its likely effects.

Galetech Energy Services (GES) has been appointed by the Developer to manage and co-ordinate the management and preparation of this EIAR. The content of the EIAR has been prepared by individual specialist and technical consultants who were appointed in order to undertake assessments and prepare chapters on specific environmental topics.

Volume I of the EIAR is arranged in 14 no. separate chapters which describe the project and addresses each component of the environment likely to be affected and their likely interactions. **Volume II** includes technical information and annexes associated with the EIAR.

The EIAR may be inspected or purchased at the public offices of the Board, Carlow County Council and Kilkenny County Council during public opening hours. The EIAR may also be inspected at the dedicated project website www.whitehillwindfarmplanning.ie.

A submission or observation in respect of the EIAR and the planning application may be made in writing to the Board; at 64 Marlborough Street, Dublin 1, D01 V902 or via the Board's website www.pleanala.ie/en-ie/observations; on payment of the €50 prescribed fee within the period of seven weeks and such submissions or observations will be considered by the Board in making the decision on the planning application.

2.0 Site Location

The proposed wind farm is located in in west County Carlow and east County Kilkenny; c. 13km southwest of Carlow, c. 14km northeast of Kilkenny City and c. 4km west of Oldleighlin. The location of the proposed wind farm, in a regional context, is illustrated in **Figure 1** below.

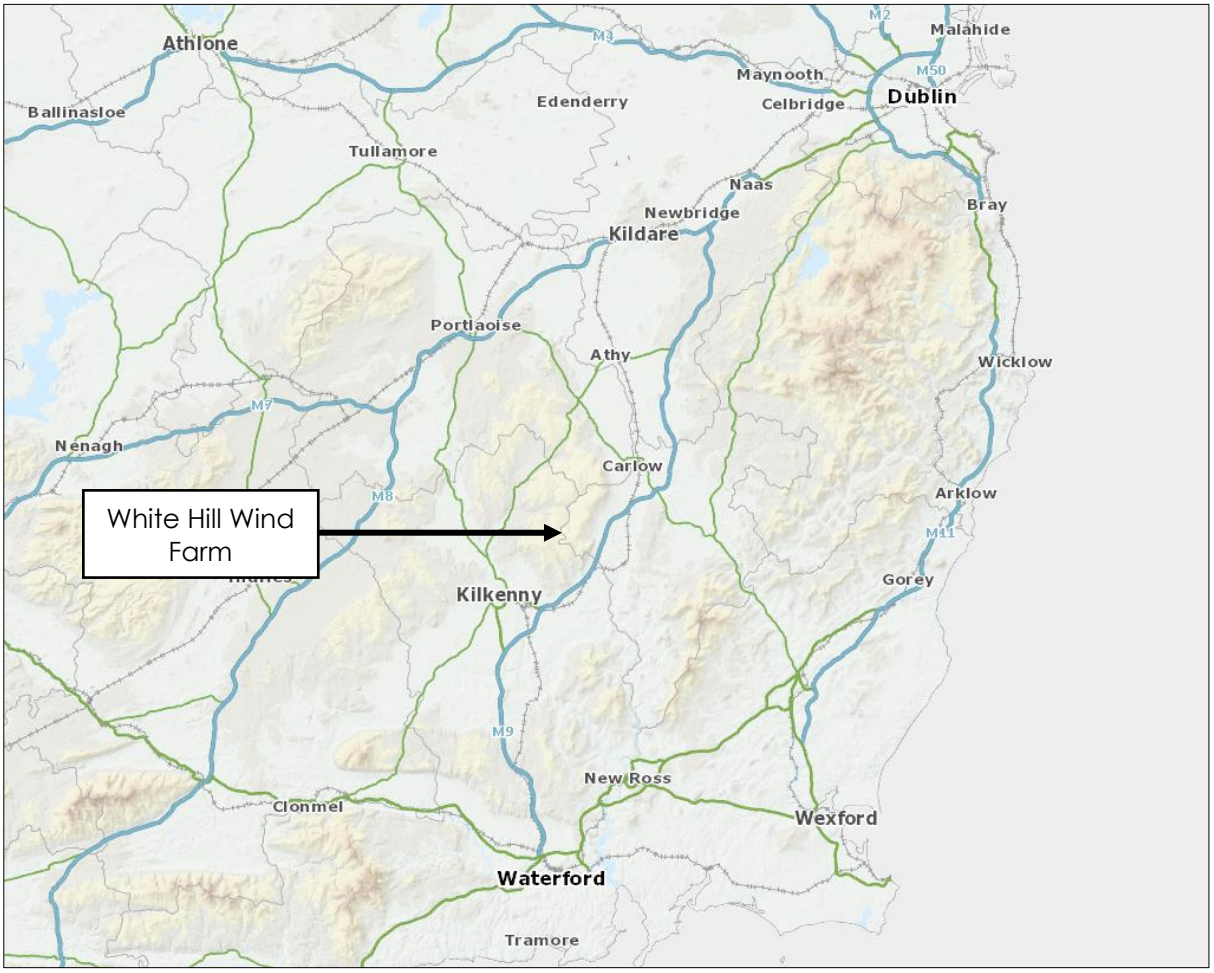

Figure 1: Project Site Location

Figure 2: Overall Site Location

The local area is typical of this part of Ireland, with settlement patterns largely comprising dispersed rural dwellings often accompanied by agricultural holdings and buildings. In total, there are 129 no. dwellings located within 1.85km of a proposed wind turbine.

The wind farm site is located on an elevated plateau, known as the Castlecomer Plateau, which is located in south county Laois, northwest county Carlow and northeast county Kilkenny. The Castlecomer Plateau is characterised by undulating hills and steep slopes at its fringes. On either side of the plateau are the Barrow and Nore rivers, which lie to the east and west respectively. The lowlands are a mixture of pasture and tillage with fields typically bordered by mature broadleaf trees and hedgerows. Agricultural land uses extend into the upland areas in the form of more marginal grazing with scrubby hedgerow field boundaries. Extensive commercial conifer plantations emerge on higher slopes throughout the Castlecomer Plateau.

The wind farm site comprises a mosaic of improved and semi-improved agricultural grassland, with tracts of conifer plantation at the northern, western and southwestern fringes. Field boundaries generally consist of mature and semi-mature hedgerows, interspersed with trees, which consist of a mix of species including sycamore, ash, whitethorn, bramble, gorse, bilberry and ferns.

Figure 3: General View across the Wind Farm Site

3.0 Description of the Project

The project assessed within this EIAR comprises a wind farm, including all associated development works to accommodate its construction, installation, operation, maintenance and the export of electrical power to the national grid. This will include:-

- 7 no. wind turbines with a hub height of 104 meters (m), a rotor diameter of 162m, and an overall tip height of 185m;
- All associated turbine foundations and crane hardstanding areas;
- All associated underground electrical and communications cabling;

- Construction of internal wind farm access tracks;
- Construction of a site entrance from the L3037 local public road and upgrades to 2 no. existing agricultural entrances from the L7122 local public road;
- 1 no. guy-wired meteorological with an overall height of 30 metres;
- 1 no. temporary construction compound;
- 3 no. borrow pits which, when exhausted, will be utilised to permanently store excess excavated material;
- The storage, as required, of excavated material at 2 no. further dedicated spoil deposition areas;
- Change of use of existing residential dwelling to wind farm site office;
- A 38 kilovolt (kV) electrical substation, switchroom and equipment compound, associated electrical equipment including an electricity storage system, and site entrance and access track from the L7117;
- Felling of 15 hectares (ha) of commercial forestry plantation to facilitate the construction and operation of wind farm infrastructure; and,
- All associated and ancillary site development, excavation, construction, landscaping and reinstatement works, including provision of site drainage infrastructure and environmental mitigation measures.

