Orsted Onshore Ireland Midco Limited

Environmental Impact Assessment Report

Volume I – Non-Technical Summary

Proposed Oatfield Wind Farm Project, Co. Clare

604569

DECEMBER 2023

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1 INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by RSK Ireland and other companies within the RSK Group (along with associated specialist consultants, including Ai Bridges, Hoare Lea, Macroworks and Pinnacle Consulting), on behalf of Orsted Onshore Ireland Midco Limited. This EIAR is submitted as part of a planning application to construct, operate, and decommission the proposed Oatfield Wind Farm in County Clare (hereafter referred to as the 'Proposed Development'). The applicant for planning permission is Orsted Onshore Ireland Midco Limited.

The key components that are described throughout the EIAR are listed below:

- The wind farm which consists of 11 wind turbines (4 turbines across the Eastern Development Area (Eastern DA) and 7 turbines across the Western Development Area (Western DA));
- The grid connection route and underground cables (also referred to as GCR and UGC); and,
- The turbine delivery route (TDR).

The term 'Proposed Development' collectively describes the above three components.

The planning application for the Proposed Development will be made to An Bord Pleanála under Section 37E of the Planning and Development Act 2000 (as amended). The application is for a 10-year duration planning permission and a 35-year operational life from the date of commissioning of the entire wind farm.

This document is a non-technical summary of the information contained in the EIAR.

1.2 Site Location

The site of the Proposed Development is located in the Oatfield and Gortacullin areas. At the nearest point, the Proposed Development site is approximately 1.3km to the South of Broadford, 4.7km to the East of Sixmilebridge, 7.6km North of Ardnacrusha, 9.2km North of Limerick, and 19.7km South of Ennis.

The Proposed Development site boundary (which is the planning boundary) includes:

- Two distinct areas containing the wind farm infrastructure, including turbines and on-site substation. Each distinct area is referred to as the Western DA and the Eastern DA (comprising principally of conifer plantation, transitional woodland scrub, mixed forest, pastures, agricultural lands, and peat lands.
- An IPP connection route from the Eastern DA to the 110kV substation located in the Western DA. The IPP cables will be installed within the body of the local public road network and public access trackway on approach to the Western DA. The overall length of this interconnecting IPP cable route is ca. 10.6km.
- Electrical energy generated from the wind farm will be exported to the national grid via double circuit underground grid connection cables to the proposed 110kV

loop-in masts at Ballycar North, County Clare, where it will connect to the existing overhead 110kV line. Two options for the interconnection with the OHL are proposed.

  - The first is a loop-in to the existing Ardnacrusha – Ennis 110kV OHL at Ballycar North (ca. 3.83km cable length) and the second is a loop-in to the existing Ardnacrusha – Drumline 110kV OHL, also at Ballycar North (ca. 4.16km cable length).
  - Once the 110kV double circuit export cable leaves the Proposed Development site, the grid connection infrastructure will be installed within the body of the public road network along the route until it reaches third party lands where the loop-in towers will be located, beneath the existing OHL in the townland of Ballycar North.

- An area of land take required for accommodation works along the proposed turbine delivery route from Foynes Port to the Proposed Development site (see **EIAR Chapter 5: Project Description** for further details).

The location of the Eastern and Western DA, including the layout of the proposed development is presented in **Figure 1.1**.

Existing land use in the area comprises coniferous forest, mixed forest, transitional woodland scrub, pastures, agricultural lands, and peatlands. Details of the land use type associated with the Proposed Development is illustrated in **Figure 1.2** below.

Figure 1.1: Location of the Eastern and Western DA

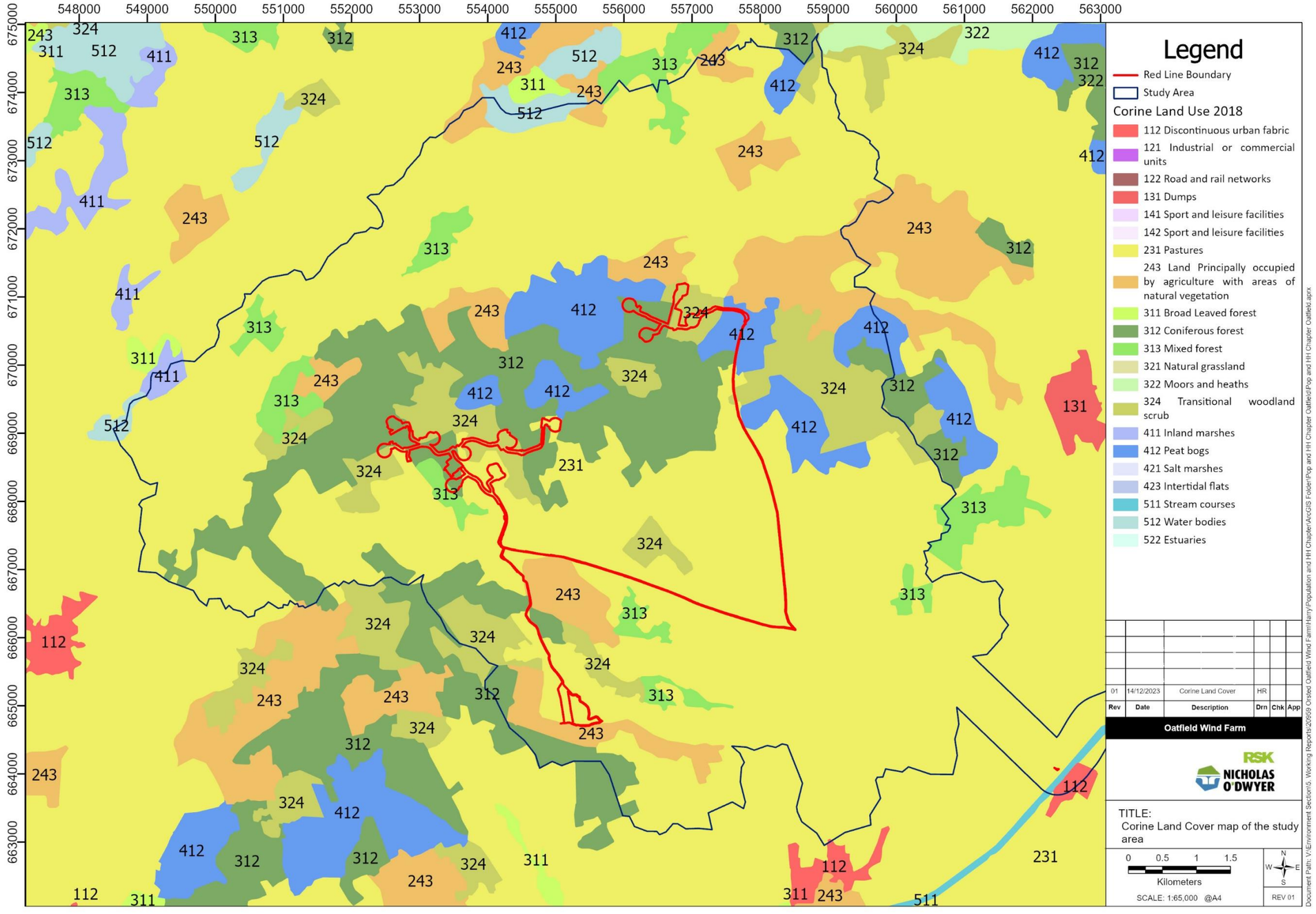

Figure 1.2 Corine land cover map of the proposed development area

1.3 The requirement for an EIAR

The Proposed Development triggers the requirement for an Environmental Impact Assessment (EIA), as it exceeds the relevant EIA threshold, as detailed in the Planning and Development Regulations, 2001 (as amended), Schedule 5, Part 2, Class 3(I), which is *"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".*

Given that an EIA is required, the applicant has commissioned the preparation of an EIAR to accompany a planning application that will enable the competent authority to undertake its duties under the EU EIA Directive.

1.4 Scoping and consultations

The scoping stage of the EIA is a process to determine the content and extent of the matters which should be covered in the EIAR. To inform this process, RSK, on behalf of, Orsted, prepared a Scoping Consultation Document that provides an overview of the Proposed Development, the project scope, and for each environmental factor as listed in the EIA Directive, an overview of the baseline environment, proposed assessment methodology and potential significant effect. The Scoping Consultation Document and a covering letter was sent to the following consultees in September 2023[1]:

- An Taisce
- Applications Unit (DAU)
- Bat Conservation Ireland
- BirdWatch Ireland
- Clare County Council Archaeology Office
- Clare County Council Environment Section
- Clare County Council Heritage Office
- Clare County Council Planning Authority
- Clare County Council Roads and Transports Department
- Clare National Roads Office
- Commission for Energy Regulation
- Department of Agriculture, Food & the Marine, Environmental Coordination Unit, Climate Change & Bioenergy Policy Division
- Department of Agriculture, Food & the Marine, Forestry Division

[1] Note: The list of consultees for the EIAR Scoping Report excludes telecoms operators which were contacted separately as part of the Telecommunications Impact Study prepared by Ai Bridges (refer to **EIAR Chapter 11: Material Assets**)

- Department of Defence, Property Management Branch
- Department of Housing, Local Government & Heritage, Development
- Dublin Airport
- EirGrid
- Environmental Protection Agency
- ESB Networks
- Fáilte Ireland
- Gas Networks Ireland
- Geological Survey Ireland
- Health and Safety Authority
- Health Service Executive, Environmental Health and Emergency Planning
- Iarnród Éireann
- Inland Fisheries Ireland, Northern and Western Region
- Ireland West Airport Knock
- Irish Aviation Authority
- Irish Raptor Study Group
- Irish Wildlife Trust
- Kerry Airport
- National Monuments Service
- National Parks and Wildlife Service
- National Transport Authority, Strategic Planning Section
- Office of Public Works
- Shannon Airport
- Sligo Airport
- Southern Regional Assembly
- Teagasc – Agriculture and Food Development Authority
- The Arts Council
- The Heritage Council
- Transport Infrastructure Ireland, Land Use Planning Unit

- Uisce Eireann

EIAR Chapter 3: Scoping Consultations, Community Engagement and Key Issues provides a summary of the comments received and how they were considered in preparing the EIAR.

1.5 Purpose of the EIAR

The purpose of this EIAR is to present an assessment of the likely potential significant effects of the Proposed Development on the environment. Annex IV (5) of the EIA Directive defines how significance of effects should be described. The EIAR documents the baseline condition of the environment both within the Proposed Development and in the vicinity of a Proposed Development. Through desk studies, field work, modelling, and analysis (as appropriate), the EIAR assesses the likely significant effects of the proposed development on the environment.

The assessment process serves to highlight any areas where mitigation measures may be necessary to address potential significant adverse effects by incorporating them into the design or limiting their effects to within acceptable levels, in accordance with established standards and guidelines. The EIAR also presents an assessment of the alternatives considered. The EIAR supports the planning application for the Proposed Development and provides the relevant environmental information to enable the competent authority (in this case An Bord Pleanála) to come to an informed conclusion when making its decision.

1.6 EIAR Approach

Baseline surveys were carried out, involving desktop surveys, and in some cases field surveys, for environmental factors including Population and Human Health, Biodiversity, Birds, Hydrology and Hydrogeology, Land, Soils and Geology, Material Assets, Shadow Flicker, Noise and Vibration, Landscape and Visual, Archaeology and Cultural Heritage, Traffic & Transport, Air Quality and Climate.

An assessment of the Proposed Development's potential impact on identified features present in and near the site, as relevant, was carried out and any potential environmental benefits were also identified for each environmental factor. Defining significance can be difficult and, in general, involves assessing the degree of change to the environment, taking into consideration the sensitivity of the environmental receptor. **EIAR Chapter 2: EIAR Methodology & Relevant Guidelines** describes the general approach taken, and each environmental factor chapter provides added detail with reference to specific guidance used and defines criteria as relevant. The following criteria were applied in assessing significance:

- Type of impact (adverse / beneficial);
- Extent and magnitude of impact;
- Direct or indirect impact;
- Duration of impact (short term / long term; permanent / temporary);
- Comparison with legal requirements, policies and standards;

- Sensitivity of receptor;
- Reversibility of impact; and
- Scope for mitigation / enhancement.

Following implementation of mitigation measures, each environmental factor identifies any residual impacts and their significance to assist the public and the Competent Authority to understand what the impacts of the Proposed Development are. The recommended mitigation measures and residual impacts are described in the chapters for each environmental factor (see EIAR **Chapter 6** to **Chapter 19**). **Chapter 20: Impact Interactions and Cumulative Effects** summarises the findings of assessment of interactive effects and cumulative effects addressed in the factor chapters, and a summary of all proposed mitigation measures is provided in EIAR **Chapter 21: Summary of Mitigation Measures**.

1.7 The EIAR team

Article 5(3)(a) of the amended EIA Directive (2014/52/EU) (EIA Directive) states that *"the developer shall ensure that the environmental impact assessment report is prepared by competent experts"*. The Guidelines on the Information to be contained in Environmental Impact Assessment Reports issued by the Environmental Protection Agency (EPA) in May 2022[2] highlight the need for competent experts to be involved in the EIA process and in the preparation of the EIAR.

RSK Ireland have been appointed by Orsted to coordinate and prepare the EIAR for the Proposed Development. RSK Ireland is one of the longest established and most reputable multi-disciplinary engineering consultancies in Ireland. RSK Ireland has been an established presence in the renewable energy wind farm and sustainable development sector for over 10 years. Table 1.1 lists the specialist companies involved in conducting baseline surveys and authoring the environmental factor chapters of the EIAR. Biopics on the competent experts, including their qualifications and experience, can be found under the 'statement of authority' section in the front end of each environmental factor EIAR chapter.

Table 1.1: EIA chapters and competent experts

EIAR Chapter	Specialist Company
Chapter 6. Population and Human Health	RSK Environment Ltd.
Chapter 7. Biodiversity	INIS Environmental Consultants Ltd. (Part of the RSK Group)
- Appropriate Assessment	INIS Environmental Consultants Ltd. (Part of the RSK Group)
Chapter 8. Ornithology	INIS Environmental Consultants Ltd. (Part of the RSK Group)
Chapter 9. Hydrology and Hydrogeology	RSK Ireland
Chapter 10. Land, Soils, and Geology	

[2] Environmental Protection Agency. 2022. Guidelines on the Information to be contained in Environmental Impact Assessment Reports.

EIAR Chapter	Specialist Company
Chapter 11. Material Assets (utilities, waste, and telecommunications and aviation)	RSK Ireland
Chapter 12. Shadow Flicker	ADAS Ltd.
Chapter 13. Noise and Vibration	Hoare Lea
Chapter 14. Landscape and Visual	Macroworks
Chapter 15. Archaeology and Cultural Heritage	ADAS
Chapter 16. Traffic and Transport	Nicholas O'Dwyer Ltd.
Chapter 17. Air Quality	RSK Environment Ltd.
Chapter 18. Climate	Nature Positive
Chapter 19. Major Accidents and Disasters	Nicholas O'Dwyer Ltd.

2 THE PROPOSED DEVELOPMENT

2.1 Background to the Proposed Development

The Proposed Development is proposed in response to international, European and national policy on climate change and reduction in carbon emissions.

The Clare County Council Wind Energy Strategy (2023), as contained in the Clare County Development Plan 2023 – 2029, has designated areas for wind energy development outside urban areas as either 'Strategic Areas', 'Open to Consideration', 'Acceptable in Principle' or 'Not Normally Permissible'. The turbines associated with the Proposed Development are located entirely within areas designated in the Clare County Development Plan 2023 – 2029 as 'Strategic Areas' or 'Acceptable in Principle' for wind energy development.

The planning application for the Proposed Development will be made to An Bord Pleanála under Section 37E of the Planning and Development Act 2000 (as amended). The application is for a 10-year duration planning permission and a 35-year operational life from the date of commissioning of the entire wind farm.

2.2 Description of the site and surrounding area

The Proposed Development is located in an upland setting dominated by commercial coniferous plantation forestry, blanket bog, wet heath, and rough/wet grassland. There is also agricultural land bounded by hedgerows, and conifer plantations. An area of broadleaf forestry is located at the North-West of the site.

The predominant habitat on site is conifer forestry. Agricultural land is present throughout the site. Marginal grazing land is predominant in large areas to the North-east of the site. There are sections of shrubby, broadleaf woodland to the North-west of the site.

The settlement pattern in the vicinity of the Proposed Development (approximately 2 km of each turbine position) is characterised by dwellings and farm buildings located mainly along the public roads, with some dwellings located down private lanes.

The works for installation of the IPP and GCR underground cabling are within the public road corridor of local roads, and a crossing of the R471 regional road.

