1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by McCarthy Keville O'Sullivan Ltd. (MKO) on behalf of Bord na Móna Powergen Ltd., as part of an application for planning permission for the construction of a wind energy development and all associated infrastructure (the Proposed Development) located within the Ballivor Bog Group on the border of Counties Meath and Westmeath. The Proposed Development will comprise 26 No. wind turbines (10 in County Meath and 16 in County Westmeath), with a tip height of 200 metres (m) above the top of the foundation. The proposed wind farm will have a total Megawatt Export Capacity (MEC) in the range of 117MW – 169MW. The Proposed Development meets the threshold for Infrastructure Development set out in the Seventh Schedule of the Planning and Development Acts 2000 to 2022 and is therefore being submitted directly to An Bord Pleanála as a Strategic Infrastructure Development (SID) in accordance with Section 37E of the Planning and Development Acts 2000 to 2022.

The Proposed Development, known as Ballivor Wind Farm, will be located on Ballivor bog, Carranstown bog, Bracklin bog, Lisclogher bog and agricultural land adjacent to Bracklin bog.

The 'Application Site' which comprises the proposed wind farm site and two areas of temporary accommodating works along the haul route is illustrated on Figure 1-1.

The 'Wind Farm Site Boundary' for the purposes of this EIAR corresponds with the red-line boundary of the wind farm site proper and encompasses an area of approximately 1,170 hectares. This is illustrated on Figure 1-2.

The Wind Farm Site Boundary measures approximately 9 kilometres (km) in length from north to south and approximately 6 km from east to west, at its widest point with a topography range between 70 metres above ordnance datum (m AOD) at its lowest point to approximately 79 m AOD at its highest point. The closest settlements to the site are Delvin located 5km north, Raharney, 4km west and Ballivor, 3.5km east of the site. The townlands within which the Proposed Development falls are listed in Table 1-1.

Table 1-1 Townlands within which the Proposed Development is located.

Wind Farm Site	
Bracklin	Craddanstown
Clondalee More	Derryconor
Clonleame	Grange More
Clonmorrill	Killagh
Clonycavan	Lisclogher Great
Cockstown	Riverdale
Coolronan	Robinstown
Haul Route Temporary Accommodating Works Areas	
Moyfeagher	Doolystown

The landcover within the Wind Farm Site Boundary is a mixture of bare cutaway peat, re-vegetated bare peat, degraded blanket bog, scrub, low woodland and remnants of high bog. Approximately 18.9km of Bord na Móna permanent fixed gauge rail lines can be found running through Ballivor, Bracklin and Carranstown Bogs.

Current activities onsite include site management and environmental monitoring as required under Integrated Pollution Control (IPC) Licence P0-501[1] from the Environmental Protection Agency (EPA) and temporary wind measurement (via a single 100m meteorological mast on Lisclogher Bog). Active peat extraction under IPC Licence No. 501 ceased in 2020. However, previously extracted stockpiled continues to be removed off the bogs. This is expected to be completed by 2024. Condition 10 of the IPC licence instructs the Applicant to produce draft peatland rehabilitation plans for each bog of the Derrygreenagh Bog Group, within which the Wind Farm Site Boundary is located, upon cessation of peat extraction. These draft plans will be agreed by the EPA prior to implantation. Please see Appendix 6-6 for the draft Cutaway Bog Decommissioning and Rehabilitation Plans for Ballivor, Bracklin, Carranstown and Lisclogher Bogs.

The Peatland Climate Action Scheme (PCAS) was carried out at Carranstown East, adjacent to the Wind Farm Site Boundary. This form of enhanced peatland rehabilitation which is above and beyond what is required under IPC licence was completed in 2022. Bracklin West, also adjacent to the Wind Farm Site Boundary has been selected for PCAS and it is expected to commence in 2023. This accelerated form of peatland rehabilitation has also been successfully implemented at the recently constructed Cloncreen wind farm. The PCAS scheme is supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC). Please see https://www.bnmpcas.ie/ for details. The National Parks and Wildlife Service (NPWS) acts as the Scheme regulator and there is ongoing engagement with the EPA. This scheme is in addition to the IPC licence requirements and therefore does not form part of the proposed Ballivor Wind Farm application.

The Wind Farm Site Boundary is surrounded by Bord na Móna landholdings, forestry, agricultural land, cutover and cutaway peatland, one-off rural housing and small village settlements. Adjacent to the northern boundary of Bracklin bog is the Bracklyn Wind Farm (Planning Reference PA25M.311565) comprising 9 no. turbines with a tip height of 185m. This development received planning consent in July 2022.

Bord na Móna have made an application to apply for leave for a substitute consent (LS17.311646) without prejudice, for the lands upon which and surrounding the proposed Ballivor wind farm development. The substitute consent application seeks/will seek to regularise the planning status of the historic peat extraction activity on those lands.

Electricity grid infrastructure in the area includes the 110kV Mullingar to Corduff overhead line that traverses the Proposed Development site at Carranstown Bog.

A cumulative impact assessment and relevant mitigation measures are set out within each of the chapters of this EIAR.

[1] *Integrated Pollution Control Licence P0-501 issued by Environmental Protection Agency for Derrygreenagh Bog Group available at: https://epawebapp.epa.ie/terminalfour/ippc/ippc-view.jsp?regno=P0501-01*

Map Legend

Application Site Boundary

N

Drawing Title

Application Site Boundary

Project Title

Proposed Ballivor Wind Farm

Drawn By	Checked By
DOS	KM
Project No.	**Drawing No.**
191137	Figure 1-1
Scale	**Date**
1:60,000	2023-03-01

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1.2 Legislative Context

On the, April 5th, 2022, An Bord Pleanála determined that the Proposed Development falls within the scope of Strategic Infrastructure Development under Section 37A of the Planning and Development Acts 2000 to 2022.

The consolidated European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), has been transposed into Irish planning legislation by the Planning and Development Acts 2000 to 2022 and the Planning and Development Regulations 2001 to 2022. The EIA Directive was amended by Directive 2014/52/EU which has been transposed into Irish law with the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). Most of the provisions of the new regulations came into operation on the 1st of September 2018 and a number of other provisions came into operation on the 1st of January 2019.

The European Union Directive 2011/92/EU, amended by EU Directive Guidance on the preparation of the on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), requires Member States to ensure that a competent authority carries out an assessment of the likely significant effects of certain types of project, as listed in the Directive, prior to development consent being given for the project. The Environmental Impact Assessment (EIA) of the proposed project will be undertaken by An Bord Pleanála, as the competent authority.

Article 5 of the EIA Directive as amended by Directive 2014/52/EU provides where an EIA is required, the developer shall prepare and submit an environmental impact assessment report (EIAR). The information to be provided by the developer shall include at least:

a) *a description of the project comprising information on the site, design, size and other relevant features of the project;*
b) *a description of the likely significant effects of the project on the environment;*
c) *a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*
d) *a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;*
e) *a non-technical summary of the information referred to in points (a) to (d); and*
f) *any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.*

In addition, summarised below is the information to be contained within an EIAR as per Annex IV of EU Directive 2014/52/EU:

a. *Description of the project;*
b. *A description of the reasonable alternatives;*
c. *A description of the relevant aspects of the current state of the environment;*
d. *A description of the factors specified in Article 3(1) likely to be significantly affected by the project;*
e. *A description of the likely significant effects of the project on the environment;*
f. *A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment;*
g. *A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment;*

h. *A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters;*
i. *A non-technical summary; and*
j. *A reference list detailing the sources used for the descriptions and assessments included in the report.*

MKO was appointed as environmental consultant on the proposed project and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive as amended by Directive 2014/52/EU, and Schedule 6 of the Planning and Development Act 2000 (as amended).

Pursuant to section 172(1)(a)(ii) of the Planning and Development Act 2000 (as amended), Part 2 of Schedule 5 of the Planning and Development Regulations 2001, as amended, identifies classes and scales of development that require Environmental Impact Assessment (EIA). The relevant class of development in this case relates to "*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*", as per Item 3(i) of Part 2 of the Schedule. The Proposed Development exceeds 5 Megawatts in scale and proposes more than 5 turbines, and therefore is subject to EIA.

In addition to the above, the Proposed Development design includes for elements which would normally require an Environmental Impact Assessment (EIA) as set out in Schedule 5 Part 2 of the Planning and Development Regulations 2001 to 2022. These relevant class(es) of development are listed in Table 1-2 below.

Table 1-2 Other classes of development which require an EIA as listed in Schedule 5 of the Planning and Development Regulations 2001-2022, relevant to the Proposed Development

Schedule 5 Part 2 of Planning and Development Regulations 2001-2022	Proposed Ballivor Wind Farm Development
Item 2. Extractive Industry (b) '*Extractions of stone, gravel, sand or clay where the area of extraction would be greater than 5 hectares'*	The Proposed Development design includes for borrow pits of a total area greater than 5 hectares for the purpose of aggregate material, and therefore is subject to EIA. Schedule 6 to the Planning and Development Act 2000 to 2020 sets out the information to be contained in an EIAR, with which this EIAR complies
Item 10 Infrastructure Projects (dd) '*All private roads which would exceed 2000m in length'*	The Proposed Development design includes for 28km of new internal tracks, and therefore is subject to EIA. Schedule 6 to the Planning and Development Act 2000 to 2020 sets out the information to be contained in an EIAR, with which this EIAR complies

1.2.1 Strategic Infrastructure Development Legislative Thresholds & Determination Criteria

The current Strategic Infrastructure Development (SID) thresholds for wind energy are set out in the 7th Schedule of the Planning and Development Act 2000 (as amended). The relevant threshold established in the 7th Schedule for the current project is *"An installation for the harnessing of wind power for energy production (a wind farm) with more than 25 turbines or having a total power output greater than 50MW".* The proposed wind farm development will have a power output in excess of 117MW and therefore exceeds the generating capacity threshold specified in the 7th Schedule. In addition to this, the project must satisfy one or more of criteria (a), (b) and (c) set out in Table 1-3 below. as mentioned above, An Bord Pleanála determined the project to satisfy criteria 37A2 (a), (b) and (c) required to qualify as a Strategic Infrastructure Development in April 2022. Please see Table 1-3 below.

Table 1-3 Qualifying criteria for a project to fall under SID according to Section 37A(2) of the Act

Criteria which the project must satisfy under Section 37A(2) (a), (b), and (c) of the Act	Proposed Ballivor Wind Farm Development
a) *The development must be of strategic economic or social importance to the State or the Region in which it would be situate*	Due to the scale of the proposal the project is of strategic economic and social importance to the region and the state. The capital investment required for a project of the scale proposed (approximately 100 to 150 million euro), when combined with the commercial rates, contributions, community gain proposals, infrastructure improvements and employment generation associated with the construction and operation of the Proposed Development, will cumulatively represent a significant economic contribution, and which will be of social importance, the Region and the State as a whole
b) *The development would contribute substantially to the fulfilment of any of the objectives in the National Planning Framework or in any Regional Spatial and Economic Strategy in force in respect of the area or areas in which it would be situate*	The Proposed Development is in accordance with the promotion of sustainable energy development as set out in provisions of the National Planning Framework ('NPF') and the provisions of the Regional Spatial and Economic Strategy for the Northern and Western Regional Assembly (RSES). The proposal will significantly contribute towards the transition to a Low Carbon and Climate Resilient Society, which forms National Strategic Outcome no. 8 of the NPF. The NPF states the Government will address environmental and climate challenges through the following overarching aims as listed under 'Resource Efficiency and Transition to a Low Carbon Economy': › Sustainable Land Management and Resource Efficiency; › Low Carbon Economy; › Renewable Energy; and › Managing Waste.