Off-site and secondary elements of the project which are included for assessment in this EIAR and are included in the current planning application, include:-

- The construction of a temporary access track (150m in length) between the N78 and L1834; and,
- Carriageway strengthening works at 'Black Bridge' on the L1835 and L3037.

Off-site and secondary elements of the project which are included for assessment in this EIAR but are not included in the current planning application and will be subject to a separate licensing and/or consenting process, include:-

- 15km of underground electricity lines to facilitate connection of the wind farm electricity substation to the existing Kilkenny 110kV substation; and,
- The planting of 15ha of commercial (replacement) forestry on lands in the townland of Drumagelvin, Co. Monaghan.

The layout of the proposed wind farm is illustrated at **Figure 4** below.

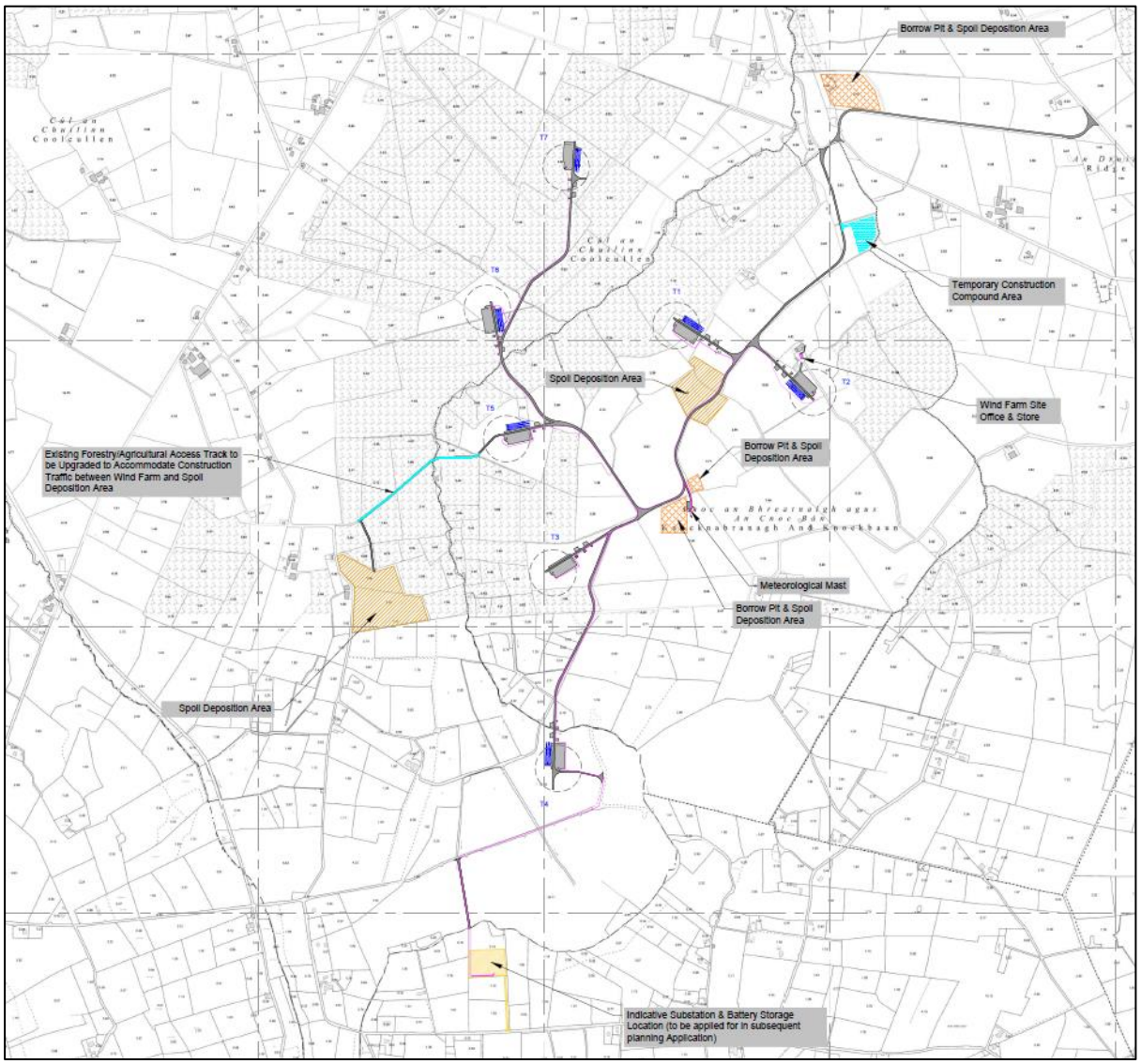

Figure 4: Layout of Wind Farm

4.0 Assessment of Project Alternatives

A description of the reasonable alternatives to this project has been provided, and details the assessment, evaluation and analysis undertaken. A range of alternate development options have been assessed through an iterative and recursive project design and environmental assessment process, including the 'do-nothing' scenario, alternative locations, alternative designs and layouts, alternative grid connections; alternative design technologies; and alternative construction phase transport routes. The objective of this process was to arrive at a project which has inherent design characteristics and has the least likely adverse environmental effects.

The final project assessed in this EIAR has been selected as it strikes the best balance between the avoidance of any significant environmental effects and achieving the objectives of the project.

5.0 Population & Human Health

5.1 Background

The chapter presents an assessment of the likelihood of effects on population and human health. Human beings are an important element of the environment and

any likely effects on the status of population and human health must be comprehensively addressed.

5.2 Methodology

The methodology used to inform the assessment generally comprised research of existing documents and information sources to fully understand the population, social and economic characteristics of the local area. Information sources included information from the 2016 National Census, local economic and community plans, and tourism information for counties Carlow and Kilkenny.

Consultation was also undertaken with a range of bodies including Failte Ireland, Carlow County Council, Kilkenny County Council, the Health and Safety Authority, and the Health Service Executive.

5.3 Description of Likely Effects

The assessment finds that the likelihood of effects during the construction phase are limited to effects on population sustainability, general amenity and well-being, economic and employment effects, effects on tourism, and the possibility of accidents or natural disasters. The assessment concludes that the project will result in both negative and positive effects on the above factors; however, the level of significance is at the lower end of the spectrum.

For example, amenity levels, in terms of local population, are likely to be subject to a minor adverse effect for the temporary duration of the construction phase; however, while these effects may be substantial at a personal level, they are not assessed to be significant in EIA terms, particularly given their short-term temporary duration.

Economic opportunities, through the provision of materials or services, will be available to local companies and direct employment during the construction phase is likely to involve the employment of up to approximately 100 people over a period of 15-18 months. Additionally, plant and materials will be sourced locally. The socio-economic benefits resulting from the construction of the project are likely to make a substantial positive effect on the local economy of the local area, through direct employment and rural diversification.

The operational phase of the project is not likely to result in any significant positive or negative effects in terms of population sustainability and residential amenity, general amenity and well-being, economic and employment effects and effects on tourism. While minor localised effects are likely to arise, both positive and negative; these effects are not assessed as likely to be significant.

The Developer is committed to operating a community benefit fund in accordance with the Wind Energy Ireland (WEI) best practice and it will be available to the community at a rate of €2 euro per megawatt hour (MWh) produced, should the Renewable Energy Support Scheme (RESS) be awarded. An investment of approximately €37,000 per turbine per year for up to 15 years, is committed. There will also be a community investment element available where there will be an opportunity for all local residents to participate, should they wish to do so. The structure for the investment scheme will form part of the RESS design; however, the precise arrangements for the RESS are not yet known.

5.4 Mitigation Measures

The land on which the project has been sited is privately owned and there will be no unauthorised public access to the site. This will ensure that there are no impacts on

the local population which could affect human health.

During the operational phase, the project will generally be unmanned. Operational monitoring activities will be carried out, remotely, on an ongoing basis. However, regular visits to the site will be undertaken for routine inspections and maintenance.