The temporary works required for transporting turbine components to the Proposed Development site via Foynes port will be within and adjacent to the public road corridors of national primary roads and motorways (N69, M7), regional roads (R494, R463, R471) and local roads requiring temporary removal of street furniture, temporary surfaces through roundabouts and in road verges, and clearance and trimming back of vegetation, where required. The temporary works will be minimised, wherever possible.

2.3 Project Description

The Proposed Development includes the construction, operation and decommissioning of a wind energy development consisting of eleven wind turbine generators with foundations and crane pad hardstanding areas; a permanent meteorological mast; an on-site 110 kV substation, underground IPP cabling connecting the Eastern DA to the Western DA; a GCR to the national grid and temporary works required for transporting

turbine components to the wind farm. Additionally, it includes all associated site works - site clearance, temporary compounds and storage areas; a new temporary entrance and upgrade of an existing entrance; upgrade of existing site tracks and construction of new site tracks; site drainage; ancillary developments including security gates and fencing, lighting and signage; and species and habitat management plan.

2.3.1 Project Elements

The Proposed Development comprises:

- 11 no. three-blade wind turbines with an overall ground to blade tip height range of 176.5m to 180m, a rotor diameter range of 133m to 150m and a hub height range of 105m to 110m;
- Construction of associated reinforced concrete foundations, crane pad hard-standing areas and associated plant/switching gear;
- Construction of new permanent, internal site tracks and upgrading of existing tracks and associated drainage infrastructure including a clear-span bridge (circa 10m length), concrete culverts and the installation of an on-site Sustainable Drainage System (SuDS);
- 2 no. temporary spoil storage areas (one in the western DA and one in the eastern DA;
- Erection of 1 no. permanent meteorological mast in the western development area with a height of 100 m above existing ground level;
- All associated internal, underground electrical and communications cabling connecting the wind turbines to an on-site substation located in the western DA;
- Provision of underground interconnecting 33kV IPP cabling and underground cable joint bays circa. every 750-1,000m for circa. 10.6km (joining eastern and western DAs) within the public road network including the R471;
- Provision of 1 no. 110kV onsite substation and parking in the western DA (Townland of Oatfield), along with associated control and switchgear;
- All works associated with the connection of the wind farm to the national electricity grid, which will be via a loop-in 110kV underground cable connection in the townland of Ballycar North, with 2 no. new 16m steel lattice end masts & associated overhead line (OHL) electrical infrastructure, located at the interface with the existing 110kV OHL. Two tie-in options to the existing overhead 110kV lines are proposed as follows:
    - Option A (loop-in to Ardnacrusha to Ennis 110kV OHL via 3.83km of double circuit underground cables and joint bays every 700 m from the onsite 110kV substation to two new 16m steel lattice loop-in masts located in the townland of Ballycar North.
    - Option B (loop-in to Ardnacrusha to Drumline 110kV OHL via 4.16km of double circuit underground cables and joint bays every 700 m from the onsite 110kV substation to two new 16m steel lattice loop-in masts located in the townland of Ballycar North.

- 2 nos. temporary construction compounds, including offices/meeting rooms, parking and transformer;
- 10 no. individual site access points and tracks to turbines, on-site sub-station, met mast, temporary spoil storage & temporary construction compound areas from the local road network/public trackway running north of the R471;
- Forest & tree felling to facilitate construction and operation of the proposed development;
- Temporary works to accommodate turbine delivery route (TDR) in the townland of Knockbrack Lower;
- All associated site development works including Construction, Operation and Decommissioning stage site-lighting, fencing and signage.

Table 2.1 provides a summary of each project element proposed as part of the Proposed Development. Each component is described in further detail in EIAR **Chapter 5: Project Description**.

Table 2.1: Overview of Project Elements

Project Element	Description of the Proposed Development
Wind Turbines	The Proposed Development will encompass 11 No. turbines. Three wind turbine models are used for assessments in the EIAR (with planning permission sought for a range covering all three types, as defined by the specifications below). The three the wind turbine models are the Vestas V-150, Nordex 149 and Nordex 133. These are three bladed, horizontal axis turbines, light grey in colour (RAL 7035 – Light Grey) and with the following range in specifications: • Tip height of 176.5 – 180.0m • Rotor diameter of 133 - 150m • Hub height of 105 - 110m • Power rating of 4.8 – 6.6MW The total Maximum Export Capacity (MEC) of the wind farm is approximately 52.8 – 72.6MW. The exact MEC will be dependent on the output power of the turbine model available at procurement stage.
Turbine Foundations	Each turbine will be erected on a steel reinforced concrete foundation. The foundations will require excavation and construction bases of approximately 12m in diameter, a 45-degree excavation angle and 1m around for workspace, down to a level where the underlying soil or rock can bear the weight of a structure without shifting or compressing. The central part of the foundation (plinth) of each turbine will be raised from the main foundation below ground level. It will encompass a cast-in insert or bolts to connect to the bottom of the turbine tower and reinforced bar structural elements.
Hardstanding Areas	The turbine hardstands are required to accommodate the delivery, laydown, and assembly of turbine components prior to turbine component lifting and assembly. The hardstands are needed to support the cranes during turbine construction, operation, and decommissioning stages. They will be constructed first and used to facilitate construction of the turbine foundations such as steel reinforcement delivery and pouring of concrete. For each turbine, the hardstand areas comprise a main crane hardstand, a component set down area, assist crane hardstands and vehicle parking and turning areas
Site Access	Site access to the wind farm will occur from the local road networks and public trackways northwards from the Regional Road R471. • Entrance to Eastern DA: o One access point to the Eastern DA from the local road running north from the regional road R471, and immediately west of the Traugh Parish Church (Mary Mother of God), through the townland of Sallybank and to the area of Gortacullin (providing access to T8, T9, T10 and T11). • Entrance to Western DA: o Two access points (providing access to T7) in the Western DA from the local road running north from the Regional

Project Element	Description of the Proposed Development
	Road R471a (junction at Aughnagourney). ○ Seven access points from the local road running north from the Regional Road R471 at Oatfield (providing access to T1, T2, T3, T4, T5, T6, Substation, temporary spoil storage area and Meteorological mast). These entrances will also be used for the duration of the 18-month construction stage for delivery of turbine components and all building materials (e.g., aggregates for access tracks, concrete for foundations, crane pads and hardstanding areas, substation building foundations, and building materials, etc.). These entrances will be gated and fenced and will remain in situ on completion of the construction stage. During the operational stage, over the lifetime of the Proposed Development, these permanent entrances and access tracks would only be called into service to accommodate delivery of replacement turbine components requiring abnormal loads (e.g., blade, nacelle, and tower, in the unlikely event that it would be required. In the interest of road safety provision will be made for upgrading these entrances to provide visibility splays measuring 80m on both sides of the entrance set back 3m from the edge of the public road. All access points to the local road network will be gated with typical single steel pole barriers with low stone pillars, similar in nature to those used by Coillte for security purposes. The site entrances will be decommissioned on completion of the decommissioning phase. Where tree felling is required, site internal access tracks will be constructed first in areas where existing forestry tracks are not present. Once site internal access tracks are constructed, machinery required for felling will be able to utilise these access tracks.
Site Tracks	Wind farm access tracks will consist of ca. 7.8km of permanent access tracks. These tracks are similar in nature to agricultural access tracks comprising fill with a top surface dressing of hardcore and will not be tarmacadamed or have a wearing course. They will be used to access the construction locations and for occasional operational maintenance purposes. Most existing site tracks will not be suitable for use by construction traffic. Where they coincide with new access track positions they will be excavated and re-constructed. In general, existing access tracks may be upgraded and widened to suit the Proposed Development needs. A total length of ca. 0.8km of existing access track will be upgraded.
Site Drainage	The site is characterised by a relatively extensive network of non-mapped natural and artificial drainage channels. The existing surface water runoff is contained within natural and artificial drainage channels that include stream and river waterbodies, drainage ditches, and other minor natural and artificial manmade drainage features.

Project Element	Description of the Proposed Development
	Constructed drainage will be provided to manage runoff from tracks, hardstanding areas, turbine bases, and storage areas for excavated materials. These will minimise the potential for silt runoff during construction works and during the operational phase. The Proposed Development will adopt a surface water management plan (see **CEMP in Appendix 5.1 to Chapter 5: Project Description**) and site drainage design using the principles of Sustainable Drainage, promoting on-site retention of flows and the use of buffers and other silt removal techniques. All drainage-related mitigation measures will form part of a robust Sustainable Drainage System (SuDS) on the site.
On-site electrical and communications components	A 110kV substation will be located in the Western DA as shown on **Drawing No. 20959-NOD-XX-XX-00-DR-C-4210** and **20959-NOD-XX-XX-DR-C-42**. The electricity from the turbines (both the Eastern DA and Western DA) will be cabled into the substation where it will be transformed, metered, and regulated for export to the national electricity system. The substation will be connected to the proposed loop-in location at Ballycar via underground cable. The final layout and design of the substation will be to ESBN specifications within the parameters assessed in this EIAR. The proposed substation contains the following: • IPP control room; • ESB control room; • Switch room; • Storeroom; • Office; • A water connection system supplied by rainwater harvesting with storage, to supply the proposed Water Closet (WC) and wash hand basin. Potable water will be supplied by bottled water; • A WC with connection to a sealed wastewater holding tank fitted with a high-level alarm; • Diesel tank and generator; • Transformer bund and associated infrastructure (busbars, circuit breakers, cable supports and cabling); • Lighting and fencing; and, • Parking. All power, communication and control cabling on the wind farm will be installed underground in excavated trenches which will be routed from the wind turbines to the wind farm substation, which is located in the Western DA. Electricity generated by the wind turbines will be fed through internal site power cables to the wind farm substation along the path of site access tracks to where these join the local road network and then along these roads. The Eastern DA will be connected to the proposed development wind farm substation by an IPP cable ducted in the existing local road network. The IPP cable will be ducted from the Eastern DA along the

Project Element	Description of the Proposed Development
	unnamed local road to where it joins the R471 Regional Road. It will then be ducted westwards along the R471 to the junction with unnamed local road leading to the Western DA and will be ducted along this road to the on site substation location itself.
Permanent Meteorological Mast	For wind farms with an MEC exceeding 10MW it is a grid operator requirement (per EirGrid Grid Code PPM1.7.1.2 and ESB Networks Distribution Code DCC11.5.1.6) to have continuous on-site meteorological monitoring during operation. These signals are essential in providing high-quality forecasting now and into the future to maintain system security. A 100m meteorological mast (met mast) is proposed at the Proposed Development site (in the Western DA) to supply continuous, real-time wind speed, wind direction, air temperature and air pressure data. The height of the proposed met mast will be agreed with ESBN / EirGrid during detailed design.
Grid Connection	The Proposed Development will be connected into either the existing Ardnacrusha to Ennis 110kV OHL (Option A) or the existing Ardnacrusha to Drumline 110kV OHL, Option B), via an underground 110kV double circuit underground cable to loop-in masts at the townland of Ballycar North. Both options are included for planning purposes and have been assessed in the EIAR.
Temporary Works	<u>Construction Compounds</u> One temporary construction compound is proposed for the Eastern DA, which will be constructed in the vicinity of T5. A second temporary construction compound is proposed for the Western DA will be constructed to the south of T10. The compounds will each contain temporary facilities for use during the construction phase including site offices and meeting rooms, a drying room, canteen area, storage areas, skips, a bunded refuelling area (with a Class 1 full retention oil interceptor), and a generator for compound electrics. The compounds will include pedestrian barriers for safety. The overall compound areas will measure 1,650m^2 each. A third construction compound area will also be located to the rear of the substation during its construction and will comprise of: • Storage areas for equipment/materials; • Drying room; • Meeting room and offices for site staff; • Toilet block; • Canteen; • Fuel tank and diesel generator; • Parking for 12 vehicles. A fourth construction compound area will also be located in the GCR loop in area during its construction and will comprise of: • Storage areas for equipment/materials; • Drying room; • Meeting room and offices for site staff;

Project Element	Description of the Proposed Development
	• Toilet block; • Canteen; • Fuel tank and diesel generator; • Parking for 12 vehicles. <u>Temporary Storage Areas</u> The handling, management and re-use of excavated materials are of importance during the construction phase of the Proposed Development. It is envisaged that material excavated to construct all infrastructure elements of the wind farm (foundations, tracks, hardstands, etc.) will be used as backfill and for site reinstatement. Two temporary storage areas will be provided with a stockpile height of a maximum of 2.5m. Storage area A will be located in the vicinity of T5 in the Western DA and a second Storage Area B will be located in the Eastern DA along the access track to T8. <u>Turbine Blade Delivery Route</u> As the turbine components will be imported via sea, the most suitable port identified for shipping in the turbine components is Foynes Port in County Limerick. This Port was selected as it is the closest port to the development site that can land, and store turbine equipment and it has direct access to the N69 National Road and the M18 and M8 Motorways. The options initially considered for the turbine delivery route from Foynes Port to the Proposed Development site were assessed as part of an abnormal loads assessment. This is detailed in the Turbine Delivery Route Report which is provided in **Appendix 16.5** of **EIAR Chapter 16 Traffic and Transport** (see also **Chapter 4 Project Need and Alternatives Considered**). A preferred route was selected for further assessment within the EIAR (Option 3a). The RSK project team have assessed the selected preferred route for pinch points where temporary accommodating works may be required (e.g., cutting back vegetation, installing temporary road surfaces, removing fencing, signs, and street furniture, etc.) for the delivery of turbine components. <u>Construction materials delivery route</u> Haulage to the site will consist of transporting other turbine components (e.g., turbine towers, nacelles, hubs) as well as general construction materials such as steel reinforcement, stone and concrete, cables, and other construction materials and electrical components. These will be brought into the site using the local roads in the region.

2.3.2 Alternatives

When designing the Proposed Development, alternative locations, alternative technologies, alternative design approaches and alternative access routes were all considered, including the do-nothing option. The alternatives assessed during the design process are described in detail in EIAR **Chapter 4: Project Need and Alternatives Considered**.

2.3.3 Construction Phase

A Construction and Environmental Management Plan (CEMP) has been prepared and is presented as **Appendix 5.1 to EIAR Chapter 5: Project Description**. The CEMP sets out the key environmental management measures associated with the construction, operation and decommissioning of the Proposed Development, to ensure that during these phases of the project, the environment is protected, and any potential effects are minimised.

A separate Construction Traffic Management Plan (CTMP) has been prepared and is presented as **Appendix 5.2 to EIAR Chapter 5: Project Description**.

The final CEMP will be developed further at the construction stage, on the appointment of the main contractor to the project. It will address the requirements of any relevant planning conditions, including any additional mitigation measures and monitoring which may be required by the Competent Authority.

The construction phase of the Project will take approximately 18 - 24 months, excluding testing and commissioning of the turbines. In general, working hours for construction activity will generally be from 07:00 to 19:00 throughout the week, with reduced working hours at weekends.

2.3.4 Operational Phase

The Proposed Development is expected to have a lifespan of approximately 35 years. During the operational phase of the development, turbine and infrastructure maintenance will be ongoing. During the operational period, on a day-to-day basis the wind turbines will operate automatically, responding by means of anemometry equipment and control systems to changes in wind speed and direction. The wind turbines will be connected via electrical and communications cables and data will be relayed from the wind turbines to an off-site control centre. The turbines will be subject to a routine maintenance programme involving visits to undertake a number of checks and changing of consumables, including oil changes.

3 ENVIRONMENTAL FACTORS SUMMARY

3.1 Population and Human Health

Chapter 6 of the EIAR was prepared by RSK Environment Ltd. (part of the RSK Group) and is concerned with the likely significant effects of the Proposed Development on the population in the area together with the effects of the Proposed Development on human health.

3.1.1 Baseline Environment

The study area for the Population and Human Health chapter encompasses the proposed wind farm site, the grid connection route (GCR), and the turbine delivery route (TDR). The study area for this chapter is defined by the Electoral Divisions (EDs) of Kilseily, Castlecrine, Cloontra, and Cloghera**.**

Through desktop studies and field surveys, sensitive receptors have been identified within a 2km radius of each of the proposed turbines in the Proposed Development for the assessments related to amenity effects on the population (i.e., shadow flicker, noise, and visual amenity). The sensitive receptors identified include occupied dwellings, unoccupied dwellings (excluding dilapidated properties), planning permission sites (validated and granted up to 4th December 2023), and places of worship, schools, and community buildings.

In total, 306 sensitive receptors are considered in the assessments for the EIAR.