	The Proposed Development is also in accordance with, and will contribute to, the fulfilment of National Policy Objective 55: › *"Promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050".* The RSES has set 16 Regional Strategic Outcomes (RSOs) which are aligned with international, EU and national policy. RSO 9 states the following: ***9. Support the Transition to Low Carbon and Clean Energy*** *Pursue climate mitigation and line with global and national targets and harness the potential for a more distributed renewables focused energy system to support the transition to a low carbon economy by 2050* RPO 7.36 of the strategy is also supportive of additional on-shore wind energy and states: *'Planning policy at local authority level shall reflect and adhere to the principles and planning guidance set out in the Department of Housing planning and local government publications relating to wind energy development and the DCCAE code of practice for wind energy development in Ireland on guidelines for community engagement and any other guidance which may be issued in relation to sustainable energy production.'* The Strategy also supports the provision of ancillary electrical infrastructure which facilitates the increased penetration of renewable energy onto the national grid, RPO's 10.19, 10.20 and 10.22 refer. Accordingly, the development as proposed will contribute substantially to the fulfilment of objectives within the NPF and RSES which are currently in place, and in the opinion of MKO fully satisfies the criteria set out in Section 37A(2)(b) of the Act.
c) *The development would have a significant effect on the area of more than one planning authority.*	The Proposed Development comprises lands within both County Meath and County Westmeath, with project infrastructure being proposed within the functional area of both these local authorities.

The EIAR provides information on the receiving environment and assesses the likely significant effects of the Proposed Development on it and proposes mitigation measures to avoid or reduce these effects. The function of the EIAR is to provide information to allow the competent authority to conduct the Environmental Impact Assessment (EIA) of the proposed project.

All elements of the project (including the wind turbines, meteorological masts and associated infrastructure, substation, grid connection and turbine delivery route) have been assessed as part of this EIAR.

1.3 EIAR Guidance

The Environmental Protection Agency (EPA) published its *'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, 2022), which is intended to guide practitioners preparing an EIAR in line with the requirements set out in the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

In preparing this EIAR regard has also been taken of the provisions of the '*Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*', published by the Department of Housing, Planning and Local Government (DHPLG) in August 2018 to the extent these guidelines are relevant having regard to the enactment of the revised EIA Directive.

The Office of the Planning Regulator (OPR) Practice Note 01 – EIA Screening (June 2021) and the accompanying Template Screening form were considered as part of the preparation of this EIAR. The OPR Practice Note 02 – AA Screening for Development Management and the associated Template Screening form were considered during preparation of the NIS.

The European Commission also published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including '*Guidance on Screening*', '*Guidance on Scoping*' and '*Guidance on the preparation of the Environmental Impact Assessment Report*'. MKO has prepared this EIAR in accordance with these guidelines.

1.3.1 Wind Energy Development Guidelines for Planning Authorities

The relevant considerations under the '*Wind Energy Development Guidelines for Planning Authorities*' (Department of the Environment, Heritage and Local Government (DOEHLG), 2006) have also been taken into account during the preparation of this EIAR.

The '*Wind Energy Development Guidelines for Planning Authorities*' (DoEHLG, 2006) are currently the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments are outlined in the document '*Proposed Revisions to Wind Energy Development Guidelines 2006 – Targeted Review*' (December 2013), the '*Review of the Wind Energy Development Guidelines 2006 – Preferred Draft Approach'* (June 2017), and the Draft Revised Wind Energy Development Guidelines (December 2019). A consultation process in relation to the 2019 document concluded on the 19th of February 2020. It should be noted that the proposed Ballivor wind energy design complies with the current adopted 2006 guidelines which requires a minimum 500m set back distance from residential properties and the current draft 2019 guidelines which requires a four times tip height set back from residential properties.

On the 21st December 2022, the Department of the Environment, Climate and Communications published the 'Climate Action Plan 2023' which states that new wind energy guidelines will be drafted in 2023 and finalised in 2024.

Notwithstanding this, however, due to the timelines associated with the planning process for renewable energy projects and the commitment within the Climate Action Plan 2023 to publish new draft guidelines in 2023 and final guidelines 2024, it is possible that the new guidelines are adopted during the consideration period for the current Proposed Development . Towards this end it is anticipated that the Proposed Development will be capable of adhering to the relevant noise and shadow flicker standards albeit without sight of the final, adopted guidelines the processes by which the Proposed Development will comply with the same cannot be confirmed at this stage.

1.3.2 Guidance document on wind energy developments and EU nature legislation (EC, 2020)

This document provides an update of the 2011 Commission guidance on wind energy and Natura 2000, as planned in the action plan for nature, people and the economy. An update of the guidance was considered necessary as EU policy and legislation on renewable energy and wind energy technology (especially at sea) has developed greatly since the guidance was first issued. In step with these developments, knowledge on the impacts of wind energy on biodiversity as well as good practice for addressing these impacts has also expanded significantly. In view of further significant expansion of wind energy in the context of tackling climate change on the one hand and growing pressures on biodiversity on the other hand, guidance based on the most recent insights and good practices on reconciling the respective policy goals and targets was considered by the Commission to be essential.

1.4 The Applicant and Project Background

The applicant for the Proposed Development is Bord na Móna Powergen Ltd. a subsidiary of Bord na Móna plc.

Bord na Móna plc is a publicly owned company, originally established in 1946 to develop and manage some of Ireland's extensive peat resources on an industrial scale, in accordance with government policy at the time. Bord na Móna's lands extend to approximately 80,000 hectares in total and are located mainly in the Irish midlands. Bord na Móna currently manages and operates a portfolio of thermal and renewable assets, namely Edenderry Power Plant a peat/biomass co-fired electricity generating unit, Cushaling peaking plant, Cloncreen Bellacorick, Mountlucas, Bruckana and Oweninny wind farms, Derrinlough windfarm (under construction), Timahoe North solar farm and the Drehid landfill gas facility.

In 2015, Bord na Móna published its 'Sustainability Statement 2030', which sets out the company's commitment to transition to peat-free electricity generation by 2030. Renewable energy generation, including solar power, biomass and wind power, is a key component of this transition. In October 2018, Bord na Móna announced its strategy to decarbonise, accelerating moves away from its traditional peat business into renewables, resource recovery and new sustainable businesses. Bord na Móna's target is for a 80% reduction in carbon emissions by 2030 based on 2015 levels and to accelerate the development of renewable energy by providing up to 2GW of renewable energy generating assets by 2030 in support of national climate and energy policy targets.

Bord na Móna has a long track record of developing energy projects, dating back to the development of the first generation of peat-fired power stations. In recent times, the business has gone through radical change, announcing the new "Brown to Green" strategy, committing to the cessation of peat harvesting, and focusing on developing climate solutions in renewable energy, sustainable waste management, carbon storage and biodiversity conservation. A key objective of this strategy involves using the land to continue to underpin Ireland's energy independence by developing green, sustainable energy sources to assist with Ireland's commitment to achieve 70% renewable electricity by 2030.

1.4.1 Brief Description of the Proposed Development

The Proposed Development will comprise 26 No. wind turbines and all associated site development works. The proposed turbines will have a blade tip height of 200 metres above the top of the turbine foundation. The Proposed Development will also provide public amenity walks and car parking. The applicant is seeking a ten-year planning permission for the following:

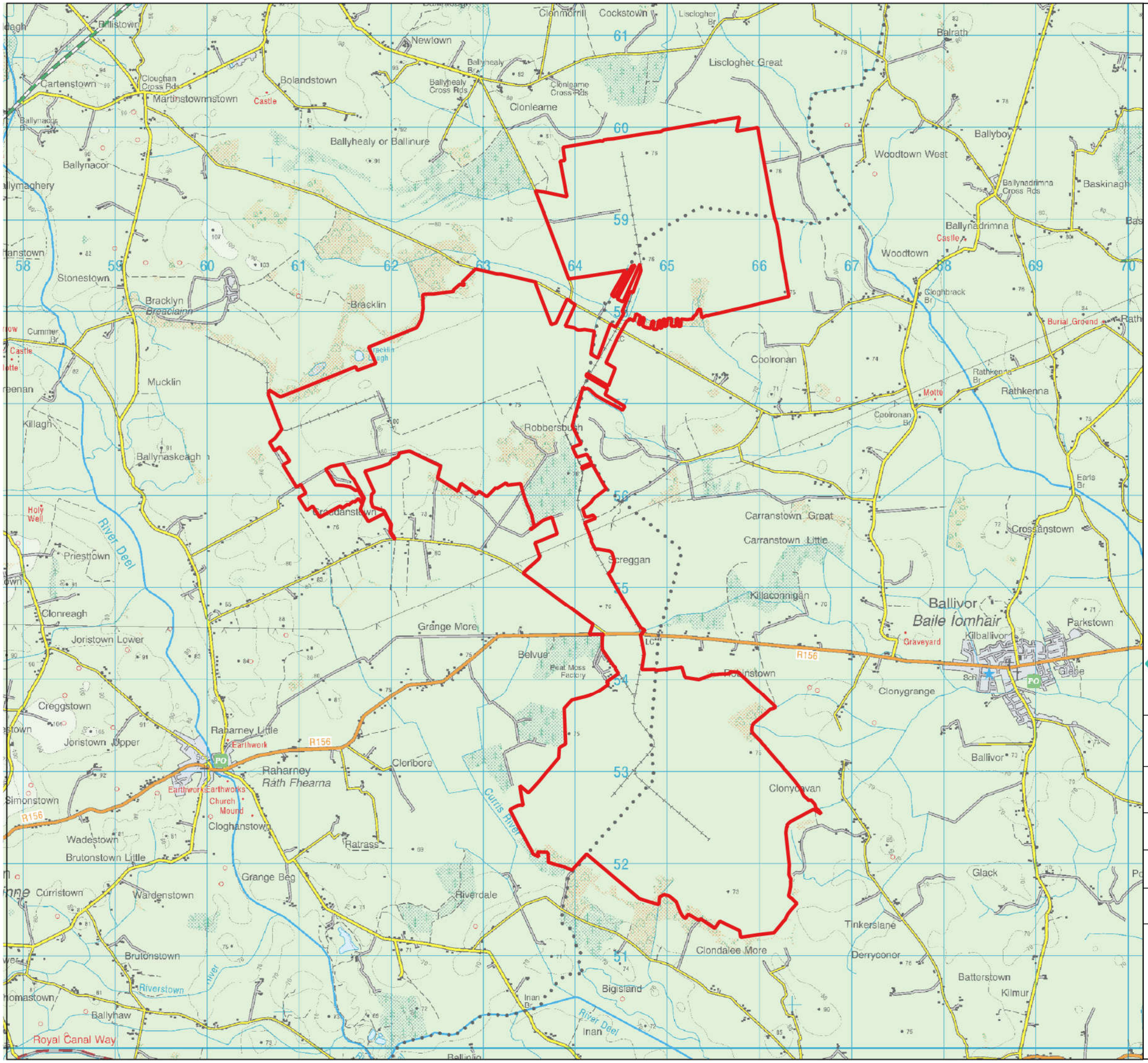
i. *26 No. wind turbines with a blade tip height of 200m and all associated hard-standing areas.*
ii. *2 No. permanent Meteorological Anemometry Masts with a height of 115 metres and removal of existing meteorological mast.*
iii. *4 No. temporary construction compounds, in the townlands of Bracklin and Grange More.*
iv. *5 No. temporary security cabins at the main construction site entrances as well as at a number of access points around the site, in the townland of Killagh, Grange More and Coolronan.*
v. *2 No. borrow pits located in Carranstown Bog, and in third party land in the townland of Craddanstown; All works associated with the opening, gravel and spoil extraction, and decommissioning of the borrow pits.*
vi. *1 No. 110 kV electrical substation, which will be constructed in the townland of Grange More. The electrical substation will have 2 No. control buildings, a 36 metre high telecom tower, associated electrical plant and equipment, a groundwater well and a wastewater holding tank. All associated underground electrical and communications cabling connecting the turbines and masts to the proposed electrical substation, including road crossings at R156 and local road between Lisclogher and Bracklin Bogs, and all works associated with the connection of the proposed wind farm to the national electricity grid, which will be to the existing Mullingar – Corduff 110 kV overhead line via overhead line.*
vii. *Provision of new internal site access roads with passing bays measuring a total length of 28km and provision/upgrade of existing/new pathways for amenity uses measuring a total length of approximately 3.3km and associated drainage.*
viii. *Temporary accommodating works to existing public road infrastructure to facilitate delivery of abnormal loads at locations on the R156 and R161 in the townlands of Doolystown and Moyfeagher;*
ix. *Accommodating works to widen existing site entrances off the R156 into Ballivor and Carranstown Bogs and reopen entrances at Lisclogher and Bracklin Bogs for use as construction site entrances and to facilitate delivery and movement of turbine components and construction materials; Entrances will be used for maintenance and amenity access during the operational period;*
x. *Permanent vertical realignment of the R156 in the vicinity of the site entrance to achieve required sight lines.*
xi. *Construction of permanent site entrances off a local road into Lisclogher and Bracklin Bogs to facilitate a crossing point for turbine components and construction materials and operation/amenity access;*
xii. *Provision of amenity access using existing entrances off the R156 and local roads in the townlands of Bracklin, Coolronan, Clondalee More and Craddanstown;*
xiii. *3 No. permanent amenity carparks in Ballivor Bog (50 car parking spaces), Carranstown (15 car parking spaces) and Bracklin Bog (15 car parking spaces) and the provision of bicycle rack facilities at each location.*
xiv. *All associated site works and ancillary development including access roads, amenity pathways, and signage.*
xv. *A 10-year planning permission and 30-year operational life from the date of commissioning of the entire wind farm.*

Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the Proposed Development, will have an operational lifespan greater than or equal to 30-years.