5.5 Overall Findings

The overall conclusion of the chapter is that any adverse effects of the project on population and human health are unlikely to be significant. No specific mitigation measures, other than full adherence to all health and safety and public health guidance, have therefore been identified as being required.

6.0 Biodiversity

6.1 Background

This chapter provides an assessment of the likely significant effects on biodiversity as a result of the project. This assessment considers the ecological impact of the entire project through the construction, operational and decommissioning phases.

6.2 Methodology

A comprehensive desk study was undertaken to inform this ecological impact assessment, involving a thorough review of available information that is relevant to the ecology of the proposed development site. Field surveys were undertaken by appropriately qualified ecologists between autumn 2019 and August 2022. These surveys applied best practice guidelines, as required for ecological assessment for proposed wind farm developments.

Surveys undertaken included:-

- Botanical surveys and Habitat mapping;
- Invasive species surveys;
- Aquatic and fisheries assessments including electrofishing under licence, biological water quality assessment and Freshwater Pearl Mussel surveys;
- Bird surveys, including:-
  - Five seasons of vantage point (VP) watch surveys from 2019-2021 covering the wind farm site and surrounding lands;
  - Winter and breeding season transects and point count surveys to record the general avian community present;
  - Breeding and wintering hinterland surveys encompassing the proposed grid route and wider surrounding area;
- Dedicated non-volant mammal survey walkovers and deployment of wildlife trail cameras. Checks along the grid connection route and points of interest on the turbine haul route;
- Multi-season bat surveys including:-
  - Active surveys;
  - Passive detector surveys (including deployment at height);
  - Identification of Potential Roost Features;
  - Roost Emergence surveys; and
- Other taxa surveys including checks of areas with Devil's Bit Scabious for signs of Marsh Fritillary larvae.

Ecological surveys for the project were undertaken following specific guidelines for habitats and species and with reference to the relevant national legislation and policy. The importance of the habitats and species present is evaluated using the

guidance document *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal, and Marine* published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018, updated 2019) and *Good Practice Guidance for Habitats and Species* (CIEEM 2021). This document outlines an accepted approach for the evaluation of potential impacts from such developments. The description and evaluation of likely and residual effects arising from the project on the existing terrestrial biodiversity of the study area and surrounding area follows guidelines published by the EPA (2022) with reference to CIEEM (2018, 2019 and 2021).

6.3 Description of Likely Effects

There are no nationally or European designated sites located within or immediately adjacent to the wind farm site. The wind farm footprint will be primarily located on Conifer Plantation (WD4) or Improved Agricultural Grassland (GA1) set out in large open fields. No Annex I habitats listed under the EU Habitats Directive were recorded within the project site, study area, haul route works locations, or along the grid connection route. No botanical species protected under the Flora (Protection) Order 2022, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC) were recorded. Furthermore, no Bryophytes protected under the Flora (Protection) Order 2022 are documented for the study area (Flora Protection Order Map Viewer NPWS). No Third Schedule invasive plant species were recorded within the wind farm site, at works areas on the haul route or along the grid connection route.

The vantage point surveys recorded a variety of bird species including raptors, waders and waterbirds. Buzzards were the most frequently observed species across the survey seasons. Kestrel and Sparrowhawk were recorded in the area year-round. Occurrence of wintering Golden Plover varied greatly between years, with few flightlines observed in 2 no. of the 3 no. winter seasons. A total of 59 no. bird species were recorded across the 5 no. seasons of breeding and wintering transect and point count surveys in this area. 6 no. of the 59 no. species recorded are on the Red-list (Gilbert *et al*. 2021), as follows: Kestrel, Meadow Pipit, Grey Wagtail, Redwing, Golden Plover and Snipe. A further 14 no. of the species recorded locally are currently Amber-listed, including Skylark, House Martin, Swallow, Willow Warbler, Starling, Spotted Flycatcher, Goldcrest, House Sparrow, Tree Sparrow, Greenfinch, Linnet, Mallard, Lesser Black-backed Gull and Herring Gull.

A total of 6 no. non-volant mammal species were identified during the study, with two outlier Badger setts recorded. Overall, a moderate level of bat activity was recorded at the site, and a moderate-to-high level of species diversity. The wind farm site contains limited roosting opportunities or high-quality foraging habitat.

No adult or larval Marsh Fritillary were recorded from the site.

In the absence of appropriate environmental controls, monitoring and mitigation there is a likelihood of effects upon biodiversity features of importance. The construction phase is identified as requiring the greatest degree of active environmental control. In the absence of appropriate mitigation, there is a likelihood of significant negative effects on designated sites, including the River Barrow and River Nore SAC and River Nore SPA associated with run-off of sediment and other potential contaminants to hydrologically connected watercourses. The loss and disturbance of areas of grassland and conifer plantation is also likely to result in some localised displacement and disturbance of species. The likelihood of operational and decommissioning phase effects upon habitats and species is also assessed. For instance, likely operational phase collision effects of birds and bats with turbines is

assessed based on the results of the surveys and the scientific literature; however, significant effects on these species are not assessed as likely.

6.4 Mitigation Measures

From the outset, an iterative process of constraints led design was employed for the project whereby independent ecological expertise was utilised at an early design stage in identifying the constraints and designing the site layout to take account of these constraints. The siting of the turbines and associated infrastructure was informed by the environmental constraints.

Mitigation measures, required to prevent adverse effects on downstream Natura 2000 sites are outlined in the Natura Impact Statement (NIS) for the project. The mitigation measures relate to protection of water quality flowing into the River Barrow & River Nore SAC and River Nore SPA. A detailed Surface Water Management Plan (SWMP) and planning phase Construction and Environmental Management Plan (CEMP) present detailed environmental controls to ensure best practice guidelines are implemented. If these measures are implemented in full, they will ensure that adverse effects on these Natura 2000 sites are avoided. These measures will also protect water quality locally within the watercourses draining the proposed development site and therefore avoid any likely significant effects on local aquatic ecology.

Mitigation measures which aim to reduce the spatial and temporal effects on the receiving environment are detailed. An Ecological Clerk of Works (ECoW) will be appointed to oversee the implementation of the construction phase mitigation. Tree-felling and removal of mature vegetation will be undertaken outside of the bird breeding season (1 March – 1 August).

Hedgerows and mature trees will be retained insofar as possible and all disruption to habitats outside of the construction footprint will be minimised. Pre-construction surveys will be carried out to ensure that the risk of disturbance of any protected mammal species is minimised and that all vegetation clearance and construction works will be carried out in accordance with the mitigation recommendations, relevant guidance and legislative requirements.

Operational phase monitoring and mitigation includes vantage point surveys for birds, passive detector bat surveys and fatality monitoring for birds and bats.

At the decommissioning phase, an decommissioning plan will be prepared in advance of the works and will include all appropriate surface water and spoil management commitments. Following reinstatement, the site will be monitored by a suitably qualified ecologist for a 2-year period to determine the progress of revegetation and if necessary to introduce supplementary planting with native species.

6.5 Overall Findings

The mitigation measures described have been designed to minimise the effect of the project, from the construction of the wind farm through the operational phase and onto decommissioning, on ecological receptors. The constraints-led design approach followed has been effective in identifying and, insofar as possible, avoiding likely effects to the receiving environment.

The ecological impact assessment has fully assessed the likelihood of adverse effects of all aspects of the project on the species and habitats in the receiving environment. Overall, it is assessed that the detailed monitoring and mitigation

commitments will be effective in ensuring that there are no likely significant residual effects on biodiversity.

Separately, the Natura Impact Statement (NIS) has fully assessed the potential impacts of the project, on its own and in combination with other projects and plans, on designated Natura 2000 sites in the wider receiving environment. The implementation of detailed mitigation commitments will ensure that there are no significant effects on any European-designated nature conservation site.

7.0 Land & Soils

7.1 Background

This chapter provides an assessment of the likely and significant effects of the project on the land, soil and geological environment.