- There are no sensitive receptors within 500m.
- There are thirty-six (36) sensitive receptors within 1km.
- There are ninety-eight (98) sensitive receptors within 1.5km
- There are three hundred and six (306) sensitive receptors within 2.1km

3.1.2 Potential Impacts of the Proposed Development

3.1.2.1 Construction Phase

The Project could create 71 to 79 direct jobs during its construction. It is likely that there will be additional direct employment for people living in the study area who may be qualified for construction related roles, and indirect employment opportunities for the many retail and service establishments in the nearby towns. Materials will be sourced in the general locality where possible. This will assist in sustaining employment in the local construction related trades and businesses for the 18-month construction stage of the Proposed Development. The construction stage of the proposed development will therefore likely have a short-term significant positive effect on the employment profile of the study area, and a short-term slight positive effect on local businesses and services in the nearby towns and villages in the study area during the construction stage.

During the 18 – 24 month construction stage, forestry operations and farming activities of the involved landowners associated with the Proposed Development will be temporarily disrupted during site clearance and preparation including setting up

temporary compounds, construction of access tracks, construction of the substation, and construction and installation of wind farm infrastructure. The construction works are confined to the lands within the red line boundary.

For the grid connection route, grid cabling will be installed in sections within the public road corridor. There will be rolling road closures in place to facilitate cabling works in combination with lane closures, partial road closures and stop/go systems. This will allow for the works to be completed efficiently and minimise disruption time for residents and businesses over the anticipated five-month duration of the works. This will likely result in brief slight negative effects to residential, agricultural, and commercial land uses where access will be temporarily restricted along the route.

Temporary accommodating works for the turbine delivery route options include temporary removal of street furniture, temporary surfacing at roundabouts, road verges and the site entrance, and trimming of trees and vegetation. There is a likelihood of effects on land use in proximity to the works. Land use activities along the turbine delivery route may be affected due to access restrictions which are likely during the transportation of turbine components over the public roads.

Based on the foregoing, the impacts on land use and activities at the works areas for the wind farm, grid connection route and turbine delivery route are likely to lead to brief to temporary slight to moderate negative effects on land use activities in the study area during the construction period.

There is the potential for recreation and tourism amenities located in the study area to be impacted during the construction stage of the proposed development comprising works for the wind farm and for the grid connection route as well as the turbine delivery route. These would relate manly to landscape impacts arising from landscape change as a result of the Proposed Development, and traffic impacts related to movement of vehicles and construction machinery with potential to cause disruption during the proposed works.

The major tourism or amenity attractions within 10km of the Proposed Development (located in Limerick City and at Bunratty) would not be affected by the construction of the Proposed Development and therefore no impact on tourism numbers or revenue for these attractions is likely. The amenities and attractions more local to the site include GAA clubs and hiking areas. These may be impacted during construction stage by traffic to and from the works areas along the grid connection route as well as the turbine delivery route.

In summary, effects arising from landscape change and traffic impacts on the recreation and tourism resources of the study area during the construction stage will be overall slight to moderate.

The construction phase of the proposed development has potential to create health and safety hazards for both construction workers and the public arising from increased traffic, the transport of heavy or bulky materials, noise emissions, and dust emissions, excavation, and general site-safety. Construction activities for the Project which may present health and safety issues for workers include, among others, lifting heavy loads overhead using cranes; working during adverse weather conditions; installation of electrical cables on-site and in the public road corridor; and works involving high voltage electricity.

Accommodating works along the public roads, along with the movement of vehicles for delivery of heavy/bulky goods and components on narrow roads, and works for the grid connection may lead to temporary limited access to farmlands and residential and commercial properties, creating a potential hazard along the route and at identified pinch points. In the absence of mitigation, this would have a temporary moderate, negative effect on public safety along the turbine delivery and grid connection routes during the construction stage.

No significant effects on amenity arising from noise / vibration during construction at the wind farm site are anticipated. For activities such as existing track upgrades, construction of a new site track, and off site works including road widening works for turbine component delivery or substation connection and most grid connection works along the existing road network, higher worst-case levels would occur but only for brief periods of time. Noise levels will quickly diminish as the works progress, moving the activity further from receptors. Due to the particularly short-term nature of the construction activity, the impact will be of minor magnitude at most on highly sensitive receptors, representing a short-term minor temporary adverse effect.

Noise from most construction activities has been assessed and is predicted to result in a temporary negligible to minor adverse effects which are not significant. However, horizontal directional drilling at night could represent a short-term major temporary reversible adverse effect, which is significant, in the absence of further mitigation.

Chapter 16 of the EIAR examines the impacts of the proposed development on Traffic and Transport. The effects to transport and access during construction on Pedestrian Severance, Delay, Amenity, Fear and Intimidation and Driver Delay would be temporary, slight and negative, and therefore not significant. For Accidents and Safety, the effects on transport and access during construction would be temporary, of moderate-significance, and negative, and therefore not significant.

3.1.2.2 Operational Phase

Once it is operational, the Proposed Development is likely to bring direct and indirect employment to the study area. The Project will have potential to create 22 jobs in the long term. This would have a long term beneficial effect which has the potential to last beyond the operational life of the wind farm for the local community and region.

The Proposed Development is not expected to result in changes to population and demographic trends of the study area during the operation stage. The effects on population and demographic trends would therefore be imperceptible.

Once operational, it is envisaged that the land, outside the infrastructure in place for the lifetime of the wind farm, will continue to be used for farming and forestry operations throughout the 35-year operation lifetime of the wind farm and, as a result, there will be minimal impact on existing land uses for the operational stage.

The biodiversity enhancements proposed for the Proposed Development as contained in the Species and Habitat Management Plan (SHMP) (referenced in EIAR **Chapter 7 Biodiversity)** are the ecological features and management prescriptions which will enhance biodiversity within the site and improve sustainability of farming and forestry operations. This will result in major beneficial effects on land use in the site.

Though it is unlikely, there is potential for the grid connection to require repair and for accommodating works to be undertaken for transport of replacement turbine components during the 35-year operational life of the proposed Development. The effect of this activity and works, should they occur, will be the same as the construction stage with impacts on road users and occupiers of residential, commercial and other premises along the subject routes, arising from noise and disruption. However, these works will be brief, and therefore neutral to slight in effect.

During the operational stage, 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 adjudged to be **'**High-medium' with the immediate site context reducing to Medium within the Central Study Area. Beyond 5km from the site, the magnitude of landscape impact will reduce to Low and Negligible.

Based on a Medium sensitivity judgement and a High-Medium magnitude, the operational stage landscape impacts are considered to be significant (Substantial-Moderate / Negative / Long-term) within and immediately around the site. There, reducing to 'Moderate', 'Slight' and Imperceptible at increasing distances from the wind farm site.

When looking specifically at the impact on Tourism, Amenity and Heritage features, the landscape and visual impact assessment concluded that proposed development will not result in significant visual impacts in respect of tourism, heritage and amenity features within the study area.

Without the application of mitigation entailing shutting down turbines when conditions are detected which could give rise to an exceedance of Wind Energy Development Guidelines (2006) thresholds, it is considered that there will be moderate significant amenity effects from operation of the wind farm arising from shadow flicker.

A worst-case noise assessment has been completed using the Candidate turbine model with the highest noise emission. Based on the modelling undertaken, predictions of operational noise for the Proposed Development in isolation at the noise-sensitive locations identified varied between 22 and 30 dB(A) at low wind speeds and 35 to 40 dB(A) at high wind speeds.

The detailed assessment undertaken demonstrated that these predicted noise levels comply with the noise limits for all properties and all locations. This assumed the use of a reduced noise operational mode ("SO2") for turbines 2 and 4 of the Proposed Development. For other turbine models, different operational restrictions (or none at all) may be required to achieve a similar conclusion. This means that the operational noise levels from the Proposed Development are considered acceptable in line with relevant guidelines. This represents a long-term permanent reversible adverse effect which is not significant.

EIAR **Chapter 14 Landscape and Visual Impact Assessment (LVIA)** presents an assessment of the visual amenity effects which will result from the introduction of turbines and related infrastructure in the landscape. With regard to visual receptors, the most sensitive visual receptors in this instance are considered to be the local community in the immediate vicinity of the development (within 5km of the site). It is concluded that the proposed turbines will present with a dominant visual presence from some of the nearest surrounding local community receptors and will be one of the defining built features along

the elevated lands surrounding the site. The dispersed nature of the two distinct development areas limits the overall perceived scale of the development as the surrounding terrain and intervening vegetation reduce the potential for clear views of both parcels of the development areas to be viewed in combination from some parts of the central study area. Furthermore, the proposed turbines are located across a broad elevated ridge characterised by extensive areas of conifer forestry, which will help to assimilate the overall scale of the turbines into this landscape context. For the foregoing reasons, it is not considered that the Proposed Development will give rise to significant visual impacts on local community receptors during the operation stage.

3.1.2.3 Decommissioning Phase

In the decommissioning stage, cranes will be used to disassemble each turbine section for their removal from the site. The upper sections of the foundations projecting above ground will be removed, and the remainder of the foundations will be covered by soils typical of the surrounding environment, then reseeded or left to re-vegetate. Underground cables will be cut back at the turbine termination points and will be recycled. Site access tracks will remain to allow access through the site for farm operations.

The potential effects associated with the decommissioning stage in relation to population and demographic trends will be the same as for the construction stage. The effects are likely to be imperceptible.

The potential effects associated with the decommissioning stage in relation to employment would be significantly reduced in magnitude to the effects predicted during construction. No construction works are required, and the specialist personnel who would disassemble the turbines are likely to come from outside the study area. There would be a limited number of direct and indirect jobs generated from decommissioning activity, with only a short-term slight positive effect on the employment profile of the study area, and a short-term slight positive effect on local businesses and services in the nearby towns and villages in the study area.

If a decision is taken to discontinue use of the site to produce renewable electricity, the turbines and tops of foundations will be removed from the site, as described, and the lands will revert fully to agricultural use. The decommissioning works is likely to have a brief slight negative effect on land-use in the wind farm site and study area.

The decommissioning works will not interact with nearby recreational facilities and tourism. It is expected that the decommissioning stage of the Proposed Development will have an imperceptible effect on recreation amenities and tourism.

There is potential for negative effects on the health and safety of workers and the public during decommissioning associated with the presence of a construction crew at the wind farm sites, increased traffic entering and leaving the sites, the presence of heavy goods vehicles and machinery on the public roads, and potential obstructions and delays to road users. The potential effects on public health and safety during the decommissioning stage is considered temporary moderate and negative.

As with the construction stage, the impacts on amenity arising from decommissioning works relate to noise and traffic, but the effects will be greatly reduced. It is expected that the decommissioning stage of the Proposed Development will have a slight to imperceptible effect on amenity as a result.

3.1.3 Mitigation and Residual Effects (Post-Mitigation)

The effects on population and demographic trends during construction, operation and decommissioning are imperceptible, therefore no mitigation measures are required, and there are no residual effects.

As the direct and indirect effects of the Proposed Development during construction, operation and decommissioning on employment and the economy are positive and beneficial, no mitigation measures are required, and there are no residual effects.

Effects on land use arising during construction, operation and decommissioning are not significant. No mitigation measures are required, and there are no residual effects.

Effects on recreation and tourism during construction and operation would relate to landscape change which is mitigated by design, and traffic impacts to the local area. In relation to traffic impacts on recreation and tourism, once the mitigation measures outlined in the Construction Traffic Management Plan (CTMP) (referenced in EIAR **Chapter 5 Project Description**) are implemented there would be no residual effects on recreation and tourism.

As described in EIAR **Chapter 9 Hydrology and Hydrogeology**, to protect groundwater quality, the pouring of concrete within the works areas will be prepared and controlled, including shuttering and the use of geotextile membrane to minimise escape of material. Once it is set, concrete is effectively inert. The mitigation measures contained in EIAR **Chapter 9** are incorporated in a Construction Environmental Management Plan (CEMP) (referenced in EIAR **Chapter 5 Project Description**). Buffers from drainage channels are observed in the design of the wind farm. These, along with best practice environmental management measures prescribed in the Surface Water Management Plan and the CEMP (will prevent pollution and protect surface and groundwater quality, and thereby human health. Once mitigated, the release of pollutants (i.e., cementitious material, hydrocarbons, HDD fluid, etc.) during construction with potential for impacting ground and surface water quality will be minimal and temporary, if it occurs at all. The residual effects are expected to be temporary, adverse and neutral.

Chapter 16 Traffic and Transport concludes that following mitigation, negative effects on the receiving environment associated with the construction works on the WDA and EDA and the GCR will be short-term in duration and slight in significance, whilst the works associated with the TDR will be temporary in duration and slight following mitigation. Traffic management measures will be put in place as detailed in EIAR **Chapter 16** and in the CTMP (referenced in EIAR **Chapter 5**. This will result in limited disruption to land use along the GCR for an anticipated duration of 5 months. Once good practice is followed, the potential for negative impact on public health and safety, the residual effects are expected to be temporary and not significant.

In relation to EIAR **Chapter 1 Air Quality**, all construction effects were assessed to be not significant provided that the recommended dust control and exhaust mitigation measures for construction, and to a lesser extent decommissioning stage, as set out in **Chapter 17**, Section 17.6 are applied. Residual effects are therefore not significant.

In relation to **Climate** (EIAR **Chapter 18)**, following the implementation of mitigation measures, due to the emission of GHGs during the construction (and decommissioning activities) the Proposed Development is likely to result in a direct, long-term minor adverse effect on global climate (with emissions remaining in the atmosphere for a long period of time (years, decades and beyond). However, this minor adverse effect is largely outweighed by the direct, long-term significant beneficial effect of operation of the wind farm upon the global climate, such that the overall net effect of the Proposed Development, after implementation of mitigation measures, is likely to be a significant beneficial effect. This is because the net GHG effects of the Proposed Development will be below zero therefore resulting in a reduction in atmospheric GHG concentration. This reduction will be brought about by the displacement of fossil fuel energy sources by the renewable energy produced by the development. This will contribute to overall positive effects on human health and wellbeing of the population.

In relation to noise during construction, recommended mitigation measures include community notification and best practicable means in the selection and use of equipment, work practices, and noise reduction measures at construction works sites. Following the application of mitigation as set out in EIAR **Chapter 13**, Section 13.9, it is concluded that the residual noise and vibration effects from construction at the wind farm site are temporary slight negative, whilst along the grid connection route the noise and vibration effects from the proposed works are considered brief, significant, and negative.

During the operational stage, noise mitigation measures will be implemented to ensure that turbine noise levels will comply with the criteria at House 17, The mitigation measure proposed is to operate Turbines T6, T8 and T9 in a reduced mode at 6m/s (v_{10}) wind speed, during daytime periods (07:00 to 23:00hrs), when wind directions are 220 to 340 degrees from north (i.e., broadly westerly winds). Following application of the proposed noise mitigation measure during the operational stage, the calculated turbine noise levels will comply with the noise criteria at all properties. There will be no residual effects.

3.2 Biodiversity

Chapter 7 was prepared by RSK Biocensus and Inis Environmental Consultants Ltd. It addresses potential effects from the Proposed Development on biodiversity features; specifically on habitats and species (excluding bird species, which are discussed in EIAR **Chapter 8**) within and adjacent to the Proposed Development site, and on relevant qualifying and supporting interests of nearby designated sites. Impacts from the Proposed Development are assessed during the construction, operational and decommissioning phases, both in isolation and in combination with other projects.

3.2.1 Baseline Environment

The receiving environment of the Proposed Development contains a range of habitats including conifer plantation, woodland and transitional woodland scrub, pasture, agricultural land and peatlands. These habitats have been found to support a range of specially protected and notable species typical of these habitats. Habitats and species of particular importance in the context of the Proposed Development were as follows:

- Wet heath (County importance);
- Marsh Fritillary (Local importance (Higher value));

- Terrestrial mammals including Otter, Badger, Pine Marten, Red Squirrel and Irish Hare (Local importance (Higher value));
- Bat species (Local importance (Higher value)) – foraging and commuting activity (including Low-Negligible activity by Lesser Horseshoe Bat); and
- Aquatic species (Local importance (Higher value)).

In addition, Invasive Non-native Species (INNS) recorded within the Proposed Development site were included as a Key Ecological Feature for further consideration in relation to the Proposed Development.

Relevant designated sites with features of biodiversity interest were identified within the potential Zone of Influence of the Proposed Development, notably:

- Lower River Shannon Special Area of Conservation (SAC);
- Danes Hole, Poulnalecka SAC;
- Ratty River Cave SAC; and
- Gortacullin Bog National Heritage Area (NHA).

3.2.2 Potential Impacts of the Proposed Development

3.2.2.1 Designated Sites

Effects on European sites were assessed in detail in the Screening for Appropriate Assessment and Natura Impact Statement reports which accompany the application.