The layout of the Proposed Development has been designed taking account of the various constraints presented by the site and its hinterland. In addition, a significant minimum separation distance from the nearest house of 815 metres has been achieved. The constraints mapping process is outlined in Chapter 3 of this EIAR.

As mentioned, the 'Wind Farm Site Boundary' for the purposes of this EIAR corresponds with the red-line boundary of the wind farm site proper and encompasses an area of approximately 1,170 hectares. This is illustrated on Figure 1-2. In some cases, the study area extends beyond the red-line boundary depending on the requirements of individual assessments. Where this occurs, the extent of the study area will be detailed in the relevant chapter, as required. The proposed permanent footprint of the Proposed Development measures approximately 32.4 hectares, which represents approximately 1.8% of the Wind Farm Site.

The Wind Farm Site Boundary in aerial format is illustrated on Figure 1-3. The potential significant effects of all elements of the proposed project, including grid connection, have been assessed as part of this EIAR. The Proposed Development is described in detail in Chapter 4 of this EIAR.



Map Legend

Site Boundary

Drawing Title	Wind Farm Site Boundary
Project Title	Proposed Ballivor Wind Farm
Drawn By: DOS	Checked By: KM
Project No.: 191137	Drawing No.: Figure 1-2
Scale: 1:40,000	Date: 2023-03-01

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Map Legend

Site Boundary

N

Drawing Title

Wind Farm Site Boundary (Aerial)

Project Title

Proposed Ballivor Wind Farm

Drawn By	Checked By
DOS	KM
Project No.	**Drawing No.**
191137	Figure 1-3
Scale	**Date**
1:40,000	2023-03-01

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Vehicular access to the internal road network will be only for maintenance and service vehicles. The entrance to the internal roads will be locked when not in use for this purpose. Appropriate sightlines and turning areas will be maintained for service and maintenance.

The proposed wind farm will require approximately 30 km of internal road network that will have a dual function of providing access for service and maintenance vehicles, and amenity trails for the general public. In addition to this, 3.3km of new/upgraded dedicated amenity paths will be provided. A public car park with 50 spaces will be provided on the northern edge of Ballivor bog for amenity use. Two further amenity car park with 15 spaces each will be provided in the northeast of Bracklin Bog and in Carranstown Bog. Each car park will also provide bicycle rack facilities for those who want to cycle to the area and then utilise the amenity loops for walking. See Appendix 4-4 Ballivor Wind Farm Amenity Plan.

As part of condition 10 attached to Bord na Móna's IPC licence (Ref. P0501-01) decommissioning and habitat rehabilitation work is currently being carried out on the site. The areas within the redline and outside of the windfarm footprint will be rehabilitated to aid regeneration of natural habitats. This will involve blocking drains where possible and planting where required. See Appendix 6-6 for details of the Cutaway Bog Decommissioning and Rehabilitation Plans (2022).

It is proposed to construct a 110 kV electricity substation within the site of the Proposed Development located in the northwest of Carranstown Bog, in the townland of Grange More within proximity to the existing Mullingar –Corduff 110 kV overhead line which traverses the site. Eirgrid and ESB Networks will access the substation from the R156 during the operational period. The substation will be serviced by a wastewater holding tank. A bored well will provide potable water to the substation and control buildings. For details of the substation design and layout see Chapter 4 and Appendix 4-1 Planning Drawings.

There will be four temporary construction compounds on site during the construction phase of the Proposed Development - one main compound at Ballivor bog, one substation compound, and two smaller compounds. They will be located in the townlands of Grange More, Craddanstown and Bracklin. These compounds will have bunded fuel storage to provide on-site re-fuelling of construction vehicles. Appendix 4-1 contains layout drawings for construction compounds and details of bunded fuel storage tanks.

Five temporary security cabins will be installed within the site for the duration of the construction phase of the Proposed Development. The security cabins will be located close to the proposed temporary and permanent site entrances as well as site access points and at crossing points on local roads from one bog to another.

Two borrow pits are proposed during the construction phase of the Proposed Development. One of these is located on-site in Carranstown bog and comprises an area of approximately 5 hectares (borrow pit 1a) with a small portion located east of a proposed access track (borrow pit 1b). The other, (borrow pit 2), is on third-party land located on the south-western boundary of Bracklin bog and also comprises an area of approximately 5 hectares. Access from the windfarm to this borrow pit will be via a floating road through a section of un-cut raised bog in Bord na Móna ownership. Post-construction, the borrow pits will be reinstated with the original peat removed during the borrow pit excavation. See Peat and Spoil Management Plan Appendix 4- 2 for details of borrow pit locations and specifications.

Temporary works will be required along the proposed haul route at two locations and are illustrated on Figure 1-1. These lands are currently in agricultural use and mainly comprise grassland and associated hedgerows. The lands will be reinstated once large turbine components deliveries have been completed.

1.4.1.1 Turbine Locations

The ITM Grid Reference coordinates of the proposed turbine locations are listed in **Table 4-1** below.

Turbine	ITM X	ITM Y	Top of Foundation Levels metre above Ordnance Datum
1	665162	753511	75.3
2	665604	753275	73.9
3	665983	752965	73.9
4	665796	752196	72.6
5	665231	752587	73.1
6	664502	752692	72.2
7	665928	751694	72.4
8	665164	751792	72.9
9	664623	752007	74.4
10	663783	752452	74.1
11	663976	753121	75.0
12	664329	753719	78.1
13	663739	757007	73.8
14	663474	757496	74.9
15	662595	757805	78.1
16	662765	757323	74.9
17	662002	756804	79.0
18	661508	757054	77.0
19	665118	758520	73.3
20	665844	758647	73.2
21	664274	759054	73.3
22	664023	759553	75.2
23	664744	759727	75.0
24	665464	759850	75.1
25	665735	759326	73.9
26	665028	759172	73.5

1.4.1.2 Turbine Type

The proposed wind turbines to be installed on the site will have a ground-to-blade tip height, hub height and blade rotor diameter:

- Turbine Tip Height –200 metres,
- Hub Height –115 metres
- Blade rotor diameter: - 170 metres,.

The turbines will be multi-ply coated to protect against corrosion. It is proposed that the turbines would be of an off-white or light grey colour to blend into the sky background. This minimises visual impact as recommended by the following guidelines on wind energy development:

- *Wind Farm Development – Guidelines for Planning Authorities, Department of the Environment, Heritage and Local Government (DoEHLG, 2006);*
- *The Influence of Colour on the Aesthetics of Wind Turbine Generators (ETSU, 1999).*

A drawing detailing the proposed wind turbine is shown in Figure 4-2 of this EIAR. The individual components of a geared wind turbine nacelle and hub are shown in Figure 4-3. Wind turbine without a gearbox (i.e. direct drive) turbines may also be considered for use in the Proposed Development. This will have no impact on the external design.

1.4.1.3 Turbine Foundations

Turbine foundations are constructed by excavating peat and soil to sub-formation level. Imported structural fill and blinding is placed and compacted to formation level. A reinforced concrete base is cast in-situ. The turbine foundation transmits any load on the wind turbine into the ground. The horizontal and vertical extent of the turbine foundation will be 26m and 4m respectively, which has been assessed in the EIAR and shown in Figure 4-2. The top of the base is referred to as 'Top of Foundation Level'. Where ground conditions are unfavourable to excavate and replace, piles will be installed to formation level. approximately 20 m in diameter, based off current models of this scale, but will depend on the loads specified by the turbine manufacturer selected from the competitive tender process.

1.4.1.4 Hard Standing Areas

Hard standing areas consisting of levelled and compacted granular fill are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are typically used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. The hard-standing area is intended to accommodate a crane during turbine assembly and erection. The proposed hard standing areas shown on the detailed layout drawings included in Appendix 4-1 and represent the maximum sizes required. However, the extent of the required areas at each turbine location may be optimised on-site within the parameters set out and assessed in this EIAR. This will depend on the turbine supplier's exact requirements.

1.4.1.5 Power Output

It is anticipated the proposed wind turbines will have a rated electrical power output in the 4.5–to-6.5-megawatt (MW) range depending on further wind data analysis and power output modelling. Turbines of the exact same make and dimensions can also have different power outputs depending on the capacity of the electrical generator installed in the turbine nacelle. For the purposes of the power output, the maximum and minimum rated outputs have been chosen to calculate the output range of the proposed 26-turbine wind farm,

Based on an installed capacity range of 117 MW to 169 MW, the Proposed Development therefore has the potential to produce between 300,302 and 433,769 MWh (megawatt hours) of electricity per year, based on the following calculation:

A x B x C = Megawatt Hours of electricity produced per year

where: A = The number of hours in a year: 8,760 hours

B = The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 28.7%[2] is applied here which corresponds to the average capacity factor for wind generation for the period 2015-2021 inclusive.

C = Rated output of the wind farm: 117 to 169 MW

The MWh of electricity produced by the Proposed Development would be sufficient to supply a range of approximately 70,036 to 101,163 Irish households with electricity per year, based on the average Irish household using 4.2 MWh of electricity (this latest figure is available from the March 2017 CER Review of Typical Consumption Figures Decision)[3].

1.4.1.6 Internal Roads

To provide internal access to the development site to connect the wind turbines and associated infrastructure, approximately 28 kilometres of internal access roads will need to be constructed, all of which will be used for amenity purposes during the operational phase. In addition to the internal wind farm roads, a further 3.3km of amenity only roads form part of the wind farm design, 1.6km of which are new with the remaining comprising exiting tracks that will be upgraded.

1.4.1.7 Electricity Substation

It is proposed to construct a 110 kV electricity substation within the site of the Proposed Development as shown in Figure 4-1, Figure 4-11 and Figure 4-12. The proposed substation site is located in the northwest of Carranstown Bog, in the townland of Grange More within proximity to the existing Mullingar- Corduff 110 kV overhead line which traverses the site. The L5507 Local Road is located to the west of the proposed substation location. Eirgrid and ESB Networks will access the substation from the R156 entrance during the operational period.

The footprint of the proposed onsite electricity substation compound measures approximately 11,600m^2. It will include two control buildings and the electrical components necessary to consolidate the electrical energy generated by each wind turbine and export that electricity from the wind farm to the national

[2] *Energy in Ireland 2022 Report (Table 34) (SEAI, December 2022). Report available at: https://www.seai.ie/publications/Energy-in-Ireland-2022.pdf.*
[3] *Commission for Regulation of Utilities 2017: Review of Typical Consumption Figures – Decision Paperhttps://www.cru.ie/document_group/review-of-typical-consumption-figures-decision-paper/*

grid. Further details regarding the connection of the onsite substation to the national electricity grid are provided in Section 4.3 and 4.8 below.