7.2 Methodology

A desk study of the project site and receiving environment (described below) was completed in advance of undertaking the walkover survey, visual assessments and site investigations. This involved collecting all relevant land, soil and geological information for the project site and surrounding area.

An initial site walkover, geological mapping and soil probing exercise was undertaken. Further site investigations, including trial pits and additional site walkovers and soil probes were also completed.

The geology of the wind farm site comprises sandstone and shale glacial tills (mineral subsoil/overburden) over sandstone or shale bedrock. Bedrock outcrop is dominant along much of the grid connection route, with the other subsoil types along the route similar to those mapped within the wind farm site (i.e. sandstones and shale tills). Similar geology is also mapped at the haul route works locations and replanting lands.

Localised patches of Blanket Peat are mapped on the north-western section of the wind farm site. However, it should be noted that no infrastructure is located within areas mapped as Blanket Peat.

In places, mineral subsoils are overlain by peat/peaty topsoil which is typically shallow, localised in nature and confined to isolated pockets. This is not an intact blanket bog deposit but is more likely to be a remnant of a more localised peat deposit in areas of historically poor drainage.

The overburden geology/mineral subsoils at the project site typically comprises firm Gravelly SILT or SILT/CLAY. 7 no. of the 9 no. trial pits encountered bedrock at depths varying between 0.5 and 2.9m.

A Geotechnical and Peat Stability Assessment undertaken for the project site determined the site is suitable for wind farm development and is considered to be at low risk of peat failure or ground instability.

7.3 Description of Likely Effects

Construction of the wind farm infrastructure will require the removal of soil, subsoil and sometimes bedrock to a competent base layer. Material for access tracks and general hardstanding construction is likely to be generated from excavations; however, where necessary, 3 no. borrow pits may be developed to provide suitable material. Relatively minor excavation works will be required for the grid connection haul route works. Removal of soil, subsoils and bedrock represents a permanent

direct impact on the geology of the site which is considered to be an acceptable part of economic progression and development. Excess overburden/spoil that remains after landscaping and reinstatement will be placed in dedicated spoil deposition areas. Other effects, such as soil erosion and compaction, are expected to be negligible.

During the construction phase, sources of contaminants (such as oil-based substances or other hazardous chemicals) will not be stored at the site except where this is done within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into soil and subsoil. Refueling will be done with a double skinned bowser with spill kits on the ready in case of accidental spillages.

With regard cumulative effects, the assessment concludes that significant effects are unlikely to arise predominately due to the localised and near surface nature of the construction works. All effects relating to the project are assessed to be contained within the immediate vicinity of the project site and it is assessed that there is no pathway for the development to act in combination with other projects.

The development will not be constructed within or near any designated sites for the protection of geological feature such as geological heritage, NHAs or SACs.

With respect to potential health effects, wind farms or grid connections are not a recognised source of pollution and so the potential for effects during the construction, operational and decommissioning phase are negligible.

7.4 Mitigation Measures

The excavation of peat, soil and subsoil will have a direct effect on the geological environment and no specific mitigation measures are proposed. The excavation of materials will be completed in accordance with best practice for the management and treatment of such materials.

7.5 Overall Findings

No significant impacts on the land, soil or the geological environmental are likely to occur during the construction, operation or decommissioning of the project.

8.0 Water

8.1 Background

This chapter provides an assessment of the likely and significant effects of the project on water aspects (hydrology and hydrogeology) of the environment.

8.2 Methodology

A desk study of the project site and receiving environment was completed in advance of undertaking a walkover survey, field mapping and site investigations. This involved collecting all relevant geological, hydrological, hydrogeological and meteorological information for the project and surrounding area. The desk study included consultation of the following data sources:-

- Environmental Protection Agency database (www.epa.ie); Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive/EPA Catchments Map Viewer (www.catchments.ie);

- Bedrock Bedrock Geology 1:100,000 Scale Map Series, Sheet 16 (Geology of Kildare - Wicklow);
- Geological Survey of Ireland (2004); Groundwater Body Initial Characterization Reports;
- OPW Past Flood Event Mapping (www.floodinfo.ie);
- CFRAM Flood Risk Assessment mapping (www.floodinfo.ie);
- Ordnance Survey Ireland (OSI) – 6 inch and 1;5000 scale basemaps; and,
- Aerial photography (www.bing.com/maps, www.google.com/maps).

Subsequently, surface water sampling was completed and tested for a range of hydrochemistry parameters.

In terms of regional surface water catchments, the wind farm and grid connection route are located in the River Nore and River Barrow catchments. The replanting lands are located in the Fane River catchment.

On a more local scale, the majority of the wind farm site (including all of the turbine locations) is located in the Dinin River sub-catchment. The Dinin River drains into the River Nore approximately 25km downstream of the wind farm site.

The southernmost section of the wind farm site within the regional River Barrow catchment drains locally to the Monefelim River. The Monefelim River drains into the River Barrow approximately 15km downstream of the wind farm site.

Along with the natural watercourse network at the wind farm site, there are manmade drainage ditches present also. The integration of the wind farm drainage infrastructure with the existing land and forestry drainage, in a manner that avoids water quality impacts in downstream water bodies, is a key component of the project design.

The shale and sandstone bedrock underlying the wind farm site is classified as poor to locally important respectively in terms of well water yield potential. Groundwater movement within the aquifer is localised. Groundwater at the site can be classed as sensitive in terms of potential impacts from the proposed development. However, there is low potential for pollutant travel within the underlying bedrock (due to short groundwater flow path distances) making surface water bodies such as streams more sensitive to pollution than groundwater at this site. Impacts on groundwater levels during excavations is not anticipated. Local private wells will not be impacted.

8.3 Description of Likely Effects

Castlewarren Group Water Scheme and Paulstown Public Water Supply drinking water protection zones are located in the area of the project site. There are no turbines located in either of the drinking water protection zones only minor elements of the project site such as a section of the grid connection. Due to the relatively small scale and shallow depth of these works within the Castlewarren GWS and Paulstown PWS source protection areas, in addition to the proven and effective measures to mitigate the risk of releases of sediment and contaminants, no effects on either source will occur.

Downstream designated sites that receive surface water runoff from the wind farm include the River Barrow and River Nore SAC. This designated site can be considered very sensitive in terms of potential effects. Comprehensive surface water mitigation and controls are proposed to ensure protection of all downstream receiving waters and ecosystems, including Freshwater Pearl Mussel. Any introduced drainage works

at the project site will mimic the existing drainage regime thereby avoiding changes to flow volumes leaving the site.

Due to the nature of wind farm/grid connection developments, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site would be from hydrocarbon spillage and leakages during refuelling. These are common potential effects from all construction sites (such as road works and industrial sites). These potential contamination sources are to be carefully managed at the site during the construction, operational and decommissioning phases of the development.

With regard likely cumulative surface water quality effects, it is assessed in the EIAR that any residual effects will be negligible and short-term following the implementation of measures described in the Surface Water Management Plan and proposed hydrological mitigation measures.

8.4 Mitigation Measures

Two methods will be employed to control drainage water within the site during construction, thereby protecting downstream surface water quality and aquatic habitats. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the site that might carry silt, to allow settlement and cleaning prior to its release.

During the construction and decommissioning phases, all runoff will be treated to a high quality prior to being released. There will be no risk of increased flooding down-gradient of the site as a result of the project due to these drainage measures. Effects on water quality during the construction phase of the wind farm will be imperceptible to none. A surface water monitoring programme will be put in place during the construction phase.

During the operational phase, drainage control measures will ensure that surface runoff from the developed areas of the project site will continue to be of good quality and will therefore not affect the quality of downstream rivers and streams. The present drainage regime of the site will not be altered in any way. No effects on surface water quality are anticipated during the operational phase.

8.5 Overall Findings

Overall, no significant effects on the water environment, including WFD status, will occur during the construction, operation or decommissioning of the project.