The Proposed Development does not involve any direct land take within any designated sites. There is therefore no potential for direct habitat loss within any designated sites. Whilst certain designated sites (e.g., Lower River Shannon SAC) are immediately adjacent to elements of the Proposed Development (e.g., the TDR), all European sites are at least 2km from the Proposed Development turbine areas. Following detailed assessment, and in view of the embedded mitigation measures within the Proposed Development design (see EIAR **Section 7.5**), no significant effects on the qualifying features of any European sites are anticipated. As such, there will be no significant adverse effects on any European sites during the construction, operation and decommissioning phases of the Proposed Development, both alone and in combination with other projects.

One nationally designated site, Gortacullin Bog NHA, is located within 10m of the Proposed Development. Considering the proximity of this designated site, implementation of embedded mitigation measures will be necessary to avoid significant effects. Implementation of these measures (notably those prescribed within the CEMP) will ensure that no significant effects on Gortacullin Bog NHA or any other nationally designated sites occur.

3.2.2.2 Construction Phase

Potential effects on ecological features identified during the construction phase of the Proposed Development are as follows:

- Direct habitat loss and fragmentation: permanent and temporary reductions to the extent, quality, and connectivity of the habitats present on site;
- Disturbance and displacement: disturbance of protected and/or priority species from additional noise, dust, light, vibration, and human activity, with the possibility of causing displacement;
- Direct mortality of individuals: fatalities or injuries to sensitive species caused by construction activities; and
- Pollution of habitats: through construction-related activities such as pollutant sedimentation and the use, assembly and storage of machines and materials (risk of chemical and fuel spills); particularly regarding aquatic habitats.

Following detailed assessment of effects, taking into consideration embedded mitigation within the design of the Proposed Development, the following potentially significant effects on ecological features were identified during the construction phase:

- Direct loss and fragmentation of important habitats, including habitats used (or potentially used) by Marsh Fritillary and bats; and
- Spread of invasive non-native plant species.

3.2.2.3 Operational Phase

Potential effects on ecological features during the operational phase of the Proposed Development are as follows:

- **Direct habitat loss and fragmentation**: permanent and temporary reductions to the extent, quality, and connectivity of the habitats present on site to facilitate operational maintenance;
- **Disturbance and displacement**: disturbance of protected and/or priority species from additional noise, dust, light, vibration, and human activity, with the potential to cause displacement;
- **Direct mortality of individuals**: fatalities or injuries to sensitive species caused by operational activities; notably potential collisions with operational turbines;
- **Pollution of habitats**: through operational activities such as the use, assembly and storage of machines and materials (risk of chemical and fuel spills); particularly regarding aquatic habitats.

Following detailed assessment of effects, taking into consideration embedded mitigation within the design of the Proposed Development, the following potentially significant effects on ecological features were identified during the operational phase:

- Spread of invasive non-native plant species.

3.2.2.4 Decommissioning Phase

Potential effects on ecological features during the decommissioning phase of the Proposed Development are as follows:

- **Direct habitat loss**: permanent and temporary reductions to the extent, quality, and connectivity of the habitats present; and

- **Disturbance and displacement**: disturbance of protected and/or priority species from additional noise, dust, light, vibration, and human activity, with the potential to cause displacement.

Following detailed assessment of effects, taking into consideration embedded mitigation within the design of the Proposed Development, the following potentially significant effects on ecological features were identified during the decommissioning phase:

- Spread of invasive non-native plant species.

3.2.3 Mitigation and Residual Effects (Post-Mitigation)

3.2.3.1 Construction Phase

Detailed mitigation measures are outlined in EIAR **Section 7.5**, which are incorporated into the CEMP for the Proposed Development to ensure that the potential for adverse effects on habitats and species is minimised. A detailed Species and Habitats Management Plan has also been produced to accompany this application. This provides a framework for the conservation and enhancement of ecological features; notably for habitats including heath, grassland, scrub and conifer plantation. This will provide suitable habitat for Key Ecological Features including Marsh Fritillary, Badger, Pine Marten, Red Squirrel and bat species including Lesser Horseshoe Bat. Together, these measures will ensure that habitat loss, disturbance and mortality regarding ecological features is minimised during construction, and that a suitably sized area of land is managed in the interests of these species. With the implementation of these mitigation measures, the construction phase residual effect will be not significant.

In addition, a detailed Invasive Species Management Plan (EIAR **Chapter 7 – Appendix G**) will be implemented to avoid adverse effects through the dispersal of INNS during construction. The implementation of this Invasive Species Management Plan will be sufficient to ensure the construction phase residual effect is not significant.

3.2.3.2 Operational Phase

Detailed mitigation measures are outlined in EIAR **Section 7.5**, which are incorporated into the CEMP for the Proposed Development to ensure that the potential for adverse effects on species and habitats during operation is minimised. A detailed Species and Habitats Management Plan has also been produced to accompany this application, including compensatory habitat creation and enhancement for bat species. The Proposed Development design includes the removal of a buffer of up to 97m (depending on the selected turbine specification) of suitable bat foraging and commuting habitat around all turbines to minimise the risk of impacts on bats through collisions and baropressure fatalities. These measures will be accompanied by long-term monitoring to ensure mitigation measures are sufficient to avoid significant adverse effects.

The detailed Invasive Species Management Plan described above will also be implemented during the operational phase to avoid adverse effects through the dispersal of INNS during operation. The implementation of this Invasive Species Management Plan will be sufficient to ensure the operational phase residual effect is not significant.

3.2.3.3 Decommissioning Phase

Taking into consideration the embedded mitigation measures detailed in EIAR **Section 7.5**, the only potentially significant negative effect on ecological features during the decommissioning phase of the Proposed Development is through the spread of INNS. Implementation of the detailed Invasive Species Management Plan described above during the decommissioning phase will be sufficient to ensure the operational phase residual effect is not significant.

3.3 Ornithology

Chapter 8 was prepared by RSK Biocensus and Inis Environmental Consultants Ltd. This chapter addresses potential effects from the Proposed Development on ornithological features; specifically on bird populations and their habitats within and adjacent to the Proposed Development site, and on relevant ornithological qualifying and supporting interests of nearby designated sites. Impacts from the Proposed Development are assessed during the construction, operational and decommissioning phases, both in isolation and in combination with other projects.

3.3.1 Baseline Environment

The receiving environment of the Proposed Development supports a wide variety of typical bird species of open countryside and farmland, including birds of prey and wader species. These include resident species, summer and winter migrants (including summer breeders) and species present during spring and autumn passage. Populations of particular importance recorded during detailed field surveys undertaken between 2021 and 2023 inclusive, included breeding and wintering populations of:

- Hen Harrier (National importance);
- Kestrel (County/district importance);
- Other raptor species (Local importance (Higher value));
- Red Grouse (County/district importance);
- Woodcock (County/district importance); and
- Passerine species (Local importance (Higher value)).

In addition, relevant designated sites with features of ornithological interest were identified within the potential Zone of Influence of the Proposed Development, notably:

- River Shannon and River Fergus Estuaries Special Protection Area (SPA); and
- Gortacullin Bog National Heritage Area (NHA).

3.3.2 Potential Impacts of the Proposed Development

3.3.2.1 Designated Sites

Effects on European sites were assessed in detail in the **S**creening for Appropriate Assessment and Natura Impact Statement reports which accompany the application.

As the Proposed Development does not overlap with any designated sites with features of ornithological interest, there is no potential for effects from direct habitat loss within these designated sites. Following detailed assessment, no significant use of the Proposed Development site by species forming qualifying features of nearby European sites was identified, and detailed Collision Risk Modelling identified no significant effects from operational turbine collisions on any relevant species. There is therefore no potential for significant effects on ornithological features of any European sites.

Considering its lack of ornithological qualifying features, potential effects on the integrity of Gortacullin Bog NHA from the Proposed Development regarding features of ornithological interest are considered not significant. Further detailed assessment and (where necessary) mitigation was undertaken to ensure significant adverse effects on species that use this designated site (notably Hen Harrier and Red Grouse) are avoided. No significant effects on any other nationally designated sites were identified.

3.3.2.2 Construction Phase

Potential effects on ornithological features identified during the construction phase of the Proposed Development are as follows:

- **Direct habitat loss and fragmentation**: permanent and temporary reductions to the extent, quality and connectivity of the habitats present for birds; and
- **Disturbance and displacement**: disturbance of nesting, flying, sheltering and foraging birds (e.g., from additional noise, dust, light, vibration and human activity), with the potential to cause displacement of birds into land outside of the Proposed Development.

Following detailed assessment of effects, taking into consideration embedded mitigation within the design of the Proposed Development, the following potentially significant effects on ornithological features were identified during the construction of the Proposed Development:

- Direct loss and fragmentation of habitat used by breeding and wintering passerines, Red Grouse, Hen Harrier, Kestrel, other raptor species and Woodcock (including potentially significant cumulative effects with nearby developments); and
- Disturbance and displacement of breeding and wintering passerines, Red Grouse, Hen Harrier, Kestrel, other raptor species and Woodcock.

3.3.2.3 Operational Phase

Potential effects on ornithological features during the operational phase of the Proposed Development are as follows:

- **Direct habitat loss and fragmentation**: permanent and temporary reductions to the extent, quality and connectivity of the habitats present for birds to facilitate operational maintenance;
- **Disturbance and displacement**: disturbance of nesting, flying, sheltering and foraging birds (e.g., from additional noise, light, vibration, visual disturbance and human activity) potentially resulting in displacement of birds; and

- **Turbine collisions**: bird collisions with turbines whilst flying within the Proposed Development, resulting in fatalities and injuries.

The detailed assessment of effects identified no likely significant effects on ornithological features during the operation of the Proposed Development. As such, targeted mitigation during the operational phase over and above the embedded mitigation within the Proposed Development design will not be required.

3.3.2.4 Decommissioning Phase

Potential effects on ornithological features during the decommissioning phase of the Proposed Development are as follows:

- **Direct habitat loss**: permanent and temporary reductions to the extent, quality and connectivity of the habitats present for birds; and
- **Disturbance and displacement**: disturbance of nesting, flying, sheltering and foraging birds (e.g., from additional noise, dust, light, vibration and human activity), potentially causing displacement.

The detailed assessment of effects identified no potentially significant effects on Key Ornithological Features during the decommissioning phase of the Proposed Development. As such, targeted mitigation over and above the embedded mitigation within the Proposed Development design will not be required.

3.3.3 Mitigation and Residual Effects (Post-Mitigation)

3.3.3.1 Construction Phase

Detailed mitigation measures are outlined in EIAR **Section 8.5**, which are incorporated into the CEMP for the Proposed Development to ensure that the potential for adverse effects on bird populations is minimised. A detailed Species and Habitats Management Plan has also been produced to accompany this application. This provides a framework for the conservation and enhancement of ecological features (notably Hen Harrier and Red Grouse), to avoid potential significant adverse effects and ensure the Proposed Development is managed in the interests of bird populations. This will ensure that a suitably sized area of land is managed in the interests of Hen Harrier, Red Grouse and other notable bird species. With the implementation of the recommended mitigation measures, the construction phase residual effect will be not significant.

3.3.3.2 Operational Phase

The Proposed Development is not anticipated to have a significant effect on ornithological features during the operational phase. Therefore, no specific operational phase mitigation measures required. The residual effects of the Proposed Development on ornithological features whilst it is in operation will be not significant.

3.3.3.3 Decommissioning Phase

The Proposed Development is not anticipated to have a significant effect on ornithological features during the decommissioning phase. Therefore, no specific decommissioning phase mitigation measures are considered to be required. The residual effects of the

Proposed Development on ornithological features during the decommissioning phase will be not significant.

3.4 Hydrology and Hydrogeology

Chapter 9 of the EIAR was prepared by RSK Ireland. This Chapter of the EIAR assesses the impact of the Proposed Development on the hydrological environment during the construction, operational and decommissioning phases.

3.4.1 Baseline Environment

The site is characterised by primarily coniferous commercial forestry, mixed farmland habitat with hedgerows and occasional areas of scrub, and man-made drains and ditches. The Site is characterised by relatively complex (hilly) topography with associated elevations ranging between approximately 130 to 270 metres Above Ordnance Datum (m AOD). The site is not within a probable flood zone, nor has it experienced any historical flooding.

The Oatfield Wind Farm project and grid connection routes are situated within the Lower Shannon Catchment (Code:25; Area 1041.26km^2) and Shannon Estuary North (ID: 27; Area: 1,651.27km^2). The Grid Connection Route 'Loopin1' is situated solely in the Lower Shannon Catchment. The Turbine Delivery Route is situated in the Lower Shannon Catchment (Code:25; Area 1041.26km^2) and Shannon Estuary South Code:24; 2033.96 km^2).The WFD status (2016-2021) for surface water bodies / rivers and streams directly draining the site range from Good to High.

The site is characterised generally by a relatively extensive network of non-mapped natural and artificial drainage channels, but also possesses several wells and boreholes which are connections to groundwater elsewhere off site also.

Surface water quality observed at eleven monitoring locations is generally of similar standard and is generally of moderate quality when screened against relevant reference concentrations. Elevated concentrations of Nitrogen compounds (Ammoniacal Nitrogen) as observed at all monitoring locations is indicative of current land practices at the Site, commercial forestry (see Photographs in EIAR **Volume III, Appendix 9.2 Tile 13**). Evidence of Iron pan can also be seen in photographs (EIAR **Volume III, Appendix 9.2 Tile 13**).

The western portion of the wind farm site (encompassing the location of T1 – T7) is underlain by a 'Poor Aquifer (Pl)' that is, bedrock which is generally unproductive except for local zones and small areas of aquifers with classifications of 'Locally Important Aquifer (Ll)'. The eastern portion (encompassing T8 – T11) of the development is underlain by a 'Locally Important Aquifer (Ll)' that is, bedrock which is moderately productive only in local zones. The GCR 'Loopin1', 'Option A' and 'Option B' is underlain by the same classification of aquifers (Pl and Ll) as the development. The Turbine Delivery Route, is underlain by the same classification of aquifers (Pl and Ll) as the development but also Regionally Important Aquifer - Karstified (diffuse) (Rkd), Regionally Important Aquifer - Karstified (conduit) (Rkc) and Locally Important Aquifer - Bedrock which is Generally Moderately Productive (Lm).

3.4.2 Potential Impacts of the Proposed Development

3.4.2.1 Construction Phase

Potential impacts of the development in the construction phase include:

- Increased runoff from the site due to earthworks
- Ground Disturbance and diffuse sediment laden runoff;
- The release of suspended solids;
- Ground Stability and compaction
- Nutrient release;
- Release of industrial contaminants i.e., Horizontal Directional Drilling Materials, wastewater sanitation contaminants, release of construction or cementitious materials, release of excavation dewatering and construction water, release of hydrocarbons; and
- Diversion and enhancement of drainage.

In absence of mitigation measures, the activities associated with potential impacts on surface water quality during construction of the proposed Oatfield Wind Farm are increased sediment loading in run-off, and accidental spills and leaks.

The proposed wind farm development has the potential to result in increased rates of runoff during the operational phase relative to baseline conditions. Such an increase in surface water runoff, or an increased hydrological response to rainfall, has the potential to exacerbate flooding events and effect on hydro morphology of waterbodies downstream of the development, and/or to exacerbate flooding and erosion within the boundary of the site.

3.4.2.2 Operational Phase

The risk associated with bedrock aquifers underlying the grid connections will remain a baseline risk however there are no significant sources of contamination associated with the operational phase with the exception of in-frequent maintenance works. Potential impacts of the development in the operational phase include:

- Increased hydraulic loading; and
- The installation of constructed drainage for the purposes of collecting either clean water or construction run off have the potential to alter the natural hydro morphology of the site.

3.4.2.3 Decommissioning Phase

No new unique or additional effects are anticipated to arise during the decommissioning phase of the Proposed Development on the hydrological and hydrogeological environment. **Management Plan 6 of the CEMP, Appendix 2.1.** All anticipated impacts are similar in nature to those already highlighted during the Construction Phase of the Development, (**Section 9.4.5**) i.e., release of hydrocarbons, wase water / sanitation and suspended soils through the excavation of material in order to remove cabling from joint bay locations.

3.4.3 Mitigation and Residual Effects (Post-Mitigation)

3.4.3.1 Construction Phase

The residual impact on the surface water receiving environment resulting from the construction phase of the Development is anticipated to be a limited temporary decrease in water quality. A limited temporary decrease in water quality may arise due to a release of suspended solids and sediments to surface waters during excavations at the Site. The potential for release of elevated suspended solids is likely to be exacerbated following heavy rainfall events which occur after sustained dry periods. Any localised reduction in water quality is likely to be mitigated against by the extensive control measures outlined in this chapter and also by natural dilution as distance from the point or diffuse source of contamination increases with distance from the Site.