1.4.1.8 Wind Farm Control Buildings

Two substation control buildings will be located within the substation compound. The Transmission Asset Owner (TSO) Control Building will measure approximately 25 metres by 18 metres and approximately 9.7 metres in height. The Independent Power Provider (IPP) Control Building will measure approximately 19 metres by 12 metres and approximately 7 metres in height. The layouts of the control buildings are shown on Figure 4-14 and Figure 4-15.

1.4.1.9 Site Cabling

Each turbine will be connected to the on-site electricity substation via an underground 33kV (kilovolt) electricity cable. Fibre-optic cables will also connect each wind turbine to the wind farm control building in the onsite substation compound. The electricity and fibre-optic cables running from the turbines to the onsite substation compound will be run in cable ducts approximately 1.2 metres below the ground surface, along the sides of or underneath the internal roadways. The route of the cable ducts will follow the access track to each turbine location. The indicative position of the cable trench relative to the roadways is shown in section in Figure 4-7 to Figure 4-10.

1.4.1.10 Grid Connection

A connection between the Proposed Development and the national electricity grid will be necessary to export electricity on to the national grid. This connection from the proposed onsite substation to the national grid will occur within the vicinity of the proposed substation, via a new overhead line which will connect into the existing Mullingar-Corduff 110 kV transmission line located approximately 35m north of the proposed substation within the development site boundary. Approximately 35m of overhead line and two lattice loop in/loop out masts will be required to connect from the proposed substation to the existing overhead line.

1.4.1.11 Anemometry Mast

Two permanent anemometry masts are included in the design of the Proposed Development. The anemometry masts will be equipped with wind monitoring equipment at various heights. The masts will be located at ITM X661518, Y756596 and ITM X 663677, Y752816 as shown on the site layout in Figure 4-1 and will be slender structures 115 metres in height. The masts will be free-standing structures and will be constructed using a hard-standing area sufficiently large to accommodate the crane that will be used to erect the mast, adjacent to an existing track. The design of the proposed anemometry mast is shown in Figure 4-17.

1.5 Need for the Proposed Development

Ireland faces significant challenges to its efforts to meet European Union (EU) targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. Further detail can be found in Chapter 2, Section 2.2 of this EIAR.

The proposed Ballivor Wind Farm development provides the opportunity to capture an additional part of Irelands valuable renewable wind energy resource. If the Proposed Development were not to proceed the opportunity to capture this renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

The opportunity to generate local employment and investment associated with the Proposed Development would also be lost, and the local economy would continue to rely primarily on agriculture and commercial forestry as the main source of income.

1.5.1 Overview

The need for the proposed project is driven by the following factors:

1. *A legal commitment from Ireland to limit greenhouse gas emissions under the Kyoto protocol to reduce global warming;*
2. *A requirement to increase Ireland's national energy security as set out in Ireland's Transition to a Low Carbon Energy Future 2015-2030[4];*
3. *A requirement to diversify Ireland's energy sources, with a view to achievement of national renewable energy targets and an avoidance of significant fines from the EU (the EU Renewables Directive);*
4. *Climate Action Plan 2023 which aims to ensure that Ireland achieves its legally binding target (the Climate Action and Low Carbon Development (Amendment) Act 2021) of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030,*
5. *Increasing energy price stability in Ireland through reducing an over reliance on imported fossil fuels; and*
6. *Provision of cost-effective power production for Ireland which would deliver local benefits.*
7. *To facilitate the Government in meeting its ambitious 80% renewable energy target by 2030.*

These factors are addressed in further detail below. Section 2.1 of **Chapter 2 Background to the Proposed Development**, presents a full description of the international and national renewable energy policy context for the project. Section 2.2 addresses climate change, including Ireland's current status with regard to meeting greenhouse gas emission reduction targets.

1.5.1.1 Climate Change and Greenhouse Gas Emissions

At the Paris climate conference (COP21) in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal the Paris Agreement. The Paris Agreement sets out a global action plan to avoid dangerous climate change by limiting global warming to well below 2°C above pre-industrial levels. Under the Paris Agreement, the EU and Governments also agreed on the need for global emissions to peak as soon as possible but recognised that this will take longer for developing countries to achieve.

[4] *Department of Communications, Energy and Natural Resources. December 2015. Ireland's Transition to a Low Carbon Energy Future 2015-2030*

In March 2021 the government approved the Climate Action and Low Carbon Development (Amendment) Bill which provide plans to facilitate the 'transition to a climate resilient and climate neutral economy by the end of year 2050'[5] and includes for a 51% reduction in emissions by 2030. Furthermore, government approval was given in February 2021 to draft amendments to the Petroleum and Other Minerals Development Act 1960 which will give statutory effect to ending the issuing of new licences for the exploration and extraction of gas. The Bill, entitled an Act, was passed into law in July 2021 and will manage the implementation of a suite of policies to assist in achieving a 7% average yearly reduction in overall greenhouse gas emissions over the next decade.

The Climate Action and Low Carbon Development (Amendment) Act 2021 also outlines the obligations of An Bord Pleanála and/or local authority in assisting the country reach these targets. Section 15 of the Act states as follows:

'Section 15. F33 (1) A relevant body shall, in so far as practicable, perform its functions in a manner consistent with—

a) *(the most recent approved climate action plan,*
b) *the most recent approved national long term climate action strategy,*
c) *the most recent approved national adaptation framework and approved sectoral adaptation plans,*
d) *the furtherance of the national climate objective, and*
e) *the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State.'*

In February 2022, the International Panel on Climate Change (IPCC) released the report 'Working Group II-Climate Change 2022: Impacts, Adaptation and Vulnerability' [6]regarding the impacts of climate change on nature and human activity. The report states that global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO_2 and other greenhouse gas emissions occur in the coming decades. the report identifies four key risks for Europe with most becoming more severe at 2 °C global warming levels (GWL) compared with 1.5 °C GWL. From 3°C GWL, severe risks remain for many sectors in Europe. The four key risks identified are:

1) Key Risk 1: Mortality and morbidity of people and changes in ecosystems due to heat
2) Key Risk 2: Heat and drought stress on crops
3) Key Risk 3: Water scarcity
4) Key Risk 4: Flooding and sea level rise

In July 2022, the EPA[7] states in its 'Ireland Provisional Greenhouse Gas Emissions 1990-2021' report that for the 2021 year, the total national greenhouse gas emissions are estimated to have increased by 4.7% on 2020 levels to 61.53 million tonnes carbon dioxide equivalent (Mt CO2eq). This increase in total emissions was driven by increased use of coal and oil for electricity generation and increases in both the Agriculture and Transport sectors. It highlights that transformative measures will be needed to meet National Climate ambitions. The report also states that Emissions in the Energy Industries sector increased by 17.6% or 1.53 MtCO2eq in 2021, attributed to a tripling of coal and oil use in electricity generation as gas fired plant were offline while simultaneously, electricity generated from wind and hydro decreased by 16% and 20% respectively in 2021. As such, the Proposed Development is critical to helping Ireland address these challenges as well as addressing the country's over-dependence on imported fossil fuels.

[5] *Rialtas na hÉireann 2021. Climate Action and Low Carbon Development (Amendment) Bill 2021 https://www.gov.ie/en/publication/984d2-climate-action-and-low-carbon-development-amendment-bill-2020/*
[6] *Climate Change 2022: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the IPCC Sixth Assessment Report. Available at: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf*
[7] *EPA (July 2022) - Ireland's Provisional Greenhouse Gas Emissions 1990-2022. https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Ireland's-Provisional-GHG-Emissions-1990-2021_July-2022v3.pdf*

The 2023 Climate Action Plan (CAP)[8] was published on the 21st December 2022 by the Department of Communications, Climate Action and Environment (DoCCAE). Following on from Climate Action Plans 2019 and 2021, CAP 2023 sets out the roadmap to deliver on Ireland's climate ambition. It aligns with the legally binding economy-wide carbon budgets and sectoral ceilings that were agreed by Government in July 2022 following the Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050, and the reduction of 51% by 2030 mentioned above. The CAP sets out an ambitious course of action over the coming years to address the impacts which climate may have on Irelands environment, society, economic and natural resources. This Plan clearly recognises that Ireland must significantly step up its commitments to tackle climate disruption. The CAP identifies the need to increase the share of electricity demand generated from renewable sources by to up to 80% where achievable and cost effective, without compromising security of electricity supply and a need for 9GW of onshore wind generation. Only 4.3GW is in place in Ireland as of May 2022, therefore Ireland needs to increase its installed capacity of wind generation. The CAP presents clear and unequivocal support for the provision of additional renewable energy generation and presents yet further policy support for increased wind energy.

CAP 2023 has set out the following targets for electricity generation and transmission:

- share of electricity demand generated from **renewable sources to up to 80%** where achievable and cost effective, without compromising security of electricity supply;
  - Onshore Wind Capacity: up to 9GW
  - Offshore Wind Capacity: 5GW (minimum)
  - Solar PV Capacity: 8GW
  - Green Hydrogen Production: 2GW
- Phase out and end the use of coal and peat in electricity generation;
- Ensure that 20-30% of system demand is flexible by 2030;
- Ensure electricity generation grid connection policies and regular rounds of connection offers which facilitate timely connecting of renewables, provides a locational signal and supports flexible technologies;
- Support at least 500 MW of local community-based renewable energy projects and increased levels of new micro-generation and small-scale generation; and
- New, dynamic Green Electricity Tariff will be developed by 2025 to incentivise people to use lower cost renewable electricity at times of high wind and solar generation.

It is estimated that the proposed Ballivor Wind Farm, with a potential installed capacity in the range of 117MW to 169MW which will result in the net displacement of between approximately 6,035,010 tonnes and 8,717,237 tonnes of Carbon Dioxide (CO_2) per annum (Against EU FFC). The carbon offsets resulting from the Proposed Development are described in detail in Chapter 10: Air and Climate.

Aligned with the Climate Action Plan 2023, Bord na Móna's vision is for a climate neutral Ireland by 2050. To help achieve this vision, the company is undertaking a number of highly significant actions in such as renewable energy developments and peatland rehabilitation as discussed above. These actions involve a radical transformation and decarbonisation of nearly the entire Bord na Móna business. In addition, Bord na Móna's pipeline of renewable energy projects, such as the proposed Ballivor Wind Farm, aligns with Government climate and energy policies in relation to climate mitigation and adaption and will complement and co-exist on some sites with PCAS discussed above in section 1.1. For the avoidance of doubt, no area developed for renewable energy projects (the specific renewable energy infrastructure footprint) will be subject to support from the scheme albeit they may lie on adjoining areas or within the same site. Rewetting of drained peatlands can lead to restoration of functional peatland aspects, such as the return of typical peatland species, which in turn may lead to the restoration of peat-formation and the carbon sink function. The carbon emission mitigation benefits associated with renewable energy coexisting alongside rehabilitated peatland will make a significant contribution to

[8] *Government of Ireland (2022) Climate Action Plan 2023 https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/*

achieving the State's carbon emission reduction target. A Bord na Mona bog in Co. Galway is now a net carbon sink in rewetted areas 8 years after rehabilitation was carried out. Further research (Wilson et al. 2022)[9] at the bog concluded that rapid rewetting of drained peatland sites is important to (a) achieve strong carbon emissions reductions, (b) establish optimal conditions for carbon sequestration and (c) set the site on a climate cooling trajectory.

The development of the proposed Ballivor Wind Farm on peatlands will underpin Ireland's energy independence by developing green, sustainable energy sources to assist with Ireland's commitment to reach a 80% reduction in carbon emissions from the electricity sector relative to 2018 baseline by 2030. The infrastructural footprint of the wind farm is very small relative to the overall size of the Wind Farm Site (less than 3%). Once constructed, it is intended to rehabilitate in and around the infrastructure e.g. rehabilitation is currently being carried out on Cloncreen Bog and this rehabilitation commenced while the turbine erection was still ongoing.