9.0 Air Quality & Climate

9.1 Background

This chapter comprises an assessment of the likely impact on air quality and climate associated with the project during its construction, operation and decommissioning phases.

9.2 Methodology

The methodology employed as part of this assessment comprised a desktop appraisal and evaluation of existing environmental conditions; the likely effects

which may arise during the construction, operational and decommissioning phases; and identification of measures to off-set or reduce likely adverse effects.

9.3 Description of Likely Effects

The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for effects from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within several hundred metres of the construction area.

The effect of the construction, operation and decommissioning of the project on Ireland's total national greenhouse gas emission is compared to Ireland's 2020 total greenhouse gas emissions and obligations under Irelands EU 2030 commitments. Any adverse effects are predicted to occur during the construction phase, with the dominant sources of greenhouse gas emissions as a result of the project arising from construction traffic and embodied energy for turbine construction.

The generation of electricity to the national grid during the operational phase will lead to a net saving for the development in terms of greenhouse gas emissions. The generation of 150,111 megawatt-hours per year of electricity from the project will lead to a net saving in terms of greenhouse gas emissions. The production of this renewable electricity results in the project having a net positive annual effect on greenhouse gas emissions.

9.4 Mitigation Measures

A range of measures have been proposed to minimise the emission of greenhouse gases during the construction phase; while a Dust Management Plan has been prepared to ensure that significant levels of dust are not generated.

9.5 Overall Findings

Due to the size, nature and location of the project, increased road traffic emissions resulting from the project are expected to have an imperceptible impact on air quality. The project will, once operational, result in a long-term positive effect on air quality and a reduction in greenhouse gases.

10.0 Landscape

10.1 Background

This chapter describes the landscape context of the project and assesses the likely landscape and visual impacts of the scheme on the receiving environment. Although closely linked, landscape and visual impacts are assessed separately.

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

10.2 Methodology

The production of this assessment involved baseline work in the form of desktop studies and fieldwork comprising professional evaluation by qualified and experienced Landscape Architects. This entailed a desktop study, fieldwork to inform the assessment and an appraisal which estimated the significance of landscape and visual impacts base on a balance of receptor sensitivity weighed against the magnitude of effects. Cumulative landscape and visual effects were also assessed in respect of other surrounding developments that are either existing or permitted.

This assessment uses methodology as prescribed in the following guidance documents:-

- Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (May 2022)
- Landscape Institute and the Institute of Environmental Management and Assessment *Guidelines for Landscape and Visual Impact Assessment – Third Addition* (2013);
- Scottish Natural Heritage (SNH) *Guidance Note: Cumulative Effect of Wind Farms* (2012);
- Department of the Environment, Heritage and Local Government *Wind Energy Development Guidelines for Planning Authorities* (2006/2019 draft); and
- Scottish Natural Heritage (SNH) *Visual representation of wind farms: Best Practice Guidelines* (version 2.2 - 2017).

10.3 Description of Likely Effects

It is assessed that the central study area is principally a productive rural landscape of strong integrity and one that contributes to the rural subsistence and amenity of the surrounding rural population. The study area also has a strong historical association with industrial land uses, as the Castlecomer Plateau was previously the home of the Leinster coalfield, Ireland's largest coalfield. The wider study area comprises a vast array of landscape features and land uses and presents with various landscape values associated with tourism, heritage and recreation. Nonetheless, it is considered that much of the wider study area constitutes a typical modified rural landscape where landscape values are similar to those within the central study area. Overall, the central and wider study area has a combined 'Medium-low' landscape sensitivity, albeit some of the heritage features in Kilkenny City and the wider Carlow area have localised pockets of high and even very high landscape sensitivity.

There will be direct physical impacts on the site during the construction and operational stages of the development, but such effects are considered to be modest in scale and nature in this already modified rural setting. There will be physical impacts on the land cover of the site as a result of the wind farm during the operational phase, but these will be relatively minor in the context of this productive working landscape that comprises existing wind energy development and extensive commercial conifer forests. The scale of the wind farm will be well assimilated within its landscape context without undue conflicts of scale with underlying land form and land use patterns. For these reasons, the magnitude of the landscape impact is deemed to be 'Medium' with the central study area, whereas, beyond 5km from the site, the magnitude of landscape impact is deemed to reduce to Low and Negligible at increasing distances as the wind farm becomes a proportionately smaller component of the overall landscape.

Based on a 'Medium-low' sensitivity judgement and a 'Medium' magnitude of

landscape impact, the significance of impact is considered to be 'Moderate-slight' within the central study area. Thereafter, significance will reduce to 'Slight' and 'Imperceptible' at increasing distances as the development becomes a progressively smaller component of the wider landscape fabric even in the context of higher sensitivity landscape features.

Visual impacts were assessed at 26 no. visual receptor locations throughout the study area where sensitivity ranged widely from 'High' to 'Low'. Those locations with the highest levels of sensitivity (high/high-medium) tend to be sensitive heritage features such as the Round Tower at St Canice's Cathedral and the heritage settlement of Kilkenny, the River Barrow and scenic designations that afford broad elevated views across the landscape.

The highest magnitude of visual impact occurs at viewpoints VP10, VP13 and VP18, all of which are representative of local community views and are some of the nearest views of the wind turbines that will be afforded within the central study area. Whilst the turbines present with a dominant visual presence and at a considerable scale from some of these representative viewpoints, the turbines are viewed in a relatively clear and comprehensible manner and do not appear incongruous in this heavily vegetated working landscape context.

The most notable point to make is that visual impacts are typically contained within the central portions of the study area, within the elevated plateau landscape that is influenced by existing wind energy development and extensive conifer forest plantations. This is further reinforced by the fact that visual impacts outside of the central study area are no greater than 'Slight', and in most cases, visual receptors in the wider study area are classified with a 'Slight-imperceptible' visual impact significance.

Whilst there will be some near-significant visual impacts within the immediate surrounds of the turbines, the wind farm often presents in a clear and comprehensible manner, and does not appear over-scaled, especially in the context of the broad underlying landscape uses and landscape features that characterise the study area. Overall, therefore, it is assessed that the wind farm can be well assimilated into this robust working landscape context without any significant visual impacts.

Wind energy development is a relatively familiar feature within the study area with a number of existing and permitted developments located within the study area. Due to the presence of other such developments, the project will generate some cumulative impacts, however, it is assessed that it will not generate a significant cumulative impact and, instead, cumulative impacts will be in the order of 'Medium'.

Additionally, cumulative effects with the proposed, adjacent, Seskin Wind Farm (located c. 1.5km northeast of the project) and two other proposed wind farms and a single turbine development in the wider study area. However, it is assessed that significant cumulative effects will not and that a magnitude of cumulative effect of 'High-Medium' is appropriate.

10.4 Mitigation Measures

Aside from construction stage mitigation measures to minimise land and vegetation disturbance and dust emissions, there are no specific mitigation measures to be implemented. The appropriate management and reinstatement of excavations, in a timely manner, will ensure that any adverse effects caused, for example at site

entrances or road upgrade locations, are minimised insofar as possible. Similarly, the progressive reinstatement and landscaping of the site will remediate any short-term adverse effects on the local landscape.

Given the highly visible nature of commercial wind energy developments it is not generally feasible to screen them from view using on-site screening measures typically employed for other forms of development during the operational phase. Instead, landscape and visual mitigation measures have been incorporated into the siting and design of the development at an early stage (see **Chapter 2**). In the case of this project, the guidance provided in the *Wind Energy Development Guidelines for Planning Authorities 2006* (and 2019 revision) was the principal consideration.

The project has embedded landscape and visual mitigation measures and thus, the assessment of likely landscape and visual effects is equivalent to any appraisal of residual effects in this instance. Some of the general mitigation measures that will be implemented to make the development less intrusive and less eye catching on a localised level include:-

- The colour will be industry standard off-white/light grey semi-matt non-reflective finish;
- Transmission lines between individual turbines and the substation will be placed underground;
- Special care will be taken to preserve any features, insofar as possible, which contribute to the landscape character of the study area; and
- Counter rotation of blade sets will be avoided.