In order to reduce the likely potential impacts on the hydrological environment, the following mitigation measures will be adopted as part of the construction works on site:

- Implementation of a Construction & Environmental Management Plan (CEMP);
- Surface water management during construction using sediment fencing and avoiding established drainage networks;
- No permanent stockpile locations;
- Earthworks limited to seasonally dry periods;

Implementation of the control measures will result in a robust environmental management plan which will target and mitigate likely sources and pathways of contaminant arising at the site, and to actively manage and monitor systems on site to achieve no effect to the receiving surface water network. Short term minor releases are still possible. However, with the monitoring and management proposed, any potential issue arising will be addressed immediately and remedied in good time.

Groundwater will not be significantly affected by the development. The principal residual risk to groundwater posed by the development is the use, storage and transfer of hydrocarbons (fuel) on site for plant equipment. In the unlikely event of a spill, the contaminant will be contained, managed and removed in good time.

Mitigation by avoidance and the implementation of physical control measures will ensure that contaminant concentrations, particularly elevated suspended solids entrained in run-off are reduced to below the relevant legislative screening criteria. The overall impact is anticipated to be a **direct, adverse, neutral to slight** with some **beneficial** potential.

3.4.3.2 Operational Phase

The residual effect on the receiving surface water environment during the operational phase of the development is anticipated to be neutral i.e., no increase in runoff and no increase in drainage discharge.

Furthermore, the drainage and attenuation network deployed will also need to consider effective passive treatment of runoff (in terms of suspended solids), considering this the finalised drainage and SuDS design will likely include increased attenuation capacity. Of note is the absence of any attenuation features as part of baseline conditions.

The finalised drainage design aims to result in attaining net beneficial effects through Nature Based Solutions**,** i.e., a net reduction in runoff rates at the site, beneficial effects to water quality and reducing flood risk to downstream flood risk areas. Coupling SuDS with ecology and biodiversity mitigation can also provide opportunities to attain net biodiversity gain. This is considered a **direct, neutral to beneficial**, effect of the development, which contrasts to the baseline conditions.

3.4.3.3 Decommissioning Phase

No new significant effect on the surface water and groundwater receiving environment are anticipated during the Decommissioning phase of the Proposed Development. The Decommissioning phase of the Proposed Development, as outline in the Decommissioning Plan (contained in the CEMP in **Appendix 2.1)**, would result in the removal of Site infrastructure such as wind turbine blades, towers, transformers, etc. Decommissioning the proposed development will take approximately 6 months to complete.

The residual effects associated with Decommissioning includes waste generation, hydrocarbon leakage and erosion of soil and rock. In general, effects will be similar to those at construction and operation, but of a greatly reduced magnitude. The carefully managed reintroduction and/or reuse of soils and peat at the Proposed Development in place of turbine hardstand areas, and successful habitat management, revegetating and rewilding of those areas will have beneficial effects, or revert to baseline conditions of the preconstruction phase.

3.5 Soils and Geology

RSK Ireland developed the soils and geology chapter (**Chapter 10**) of the EIAR.

3.5.1 Baseline Environment

The Site is comprised mainly of coniferous forest, transitional woodland-shrub, pastures, peat bogs. It is characterised by hilly topography and elevations ranging between 130 – 270mAOD.

There are a number of mapped geological formation underlying the site. The Old Red Sandstone is the most dominant bedrock and unconformably overlies the older inliers of Lower Paleozoic mudstones and siltstones of the Broadford Formation and the Cornagnoe Formation.

There are a number of soil types found at the Site including blanket peat and ‘Acid Shallow, lithosolic or podzolic type soils potentially with peaty topsoil’ in the Eastern PDA with the Western PDA having predominantly ‘Acid Deep Poorly Drained Mineral’ soil with smaller pockets of ‘Acid Poorly Drained Mineral Soils with Peaty Topsoil’, ‘Acid Deep Well Drained Mineral’, and ‘Acid Shallow Well Drained Mineral’. The subsoils found at the Site include peat and till (both sandstone and sandstone and shale till). The average peat depth across the site from 876 peat probe depths is 0.4m with most of the peat probe depths recorded as very shallow to shallow.

The Proposed Development is considered to be of 'Low Risk' to 'Moderate Risk' in terms of landslide susceptibility with minor areas considered to be of 'Moderately High Risk' at T6 and T10.

3.5.2 Potential Impacts of the Proposed Development

3.5.2.1 Construction Phase

Potential effects of the Proposed Development during the construction phase includes

- Increased nutrient release due to felling of forestry as a part of land take
- Increase of runoff due to soil sealing
- The release of suspended solids due to subsoil and bedrock removal
- Ground stability, erosion and compaction
- Soil contamination (potential for contamination from the release of hydrocarbons, wastewater and sanitation, construction or cementitious materials or general waste).

In the absence of mitigation measures the construction activities associated with the direct potential effects on land, soils and geology of the Proposed development are ground stability, erosion and compaction and soil contamination. The secondary potential effects associated with increased nutrient release, runoff and suspended solids of the receiving surface water.

3.5.2.2 Operational Phase

During the Operational Phase of the proposed development no further construction other than minor landscaping and maintenance activities will be required. The footprint of the development will remain in place and this will continue to impact of land, soils and geology at the Site. Including the potential effects associated with land take and soil compaction and subsidence.

3.5.2.3 Decommissioning Phase

In general, the potential effects associated with Decommissioning will be similar to those associated with construction but of reduced magnitude because extensive excavation, and wet concrete handling will not be required. The potential environmental effect of soil storage and stockpiling and contamination by fuel leaks will remain during Decommissioning. No new impacts are anticipated during the Decommissioning Phase of the project in comparison to the Construction Phase.

Restoration activities have the potential to be disruptive and hazardous to the environment.

3.5.3 Mitigation and Residual Effects (Post-Mitigation)

Mitigation measures outlined in this chapter lay down the framework to reduce all potential effects of the Proposed Development on geological receptors. It is noted that geological mitigation measures and effects are strongly connected to those related to Hydrology and Hydrogeology.

3.5.3.1 *Construction Phase*

The residual effect on the geological receiving environment resulting from the Construction Phase of the Development remains slight for land take which is an unavoidable however through mitigation by design is reduced as far as possible. There also remains a slight residual effect of soil contamination which is considered a localised effect, however if hydrocarbon contamination is intercepted by surface water features the effect is potentially regional.

In order to reduce the likely potential effects, the following mitigation measures will be adopted as part of the construction works on site.

- Implementation of a Construction & Environmental Management Plan (CEMP);
- No permanent stockpiling
- Stockpiling limited to the footprint of the development
- Vehicular movement limited to the footprint of the development.
- Earthworks limited to seasonally dry periods
- Surface water management during construction using sediment fencing and avoiding established drainage networks

The unavoidable residual effects on the soils and geology environment as a function of the Development is that there will be a change in ground conditions at the Site with natural materials such as peat, subsoil and bedrock being replaced by concrete, subgrade and surfacing materials. This is a direct, localised, adverse, moderate significance at a local scale, direct permanent change to the materials composition at the Site.

3.5.3.2 *Operational Phase*

No new impacts are anticipated during the operational phase of the Development on the geological, geomorphological and geotechnical environment therefore no additional mitigation measures are required. The potential residual effects on the soil and geological environment during the operational phase of the work will be mitigated through good site practice; vehicular movements, hydrocarbon controls. Overall, the residual effects from these aspects will have a slight, permanent, adverse effect on the Site.

Other potential effects are considered to range in significance from slight to significant and can potentially be long term to permanent including potential indirect or secondary effects on environmental receptors, namely the receiving surface water and drainage network. Providing the prescribed mitigation measures outlined in this report are fully implemented and best practice is followed on Site, will ensure the risk of such potential effects can be significantly reduced or are considered avoidable.

3.5.3.3 *Decommissioning Phase*

The residual effects associated with Decommissioning includes waste generation, hydrocarbon leakage and erosion of soil and rock. In general, effects will be similar to those at construction and operation, but of a greatly reduced magnitude.

On completion of reinstatement works, following the construction phase, it is expected that the wind farm will be returned as close to its present condition as possible. In

particular areas of peat and current drainage regimes will be reinstated and left to revegetate naturally with the passage of time and the Site will revert over time to a more natural drainage regime. It is expected that the long-term residual effects associated with the wind farm Development will therefore be negligible.

3.6 Material Assets

An assessment has been made of the effect of the proposed development on material assets, such as waste, utilities, telecommunications and aviation by RSK Ireland and is presented in **Chapter 11**.

3.6.1 Baseline Environment

A desktop study was undertaken to review the licensed waste facilities in proximity of the Proposed Development. There are twenty-six licensed waste facilities and three EPA licenced waste facilities in proximity to the proposed development. There are no utilities located within the Proposed Development. In addition, there are eight telecommunication mast sites that could be potentially impacted by the proposed development.

The closest airport to the site is the Shannon international airport, which is about 16.6km to the west of the site.

3.6.2 Potential Impacts of the Proposed Development

Construction Phase

During the construction phase, waste will be produced from materials such as packaging materials, canteen and domestic waste. The appointed Contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

The proposed development will generate a range of non-hazardous and hazardous waste materials during site excavation and construction. However, in the absence of mitigation to reduce waste generated and ensure waste management as high up the hierarchy as possible, the effect on the local and regional environment is likely to be short-term, significant and adverse.

The power requirements for the construction phase will be relatively minor. The potential impact on utility infrastructure for the construction phase is neutral, imperceptible and short-term.

All waste waters will be collected in an enclosed holding tank within the compound and removed from site on a regular basis for final wastewater treatment by a licensed contractor. The source of a water supply will be non-potable water for the site office and service area which will be delivered and stored on site for use in the welfare facilities. Potable water will be supplied by bottled water or water cooler. The potential impact on utility infrastructure for the construction phase is neutral, imperceptible and short-term.

The potential telecommunications effects that may arise during the construction phase are likely to be due to cranes used to assemble the turbines. The potential impact on telecommunications for the construction phase is negative, not significant and short-term.

The closest airport to the Proposed Development is Shannon Airport, located ca. 16.6km west of the Proposed Development Areas. In the absence of mitigation, there is potential for adverse, significant, and long term effects on Instrument Flight Procedures as two of the nine published Instrument Flight Procedures (IFP) for flights to/from Shannon Airport are potentially impacted. In addition, the ATC-SMAC (which is used by Air Traffic Controllers to vector flights for landing into Shannon Airport) is penetrated by two of the proposed turbines. There is also potential for adverse, significant, and long-term effects the radar station at Woodcock Hill in the absence of mitigation.

Operational Phase

Once operational, it is anticipated that very small amounts of waste will be generated from staff during inspections and maintenance works. These wastes may include organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons) and non-recyclable waste. Waste fuels/oils, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently. All such waste will be stored appropriately and safely from wind, rain and wild animals that often tear apart rubbish bags. The potential effect on waste infrastructure for the operational phase is neutral, imperceptible, and long-term.

The rotating blades of wind turbines can occasionally scatter electromagnetic signals causing interference to a range of communication systems. One telecommunications link (Enet link Kilselly to ESB Kilonan) could potentially be impacted by the Project. There are no anticipated impacts to the other links assessed. In the absence of mitigation, the effect on telecommunications is likely to be long-term, significant and adverse for the Enet link Kilselly to ESB Kilonan. For all other telecommunications, the effect is likely to be long-term, imperceptible, and neutral.

The potential for aviation impacts during the operational phase arising from the Proposed Development are similar to those as set out in for the construction phase. There will be a potential significant effect on aviation from the Proposed Development during the operational phase in the absence of mitigation related to Instrument Flight Procedures and the SSR Radar at Woodcock Hill. Therefore, the potential effect on aviation for the operational phase in the absence of mitigation is adverse, significant and long-term.

Once the Proposed Development is operational it is estimated that there will be approximately 6 - 8 staff members employed occasionally on site with a similar number of vehicle trips.

During the operational phase the effect on the surrounding local highway network will be negative and long term but will be imperceptible based on a projected maximum of 16 trips to and from the site per day generated by maintenance staff.

Decommissioning Phase

During decommissioning of the Proposed Development, effects will be similar to those assessed for the construction phase. The decommissioning will be managed on a phased basis to minimise the disruption to the amenity use of the site. The effects of decommissioning will be negative and short term but will be imperceptible.

No significant impacts are anticipated on utilities, telecommunications or aviation during the decommissioning phase of the proposed development.

3.6.3 Mitigation and Residual Effects (Post-Mitigation)

Construction Phase

A Waste Management Plan (WMP) will be prepared during the construction stage and will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

Ongoing consultation with Uisce Éireann, Bord Gáis EirGrid, ESB Networks and other relevant service providers within the locality, and compliance with any requirements or guidelines they may have, will ensure a smooth construction schedule without disruption to the local residential and business community. The works contractor will be obliged to put best practice mitigation measures in place to ensure there are no interruptions to these utilities, unless this has been agreed in advance.

Extensive field survey and software modelling analysis was carried out to determine viable mitigation measures to offset the impact of the proposed turbine layout on the Enet radio link between Kilseily and Kilonan. A mitigation measure of re-routing the service into ESB Killonan from an alternative Feeder Site has been identified as a feasible mitigation option.

In agreement with the IAA and Shannon Airport a confirmatory study of the potential for impact of the proposed turbines on the Woodcock Hill Radar Surveillance Sensor will be carried out by an Aviation Design Specialist (approved by the IAA). Where upgrades are required, the Design Specialist will specify the required changes to the Woodcock Hill software and hardware to be implemented by Shannon Airport if required. A detailed conditions survey by the manufacturer will be undertaken to assist in assessing the requirements. Once the Radar upgrade has been implemented the risk will be fully mitigated. Should planning consent be granted for the Proposed Development, the Developer will liaise with the Irish Aviation Authority (as noted in the scoping response) to ensure all aviation requirements, such as a warning lighting scheme, are implemented.

Operational Phase

The implementation of the mitigation measures within will ensure that the residual impacts on material assets during the operational phase will be neutral, imperceptible and long-term*.*

3.7 Shadow Flicker

A shadow flicker assessment for the proposed Project was carried out by RSK ADAS Ltd. and is presented in **Chapter 12**.

Shadow flicker is the effect that occurs where the blades of a wind turbine cast a shadow over a window in a nearby house, and the rotation of the blades causes the shadow to flick on and off. This effect happens only in certain specific combined circumstances, and at distances greater than 10 rotor diameters (the width of the circle the wind turbine blades make) from a wind turbine, the potential for shadow flicker to occur is very low.

3.7.1 Baseline Environment

Assessments were carried out for three candidate turbines with rotor diameters of 150 m (candidate turbine 1), 149 m (candidate turbine 2) and 133 m (candidate turbine 3). In each assessment, a study area equal to 10 rotor was defined around the proposed wind turbines, beyond which the potential for shadow flicker is very low. Modelling was then carried out to predict shadow flicker at all sensitive receptors within this study area.

There are 101 sensitive receptors within the 10 rotor diameter (1,500 m) study area for candidate turbine 1; 98 sensitive receptors within the 10 rotor diameter (1,490 m) study area for candidate turbine 2; and 69 sensitive receptors within the 10 rotor diameter (1,330 m) study area for candidate turbine 3. These include residential dwellings, associated dwellings, one place of worship, sites with planning permission, and dilapidated dwellings / potential replacement opportunities.

3.7.2 Potential Impacts of the Proposed Development

3.7.2.1 Construction Phase

Shadow flicker can only occur when the blades of a wind turbine are moving. This means the turbine needs to be installed and operational. Because of this, there will be no shadow flicker effects during the construction of the Project.

3.7.2.2 Operational Phase

Results of a 'worst-case' analysis, and assuming no mitigation, are as follows:

- Candidate turbine 1: Of the 101 receptors in the study area, 56 may experience some shadow flicker. Of these, 40 may potentially experience effects for greater than 30 hours per year or 30 minutes per day.
- Candidate turbine 2: Of the 98 receptors in the study area, 55 may experience some shadow flicker. Of these, 40 may potentially experience effects for greater than 30 hours per year or 30 minutes per day.
- Candidate turbine 3: Of the 69 receptors in the study area, 43 may experience some shadow flicker. Of these, 31 may potentially experience effects for greater than 30 hours per year or 30 minutes per day.

With the incorporation of average annual sunshine in a more 'likely' scenario, no receptors are predicted to experience more than 30 hours of shadow flicker effects per year.