1.5.1.2 Energy Security

At a national level, Ireland currently has one of the highest external dependencies on imported sources of energy, such as coal, oil and natural gas in the EU.

Drawing on the 2030 Climate and Energy Framework and Climate Action Plan 2019 (since superseded by CAP 2023), EirGrid's *'All Island Generation Capacity Statement 2021 – 2030'* (September 2021) states that the national power system will require unprecedented change over this decade, '*a fundamental transition for our electricity sector*', in order to accommodate at least 70% of electricity from renewable sources by 2030. The retiring of traditional fossil fuel plant (coal, peat and oil-fired generators), c. 1,650MW of generation over the next 5-years within Ireland, further emphasises the need for a deliberate and swift transition to a low-carbon power system based on renewable energy, natural gas and ancillary supporting infrastructure. With regard to wind energy, the All Island Generation Capacity Statement 2021 – 2030 states that,

> *"It can be assumed that Ireland's renewable targets will be achieved largely through the deployment of additional wind powered generation."*

1.5.2 REPowerEU

In a Communication from the European Parliament on Joint European Action for more affordable, secure and sustainable energy [10], the European Commission proposed an outline of a plan to make Europe independent from Russian fossil fuels well before 2030 in light of Russia's invasion of Ukraine. Commission President Ursula von der Leyen stated:

> *"We must become independent from Russian oil, coal and gas. We simply cannot rely on a supplier who explicitly threatens us. We need to act now to mitigate the impact of rising energy prices, diversify our gas supply for next winter and accelerate the clean energy transition. The quicker we switch to renewables and hydrogen, combined with more energy efficiency, the quicker we will be truly independent and master our energy system."*

In May 2022, the EU published the REPowerEU Plan[11] in light of Russia's invasion of Ukraine in February 2022. The core purpose of the plan, in addition to accelerating the EU's transition from the use of fossil fuel to renewable energy sources, is to end the dependence on Russian fossil fuels.

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[9] *Wilson et al 2022 Carbon and climate implications of rewetting a raised bog in Ireland Global Change Biology Volume 28, Issue 21.*
[10] *European Commission (March 2022) REPowerEU: Joint European Action for more affordable, secure and sustainable energy. Strasbourg. https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1511*
[11] *https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131*

1.5.2.1 EU 2020 Renewable Energy Targets

The burning of fossil fuels for energy generation creates greenhouse gases, which contribute significantly to climate change. These and other emissions also create acid rain and air pollution. Sources of renewable energy that are utilised locally with minimal impact on the environment are necessary to reduce greenhouse gas emissions and meet the challenges of the future. The EU adopted Directive (2009/28/EC) on the Promotion of the Use of Energy from Renewable Sources in April 2009. This Directive includes a common EU framework for the promotion of energy from renewable sources.

The Directive sets a legally binding mandatory national target for the overall share of energy from renewable sources for each Member State. This package was designed to achieve the EU's overall 20:20:20 environmental target, which consists of a 20% reduction in greenhouse gases, a 20% share of renewable energy in the EU's total energy consumption and a 20% increase in energy efficiency by 2020. To ensure that the mandatory national targets are achieved, Member States were required to follow an indicative trajectory towards the achievement of their target as outlined in Ireland's National Renewable Energy Action Plan (NREAP).

Ireland's mandatory national target for 2020 was to supply 16% of its overall energy needs from renewable sources. This target covered energy in the form of electricity (RES-E), heat (RES-H) and transport fuels (RES-T). Government policies identify the development of renewable energy, including wind energy, as a primary strategy in implementing national energy policy. The Sustainable Authority of Ireland (SEAI) published a report in December 2022 titled 'Energy in Ireland 2022', which states that Ireland supplemented its indigenous electricity generation with 1600 GWh of net imports through the interconnects with Northern Ireland. Ireland continues to be hugely energy import-dependent leaving it exposed to large energy price fluctuations as a minimum and possibility of fuel shortages if a major energy crisis were to occur. The international fossil fuel market is growing increasingly expensive and is increasingly affected by international politics which can add to price fluctuations. This volatility will be increased as carbon prices increase in the future. This has implications for every Irish citizen. The SEAI 2022 report continues:

'Ireland imports most of its energy. ...[...]...Oil and natural gas are by far our largest energy imports, but we also import significant quantities of coal...[...]...When averaged over the full year of 2021, we imported three times as much electricity as we exported'.

The cost of carbon credits is included in all electricity traded, and the price of electricity generated by coal is particularly vulnerable due to its high carbon emissions per unit of electricity generated. As discussed above, coal and oil use for electricity increased in 2021, but the Climate Action Plan 2023 calls for an aggregate reduction in carbon dioxide emissions of at least 80% (compared to 1990 levels) by 2050. Any steps to reduce this dependence on imported fossil fuels will add to financial autonomy and stability in Ireland. The use of Ireland's indigenous energy resources, such as wind, will contribute to a reduction in energy imports.

1.5.2.2 EU 2030 Renewable Energy Targets

Ireland's statutory national climate objective and 2030 targets are aligned with Ireland's obligations under the Paris Agreement and with the European Union's objective to reduce GHG emissions by at least 55% by 2030, compared to 1990 levels and to achieve climate neutrality in the European Union by 2050. As mentioned, Ireland's Climate Act 2021 commits Ireland to reach a legally binding target of net-zero emissions no later than 2050, and a cut of 51% by 2030 (compared to 2018 levels).

The EPA notes in their July 2022 report that the level of annual emissions reductions required to achieve a 51% emissions reduction by 2030 requires an annual average emission reduction of 7.5% each year from 2022 to 2030 inclusive. However, provisional national total emissions for 2021 indicate that already, to stay within budget for the first carbon budget period (2022-2025) Ireland would require an 8.4 per cent

average annual emissions reduction, or over 5 Mt CO2eq emissions reductions annually. If consented, the Ballivor Wind Farm is likely to be operational before 2030 and will contribute to this 2030 target.

It is now more critical than ever that we continue to progress renewable energy development in Ireland so that we are successful in meeting our 2030 target. Further detail on the EU 2030 targets including the implications of the Climate Action Plan is noted in Chapter 2 Background to the Proposed Development.

1.5.3 Increasing Energy Consumption

As detailed above, the CAP 2023 identifies a need for 9GW of onshore wind generation in order for Ireland to meet its 2030 targets. In their '*All Island Generation Capacity Statement 2022–2031'* (October 2022), EirGrid estimate that a total of 10,7GW of combined onshore and offshore wind would be installed on the Island relative to current operational and permitted developments. This figures falls short of the required 9GW and 5GW targets in CAP 2023 for onshore and offshore wind energy, respectively. Furthermore, the report notes that electricity demand on the island of Ireland is expected to grow by 21%% out to 2031 (median scenario). Much of this growth is expected to come from new data centres in Ireland and higher rates of electrification in the heat and transport sectors. The report however, acknowledges that wind energy is accepted as the main contributor to meeting Ireland's national climate change and energy supply obligations. Notwithstanding this, it must also be acknowledged that not every part of Ireland is suitable for wind development and therefore, not all counties will be able to deliver wind-based renewable energy. Furthermore, whilst it is accepted that there are other renewable energy technologies that can be deployed, for the foreseeable future many areas will be unable to deliver significant renewable energy output. This primarily applies to the more populous areas.

National and international renewable energy and climate change targets must be achieved, and it is crucial that these are appropriately translated and implemented at regional and local levels. Wind farm development and design involves balancing the sometimes-conflicting interests of constraints (e.g. natural and built heritage, human beings, ecological, ground conditions, hydrological, etc.) with visual amenity and the technological/economic requirements/realities of the specific project and turbines.

The development of additional indigenous wind energy generating capacity, such as that proposed at Ballivor, will not only help to reduce carbon emissions but will also improve Ireland's security of energy supply. Further information on Ireland energy demands and 2030 commitments for Ireland are discussed in Chapter 2 Background to the Proposed Development.

1.5.4 Economic Benefits

In addition to helping Ireland avoid significant fines and reducing environmentally damaging emissions, the proposed project will have significant economic benefits. Ireland currently has one of the highest external dependencies in the EU on imported sources of energy, such as coal, oil and natural gas. For example, in 2019 the cost of all energy imports to Ireland was approximately €4.5 billion with imported oil alone accounting for 57% of all energy consumed (SEAI 2020).[12] The economic benefits of renewable energy to Ireland cannot be denied. The 2020 SEAI report includes that renewable electricity (mostly wind energy) displaced over €500 million of fossil fuel imports in the same period. The cost of energy imports in 2022 was €10 billion however, this inflated cost was partially due to limited fuel supplies due to the Russian invasion of the Ukraine.

[12] *Sustainable Energy Authority Ireland December 2020 Energy in Ireland 2020. .https://www.seai.ie/publications/Energy-in-Ireland-2020.pdf*

1.5.4.1 Employment potential

The 2014 report 'The Value of Wind Energy to Ireland', published by Pőyry, stated that growth of the wind sector in Ireland could support 23,850 jobs (construction and operational phases) by 2030. The reduction in fuel imports not only benefits security of supply but also creates a net transfer to the Irish economy, potentiality allowing for a saving of almost €671m of expenditure on fuel imports per annum by the time we reach 2030.

A 2021 MaREI report[13] includes a prospective view of Ireland's energy sector in 2050 whereby an additional 25,000 jobs would be created in the development of onshore and offshore wind to meet the zero carbon targets as pledged in the Climate Action and Low Carbon Development Act 2021 discussed in section 1.5.1.1 above.

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

1.5.4.2 Community Gain

The Ballivor Wind Farm will be capable of providing electrical energy to a range of approximately 70,736 to 101,163 Irish households every year, as presented in the calculations in Chapter 1 of this EIAR. Ballivor wind farm will involve an in excess of €100 million investment in Irish renewable energy.

Further to the above, the Renewable Energy Support Scheme (RESS) Terms and Conditions, published by the Department of Communications, Climate Action and Environment on the 27th February 2021, make some high level provisions for how this type of benefit fund will work. Any project which wants to export electricity to the national grid must abide by these broad principles. These include the following:

1. *a minimum of €1,000 shall be paid to each household located within a distance of a 1-kilometre radius from the Project;*
2. *a minimum of 40% of the funds shall be paid to not-for-profit community enterprises whose primary focus or aim is the promotion of initiatives towards the delivery of the UN Sustainable Development Goals, in particular Goals 4, 7, 11 and 13, including education, energy efficiency, sustainable energy and climate action initiatives;*
3. *a maximum of 10% of the funds may be spent on administration. This is to ensure successful outcomes and good governance of the Community Benefit Fund.*
4. *the balance of the funds shall be spent on initiatives successful in the annual application process, as proposed by clubs and societies and similar not-for-profit entities, and in respect of Onshore Wind RESS 1 Projects, on "near neighbour payments" for households located outside a distance of 1 kilometre from the Project but within a distance of 2 kilometres from such Project.*

Further details on the Community Gain proposals are presented in Chapter 4 this EIAR. The above terms and conditions may be subject to change in RESS processes in the future or may be replaced by terms dictated by specific Power Purchase Agreements (PPAs).

1.5.4.2.1 *Recreational Benefits*

In addition to the economic and environmental benefits of the Proposed Development, there will be potential social and recreational benefits associated with the proposed Recreational Amenity pathway.