10.5 Overall Findings

Overall, it is assessed that the White Hill Wind Farm will not generate a significant cumulative impact in relation to the potential future baseline scenario. It is assessed that a magnitude of cumulative effect of 'High-Medium' is appropriate in this instance. Furthermore, given the pre-planning status of these Wind Farms, consideration of potential cumulative impacts is somewhat premature and should not necessarily be taken as the future reality.

11.0 Cultural Heritage

11.1 Background

This chapter has been prepared to assess and define any likely significant impacts or effects which the construction, operation and decommissioning of the project may have on the archaeological, architectural and cultural heritage resource. The chapter includes an identification of likely significant impacts or effects which may arise and outlines mitigation measures, based on current information, which may be used to avoid, reduce or offset any likely adverse effects.

Construction phase effects may arise as a result of the development of turbine foundations and hardstand areas, access tracks, underground cabling, grid connection works, road upgrade works and associated activities; each of which will involve the mechanical excavation of overburden down to and through geologically deposited strata at their identified locations. Operational phase effects may arise as a result of the visual effects resulting from the presence of the proposed wind turbines in the landscape. Decommissioning phase effects are assessed as likely to be similar to the construction phase but of a reduced magnitude and significance.

As a result of carrying out this assessment, the following likely archaeological,

architectural and cultural heritage direct, indirect, construction, operational, cumulative and residual effects have been assessed.

11.2 Methodology

There is no professional standard for defining the extent of a study area when assessing the likelihood of effects on archaeological, architectural or cultural heritage remains. A 1km study area has been applied around the wind farm to assess the presence of statutorily protected archaeological remains (RMP sites). In addition, a 20km study area has been applied around the wind farm to assess the presence of any World Heritage Sites, sites included in the Tentative List as consideration for nomination to the World Heritage List; while a 5km study area has been applied around the wind farm site to assess the presence of National Monuments, sites with Preservation Orders or Temporary Orders, Protected Structures, Conservation Areas or Proposed Conservation Areas.

A 1km study area has been applied around the wind farm to record the presence of any structures recorded on the National Inventory of Architectural Heritage (NIAH). An assessment has also been made of any historic gardens or designed landscapes as recorded on the NIAH that may exist within the project site.

A 100m study area has been applied around the proposed grid connection, while the area of land take associated with the temporary access track between the N78 and L1834 and the forestry re-plant lands have also been assessed.

Research has been undertaken in two phases. The first phase comprised a desk review, namely a paper and digital survey of archaeological, historical and cartographic sources. The second phase involved field inspections of the project site.

11.3 Description of Likely Effects

There are no Recorded Monuments or any additional statutorily protected archaeological features within the footprint of the project. As a result, there will be no direct or indirect construction phase effect on the recorded archaeological resource.

It is assessed that there will be a likely permanent, direct and imperceptible construction phase effect on any previously unrecorded archaeological remains that may exist within the project site and which may be discovered during the construction phase; a likely temporary, reversible and imperceptible construction phase visual and noise effect on the archaeological resource; a likely permanent, direct and imperceptible construction phase effect on any townland, parish, barony or county boundaries that may be impacted on by the project; a likely permanent, direct and imperceptible construction phase effect on Black Bridge; and a likely temporary, reversible and imperceptible construction phase effect on Crettyard Bridge.

It is assessed that there will be a likely long-term, reversible and moderate operational phase visual effect on 1 no. Recorded Monument located within 1km of the wind farm. It is assessed that there will be a likely long-term, reversible and slight-not significant operational phase visual effect on 8 no. Protected Structures within 5km of the wind farm. It is assessed that there will be a likely long-term, reversible and moderate operational phase visual effect on 1 no. structure recorded on the National Inventory of Architectural Heritage located within 1km of the wind farm.

It is assessed that there will be no likely decommissioning phase effects on the

archaeological, architectural or cultural heritage resource. The decommissioning phase will result in the removal of infrastructure and is likely to result in an improvement in the archaeological, architectural and cultural heritage resource. However, any improvement will be negligible given the low magnitude and significance of the predicted construction and operational phase effects.

An assessment of National Monuments within 5km of the wind farm site has been undertaken to assess for likely cumulative effects during the operational phase. The likelihood of additional turbines being visible in the wider landscape from National Monuments is such that cumulative effects could occur, as it is not possible to mitigate the effects on setting arising from turbines at the operational stage. However there are no National Monuments within 5km of the wind farm site, and as such it is assessed that there will be no operational phase cumulative effects on any National Monuments.

It is assessed that the operation of the wind farm; in combination with other wind energy developments; is likely to result in a long-term, reversible and slight cumulative visual effect on the archaeological, architectural and cultural heritage resource.

11.4 Mitigation Measures

Post-consent pre-construction test trenching shall be carried out in the area of land take closest to RMP MO020-012 (ringfort) within the forestry re-plant lands. Archaeological monitoring of all excavations associated with the construction of the wind farm; of all excavations associated with the grid connection infrastructure; of all excavations within the temporary access track between the N78 and L1834; and of all excavations at townland, parish, barony or county boundaries shall be carried out. Written and photographic records will be created of any townland, parish, barony or county boundaries that may be impacted on. Post-consent pre-construction Architectural Impact Assessments of Black Bridge and Crettyard Bridge shall be carried out by a suitably qualified historic building consultant/Conservation Architect.

11.5 Overall Findings

Following the implementation of mitigation measures outlined, the likely residual effects of the project remains imperceptible to moderate. This assessment has further concluded that the project will not result in any likely significant cumulative effects with other existing, permitted or proposed development.

12.0 Noise & Vibration

12.1 Background

This assessment comprises an assessment into the likely environmental noise and vibration impacts of the project.

12.2 Methodology

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 2006* published by the Department of Environment, Community and Local Government, which 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 farm.

The background noise environment has been established through noise monitoring surveys undertaken at several noise sensitive locations (NSLs) surrounding the project. 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 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 likely noise and vibration effects on the surroundings must be considered for the short-term construction and decommissioning phases and the long-term operational phase.

12.3 Description of Likely Effects

The assessment of construction and decommissioning phase noise and vibration 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 the methodologies to be implemented, the characteristics of activities during the construction and decommissioning phases, and the short-term duration of the activities, noise associated with the construction and decommissioning phases is not expected to result in significant effects. Similarly, significant effects from vibration are not likely to occur.

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. The predicted noise levels associated with the project will be within best practice noise limits recommended in Irish guidance at all dwellings. Therefore, it is assessed that significant noise effects will not occur.

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

12.4 Mitigation Measures

The various contractors involved in the construction and decommissioning phases will be obliged, under contract, to take specific noise abatement measures and comply with the recommendations of *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*.

An assessment of the operational phase noise levels, both specific to the project and in combination with the proposed Seskin Wind Farm, has been undertaken in accordance with best practice guidelines and procedures. The findings of the assessment confirm that predicted operational phase noise levels will be within the relevant best practice noise criteria curves for wind farms. Therefore, noise mitigation measures are not required for the operational phase of this project.

12.5 Overall Findings

In summary, the noise and vibration effect of the project is not likely to be significant in the context of current national guidance.

13.0 Shadow Flicker

13.1 Background

Shadow flicker from wind turbines can occur when a particular combination of weather conditions coincide at specific locations at particular times of the day and year. It usually occurs when the sun is low in the sky and shines on a building or location from behind a rotating wind turbine. This can cause the shadow of the turbine blades to flicker on and off as the turbine blades rotate. The project has been carefully designed to reduce the potential impact of shadow flicker as far as is reasonably possible and the location of each wind turbine has been carefully chosen to reduce the potential impact in relation to shadow flicker.