Due to predicted worst-case scenario shadow flicker effects at sensitive receptors exceeding 30 minutes per day or 30 hours per year, it is considered that in the absence of mitigation, the shadow flicker that would be experienced at these receptors is significant and adverse.

The 10 rotor diameter Oatfield study area was found to overlap with the 10 rotor diameter study area of one pre-planning project, Knockshanvo Wind Farm. A cumulative assessment was therefore carried out, with two scenarios assessed. Cumulative scenario 1 assumes the hub height and rotor diameter of the Knockshanvo turbines are the largest of the ranges provided, and candidate turbine 1 is used for Oatfield turbines. Cumulative

scenario 2 assumes the hub height and rotor diameter of the Knockshanvo turbines are the smallest of the ranges provided, and candidate turbine 3 is used for Oatfield turbines.

In the cumulative assessment, 13 receptors (cumulative scenario 1) or 10 receptors (cumulative scenario 2) may experience shadow flicker effects from both Oatfield and Knockshanvo turbines, with these potentially exceeding thresholds of 30 hours per year or 30 minutes per day. With the incorporation of average annual sunshine data, this is reduced to 5 receptors and 3 receptors respectively.

It is therefore considered that in the absence of mitigation, there is potential for significant, adverse cumulative shadow flicker effects.

3.7.2.3 Decommissioning Phase

Shadow flicker can only occur when the turbine blades are moving. This requires the turbine to be operational. As such, there will be no shadow flicker effects during the decommissioning phase of the Proposed Development.

3.7.3 Mitigation and Residual Effects (Post-Mitigation)

3.7.3.1 Construction Phase

As there are predicted to be no shadow flicker effects during the construction phase of the Project, there is predicted to be no need for mitigation measures.

3.7.3.2 Operational Phase

A shadow flicker control system will be installed and operated as part of the Proposed Development. Using a control system, when the conditions for shadow flicker to occur are detected, responsible turbines can be curtailed and will over the course of 1 – 2 minutes come to a stop. Through implementation and operation of this system, the Development will adhere to currently adopted Wind Energy Development Guidelines (2006) thresholds of 30 minutes per day, or 30 hours per year for both direct and cumulative effects. Should guidelines with revised limitations on shadow flicker be adopted during the planning application process for this Development, these measures can be adapted and applied to adhere to these (allowing for a short period for shadow conditions to be confirmed and for the turbines to come to a stop).

With the application of this mitigation, it is considered that there would be no significant effects related to shadow flicker from the Proposed Development.

3.8 Noise and Vibration

EIAR **Chapter 13** was prepared by Hoare Lea. This chapter addresses the likely significant noise and vibration effects of the Proposed Development on noise-sensitive receptors. Noise will be emitted by equipment and vehicles used during construction and decommissioning of the wind farm and by the turbines and substation during operation. The level of noise emitted by the sources and the distance from those sources to the receiver locations are the main factors determining levels of noise at receptor locations. Vibration effects will be localised and unlikely to be significant and so this was scoped out of the assessment.

3.8.1 Baseline Environment

The baseline noise environment in the area surrounding the Proposed Development is of low population density and is typically dominated by 'natural' noise sources such as wind disturbed vegetation and birdsong and farm animals. Other sources of noise include intermittent local road and agricultural vehicle movements in the area.

A survey has been performed to establish existing baseline noise levels at a representative selection of locations around the Proposed Development Site.

3.8.2 Potential Impacts of the Proposed Development

3.8.2.1 Construction Phase

Construction noise has been assessed by a desk-based study of a potential construction programme and by assuming the proposed development is constructed using standard and common methods. Noise levels have been calculated for receiver locations closest to the areas of work and compared with guideline and baseline values. Construction noise, by its very nature, tends to be temporary and highly variable and therefore much less likely to cause adverse effects. Factors including in particular the restrictions of hours of working have been taken into consideration. It is concluded that noise generated through construction activities would generally have negligible to minor adverse effects.

However, Horizontal Directional Drilling (HDD) may need to be undertaken at night which could represent a short-term major temporary reversible adverse effect, which is significant, in the absence of further mitigation.

3.8.2.2 Operational Phase

Operational turbines emit noise from the rotating blades as they pass through the air. This noise can sometimes be described as having a regular 'swish'. The amount of noise emitted tends to vary depending on the wind speed. When there is little wind the turbine rotors will turn slowly and produce lower noise levels than during high winds when the turbine reaches its maximum output and maximum rotational speed. Background noise levels at nearby properties will also change with wind speed, increasing in level as wind speeds rise due to wind in trees and around buildings, etc.

Noise limits have been derived from data about the existing noise environment following the method stipulated in national planning guidance. Predicted operational noise levels have been compared to the limit values to demonstrate that turbines of the type and size which would be installed can operate within the limits so derived. It is concluded therefore that operational noise levels from the wind farm will be within levels recommended in national guidance for wind energy schemes. This therefore represents a long-term permanent reversible adverse effect which is not significant.

3.8.2.3 Decommissioning Phase

De-commissioning is likely to result in less noise than during construction, due to the reduced amount of activity and traffic likely to be involved and would also not involve HDD drilling out of hours. This phase of the Proposed Development would therefore be associated with short-term minor temporary reversible adverse effects at most which is not significant.

3.8.3 Mitigation and Residual Effects (Post-Mitigation)

3.8.3.1 Construction Phase

A suite of mitigation measures have been proposed for the construction stage in line with the guidance contained within BS5228: 2009 + A1 2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1 Noise*. Various mitigation measures will be considered and applied during the construction of the proposed development to minimise the noise and vibration impacts where required.

The adoption of the identified mitigation measures will reduce the potential noise effects of construction. In particular, the potential noise impacts of out-of-hours HDD drilling would be reduced to a minor magnitude at most.

Comparing the predicted noise levels to the range of background noise levels measured around the Proposed Development suggests that the noisier construction activities could be audible at various times throughout the construction phase. However, based on the considerations presented above, the associated effects will be negligible to minor short-term temporary reversible adverse and therefore not significant.

3.8.3.2 Operational Phase

The selection of the final turbine to be installed at the site will be made on the basis of ensuring relevant noise limits as set out in **Appendix 13.1** are achieved at the surrounding residential properties.

At some locations under some wind conditions and for a certain proportion of the time, noise from the Proposed Development may be audible; however, operational noise immission levels are acceptable in terms of the relevant guidance for the assessment of wind farm noise. This therefore represents a long-term permanent reversible adverse effect which is not significant.

3.8.3.3 Decommissioning Phase

Decommissioning would still be associated with minor short-term temporary reversible adverse effects at most which is not significant.

3.9 Landscape and Visual

A Landscape and Visual Impact Assessment (LVIA) of the proposed development (**Chapter 14** of the EIAR) has been undertaken by Macroworks.

3.9.1 Baseline Environment

This assessment defines the existing landscape and visual baseline environments; assesses their sensitivity to change; describes the key landscape and visual related aspects of the proposed development; describes the nature of the anticipated changes and assesses the effects arising during construction once operational and decommissioning. The assessment findings have been informed by desk study, visualisations and Zone of Theoretical Visibility (ZTV) studies and a number of site visits.

The proposed development would introduce wind turbines into a large-scale working landscape of forestry and farmland with undulating topography, dispersed and low

density settlement pattern and a prevalence of hedges and woodland throughout the study area.

3.9.2 Potential Impacts of the Proposed Development

3.9.2.1 Construction Phase & Decommissioning Phase

Construction and decommissioning stage effects would be substantively the same. They would involve short-term activities and effects which would not be significant. The greatest effects during the construction phase would arise from the standing turbines, and large cranes used to erect these, during the final stages of construction – by which point the effects would be the same as for those during operation.

3.9.2.2 Operational Phase

From early-stage constraint studies, baseline assessments and fieldwork investigation specific to the proposed development, some of the most susceptible physical landscape receptors within the study area are considered to be the lakelands located throughout the northern extent of the central study area, the uplands in the northern extent of the wider study area and Lough Derg and the River Shannon corridor in the eastern and southern extents of the study area. Whilst there is some sensitivity associated with the elevated lands in the surrounds of the site and in the southern aspect of the central study area, this comprises a notable utilitarian character due to the extensive areas of conifer forestry, numerous major routes and telecommunication towers and radar equipment (Woodcock Hill).

With regard to visual receptors, the most sensitive visual receptors in this instance are considered to be the local residential receptors located in the immediate vicinity of the development located along the sloping landscape north and south of the site. The settlement of Broadford is a notable visual receptor in this instance due to its proximity to the northern aspect of the development and as a result of its relatively pleasant and contained location situated along the valley of the Broadford River. Other sensitive visual receptors within the central study area also include users of the East Clare Way and areas that present with a strong sense of amenity, such as Doon Lough. The central and wider study area also encompasses numerous scenic view designations (identified in the current Clare, Tipperary and Limerick County Development Plan), whilst other sensitive heritage receptors within the wider study area include Bunratty Castle and King Johns Castle, located in the southern half of the wider study area.

3.9.3 Mitigation and Residual Effects

3.9.3.1 Construction Phase

Aside from construction stage mitigation measures to minimise land and vegetation disturbance and dust emissions (which may reduce visual amenity), 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.

3.9.3.2 Operational Phase

Given the highly visible nature of commercial wind energy developments it is not generally feasible to screen them from view using on-site measures as would be the primary form of mitigation for many other types of development. Instead, landscape and visual mitigation for wind farms must be incorporated into the early-stage site selection and design phases.

In this instance, the two main forms of landscape and visual mitigation employed were:

- Mitigation by avoidance and design
- Buffering of Residential Receptors

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;
- Electricity lines between individual turbines and the substation, and the grid connection infrastructure, 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.
- The removal of areas of existing vegetation will be avoided in so far as possible.

For the proposed Oatfield Wind Farm, the minimum distance of any turbine from the nearest residential receptor is 725m, which is in excess of the draft Wind Energy Development Guidelines (2019) minimum set back of 500m and greater than the setback distance of 4 times the tip height of the proposed turbines. In this instance the setback distance for visual amenity purposes would be 720m from residential receptors on the basis of the 180m high turbines (this represents the greatest potential setback distance with regard to all potential turbines ranges).

3.10 Archaeological, Architectural and Cultural Heritage

EIAR **Chapter 15** was prepared by RSK ADAS Ltd. This chapter addresses the likely significant effects of the Proposed Development on Archaeology, Architectural and Cultural Heritage.

3.10.1 Baseline Environment

There are no World Heritage Sites, National Monuments, Architectural Conservation Areas, Protected Structures, Monuments defined in the Record of Monuments and Places and Sites and Monuments Record or historic buildings and gardens recorded by the National Inventory of Architectural Heritage located on the Site.

There is one Protected Structure, the St Vincent de Paul's Church (RPS Number 665), located within 100km of the Grid Connection Route. This Church is also a Recorded Monument (CL052-043).

There is one Architectural Conservation Area (Friary Precinct Architectural Conservation Area) and four Protected Structures (RPS Numbers 1644, 6255, 6257 and 304) located along the Turbine Delivery Route.

The Site, Grid Connection Route and Turbine Delivery Route are located in a landscape that is generally rich in potential for historic buildings and structures dating predominantly from the medieval period to the present day and for buried archaeology an earthworks dating from the Prehistoric period to the post-medieval period. There are ten Monuments defined in the Record of Monuments and Places and/or Sites and Monuments Record within 1km of the Site.

There are no World Heritage Sites or National Monuments located within 10km of the Site. There is one Protected Structure (the St Vincent De Paul's Church) located within 1km of the Site and fifteen other Protected Structures located within 5km of the Site. There is one Architectural Conservation Area (Kilkishen) located within 5km of the Site. There are eight historic structures recorded on the National Inventory of Architectural Heritage within 5km of the Site.

Within the immediate vicinity of areas where groundworks will be required on the Site, along the Grid Connection Route and along the Turbine Delivery Route the key heritage constraints have been identified as follows:

- Megalithic Wedge Tomb Recorded Monument (CL052-039) located close to the Site boundary, 286 m east of Turbine 9
- Unregistered historic 19th century buildings (in ruins) located outside of the Site boundary north of Turbine 4.
- Unregistered historic 19th century structure located immediately south of Turbine 7
- Possible remnant of unregistered historic 19th century cattle droveway in the western part of the Site
- Two likely modern clearance cairns in the substation area
- Unregistered 19th century stone bridge south-west of the St Vincent de Paul Church along the Grid Connection Route
- 19th century existing historic field boundaries across the Site and along the Grid Connection Route
- Currently unknown buried archaeological deposits and artefacts of unknown significance on the Site, along off-road sections of the Grid Connection Route and in the area of off-road groundworks required at the junction of the R4563 and the R471 along the Turbine Delivery Route.

3.10.2 Potential Impacts of the Proposed Development

3.10.2.1 Construction Phase

Potential effects on archaeological, architectural and cultural heritage features identified during the construction phase of the Proposed Development are as follows:

- **Direct effect (impact) on currently unknown buried archaeology, unregistered historic 19th century structures and unregistered historic 19th century field boundaries**: Truncation and/or removal of currently unknown buried archaeology of unknown significance, unregistered existing historic 19th century structures and unregistered existing historic 19th century field boundaries on the Site, along the Grid Connection Route and along the Turbine Delivery Route as a result of groundworks and vehicle movements during the construction phase.
- **Indirect effect (impacts) on a Megalithic Wedge Tomb Recorded Monument located 286 m east of Turbine 9**: Possible accidental damage during construction phase as a result of construction vehicle movements or inappropriate storage of materials.

Following detailed assessment of effects, taking into consideration embedded mitigation within the design of the Proposed Development, the following potentially significant effects on archaeological, architectural and cultural heritage features were identified during the construction of the Proposed Development:

- Direct loss or truncation of currently unknown buried archaeological deposits, features and artefacts of unknown significance on the Site.

3.10.2.2 Operational Phase

Potential effects on archaeological, architectural and cultural heritage features identified during the construction phase of the Proposed Development are as follows:

- **Indirect effect (impacts) on the setting of heritage assets**: Potential indirect visual effects of the Proposed Development on the settings of National Monuments, Architectural Conservation Areas, Protected Structures, Recorded Monuments and historic buildings and gardens on the National Inventory of Architectural Heritage.

The detailed assessment of effects identified no likely significant effects on the heritage significance of National Monuments, Architectural Conservation Areas, Protected Structures, Recorded Monuments and historic buildings and gardens on the National Inventory of Architectural Heritage during the operation of the Proposed Development. As such, targeted mitigation during the operational phase over and above the embedded mitigation within the Proposed Development design will not be required.

3.10.2.3 Decommissioning Phase

Potential effects on archaeological, architectural and cultural heritage features identified during the construction phase of the Proposed Development are as follows:

- **Indirect effect (impacts) on the setting of heritage assets**: Potential indirect visual effects of the Proposed Development on the settings of National Monuments, Architectural Conservation Areas, Protected Structures, Recorded Monuments and historic buildings and gardens on the National Inventory of Architectural Heritage.

The indirect visual effects of the windfarm on the settings of National Monuments, Architectural Conservation Areas, Protected Structures, Recorded Monuments and

historic buildings and gardens on the National Inventory of Architectural Heritage will likely be reversed. Therefore, no specific decommissioning phase mitigation measures are considered to be required. The residual effects of the Proposed Development on archaeological, architectural and cultural heritage features during the decommissioning phase will be not significant.

3.10.3 Mitigation and Residual Effects (Post-Mitigation)

3.10.3.1 Construction Phase

Detailed mitigation measures are outlined in EIAR **Section 15.7**, which are incorporated into the **Construction Environmental Management Plan** (CEMP) for the Proposed Development to ensure that the potential for adverse effects archaeological, architectural and cultural heritage features is minimised. With the implementation of the recommended mitigation measures, the construction phase residual effect will be not significant.

3.10.3.2 Operational Phase

Embedded design mitigation measures to minimize the indirect effects of the Proposed Development on the settings of National Monuments, Architectural Conservation Areas, Protected Structures, Recorded Monuments and historic buildings and gardens on the National Inventory of Architectural Heritage are outlined in EIAR Chapter 14. With the implementation of the recommended mitigation measures, the construction phase residual effect on heritage significance will be not significant.

3.10.3.3 Decommissioning Phase

The Proposed Development is not anticipated to have a significant effect archaeological, architectural and cultural heritage features during the decommissioning phase. The indirect visual effects of the windfarm on the settings of National Monuments, Architectural Conservation Areas, Protected Structures, Recorded Monuments and historic buildings and gardens on the National Inventory of Architectural Heritage will likely be reversed. Therefore, no specific decommissioning phase mitigation measures are considered to be required. The residual effects of the Proposed Development on archaeological, architectural and cultural heritage features during the decommissioning phase will be not significant.