[13] *MaREI 2021 Our Climate Neutral Future: Zero by 2050. https://www.marei.ie/wp-content/uploads/2021/03/Our-Climate-Neutral-Future-Zero-by-50-Skillnet-Report-March-2021-Final-2.pdf*

The Proposed Development and all its associated infrastructure create a unique opportunity to develop an amenity area for use by members of the local and wider community alike. The peatland habitat within the bogs is attractive to both locals and visitors to the area because of its history and variety of vegetation. The proposed wind farm roads (30km) will be open to the public for walking and cycling and an additional 3.3km of dedicated amenity tracks will be added/upgraded. This proposal will provide a safe site and openly available recreational area for walkers, trail runners, cyclists and other recreational users, as outlined in Appendix 4-4 of this EIAR. The Proposed Development will also facilitate linkages to the wider area and to both existing and proposed amenity walkways.

This will provide a long-term benefit to both the local community and visitors to the area.

1.6 Purpose and Scope of the EIAR

The purpose of this EIAR is to document the current state of the environment in the vicinity of the Proposed Development site and to quantify the likely significant effects on the environment of the Proposed Development in accordance with the requirements of the EIA Directive, as amended. The EIAR will highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from the possibility of any negative impacts arising from the Proposed Development. It is important to distinguish the Environmental Impact Assessment (EIA) to be carried out by An Bord Pleanála, from the EIAR and the accompanying planning application.

The EIA is the assessment carried out by the competent authority, which includes an examination that identifies, describes and assesses in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 11 of the EIA Directive, the direct and indirect effects of the Proposed Development on the following:

- Population and Human Health,
- Biodiversity,
- Land, Soil, Water, Air, Climate,
- Material Assets, Cultural Heritage and the Landscape
- Interactions between these factors.

The EIAR submitted by the applicant provides the relevant environmental information to enable the EIA to be carried out by the competent authorities. The information to be contained in the EIAR is prescribed in Article 5 of the revised EIA Directive described previously in Section 1.4.

1.7 Structure and Content of the EIAR

Volume 1 of this EIAR uses the grouped structure method to describe the existing environment, the potential impacts of the Proposed Development thereon and the proposed mitigation measures. Background information relating to the Proposed Development , scoping and consultation undertaken and a description of the Proposed Development are presented in separate sections. The grouped format sections describe the impacts of the Proposed Development in terms of Population and Human Health, biodiversity, soils and geology, hydrology and hydrogeology, air and climate, noise and vibration, landscape and visual, cultural heritage and material assets such as traffic and transportation, together with the interaction of the foregoing. The chapters of this EIAR are as follows:

- Introduction
- Background to the Proposed Development
- Consideration of Reasonable Alternatives
- Description of the Proposed Development
- Population and Human Health
- Biodiversity
- Ornithology
- Land, Soils and Geology
- Hydrology and Hydrogeology
- Air and Climate
- Noise and Vibration
- Archaeological, Architectural and Cultural Heritage
- Landscape and Visual
- Material Assets (including Traffic and Transport, Telecommunications and Aviation, Utilities, Waste Management)
- Vulnerability of the Project to Major Accidents and Natural Disasters
- Interactions of the Foregoing
- Schedule of Mitigation and Monitoring Measures

The EIAR also includes a Non-Technical Summary, which is a condensed and easily comprehensible version of the EIAR document. The non-technical summary is laid out in a similar format to the main EIAR document and comprises a description of the Proposed Development followed by the existing environment, impacts and mitigation measures presented in the grouped format.

The photomontage booklet pertaining to Chapter 13: Landscape and Visual is included as Volume 2 of this EIAR.

Appendices to the chapters listed above are included in Volume 3 of this EIAR.

Each technical assessment included in the EIAR has followed the same general format:

- **Assessment Methodology and Significance Criteria:** A description of the methods used in baseline surveys and in the assessment of the significance of effects;
- **Baseline Description:** A description of Proposed Development Site baseline relevant for the assessment, based on the results of surveys, desk information and consultations, and a summary of any information required for the assessment that could not be obtained;
- **Assessment of Potential Environmental Effects:** A description of how the baseline environment could potentially be affected for the EIA Development, including a summary of the measures taken during the design of the EIA Development to minimise effects;
- **Mitigation Measures and Residual Effects** - A description of measures recommended that will be implemented to minimise and/or off-set potential negative effects and a summary of the assessed level significance of the effects of the Proposed Development and/or the EIA Development after mitigation measures have been implemented;
- **Cumulative Effects**: A description identifying the potential for effects of the EIA Development to combine with those from other existing and/or permitted developments to affect resources;
- **Summary of Significant Effects;**
- **Statement of Significance of effects**.

1.7.1 Description of Likely Significant Effects and Impacts

As stated in the *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022), an assessment of the likely impacts of a Proposed Development is a statutory requirement of the EIA process. The statutory criteria for the presentation of the characteristics of potential impacts requires that potential significant impacts are described with reference to the extent, magnitude, complexity, probability, duration, frequency, reversibility and trans-frontier nature (if applicable) of the impact.

The classification of impacts in this EIAR follows the definitions provided in the Glossary of Impacts contained in the following guidance documents produced by the European Commission (EC) and the Environmental Protection Agency (EPA):

- *'Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report'* (EC, 2017)
- *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports – June 2022'* (EPA, 2022).

Table 1-4 below presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, duration and type of impacts associated with a Proposed Development on the receiving environment. The use of pre-existing standardised terms for the classification of impacts ensures that the EIA employs a systematic approach, which can be replicated across all disciplines covered in the EIAR. The consistent application of terminology throughout the EIAR facilitates the assessment of the Proposed Development on the receiving environment.

Table 1-4 Impact Classification Terminology (EPA, 2022)

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
	Profound	An effect which obliterates sensitive characteristics
Extent and Context	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions
Probability	Likely	Effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
	Unlikely	Effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented

Impact Characteristic	Term	Description
Duration and Frequency	Momentary	Effects lasting from seconds to minutes
	Brief	Effects lasting less than a day
	Temporary	Effects lasting less than a year
	Short-term	Effects lasting one to seven years
	Medium-term	Effects lasting seven to fifteen years
	Long-term	Effects lasting fifteen to sixty years
	Permanent	Effect lasting over sixty years
	Reversible	Effects that can be undone, for example through remediation or restoration
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Type	Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should the subject project not be carried out
	Worst Case'	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents

Impacts are described in terms of its quality, significance, extent, duration and frequency and type, where possible. A 'Do-Nothing' impact is also predicted in respect of each environmental theme in the EIAR. Residual impacts are also presented following any impact for which mitigation measures are prescribed. The remaining impact types are presented as required or applicable throughout the EIAR.

Any potential interactions between the various aspects of the environment assessed throughout this EIAR are presented in Chapter 15: Interaction of the Foregoing.

1.8 Project Team

1.8.1 Project Team Responsibilities

The companies and staff listed in Table 1-5 EIAR Project Team were responsible for completion of the EIAR of the Proposed Development. Further details regarding project team members are provided below.

The EIAR project team comprises a multidisciplinary team of experts with extensive experience in the assessment of wind energy developments and in their relevant area of expertise. The qualifications and experience of the principal staff from each company involved in the preparation of this EIAR are summarised in Section 1.8.2 below. Each chapter of this EIAR has been prepared by a competent expert in the subject matter. Further details on project team expertise are provided in the Statement of Authority at the beginning of each impact assessment chapter.

Table 1-5 EIAR Project Team

Consultants	Principal Staff Involved in Project	EIAR Input
MKO Tuam Road, Galway.	Michael Watson Eoin McCarthy Pat Roberts Dervla O' Dowd John Willoughby Mary Kelleher Karen Mulryan Padraig Cregg Donnacha Woods Patrick Manley Jack Workman John Hynes Sarah Mullen Owen Cahill Aoife Joyce James Newell Darragh Buckley Joseph O'Brien	Project Managers, Scoping and Consultation, Preparation of Natura Impact Statement and the following Chapters: › 1. Introduction › 2. Background to the Proposed Development › 3. Consideration of Reasonable Alternatives › 4. Description of the Proposed Development › 5. Population and Human Health › 6. Biodiversity › 7. Ornithology › 10. Air and Climate › 13. Landscape and Visual › 14. Material Assets (non-Traffic) › 15. Vulnerability to Major Accidents and Natural Disasters › 16. Interaction of the Foregoing

Consultants	Principal Staff Involved in Project	EIAR Input
		› 17. Schedule of Mitigation Measures
Hydro Environmental Services 22 Lower Main Street, Dungarvan, Co. Waterford.	Michael Gill David Broderick Adam Keegan	Flood Risk Assessment, Drainage Design and Preparation of the following Chapters: › 8. Land, Soils and Geology › 9. Hydrology and Hydrogeology
Fehily Timoney & Company The Grainstore Singletons Lane, Bagnelstown, Co. Carlow.	Ian Higgins	Preparation of Peat Stability Assessment and Peat and Spoil Management Plan
AWN Consulting The Tecpro Building, Clonsgaugh Business & Technology Park, Dublin 17.	Mike Simms Donogh O Casey Dermot Blunnie	Baseline Noise Survey and Preparation of Chapter 11: Noise and Vibration
Tobar Archaeological Services Saleen Midleton Co. Cork.	Annette Quinn Miriam Carroll	Preparation of Chapter 12: Archaeological, Architectural and Cultural Heritage
Alan Lipscombe Traffic and Transport Consultants Claran, Headford, Co. Galway	Alan Lipscombe	Preparation of Chapter 14: Material Assets - Traffic and Transport

1.8.2 Project Team Members

1.8.2.1 MKO

Michael Watson, MA; Miema CEnv PGeo

Michael Watson is Project Director and head of the Environment Team in MKO. Michael has over 20 years' experience in the environmental sector. Following the completion of his Master's Degree in Environmental Resource Management, Geography, from National University of Ireland, Maynooth he worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy prior to joining MKO in 2014. Michael's professional experience includes managing Environmental Impact Assessments, EPA License applications, hydrogeological assessments, environmental due diligence and general environmental assessment on behalf of clients in the wind farm, waste management, public sector, commercial and industrial sectors nationally. Michaels key strengths include project strategy advice for a wide range and scale of projects, project management and liaising with the relevant local authorities, Environmental Protection Agency (EPA) and statutory consultees as well as coordinating the project teams and sub-contractors. Michael is a key member of the MKO senior management team and as head of the Environment Team has responsibilities to mentor various grades of team members, foster a positive and promote continuous professional development for employees. Michael also has a Bachelor of Arts Degree in Geography and Economics from NUI Maynooth, is a Member of IEMA, a Chartered Environmentalist (CEnv) and Professional Geologist (PGeo).

Eoin McCarthy B.Sc. (Env.)

Eoin is a Project Environmental Scientist with McCarthy O'Sullivan Ltd. with over 10 years of environmental consultancy experience. Eoin holds B.Sc. (Hons) in Environmental Science from NUI, Galway. Eoin took up his position with McCarthy Keville O'Sullivan in June 2011. Eoin's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy site selection and feasibility assessment. Since joining MKO Eoin has been involved as a Graduate, Assistant and Project Environmental Scientist on a significant range of energy infrastructure, tourism, waste permit, flood relief scheme and quarrying projects. He has overseen some of the largest SID wind energy in Ireland in recent years. In his role as project manager, Eoin works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Eoin is also involved in the development of project strategy for the projects that he manages. He has held the role of project manager on over 500MW worth of wind energy projects. Within MKO Eoin plays a large role in the management of and sharing of knowledge with junior members of staff and works as part of a large multi-disciplinary team to produce EIA Reports.

Pat Roberts B.Sc. (Env.)

Pat Roberts is a Senior Ecologist and director of the Ecology team with McCarthy O'Sullivan Ltd. with over 16 years post graduate experience of providing ecological services in relation to a wide range of developments at the planning, construction and monitoring stages. Pat holds B.Sc.(Hons) in Environmental Science. Pat has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage. He has worked closely with construction personnel at the set-up stage of numerous construction sites to implement and monitor any prescribed best practice measures. He has designed numerous Environmental Operating Plans and prepared many environmental method statements in close conjunction with project teams and contractors. He has worked extensively on the identification, control and management of invasive species on numerous construction sites. Prior to taking up his position with MKO in June 2005, Pat worked in Ireland, USA and UK as a Tree Surgeon and as a nature conservation warden with the National Trust (UK) and the US National Park Service. Pats key strengths include his depth of knowledge and experience of a wide range of ecological and

biodiversity topics and also in his ability to understand the requirements of the client in a wide range of situations. He currently manages the ecological team within MKO and ensures that the outputs from that team are of a very high standard and meet the requirements of the clients and relevant legislation and guidelines. He is a full member of the Chartered Institute of Ecologists and Environmental Managers (CIEEM).