An assessment of the potential number of hours per year likely to be experienced under exceptional 'worst case' shadow flicker on properties within 1,850m (10-times overall tip height) from the proposed wind turbines.

13.2 Methodology

This assessment has been carried out in accordance with all statutory guidelines and uses techniques which are recognised as best practice by the relevant environmental health organisations.

WindPro software, a detailed computer software model which can estimate the likely occurrence of shadow flicker, was used to predict the likely effect of the project. The prediction model assesses the likelihood of shadow flicker occurring at receptor locations relative to the wind turbine locations and with long term average sunshine hours.

13.3 Description of Likely Effects

As the proposed wind turbines will not be operational during the construction phase, shadow flicker will not occur.

The 'worst case' results (expressed as hours per day) indicate that the greatest level of predicted shadow flicker will be at H007 which is predicted to experience 1-hour and 18-minutes of shadow flicker. However, it should be noted that this prediction is a 'worst case' scenario and is not representative of likely shadow flicker effects. The 'worst case' scenario can only occur under rare and specific combination of circumstances occurring simultaneously i.e. when the sun is at a certain position in the sky, the sun is shining, the turbines rotor is rotating and rotating parallel (directly or indirectly) to the shadow receptor.

The 'expected' results over the course of a year (expressed as hours per year); which, while also being likely to significantly overestimate the actual shadow flicker impact, are more realistic prediction of likely shadow flicker levels; are also presented. In this case, H007 is, again, predicted to experience the greatest level of shadow flicker at 22-hours and 27-minutes.

It should be noted that 110 no. dwellings are predicted to experience less than 10-hours of shadow flicker per year; while 36 no. dwellings are not predicted to experience any effects whatsoever.

A cumulative assessment has been undertaken with the proposed Seskin Wind Farm due to its proximity to the White Hill Wind Farm. While the addition of the Seskin Wind Farm increases the effects of shadow flicker at a number of dwellings; the increases are not assessed as likely to result in significant effects. Under 'worst-case' conditions, the greatest level of shadow flicker remains 1-hour and 18-minutes at H007; while the

greatest level under 'expected' conditions is 26:41, again, at H007.

13.4 Mitigation Measures

The following mitigation measures relate solely to the White Hill Wind Farm and are not applicable to the proposed Seskin Wind Farm; however, it is assumed that the Seskin Wind Farm will implement similar measures.

As there is no likelihood of effects during the construction phase, no mitigation measures or monitoring proposals are required, or proposed.

The likelihood of shadow flicker effects have been minimised, and avoided where possible, through the design process and assessment of project alternatives. However; shadow flicker effects remain, as discussed above.

The *Draft Revised Wind Energy Guidelines 2019* ('Draft 2019 Guidelines') propose to fully eliminate the occurrence of shadow flicker at all dwellings, places of work and schools through the installation of automated turbine shut down software. While the Draft 2019 Guidelines have not been formally adopted, the Developer has committed to the implementation of design/mitigation measures to fully eliminate shadow flicker at all dwellings, places of work and schools.

Automated turbine shut-down software is available and is already widely implemented to reduce/eliminate the occurrence of shadow flicker on wind farm developments. Shut-down software limits the operation of turbines during the infrequent and rare periods when shadow flicker occurs. The wind turbines will each be fitted with automated turbine shut-down software to facilitate their shut down as required.

The shut-down software will be programmed with a set of predetermined times when shadow flicker could occur if the wind is blowing and the sun is shining. The software will determine; based on the operation, or otherwise, of each turbine; whether the wind is blowing and; based on a sunlight sensor fitted within the wind farm; whether the sun is shining.

If the wind is blowing and the sun is shining during the set of predetermined times, the software will temporarily switch off a turbine (or turbines) which is (or are) predicted to result in shadow flicker effects at a particular receptor. Having switched off a turbine (or turbines), the software will then recognise when the generation of shadow flicker at a dwelling/place of work/school can no longer occur and will switch on the turbine (or turbines). This automated process will ensure that no shadow flicker, whatsoever, is experienced at any dwelling, place of work or school.

Within 12-months of the commencement of operations, a shadow flicker survey will be undertaken by a qualified person to verify the implementation of the turbine shut-down software. Monitoring will be undertaken when and where the model predicts shadow flicker is expected to occur.

13.5 Overall Findings

This chapter has assessed the likelihood of shadow flicker effects at all dwellings (129 no.) located within 10-times the overall tip height (1,850m) of the wind turbines using a shadow flicker model. Shadow flicker is a rare phenomenon and can only occur during the infrequent coincidence of a number of specific, variable meteorological and geographic factors. The shadow flicker model is also based on a number of precautionary assumptions which significantly overestimate the likely shadow flicker impact at any receptor.

There is no likelihood of any effects during the construction or decommissioning phases as the proposed wind turbines will not be operational. Similarly, secondary developments associated with the wind farm, such as the proposed grid connection infrastructure, haul route upgrade works, and forestry re-planting are not capable of causing shadow flicker.

Technological mitigation measures will be implemented to shut down the wind turbines at predetermined times when shadow flicker could occur (based on meteorological conditions) to exclude any possibility of shadow flicker occurring. These measures will ensure that no dwelling/place of work/school will experience shadow flicker and, therefore, it is concluded that the project will not result in any likely significant shadow flicker effects, either individually or in combination with other existing, permitted or proposed developments.

14.0 Material Assets

14.1 Transport & Access

14.1.1 Background

The assessment provides a detailed description of the haul route to be followed from the chosen port facility to the subject site, including the traffic management and improvement works required along the road network and at junctions and roundabouts. It also details the breakdown and schedule of the number and size of vehicles associated with the construction, operation and decommissioning phases of the development. The effect of increased construction traffic on the local road network has also been assessed.

14.1.2 Methodology

This assessment used the following method, further details of which are provided in the following sections:-

- Legislation and guidance review;
- Desk study, including review of available maps and published information;
- Site walkover, including review of road network to be used;
- Evaluation of likely effects;
- Evaluation of the significance of these effects; and
- Identification of measures to avoid and mitigate any likely effects.

14.1.3 Description of Likely Effects

It is assessed that, during the construction phase, there will be a temporary increase in traffic flows on the local road network due to vehicles carrying turbine components and construction materials. A number of oversized loads will be required to carry the long blades, towers and heavy turbine components to the site and will necessitate upgrade works at 12 no. locations, with 11 of these being temporary upgrades and permanent upgrade works at 1 no. location. The permanent upgrade works will comprise the reinforce the structural integrity of 'Black Bridge' along the L1835 local road.

Once these components are delivered and installed, traffic entering the site will be substantially reduced, with maintenance vehicles visiting the site only intermittently. The haulage route and traffic assessment concludes that the local road network will be able to accommodate the additional traffic volume associated with the construction of the wind farm. A Traffic Management Plan, to be agreed with the local authority, will also help to minimise the impact on local roads and traffic and to

provide for the safety of all road users.

14.1.4 Mitigation Measures

A series of mitigation measures have been proposed to reduce the level of potential impact associated with the project on Transport and Access. The project has generally been assessed as having the likelihood to result in likely, negative, of short-term duration and ranging between slight and moderate. Following the implementation of mitigation measures, the likely final effects have been assessed as imperceptible-to-slight, direct, indirect, negative (temporary), and positive (long-term).

14.1.5 Overall Findings

Overall, it has been identified that there is no likelihood of significant effects on transport and access which could arise as a result of the construction, operation or decommissioning of the project either individually or in combination with other existing, permitted or proposed developments.

14.2 Aviation

14.2.1 Background

This section assesses the likelihood of effects on aviation arising from the construction, operation or decommissioning of the project.