3.11 Traffic and Transport

This Chapter of the EIAR evaluates the proposed project in the context of the traffic and transportation within the study area. The assessment examines potential impacts and identifies mitigations for construction, operation and decommissioning of the Proposed Development. The Chapter was prepared by Pinnacle Consulting and is presented in Chapter 16.

3.11.1 Baseline Environment

The following paragraphs provide an overview of the current baseline transport and accessibility conditions within the study area considering the following:

- pedestrian and cycle facilities and access;

- public transport accessibility; and
- the operation of the existing highway network.

Consideration is also given to the existing baseline flows where available. This analysis provides the baseline context against which the transport movements and accessibility of the Proposed Development have been assessed.

3.11.1.1 Local Highway Network

The site will be access via 2 No. site access.

Access No. 1

The accessed using the L3016 via the R471.

The L3016 is a narrow single track road providing access to agricultural lands and a number of standalone houses/farmyards.

It forms a priority-controlled junction with the R471 to the south and 'Crag' to the north.

There was no posted speed limit on the L3016, however, based on the vertical and horizontal alignment, road width and other characteristics, the 85th percentile speed is estimated at between 20km/h to 30km/h.

No facilities for pedestrians or cyclists were noted on the L3016 in the vicinity of the Proposed Development.

No public lighting was noted on the L3016 in the vicinity of the Proposed Development.

Access No. 2

The Eastern Development Area (EDA) will be accessed using an Unnamed Road via the R471.

The Unnamed Road is a single carriageway road providing access to agricultural lands and a number of standalone houses/farmyards.

It forms a priority-controlled junction with the R471 to the south and 'Crag' to the north with various junctions with local farm tracks off it.

There was no posted speed limit on an Unnamed Road but based on the vertical and horizontal alignment, road width and other characteristics, the 85th percentile speed is estimated at between 40km/h to 50km/h.

No facilities for pedestrians or cyclists were noted on the Unnamed Road in the vicinity of the Proposed Development.

No public lighting was noted on the Unnamed Road in the vicinity of the Proposed Development.

R471

The R471 is a single carriageway road that links Sixmilebridge in the west to Cloonlara in the east.

It is assumed that a speed limit of 80km/h operates along the R471 in the vicinity of the proposed development.

No facilities for pedestrians or cyclists were noted R471 in the vicinity of the Proposed Development.

No public lighting was noted on the R471 in the vicinity of the Proposed Development.

R465

The R465 is a single carriageway road that links Ardnacrusha in the south to Bodyke in the north.

It is assumed that a speed limit of 80km/h operates along the R465.

3.11.2 Potential Impacts of the Proposed Development

3.11.2.1 Construction Phase

The peak construction period would be in Month 8 of the 18-month construction program with a maximum of 76 construction vehicle movements per day, of which 47 will be HGVs and 29 will be LGVs. This results in a maximum uplift in traffic volumes as a result of construction activities of c. 5%.

These 76 movements include movements associated with the delivery of turbine equipment and the construction of the grid connection.

In accordance with IEMA Guidelines, projected changes in traffic flows of less than 10% create no discernible environmental effect.

A CTMP would require construction traffic including both construction plant and material deliveries to be programmed to avoid peak traffic periods on the surrounding local and strategic road network and minimise any effect on the local highway network, pedestrian and cycle users. No additional mitigation would be required for the construction stage.

Therefore, it is considered that residual effects to transport and access during construction would be temporary, imperceptible, adverse and not significant in EIA terms.

3.11.2.2 Operational Phase

The Proposed Development would be fully operational in 2030 and is anticipated to generate between 6 and 8 trips (12-16 two-way trips) per day.

In accordance with IEMA Guidelines, projected changes in traffic flows of less than 10% create no discernible environmental effect.

Overall, it is considered that residual effects on transport and access during operation are imperceptible, adverse and not significant in EIA terms.

No additional mitigation would be required for the operation stage.

3.11.2.3 Decommissioning Phase

The design life of the wind farm is 35 years, after which time the Applicant will decide whether the turbines will be replaced by newer more efficient turbines (which would be subject to a separate planning application) or if decommissioning will be carried out.

If the site is decommissioned, cranes will disassemble each turbine tower and all equipment.

All infrastructure including turbine components will be separated and removed off-site for re-use, recycling and waste disposal, where possible. The turbine and associated equipment will be broken down into smaller parts to allow for transport off site using standard HGVs.

It is anticipated that the turbine foundations and hard-standing areas will be left in place and covered with peat/soil/topsoil or other suitable materials.

It is proposed to leave the access roads in situ at the decommissioning stage which may allow for an amenity value to be associated with the site.

It is considered that leaving the turbine foundations, access tracks and hard-standing areas in situ will cause less environmental damage than removing and recycling them. However, if removal is deemed to be required all infrastructure will be removed with mitigation measures similar to those during construction being employed. The decommissioning will be managed on a phased basis in order to minimise the disruption to the amenity use of the sitey.

3.11.3 Mitigation and Residual Effects (Post-Mitigation)

3.11.3.1 Construction Phase

The successful completion of the Proposed Development will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction phase to minimise the effects of the additional traffic generated by the Proposed Development. A range of mitigation measures are set out in the Construction Traffic Management Plan (**Appendix 5.2 to EIAR Chapter 5: Project Description**).

During the construction phase of the, it is predicated that the additional traffic that will be created by the Proposed Development will have a moderate and short-term effect on existing road users, and will be minimised with the implementation of the mitigation measures outlined in the Construction Traffic Management Plan (**Appendix 5.2 to EIAR Chapter 5: Project Description)**.

Works required for the grid connection will require the laying of cables in the ground which will generally be installed in a trench at the side or in the corridor of the road, which will result in local, temporary delays to traffic at each site mobilisation. It is unlikely that any road closures will be required.

While traffic delays will be incurred resulting in a slight, temporary impact on local traffic, and potentially on local businesses, it is noted that only a short section of the cable route, and the trips that pass through it, will be affected each day.

3.11.3.2 Operational Phase

Due to the very low volumes of traffic forecast to be generated during this stage of the development, no mitigation measures are required.

No additional mitigation would be required; therefore, the residual operation effects remain as reported in the assessment of effects section, i.e.:

- Imperceptible, adverse effects for Pedestrian Severance, Delay, Amenity, Fear and Intimidation that are not significant in EIA terms;
- Imperceptible, adverse effects for Driver Delay that are not significant in EIA terms; and
- Imperceptible, adverse effects for Accidents and Safety that are not significant in EIA terms.

3.11.3.3 Decommissioning Phase

In the event that the wind farm is decommissioned after 35 years of operation, a decommissioning plan, including material recycling/disposal and Traffic Management Plan will be prepared for agreement with the Local Authority prior to decommissioning of the wind farm.

No additional enhancement measures would be required for the Decommissioning Phase.

Should Orsted decide to decommission the windfarm after its predicated operational life span, a Decommissioning Plan will be prepared and implemented in order to minimise the residual effects during this stage.

The decommissioning phase will employ similar mitigation measures as the construction phase.

As the expected volumes of traffic will be primarily associated with the transportation off-site of turbine components and materials only, the residual effect is considered to be slight and temporary.

3.12 Air Quality

EIAR **Chapter 17** was prepared by RSK Environment Limited. This chapter addresses the likely significant effects of the Proposed Development on local air quality during the construction, operational and decommissioning phases.

3.12.1 Baseline Environment

The principal air quality pollutants relevant to this assessment are considered to be nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). A desk-based study has been undertaken using data obtained from the (Environmental Protection Agency) EPA website.

The Ennis, Co. Clare monitoring site (Station 25) is the nearest air quality monitoring station to the development site, which is located approximately 22km to the northwest. The next nearest one is Ennistymon, Co. Clare monitoring site (TNO3947), which is approximately 45km to the northwest of the development site. Monitored air quality at Ennis, Co. Clare and Ennistymon, Co. Clare stations were used in the assessment, which saw no exceedances to the relevant air quality standards (AQSs) in 2022. Background air quality concentrations at the site are anticipated to be below the relevant AQSs.

3.12.2 Potential Impacts of the Proposed Development

3.12.2.1 Construction Phase

A qualitative construction dust assessment has been undertaken to consider potential impacts from dust nuisance from soiling and impacts on human health from particulate matter generation. The assessment defines the pre-mitigation risk of dust impacts of the activities during construction, and site-specific mitigation measures have been recommended. The risk of dust impacts from construction activities (before mitigation) is identified as ranging between low and high risk (equivalent to slight to significant effect).

The predicted construction phase traffic generation do not exceed the Design Manual for Roads and Bridges (DMRB) screening criteria. The short-term increase in vehicle emissions during construction phase is considered to be not significant.

3.12.2.2 Operational Phase

The main potential air quality impact once the development is complete and occupied is likely to be emissions from road traffic associated with the Proposed Development. A qualitative screening level assessment against the DMRB screening criteria has been undertaken to assess the additional road traffic exhaust emissions during the occupational phase. Overall, the Proposed Development is not anticipated to have a significant effect on local air quality.

3.12.2.3 Decommissioning Phase

Vehicles and generators associated with the removal of the wind turbines and associated infrastructure from the site have the potential to cause a temporary negative impact on local air quality in the short term. A qualitative assessment of decommissioning phase impacts has been undertaken. Based on the temporary nature of the decommissioning activities and low background pollutant concentrations in the vicinity of the site, it is considered unlikely that the effect of dust and particulate matter emissions and exhaust emissions from plants and vehicles during decommissioning phase will result in a significant effect on local air quality.

3.12.3 Mitigation and Residual Effects (Post-Mitigation)

3.12.3.1 Construction Phase

Detailed dust mitigation measures are outline in Section of Chapter 17.7.1, which are incorporated into the Construction Environmental Management Plan (CEMP)) for the site to ensure that the potential for adverse environmental effects on local receptors is minimised. With the implementation of the recommended construction phase mitigation measures, the construction phase residual effect is considered to be not significant.

3.12.3.2 Operational Phase

The Proposed Development is not anticipated to have a significant effect on local air quality during the operational phase. Therefore, no specific operational phase mitigation measure is considered to be required. The residual effects of the Proposed Development on air quality whilst it is in operation are considered to be not significant.

3.12.3.3 Decommissioning Phase

Any effects on air quality will be temporary during the decommissioning phase. Mitigation measures suggested for the construction phase are also relevant for the decommissioning phase to control potential fugitive emissions from the decommissioning works and exhaust emissions from plant and vehicles. With the implementation of the recommended mitigation measures, the effect of dust and particulate matter emissions and exhaust emissions generated by decommissioning phase activities is considered to be not significant.

3.13 Climate

The climate assessment for the proposed Project was carried out by Nature Positive and is presented in **Chapter 18**.

3.13.1 Baseline Environment

Biodiversity onsite varies in its carbon storage and sequestration potential. Baseline environmental conditions in relation to potential climate change impacts from the Proposed Development include existing carbon stored in the site (such as peat and forestry) that could be impacted by the Proposed Development resulting in CO_2 and other GHG emissions.

The Site is broken down into two distinct areas; the Western PDA (approximately 153 hectares) and the Eastern PDA, (approximately 139 hectares) comprising of a total land area of approximately 296 hectares which principally consists of conifer plantation, transitional woodland scrub, mixed forest, pastures, agricultural lands and peat lands.

3.13.2 Potential Impacts of the Proposed Development

Construction Phase and Decommissioning Phase

Significant GHG emissions are predicted from soil organic matter, as well as some emissions from the felling of forestry. Total projected emissions are 181,610 tCO_2e.

Any post-decommissioning site restoration and enhancement work, such as blocking drainage ditches to promote re-wetting, would be aligned with the Species and Habitat Management Plan. Such activities can incur GHG savings by promoting growth of peat or other natural carbon stores. Other management options may occur during the Habitat Management Planning stage.

Taking into account the predicted GHG emissions from wind turbine manufacture, construction and decommissioning alongside those savings from the improvement of the site, the total net GHG emissions from the Proposed Development are expected to be 176,022 tCO_2e.

Operational Phase

The operational stage of the Proposed Development has the greatest potential for GHG savings. At this stage, GHG emissions from construction activities will have ceased and operation of the turbines would generate zero-carbon electricity for the remainder of their lifespan.

The predicted emissions payback time is estimated to be 5.0 years against a representative grid mix (electricity of which the main sources of energy are identical to those used for the National Grid; this could include fossil fuels, renewable energy, etc), and 2.2 years against a fossil-fuel mix electricity generation (electricity that is sourced through the combustion of fossil fuels alone).

3.13.3 Mitigation and Residual Effects (Post-Mitigation)

It has been assumed that all activities during construction, operation and decommissioning would be conducted in accordance with good practice guidance.

Relevant guidance includes:

- Good Practice During Wind Farm Construction, NatureScot et al. (2019); and
- Life Extension and Decommissioning of Onshore Windfarms, SEPA (2016).

As no adverse effects are predicted, no additional mitigation measures are proposed.

GHG emissions will arise from the manufacture, construction and decommissioning activities, including the loss of peat and forestry, from the construction of turbines and associated infrastructure. The emissions from the construction and decommissioning phase is likely to be largely outweighed by the direct, long-term (significant) beneficial effect of operation of the wind farm upon the global climate, such that the overall net effect of the proposed development, is likely to be a significant beneficial effect. This is because the net GHG effects of the proposed development will be below zero and the project will result in a reduction in atmospheric GHG concentration. This reduction will be brought about by the displacement of fossil fuel energy sources by the renewable energy produced by the development.

3.14 Impact Interactions & Cumulative Effects

This Chapter highlights where there is potential for cumulative effects of the Proposed Development with other developments. It also considers the potential for interactions and inter-relationships between the factors of the environment that have been examined individually throughout this EIAR which could result in an impact being either positive or negative, as well as having varying levels of significance.

Chapters 6 to **19** of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Health, Shadow Flicker, Biodiversity, Birds (Ornithology), Land, Soils and Geology, Hydrology and Hydrogeology, Air and Climate, Noise and Vibration, Landscape and Visual, Archaeology and Cultural Heritage, Material Assets, Traffic and Transportation, as a result of the Proposed Development as described in EIAR **Chapter 5: Project Description**. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these effects. The result of interactive effects may exacerbate the magnitude of the effects, improve them or have a neutral effect.

3.14.1 Interactive effects

The consideration of interactive effects was an integrated part of the assessment process. The EIA coordinator and environmental specialists working on the various

environmental factors consulted each other as needed during the design process. The impact interactions are assessed as relevant within the specific environmental factor chapters and therefore, no additional assessment is included in this chapter. However, in accordance with EPA Guidance (2022), the assessment of impact interactions is summarised in this chapter in the form of a matrix.

3.14.2 Cumulative effects

SNH guidance on *Assessing the Cumulative Impacts of onshore Wind Energy Developments* (2018) describes cumulative effects as arising from two or more developments, which may be:

- Additive (i.e., multiple independent additive model);
- Antagonistic (i.e., the sum of impacts are less than in a multiple independent additive model); and
- Synergistic (i.e., the cumulative impact is greater than the sum of the multiple individual effects).

For this EIAR, assessment of cumulative effects was carried out using the following approach:

1. Identification of a list of other projects that could result in environmental effects that could result in significant cumulative effects with effects arising from the Project;
2. Identification of a shortlist of other projects;
3. Desk study for the shortlisted projects; and
4. Assessment.

3.14.3 Summary of interactive effects

This section summarises interaction and interdependencies between one factor and another. The matrix provided in **Table 3.1** provides a snapshot summary of the findings from the assessment of interacting effects, where relevant, as addressed within each of the environmental factor chapters of the EIAR.

Table 3.1 Interactive effects summary matrix

Interaction With	Pop & Human Health	Biodiversity	Birds	Hydrology/Hydrogeology	Land, Soils & Geology	Material Assets	Shadow Flicker	Noise & Vibration	Landscape & Visual	Archaeology & Cultural Heritage	Traffic & Transport	Air Quality	Climate
Population & Human Health				✓	✓	✓	✓	✓	✓		✓	✓	✓
Biodiversity			✓	✓	✓			✓			✓		
Birds		✓			✓			✓			✓		
Hydrology & Hydrogeology	✓	✓			✓						✓		
Land, Soils & Geology		✓	✓	✓						✓	✓		
Material Assets	✓										✓		✓
Shadow Flicker	✓												
Noise & Vibration	✓	✓	✓								✓		
Landscape & Visual	✓									✓	✓		
Archaeology & Cultural Heritage					✓				✓		✓		
Traffic & Transport	✓	✓	✓	✓	✓					✓		✓	✓
Air Quality	✓										✓		
Climate	✓					✓					✓		
Key: √ =Interactive Effect													

As described and assessed in the environmental factor chapters of the EIAR, during the construction phase, the Proposed Development is likely to impact on the local environment (i.e., noise, traffic disruption, dust). However, implementation of mitigation measures specified in the relevant EIAR factor chapters and summarised in EIAR **Chapter 21 Summary of Mitigation Measures**, including good site management and best construction practices as identified in the CEMP and CTMP (referenced in EIAR **Chapter 5 Project Description**) will mitigate and reduce identified impacts so as not to be significant.