Dervla O'Dowd B.Sc. (Env.)

Dervla O'Dowd is a Senior Ecologist and Project Manager with McCarthy O'Sullivan Ltd. with twelve years of experience in environmental consultancy. Dervla graduated with a first class honours B.Sc. in Environmental Science from NUI, Galway in 2005 and joined Keville O'Sullivan Associates in the same year. Dervla has gained extensive experience in the project management and ecological assessment of the impacts of various infrastructural projects including wind energy projects, water supply schemes, road schemes and housing developments nationwide and has also been involved in the compilation of Environmental Impact Statements, with emphasis on sections such as Flora and Fauna, and acted as EIS co-ordinator on many of these projects. Dervla has also provided site supervision for infrastructural works within designated conservations areas, in particular within aquatic habitats, and has also been involved in the development of environmental/ecological educational resource materials and major ecological surveys of inland waterways. Currently, Dervla is responsible for coordinating ecological work, in particular ornithological surveys required on major infrastructural projects, with emphasis on wind energy projects. Dervla's key strengths and areas of expertise are in project management, project strategy, business development and survey co-ordination to ensure the efficient operation of the Ornithology team's field survey schedule. Dervla holds full membership of the Chartered Institute of Ecology and Environmental Management.

Karen Mulryan BA MSc ACIfA IAI

Karen is a Project Environmental Scientist with MKO with over 6 years' experience in the consultancy sector. Karen holds a BA International in Archaeology from NUI Galway and a MSc in Archaeology from the University of Edinburgh. Karen has experience project managing large scale SID wind applications, coordinating environmental impact assessment reports, site investigation work, and regularly undertakes wind energy site selection and feasibility assessments. Since joining MKO, Karen has gained experience managing and assisting managers on wind farm projects of various scales including SID applications across Ireland. Karen's previous project management role included coordinating Environmental Assessments and site work for a wide range of developments such as solar, energy storage, single wind applications, retail, EV stations etc., for full, amendment, RFI, Clarification FI, exempted development and SID applications in Ireland and the UK. Karen has experience in report writing, input into EIAR chapters, feasibility studies and EIA screening reports, liaising with planning authorities and managing subconsultants. Karen has a wide range of experience in the commercial sector including watching briefs on behalf of SouthEast Water England; watching briefs during the ground works of a solar farms in the UK; field excavation and survey of Iron Age, Roman and Medieval sites in Ireland and the UK; and desk-based assessments and heritage walk over surveys. Karen holds memberships with the Chartered Institute for Archaeologists (ACIfA) and the Institute of Archaeologists of Ireland (IAI).

John Willoughby – Project Planner

John is a Project Planner in MKO with over 6 years' experience across planning consultancy and environmental management. John holds a BA (Hons) in Geography, Planning and Environmental Policy, and an MSc (Hons) in Environmental Policy, both from UCD, and recently completed an Advanced Diploma in Planning and Environmental Law at Kings Inns. Prior to taking up his position with MKO in 2022, John worked in planning consultancy since 2017, managing and assisting with the coordination of development projects throughout the statutory planning process, from feasibility stage to final grant and planning compliance, carrying out due diligence, feasibility assessments, development potential reports, appeals, submissions and bespoke planning advice on a wide range of development projects. John also

has previous experience in environmental management in both the Pharmaceutical and Infrastructure sectors. Through both his professional and academic experience, John has gained skills in urban planning, Environmental Impact Assessment, regeneration, development management, project management, strategic planning and policy research. John is a corporate member of the IPI with specialist knowledge in national, regional and local planning policy and guidance, development management and strategic planning analysis for a wide range of projects across the residential, commercial, mixed-use, retail and renewable energy sectors. Within MKO, John works as part of a larger multidisciplinary team to coordinate the development of planning applications for renewable energy infrastructure for submission to both Local Authorities and An Bord Pleanála.

Mary Kelleher

Mary Kelleher is a Planner with MKO since graduating in 2022. Mary is a chartered town planner with experience across a range of sectors including renewable energy, residential, and commercial developments. Since joining MKO Mary has been working on various projects including Large Scale Residential Developments, Solar Energy and Wind Farm Projects, lodgement and management of Planning Applications, Development Plan Submissions and preparing Development Potential Reports. Mary holds chartered membership with the Royal Town Planning Institute and with the Irish Planning Institute.

Jack Workman BSc MSc CIWEM

Jack Workman is an Environmental Scientist with MKO, he took up his position in February 2020. Upon completion of his MSc. in Coastal and Marine Environments, Jack worked as a freelance research assistant and geospatial analyst on a collection of research projects at the National University of Ireland Galway. Jack has previous experience in the coastal engineering sector with Royal Haskoning DHV and Saltwater Technologies. Jack's key strengths and expertise lie in report writing, GIS mapping, scientific research, UAV remote-sensing, coastal geomorphology and physical oceanography. Jack's primary role at MKO is within the landscape team where he produces the LVIA chapter of EIA reports. Since joining MKO, Jack has been involved in a range of renewable energy infrastructure projects, working as part of a large multi-disciplinary team.

Padraig Cregg B.Sc. (Zoo.), M.Sc. (Eco.)

Padraig Cregg is a Senior Ornithologist with McCarthy O'Sullivan Ltd. with over 8 years of experience in both private practice and NGOs. Padraig holds a BSc (Hons) in Zoology and Masters in Evolutionary and Behavioural Ecology. Prior to taking up his position with McCarthy Keville O'Sullivan in December 2018, Padraig worked as a Senior Ornithologist and held previous posts with TOBIN Consulting Engineers, Energised Environments Ltd in Scotland, WSP Environment and Energy Ltd in Scotland and BirdWatch Ireland. Padraig has specialist knowledge in designing, executing and project managing ornithological assessments, primarily in the renewable industry. Padraig's key strengths and areas of expertise are in ornithology and ecology surveying and in writing Natura Impact Statements (NIS) and the Biodiversity chapter of Environmental Impact Assessment Reports (EIAR) to accompany planning applications. Since joining MKO Padraig has been involved in designing, executing and project managing the ornithological assessment on over 20 proposed wind farm developments. He has played a key role in project managing these planning applications through the statutory planning system, with more projects in the pipeline. Within MKO Padraig plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIAR and NIS Reports.

Patrick Manley BSc

Patrick Manley is a Project Ornithologist at MKO. He attended University College Dublin where he completed a BSc (Hons) in Geology. Patrick has over five years' experience working with MKO in designing and executing ornithological surveys, primarily within the renewables sector. Patrick has also worked on ornithological chapters of Environmental Impact Assessment Report (EIAR) to accompany planning applications. Within his role as Project Ornithologist, Patrick is responsible for managing a number of bird survey works at wind farm sites, including preparing scope of works for surveys, coordinating surveys and access, liaising with clients and preparing reports.

John Hynes M.Sc. (Ecology), B.Sc.

John Hynes is a Senior Ecologist with McCarthy O'Sullivan Ltd. with over 7 years of experience in both private practice and local authorities. John holds a B.SC in Environmental Science and a M.Sc. in Applied Ecology. Prior to taking up his position with MKO in March 2014, John worked as an Ecologist with Ryan Hanley Consulting Ltd. and Galway County Council. John has specialist knowledge in Flora and Fauna field surveys. Geographic Information Systems, data analysis, Appropriate Assessment, Ecological Impact Assessment and Environmental Impact Assessment. John's key strengths and areas of expertise are in project management. GIS and impact assessment. Since joining MKO John has been involved as a Senior Ecologist on a significant range of energy infrastructure, commercial, national roads and private/public development projects. Within MKO John plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIS Reports. John has project managed a range of strategy and development projects across the Ireland and holds CIEEM membership.

Donnacha Woods BSc (Zoology), MSc (Biodiversity and Conservation)

Donnacha Woods is a Project Ornithologist with MKO having joined the company in August 2020. He holds a BSc (Hons) in Zoology, and a MSc (Hons) in Biodiversity and Conservation where he focused his studies on feather morphology and its implications on bird flight. Donnacha's key strengths and expertise are bird surveying and identification, survey design, data analysis and report writing. Since joining MKO, Donnacha has been involved in a range of wind energy projects, in addition to projects in the education and housing sectors. In his role as a project manager, Donnacha works with and co-ordinates a team within MKO's Ornithological department, as well as sub-contractor ornithologists, in the collection and analysis of data for the production of EIAR Bird chapters, Natura Impact Statements and other reports as required.

Sarah Mullen B.Sc. (Botany), M.Sc. (Biodiversity and Conservation) Ph.D. (Botany)

Sarah is a Project Ecologist with MKO with over 5 years of experience in ecological consultancy. Sarah holds a B.Sc. (Hons) in Botany, an M.Sc. in Biodiversity and Conservation and a Ph.D. in Botany, in which she investigated the role of biodiversity in the functioning of plant-pollinator interactions in semi-natural grassland habitats. Prior to taking up her position with MKO in September 2018, Sarah worked as an Ecologist with Ryan Hanley Ltd. where she gained experience in multidisciplinary ecological surveys, ecological impact assessment and appropriate assessment. Since joining MKO Sarah has been responsible for the management and undertaking of flora, fauna and habitat surveys for a range of projects including energy infrastructure and public and private residential developments and for the preparation of Ecological Impact Assessments, Stage 1 and Stage 2 Appropriate Assessment reports and Biodiversity/Habitat Management Plans. Sarah's key strengths and areas of expertise are in terrestrial flora and fauna ecology, including vegetation surveys, habitat mapping, invasive species surveys, mammal surveys, Appropriate Assessment and Ecological Impact Assessment. She holds membership with the Chartered Institute of Ecology and Environmental Management.

Owen Cahill B.Sc M.Sc.

Owen is an Environmental Engineer with McCarthy O'Sullivan Ltd. with over 12 years of experience in the environmental management and construction industries. Owen holds BSc. (Hons) and MSc. in Construction Management and a Masters in Environmental Engineering. Prior to taking up his position with MKO in October 2013, Owen worked as an Environmental Officer with Kepak and prior to which he held a post with Pentland Macdonald Contaminated Land & Water Specialist in Northern Ireland. Prior to working in planning and environmental consultancy, Owen was employed within the construction industry where he gained significant experience on a variety of civil, residential and commercial projects. Owen's wide ranging multi sector experience has provided him with specialist knowledge and understanding of the challenges in the planning and delivery of developments with the minimum environmental impact and with practicality and constructability in mind. Owen's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy & solar energy construction & environmental management planning and waste permit management. Since joining MKO Owen has been involved as a Project Manager on a range of energy infrastructure, commercial, residential, waste facility and quarry projects as well as managing the licensing requirements of a number of EPA licensed facilities. Within MKO Owen plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIS Reports. Owen has project managed the Environmental Impact Assessment of a range of development projects across the Ireland and holds Affiliate Membership with the Institute of Environmental Management & Assessment and is currently awaiting interview and assessment to become a Full Member and Chartered Environmentalist.

Aoife Joyce B.Sc M.Sc.