14.2.2 Methodology

The assessment involved consultation with various stakeholders including the Irish Aviation Authority (IAA) and Department of Defence. In addition, publications issued by the IAA and the Department were reviewed to determine if the project site was assessed as being of significance or if significant effects were likely. A desktop study was also undertaken to determine the presence of aerodromes or airstrips within 20km of the wind farm site.

This assessment has also had regard to the *Draft Air Corps Wind Farm/Tall Structures Position Paper* (August 2014) which sets out the Air Corps position on the appropriate siting and management of wind farms and tall structures. This assessment includes a detailed review of this position paper, a comparison of the project site with identified 'Danger Areas', 'Restricted Areas' and 'Low Level Flying Areas'.

14.2.3 Description of Likely Effects

Due to the general 'low level' of activity during the construction phase, it is assessed that there will be no likely impact on aviation. During the erection of wind turbines, cranes will be fitted with appropriate aviation warning lighting to alert pilots to the presence of tall structures.

Following the completion of the construction phase, no significant effects are assessed as likely to occur. The installation of aviation warning lighting is inherent to the project design; and its operation during the operational phase will ensure that any civil and military aviation activities occurring then the vicinity of the project are sufficiently aware of the presence of the wind turbines.

The project site is not located within any low flying areas, restricted areas, danger areas, military operating areas or low level routes identified within the Draft Air Corps Wind Farm/Tall Structures Position Paper.

14.2.4 Mitigation Measures

The wind turbines will, as requested by the IAA in its consultation response, be fitted with aviation warning lighting in accordance with the specification to be agreed with the IAA and the Planning Authority.

14.2.5 Overall Findings

This assessment concludes that the project is unlikely to result in any significant effect on aviation. The project site is not located within an area identified as being of particular sensitivity or importance in the *Draft Air Corps Wind Farm/Tall Structures Position Paper* on military aviation or located close to any civilian aerodrome, airfield or airport. Accordingly, with the installation of appropriate aviation warning lighting, no significant effects are assessed as likely to occur. Therefore, it is assessed that significant effects on aviation are unlikely to arise as a result of the project, either individually or in combination with other existing, permitted or proposed developments; including the proposed Seskin Wind Farm.

14.3 Telecommunications

14.3.1 Background

This section assesses the likely effects of the project upon a range of communications infrastructure, including telecommunication networks, broadcast radio and television and fixed infrastructure such as telecommunication masts.

14.3.2 Methodology

The methodology followed to assess the likelihood of significant effects on telecommunication networks consisted of desk based research and consultation with various telecommunication companies and relevant authorities.

14.3.3 Description of Likely Effects

During consultation, Enet had advised that a microwave link would be affected by the project. Following further detailed discussions, a technical solution was agreed upon to avoid any disruption to Enet's service.

In consultation with Vodafone Ireland, the Developer was advised that a link was located in the immediate vicinity of turbine T2. Further to consultation with Vodafone, the location of T2 was revised to increase the separation distance to the link and ensure the avoidance of disruption. Subsequently, Vodafone Ireland confirmed that it does not anticipate any impact on their services.

2rn (RTE Transmission Network) advised that there is potential for localised interference to the terrestrial television network. 2rn have requested that the Developer enter into a protocol arrangement to ensure the appropriate remediation of any adverse effects which may be experienced.

Radio Services & Building Limited (KCLR Radio)[1] advised that the location of turbines T6 and T7 poses a risk of interference to an existing transmission link between Johnswell (Co. Kilkenny) and Rathmore (Co. Laois).

14.3.4 Mitigation Measures

With regards to Enet, following extensive consultation, a technical solution has been identified and agreed with the service provider. The solution comprises the re-routing of the affected microwave link to avoid the project site. The cost of the solution shall be borne by the Developer and shall be implemented and operational prior to the

[1] The KCLR telecommunications network is operated and managed by Radio Services & Building Limited

erection of the wind turbines. The implementation of this measure shall be undertaken in consultation with Enet to ensure that there is no interruption to broadcast services.

For Radio Services & Building Limited (KCLR Radio), it is proposed to re-route the affected transmission link between Johnswell (Co. Kilkenny) and Rathmore (Co. Laois) to avoid the proposed development site. The cost of the solution shall be borne by the Developer and shall be implemented and operational a minimum of 6-months prior to the installation of turbines T6 & T7. The implementation of this measure shall be undertaken in consultation with Radio Services & Building Limited (KCLR Radio) to ensure that there is no interruption to broadcast services.

In its consultation response, 2rn recommended that a protocol agreement be entered into to ensure that any complaints received from members of the public are appropriately managed, addressed, and remediated. A protocol has been agreed to and entered into between the Developer and 2rn.

While assessed to be unlikely, if significant signal interference in any form is identified and is directly attributed to the project, appropriate remedial measures will immediately be undertaken. A range of technical measures are available to mitigate any instances of interference including signal amplifiers, active deflectors and relay transmitters, repeater stations, booster units, realignment of domestic aerials, installation of higher quality aerials and the installation of suppression equipment. Remedial works will be promptly undertaken, at the Developer's expense, to ensure uninterrupted telecommunication, broadcasting and mobile phone service provision.

14.3.5 Overall Findings

It can be concluded that, on the basis of a desktop assessment and extensive consultation with stakeholders, the project will not result in likely significant effects on the telecommunications network.

14.4 Resources & Utility Infrastructure

14.4.1 Background

This section provides details of the likelihood of significant effects or interactions with existing renewable and non-renewable resources and existing utility infrastructure; including existing or permitted wind farms, quarries, mining operations and utility infrastructure (electricity lines and phone lines).

14.4.2 Methodology

The methodology followed in this assessment involved a desk based study to identify resources and utility infrastructure which could be affected by the project followed by an evaluation, based on experience, as to whether these resources were likely to be affected.

14.4.3 Description of Likely Effects

The construction phase of the project is not likely to have any significant effects on existing resources or utility infrastructure. The construction phase will not restrict the export of energy generated from other sources nor will it impact upon existing utility services. While there is a possibility interaction with utility services (e.g. accidental collision with overhead wires during the construction phase), this can be mitigated through good construction practices.

The construction phase will result in the extraction of non-renewable resources in the form of stone and gravel for the construction of access tracks and concrete for turbine foundations, building foundations and electrical equipment plinths.

The operational phase of the project will not result in any effect on existing utility infrastructure or renewable or non-renewable resources. The connection of the project to the national grid will strengthen the electricity network infrastructure in the wider region.

14.4.4 Mitigation Measures

No specific mitigation measures are proposed or required during the construction or operational phases.

14.4.5 Overall Findings

This assessment concludes that the project is unlikely to result in any significant adverse effect on renewable and non-renewable resources or on utilities infrastructure. The operation of the project will bring about a benefit in terms of electricity generated from renewable sources and a strengthening of national electricity grid infrastructure in the wider region of the project site. This assessment similarly concludes that the project is unlikely to result in any significant adverse cumulative effects in combination with existing, permitted or proposed developments.

15 Interactions of the Foregoing

All environmental factors are interrelated to some degree. The assessment of these interactions is an important requirement of the environmental impact assessment process. Having assessed the interaction of likely effects during the construction and operational phases, the likely interactions are not assessed as likely to result in any effects that could magnify effects through the interaction or accumulation of effects.

16 Summary of Effects

This Non-Technical Summary has outlined, in summary format, the findings of the EIAR for the project. Full details are set out in the EIAR and its accompanying technical appendices.

The EIAR has assessed that any likely adverse effects of the project, and their interactions, can be managed and mitigated and that there are lasting social and environmental benefits as a result of the project. Whilst the project will have some minor adverse residual effects on the local environment, these will be addressed through mitigation measures, good management and proposed construction techniques and are not assessed as likely to be significant.

The project will make a positive contribution to sustainable energy generation in Ireland and will also help diversify and sustain the rural economy through construction, as well as operation and maintenance activities. Overall, the combined effects which have been assessed within this EIAR demonstrate that the project will not result in a likely significant adverse effect on the environment.