The interactions between Traffic & Transport and other aspects such as Population & Human Health and Biodiversity are expected to be greatest during construction stage (refer to EIAR **Chapter 6 Population and Human Health** and **Chapter 7 Biodiversity**, respectively). Interactions between Land, Soils & Geology, Hydrology & Hydrogeology, and Traffic & Transport are also key during construction. The mitigation measures specified in the EIAR The mitigation measures specified in the EIAR **Chapter 9 Hydrology and Hydrogeology**, **Chapter 10 Land, Soils and Geology** and **Chapter 16 Traffic and Transport**, and identified in the CEMP and CTMP (referenced in EIAR **Chapter 5 Description of the Proposed Development**) are required to ensure effects are not significant.

During operation, potential interactions are considered likely in terms of Population & Human Health mainly in terms of the consideration of sensitive receptors (**Chapter 6 Population and Human Health**). A combined effect of noise (**Chapter 13 Noise and Vibration**), shadow flicker (**Chapter 12 Shadow Flicker**), disruption and change of current land use practices (**Chapter 10 Land, Soils and Geology**), and changes to visual amenity and landscape (**Chapter 14 Landscape and Visual**), can adversely affect the population in terms of current use of the area. With mitigation in place, residual effects in relation to landscape and visual amenity range from imperceptible to substantial moderate.

On the other hand, as highlighted in EIAR **Chapter 6 Population and Human Health**, research has shown that there is increasing acceptance and more positive views of wind energy in Ireland by people living, working, and visiting areas where there are wind turbines.

3.14.4 Summary of cumulative effects

3.14.5 Biodiversity

EIAR **Chapter 7 Biodiversity** notes that each additional turbine has the potential to add to potential effects on habitats and species. The following cumulative effects were identified and assessed:

- Cumulative effects on habitats:
    - Loss and fragmentation of habitats – cumulative effects are considered as not significant.
    - Habitat disturbance and pollution: with embedded mitigation, the assessment considered that there is no potential for significant cumulative effects.

- Cumulative effects on species:
    - Effects on species through habitat loss and fragmentation – with embedded mitigation, cumulative effects on plant species, Marsh Fritillary, reptiles and amphibians, terrestrial mammals (excluding bats) and aquatic species are considered not significant. Regarding potential cumulative effects on bats, the assessment considers that the constraints-led design approach has minimised the risk of disturbance, displacement and reduced habitat extent/connectivity. Significant cumulative effects through these impact pathways are not anticipated.

3.14.6 Ornithology

Cumulative effects on the River Shannon and River Fergus Estuaries SPA affecting ornithological features were assessed. EIAR **Chapter 8 Ornithology** considers that even in the context of nearby plans and projects, the Proposed Development does not have the potential to give rise to significant adverse effects on ornithological features in this SPA. In addition, cumulative effects on any Important Bird Areas (IBAs3) from the Proposed Development are considered not significant.

Bird species vary in their typical sensitivity to windfarm projects depending on the extent of habitat loss, changes in agricultural activities within the surrounding environment, and specific elements (e.g., underground/overhead cables, substation location, road/vegetation changes, turbine operation). Most bird species have additional pressures that are not affiliated with windfarm projects as a source but are considered to result in cumulative impacts where potential overlap of impact sources is possible, in accordance with the precautionary principle.

EIAR **Chapter 8 Ornithology** identified that for species with relatively larger home ranges and/or that commute long distances (e.g., raptors and waders), there is a cumulative collision risk. Results obtained from surveys carried out indicate that the Proposed Development is not situated along any regular commuting routes for birds. Kestrel was identified as being at risk of potentially significant effects with other wind farm developments. This species is relatively sedentary within the Proposed Development and adjacent land, reducing the likelihood of cumulative effects with other projects. Wider areas of suitable habitat for Kestrel and the other Key Ornithological Features will be retained within and adjacent to the Proposed Development, and the avoidance of any cumulative effects will be further assisted by adoption of the Species and Habitats Management Plan. Thus, significant cumulative displacement/barrier and collision risk effects are not anticipated.

3.14.7 Hydrology and Hydrogeology

Given the neutral residual effects identified, EIAR **Chapter 9 Hydrology and Hydrogeology** considers that the Proposed Development will not significantly contribute to the associated hydrological network in terms of water quality of the associated hydrological network.

[3] Important Bird Areas are identified by Birdlife International using internationally agreed criteria as being globally important for the conservation of bird populations.

In the event of a pollution incident (e.g., as a result of an accidental spill), the incident will likely be minor and temporary and therefore will unlikely contribute significantly to cumulative effects in the associated surface water network.

Given that potential effects of the Proposed Development on hydrogeology are likely to be localised due to the overlying peat, slow recharge rates, high run-off rates and poor yielding underlying groundwater aquifer except for local zones, the Development is not considered likely to potentially significantly contribute to cumulative effects.

3.14.8 Land, Soils and Geology

Potential effects of the Proposed Development on land, soils and geology will be localised. Therefore, the cumulative effects of the Proposed Development are not considered to vary significantly or act synergistically with other projects.

Residual cumulative effects from other nearby Wind Farms in terms of land take which is generally localised can be determined to have a slight residual effect provided mitigation measures are implemented and monitored in line with the relevant guidelines and legislation.

3.14.9 Material Assets

No significant cumulative effects were identified in relation to Material Assets.

3.14.10 Shadow Flicker

Potential cumulative effects were identified with the adjacent pre planning Knockshanvo wind farm. The proposed Knockshanvo wind farm is adjacent to the Proposed Development and comprises nine turbines with a maximum rotor diameter of 163m. The 10-rotor diameter study area overlaps with that of the Proposed Development.

A cumulative shadow flicker assessment was therefore carried out, whereby the turbines of both the Proposed Development and the Knockshanvo proposal were considered.

Given that final details of combinations of hub height and rotor diameter are not currently available, two scenarios were assessed in order to consider a potential range of shadow flicker effects:

- Cumulative scenario 1: Assumes the hub height (110.5m) and rotor diameter (163m) of the Knockshanvo turbines are the largest of the ranges provided. This results in a tip height of 192m, slightly larger than the provided turbine envelope. Candidate turbine 1 (largest rotor diameter and tip height) is assumed for the Oatfield turbines;
- Cumulative scenario 2: Assumes the hub height (102.5m) and rotor diameter (149m) of the Knockshanvo turbines are the smallest of the ranges provided. This results in a tip height of 177m, slightly smaller than the provided turbine envelope. Candidate turbine 3 (smallest rotor diameter and tip height) is assumed for the Oatfield turbines.

In the absence of mitigation measures, it is considered that the cumulative shadow flicker that would be experienced at the identified receptors is significant and adverse.

Mitigation measures to address cumulative shadow flicker will include the adoption of a shadow flicker control system to be operated to curtail Oatfield turbines should they, in combination with Knockshanvo turbines, result in exceedances of adopted Wind Energy Development Guidelines (2006) thresholds of 30 minutes per day, or 30 hours per year. The control system can be used to detect and mitigate instances of shadow flicker at any sensitive receptor if required.

No significant residual cumulative effects will remain as predicted in EIAR **Chapter 12 Shadow Flicker**.

3.14.11 Noise and Vibration

Given the localised nature of the noise effects from other construction activities, cumulative construction effects are considered to be negligible to minor, short-term, temporary, reversible adverse and not significant.

During the operational phase, the analysis determined the separation distances from other existing, proposed or consented wind farms in the area are such that cumulative effects from these wind farms would be negligible.

A cumulative operational assessment was carried out with the pre planning Knockshanvo wind farm. The assessment demonstrates that predicted cumulative operational levels do not exceed the derived noise limits, with some negligible exceptions (exceedances of derived noise limits of less than 1dB) which would be unlikely to arise in practice (as the receptors would not be downwind of all turbines). Hence the noise limits would be unlikely to be exceeded. Therefore, cumulative noise levels would still likely represent a long-term reversible adverse effect which is not significant.

Decommissioning would still be associated with minor short-term temporary reversible adverse effects at most which is not significant.

3.14.12 Landscape and Visual

In assessing cumulative effects, EIAR **Chapter 14** Landscape and Visual considers the existing baseline scenario and the potential future baseline scenario. The existing baseline scenario relates to all existing and consented developments within the study area. It does not include any developments that are proposed, under appeal or at the pre-planning stage. The potential future baseline scenario includes all existing, consented and proposed developments and developments at the pre-planning stage that have publicly accessible information.

There are two operational single turbines located in the wider southern half of the study area, whilst a consented 19 turbine development is located in the Slieve Bearnagh Mountains some c. 4km north of the site. Over 58% of the study area has the potential to afford views of the Proposed Development in combination with other existing and consented developments.

There is also some potential for sequential cumulative visual impacts to occur along the R465 regional road scenic route located north of Broadford.

In considering cumulative effects, the findings indicate that there will be a clear reduction in the potential for isolated views of the Proposed Development. As outlined in EIAR **Chapter 14 Landscape and Visual**, the Proposed Development and proposed

Knockshanvo developments are likely to be perceived as one larger scale development situated across the underlying elevated hills west of the settlement of Broadford. Whilst the combined developments will result in a marked intensity of development in the local landscape and on the surrounding hillsides, the addition of the proposed Knockshanvo development will fill the existing gaps between the western and eastern aspects of the Proposed Development turbine array and will likely present as one consolidated wind farm development along the broad ridge. The turbines in both proposed developments will also be of a similar scale, which reduces the potential for any sense of scale conflict to occur and results in a more comprehensible combined view of the two developments. Nevertheless, the combination of both proposed developments will result in wind farm development becoming one of the more characteristic features in this elevated landscape context.

Other developments considered in EIAR **Chapter 14 Landscape and Visual i**nclude:

- The proposed Ballycar development. This is located along sloping lands facing north towards the Proposed Development and will often be viewed in combination with the Proposed Development, especially from receptors located within the valley between the proposed site and Woodcock Hill.
- The proposed Fahy Beg and Lackareagh Wind Farms are situated to the east of the site and are afforded a clear degree of separation from the Proposed Development. They are located along the Slieve Bearnagh foothills, some 5.5km east of the site. Nonetheless, there will still be some clear opportunities to afford combined views of the Proposed Development and the proposed Fahy Beg and Lackareagh developments. They will contribute to a notable increase in the intensity of wind farm development in this aspect of the study area, albeit they will present as distinctly separate developments to the Proposed Development turbines.
- Sequential cumulative effects: There will be a notable increase in the intensity of these effects in the potential future baseline scenario when compared to the existing baseline scenario.

Overall, should all of the proposed developments within the study area be permitted and constructed, it is considered that the Proposed Development will contribute to a cumulative effect in the order of High-medium in the potential future baseline scenario.

3.14.13 Archaeology and Cultural Heritage

EIAR **Chapter 15 Archaeology and Cultural Heritage** considers the cultural heritage landscape in its cumulative assessment and refers to the findings in EIAR **Chapter 14 Landscape and Visual**. The following summarises the findings when considering the existing baseline scenario:

- There will be no additional cumulative indirect effect on the setting of World Heritage Sites or National Monuments.
- The overall likely cumulative effect on the settings of all Architectural Conservation Areas, Protected Structures and National Inventory of Architectural Heritage Sites is likely to be moderate adverse (an effect

that alters the character of the historic environment in a manner that is consistent with existing and emerging baseline trends).

- The overall likely cumulative effect on Recorded Monuments will be neutral.
- The overall likely cumulative effect on unregistered buildings, earthworks and field boundaries of heritage interest will be slight adverse (an effect which causes noticeable changes in the character of the historic environment without affecting its sensitivities).

When considering the potential future baseline scenario, as identified also in EIAR **Chapter 14 Landscape and Visual**, one of the most notable differences is the clear reduction in the potential for isolated views of the proposed Oatfield Wind Farm to be afforded.

A cumulative effect is predicted during the construction phase of the GCR as the Carrowngowan Wind Farm Project's GCR will intersect that of the Proposed Development for a length of approximately 150m along the R471.

During the operational phase, it is considered that there will be no additional cumulative indirect effect on the setting of World Heritage Sites or National Monuments.

The overall likely cumulative effect on the settings of all Architectural Conservation Areas (ACAs), Protected Structures and National Inventory of Architectural Heritage Sites is likely to be Significant.

The overall likely cumulative effect on Recorded Monuments will likely remain neutral. The overall likely cumulative effect on unregistered buildings, earthworks and field boundaries of heritage interest may be moderate adverse. This will primarily be due to potential cumulative loss of unregistered upland field boundaries, trackways and currently unknown buried archaeology in the locations of the windfarm developments.

Any adverse significant effects identified on the settings of heritage assets would be reversed by the decommissioning of the Proposed Development.

Mitigation measures will include:

- 50m Buffer around the monument and a visual barrier to be erected demarcating the extent of the buffer zone on the ground during the construction phase;
- Preservation in situ. Buffer to be placed around these historic buildings and visual barrier to be erected demarcating the extent of the buffer zone on the ground during construction;
- Photographic and written recording of the features prior to removal.
- Licensed archaeological monitoring of any open cut trenching outside of the existing modern public road and also along the section of the public road adjacent to the St Vincent de Paul Church recorded monument. Field boundaries should be preserved in situ where possible and the cable trench for off road sections should be aligned through existing gaps of field boundaries to minimize loss of field boundaries.
- Preservation in situ of historic bridge.

- Licensed archaeological monitoring of groundworks across this bridge.

3.14.14 Traffic and Transportation

The Fahybeg wind farm was identified as potentially resulting in cumulative effects on traffic and transportation with the Proposed Development.

Whilst there would be an increase in traffic resulting from the cumulative schemes during each stage of the project, overall, there are no significant effects anticipated as a result of the cumulative impacts and therefore no mitigation is proposed.

3.14.15 Air Quality

The phasing/commencement of any other permitted developments in the locality could potentially result in the scenario where a number of other construction sites are in operation at the same time as the Proposed Development. The IAQM construction phase methodology states that beyond 250m from a site boundary, the risk of impact from activities carried out on-site during the construction phase can be considered to be negligible. All permitted developments are expected to agree and follow site specific Construction Environmental Management Plans or Dust Management Plans and Construction Traffic Management Plans that will adequately control emissions from construction.

Chapter 17 identifies that there are no significant residual cumulative effects at any of the project phases.

3.14.16 Climate

As identified in EIAR **Chapter 18 Climate**, the Proposed Development makes an important contribution to securing the quick deployment required by the Republic of Ireland's Government's emissions reductions ambitions for 2030. The Proposed Development also assists in meeting the Republic of Ireland's Government's target of securing an overall ambition of 8GW of installed onshore wind capacity in the Republic of Ireland by 2030, as set out in the Climate Action Plan 2021: Securing Our Future.

Any other wind-based energy generation projects in Clare County Council and the Republic of Ireland would be highly likely to result in total emissions savings by offsetting fossil fuel contributions to grid electricity. The GHG savings would thus outweigh total losses and the cumulative effects from these existing and potential wind farm developments would be Significantly Beneficial, contributing towards climate change mitigation.

3.15 Summary of Mitigation & Next Steps

3.15.1 Mitigation Measures

Chapter 21 of the EIAR presents a summary of mitigation measures identified in each environmental factor assessment chapter. The mitigation measures are the environmental commitments for construction and implementation of the proposed development. The final CEMP must take account of all the mitigation measures and any conditions of a planning consent if granted.

3.16 Availability of the EIAR

The EIAR can be accessed through the below options:

1. Via the Department of Housing, Local Government and Heritage's EIA Portal, which will provide a link to the planning application on the planning authority's website. The EIA Portal can be accessed at:
    - https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1.%20.
2. Via in person viewing at Clare County Council's planning or at An Bord Pleanála's offices.
3. Via download of the EIAR documents at:
    - www.oatfieldplanning.ie.

Information about the Proposed Development, including updates on the consenting process, will be provided at https://orsted.ie/renewable-energy-solutions/oatfield.

The EIAR may be inspected free of charge and copies of same purchased by any member of the public during normal opening hours at the following addresses:

- The Offices of An Bord Pleanála, 64 Marlborough Street, Dublin 1.
- Clare County Council Planning Department, New Road, Ennis, Co. Clare, V95DXP2.