Aoife Joyce is a Graduate Ecologist with MKO Planning and Environmental Consultants with experience in research, consultancy and drilling contractors. Aoife is a graduate of Environmental Science (Hons.) at NUI Galway, complemented by a first class honours MSc in Agribioscience. Prior to taking up her position with MKO in May 2019, Aoife worked as an Environmental Scientist with Irish Drilling Ltd. and held previous posts with Inland Fisheries Ireland and Treemetrics Ltd. She has a wide range of experience from bat roost identification, acoustic sampling, soil and water sampling, Waste Acceptability Criteria testing, electrofishing, mammal and habitat surveying to GIS, Environmental Impact Assessments (EIAs) and mapping techniques. Since joining MKO, Aoife has been involved in deploying bat detectors and weather stations nationwide, dawn and dusk bat detection surveys, sound analysis, mapping and report writing. Within MKO, she works as part of a multidisciplinary team to help in the production of ecological reports and assessments. Aoife is a member of Bat Conservation Ireland and Qualifying CIEEM.

James Newell Dip Art and Design, 2D, 3D CAD

James Newell is a Graphic Technician with MKO Ltd. with over 20 years of experience in private practice. Prior to joining MKO, James worked as a graphic designer and illustrator for over eight years. His previous experience included graphic design & typesetting of both print & web associated with his graphic design position, in addition to illustration of a number of children's books. He originally joined the Company as a CAD Technician; however his role was extended to include Information Technology for MKO as well as design work on projects, including public consultation projects. He is responsible for all mapping and drawings completed by the company and is proficient in the use of GIS mapping software in addition to AutoCAD and other design and graphics packages.

Joseph O'Brien BA (Modelmaking, Design and Digital Effect)

Joseph O'Brien joined MKO in 2016 and holds the position of CAD Technician. Joseph holds a BA Honours Level 8 Modelmaking, Design and Digital Effect, Institute of Art Design and Technology (IADT), Dun Laoghaire & City & Guilds Level 3 2D &3D AutoCAD certificates. Joseph's role entails various wind and solar farm projects which require various skills such as mapping, aerial registration and detailed design drawings for projects.

Darragh Buckley B. Eng. (Video and Sound Technology)

Darragh Buckley currently holds the role of Graphics Technician within MKO. Darragh has achieved a B. Eng. in Video and Sound Technology awarded from the Limerick Institute of Technology. Prior to taking up his position with MKO in November 2019, Darragh worked as a graphic designer within the design and print industry. Darragh has worked for print / design companies such as Cube Printing (Limerick) and Dyna Signs (Galway), as well as operating his own freelance design business. His key skills involve the proficient use of the Adobe Suite, e.g. Photoshop, InDesign, and Illustrator. These acquired skills have greatly benefited him when applying them to the production of EIAR Photomontages, Website design and other MKO graphic requirements.

1.8.2.2 Hydro Environmental Services

Michael Gill

Michael Gill is an Environmental Engineer with over 12 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms in Ireland. He has also managed EIA/EIS assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, wetland hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions.

David Broderick

David Broderick is a hydrogeologist with over seven years' experience in both the public and private sectors. Having spent two years working in the Geological Survey of Ireland working mainly on groundwater and source protection studies. David moved into the private sector. David has a strong background in groundwater resource assessment and hydrogeological/hydrological investigations in relation to developments such as quarries and wind farms. David has completed numerous geology and water sections for input into EIAs for a range of commercial developments.

Adam Keegan

Adam Keegan is a hydrogeologist with two years of experience in the environmental sector in Ireland. Adam has been involved in Environmental Impact Assessment Reports (EIARs) for numerous projects including wind farms, grid connections, quarries and small housing developments. Adam holds an MSc in Hydrogeology and Water Resource Management. Adam has worked on several wind farm EIAR projects, including Croagh WF, Lyrenacarriga WF (SID), Cleanrath WF, Carrownagowan WF (SID), and Fossy WF.

1.8.2.3 Fehily Timoney & Company

Fehily Timoney & Company Ltd. (FT) recently acquired AGEC Ltd. adding to their growing geotechnical team. The geotechnical aspects of the project, which have been incorporated into the Land, Soils and Geology Chapter and the Hydrology and Hydrogeology Chapter of the EIAR, were completed by Fehily Timoney & Company Ltd. FT (previously AGEC) has extensive experience in the production of Peat Stability Assessments for wind energy developments. They provide specialist geotechnical engineering and engineering geology advice to local authorities, contractors and consultants, particularly for infrastructure projects forming part of the National Development Plan and also for private commercial and residential developments as they move on to sites with more complex ground conditions.

Ian Higgins

Ian is a geotechnical engineer with 20 years' experience in the design and supervision of construction of bulk earthworks, geotechnical foundation design, geotechnical monitoring and reviewing, reinforced earth design, slope stability assessments and 3rd party checking of piling and ground improvement designs. Ian's experience also includes the design, supervision and interpretation of ground investigations, including desk studies, walkover surveys, hazard mapping of rock excavations and slopes. Ian has experience in many areas of civil engineering including highways, railways, energy projects and commercial developments.

1.8.2.4 AWN Consulting Ltd.

Mike Simms

Mike Simms BE MEngSc MIOA MIET, Senior Acoustic Consultant at AWN, who has worked in the field of acoustics for over 19 years and has been a consultant since 1998. He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, energy, industrial, commercial and residential.

Dermot Blunnie

Dermot Blunnie (Senior Acoustic Consultant) holds a BEng. from the University of South Wales, a M.Sc. from the University of Derby and IOA Diploma in Acoustics and Noise Control from the Institute of Acoustics. He has over 11 years' experience as an acoustic consultant and is a member of the Institute of Acoustics. He has extensive knowledge and experience in relation to commissioning noise monitoring and impact assessment of wind farms as well as a detailed knowledge of acoustic standards and proprietary noise modelling software packages. He has commissioned noise surveys and completed noise impact assessments for numerous wind farm projects within Ireland.

Donogh O' Casey

Donogh Casey (Acoustic Technician) has responsibility for the Noise Survey team within AWN Consulting. He is an affiliated member of the Institute of Acoustics with four years' experience in the field of acoustics. He has extensive experience in environmental noise impact assessment, industrial/manufacturing and renewable energy noise source projects. He is also a registered sound insulation tester under the Sound Insulation Testing Register, Ireland (SITRI).

1.8.2.5 Tobar Archaeological Services

Tobar Archaeological Services is a Cork-based company entering its ninth year in business. They offer professional nationwide services ranging from pre-planning assessments to archaeological excavation, and cater for clients in state agencies, private and public sectors.

Tobar's Directors, Annette Quinn and Miriam Carroll, are licensed by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs to carry out excavations in Ireland and have carried out work directly for the National Monuments Services of the Department of the Environment, Heritage and Local Government. Tobar Archaeological Services has a proven track record and extensive experience in the wind farm industry from EIAR stage through to construction stage when archaeological monitoring is frequently required.

Annette Quinn

Annette Quinn is a partner of Tobar Archaeological Services which was established in 2003. Prior to that Annette worked in the field of commercial archaeology for five years in University College Cork where she completed her primary and Masters degrees. Her primary degree consisted of a joint honours degree in Geography and Archaeology. Annette's Masters degree focused on the study of two medieval populations looking at the human remains from both St Mary's of the Isle in Cork City and Tintern Abbey, Co. Wexford. Annette has over 24 years of experience in the field of archaeology, with 19 of those as partner of Tobar Archaeological Services. She is a full member of the Institute of Archaeologists of Ireland (IAI) and is licensed by the National Monuments Service to carry out excavations in Ireland. Annette spent a substantial time in her career excavating for the National Monuments Service under the OPW in Boyle Abbey, Co Roscommon. This project took place between 2006 and 2014 and was one of Ireland's (and Europe's) largest conservation project. Annette is also experienced in GIS (ArcGIS) and GPS survey as well as viewshed analysis. EIARs are currently the largest part of Annette's work brief mainly for wind and solar farms as well as 110kV and 400kV Overhead lines projects. Annette has also presented evidence at Oral Hearings for such projects in the past. Tobar Archaeological Services are currently on the Framework for numerous state and semi-state bodies such as Irish Rail, ESB Networks, Irish Water to name a few and have worked directly for the National Monuments Service (governing bodies for all licensed archaeologists). She is also a fully trained First Aid Responder (formerly occupational First Aid) and trained in the use of AEDs.

Miriam Carroll

Miriam Carroll is a partner of Tobar Archaeological Services which was established in 2003. Prior to that Miriam worked in the field of commercial archaeology for five years in University College Cork where she completed her primary and Masters degrees. Miriam has over 24 years of experience in the field of archaeology, with 19 of those as partner of Tobar Archaeological Services. She is a full member of the Institute of Archaeologists of Ireland (IAI) and is licensed by the National Monuments Service to carry out excavations in Ireland. Miriam undertook her primary degree in Archaeology (major) and English (minor) between 1993 and 1996. Her Masters degree was also undertaken in University College Cork. This was a 2 year course in Irish Archaeology. The subject of Miriam's thesis focused on 'Ballyalton Bowls' (prehistoric pottery) in the context of the Irish Neolithic. This Masters degree was undertaken between 1996 and 1998. Miriam then went on to work in commercial archaeology in the Archaeological Services Unit of University College Cork for 5 years after which both Annette Quinn and Miriam set up the business Tobar Archaeological Services in 2003. She is a full member of the Institute of Archaeologists of Ireland (IAI) and is licensed by the National Monuments Service to carry out excavations in Ireland. Miriam has overseen numerous commercial projects in Ireland including wind, solar and overhead line projects. Miriam was the project archaeologist for the Bandon Sewerage Scheme which lasted a number of years. This required a high-level of experience and organization as well as the resolution of parts of the 17th century town wall and other additional significant finds in a timely and efficient manner. Miriam also successfully managed a major excavation in Buttevant, Co. Cork for the Cork Education and Training board as well as being the project archaeologist for Fota Wildlife park extension from 2014. This involved project management of a large team of archaeologists on a medieval settlement site. Miriam has also undertaken numerous EIARs and has presented evidence at numerous Oral Hearings for bodies such as Eirgrid.

1.8.2.6 Alan Lipscombe Traffic and Transport Consultants

In January 2007 Alan Lipscombe set up an independent traffic and transportation consultancy providing advice for a range of clients in the private and public sectors.

Prior to this Alan was a founding member of Colin Buchanan's Galway office having moved there as the senior transportation engineer for the Galway Land Use and Transportation Study. Since the completion of that study in 1999, Alan has worked throughout the West of Ireland on a range of projects including: major development schemes, the Galway City Outer Bypass, Limerick Planning Land-Use and Transportation Study, Limerick Southern Ring Road Phase II, cost benefit analyses (COBA) and various studies for the NUI Galway. Before moving to Galway in 1997, Alan was involved in a wide variety of

traffic and transport studies for CBP throughout the UK, Malta and Indonesia. He has particular expertise in the assessment of development related traffic and transport modelling, including for numerous wind farm developments, and is an accomplished analyst who has experience of a wide variety of modelling packages and methods.

1.9 Difficulties Encountered

There were no difficulties encountered during the preparation of this EIAR.

1.10 Viewing and Purchasing the EIAR

Copies of this EIAR will be available online, including the Non-Technical Summary (NTS), on the website of An Bord Pleanála, under the relevant Planning Reference Number (to be assigned on lodgement of the application).

- An Bord Pleanála: http://www.pleanala.ie/

This EIAR and all associated documentation will also be available for viewing at the offices of An Bord Pleanála, Meath County Council and Westmeath County Council. The EIAR may be inspected free of charge or purchased by any member of the public during normal office hours at the following address:

- An Bord Pleanála,
- 64 Marlborough Street,
- St. Rotunda,
- Dublin 1

- Meath County Council,
- Buvinda House,
- Dublin Road,
- Navan, Co. Meath, C15 Y291

- Westmeath County Council,
- Aras An Chontae,
- Mount St,
- Mullingar,
- Co. Westmeath.

The EIAR will also be available to view online via the Department of Planning, Housing and Local Government's EIA Portal, which will provide a link to the planning authority's website on which the application details are contained. This EIA Portal was recently set up by the Department as an electronic notification to the public of requests for development consent which are accompanied by an EIAR.

(https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal)

The EIAR will also be available to view online on the Ballivor Wind Farm dedicated SID website: www.ballivorwindfarmplanning.ie/