Planning and Environmental Consultants

Environmental Impact Assessment Report

Carrig Renewables Wind Farm

Chapter 1 - Introduction

DOCUMENT DETAILS

Client:	**Carrig Renewable Energy Ltd**
Project Title:	**Carrig Renewables Wind Farm**
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Planning and Environmental Consultants

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01	Final	18.09.2023	JF	EM

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1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of Carrig Renewable Energy Ltd, who intend to apply to both Tipperary County Council (TCC) and Offaly County Council (OCC) for planning permission to construct a renewable energy development which will comprise 7 No. wind turbines, and associated infrastructure south of the village of Carrig, Co. Tipperary. The proposed development is being brought forward in response to regional, national, and European policy regarding Irelands transition to a low carbon economy and associated climate change policy objectives.

The majority of the proposed development including the 7 no. turbines and associated infrastructure, on-site substation and 10.1 kilometres (km) of the underground grid connection cabling route is located in Co. Tipperary and will be the subject of an application for planning permission to TCC. The remaining 3.6km of the grid connection cabling route is located in Co. Offaly and will be the subject of an application for planning permission to OCC.

Both planning applications are accompanied by this EIAR. The planning applications are also accompanied by a Natura Impact Statement ('NIS').

Full details of the pre-application consultation undertaken with regards both planning applications can be found in Section 2.5.2 in Chapter 2 of this EIAR.

1.1.1 References to Proposed Development

For the purposes of this EIAR, where the 'Proposed Development' is referred to, this relates to turbines, access roads, temporary construction compounds, meteorological mast, junction accommodation works, spoil management, tree felling, site drainage, battery energy storage system, 38kV onsite substation and associated underground 38kV cabling connecting to the existing Dallow 110kV Substation. The Proposed Development is described in detail in Chapter 4 of this EIAR.

This EIAR, along with a Natura Impact Statement ('NIS'), will accompany the applications for planning permission for the Proposed Development which will be made to the local authorities. Both the EIAR and NIS contain the information necessary for the local authorities to complete the Appropriate Assessment and Environmental Impact Assessment as required for this planning permission application.

Both the EIAR and NIS take into account the combined impacts of these individual elements of the Proposed Development.

For clarity in this EIAR, all elements of the Proposed Development will be assessed cumulatively and in combination with other plans and projects to aid the local authorities in carrying out an EIA.

The EIAR Site Boundary identifies the primary EIAR site area for the Proposed Development, however, each individual topic, i.e., chapter, has its own study area for assessment purposes relevant to that topic which will be clearly identified in the relevant chapters. The actual site outline (red line boundary) for the purposes of the two planning permission applications occupies a smaller area within the primary EIAR Site Boundary. The EIAR Site Boundary encompasses an area of approximately 315 hectares (ha). The permanent footprint of the Proposed Development measures approximately 7.18 ha, which represents approximately 2.3% of the Site.

The Proposed Development is described in detail in Chapter 4 of this EIAR.

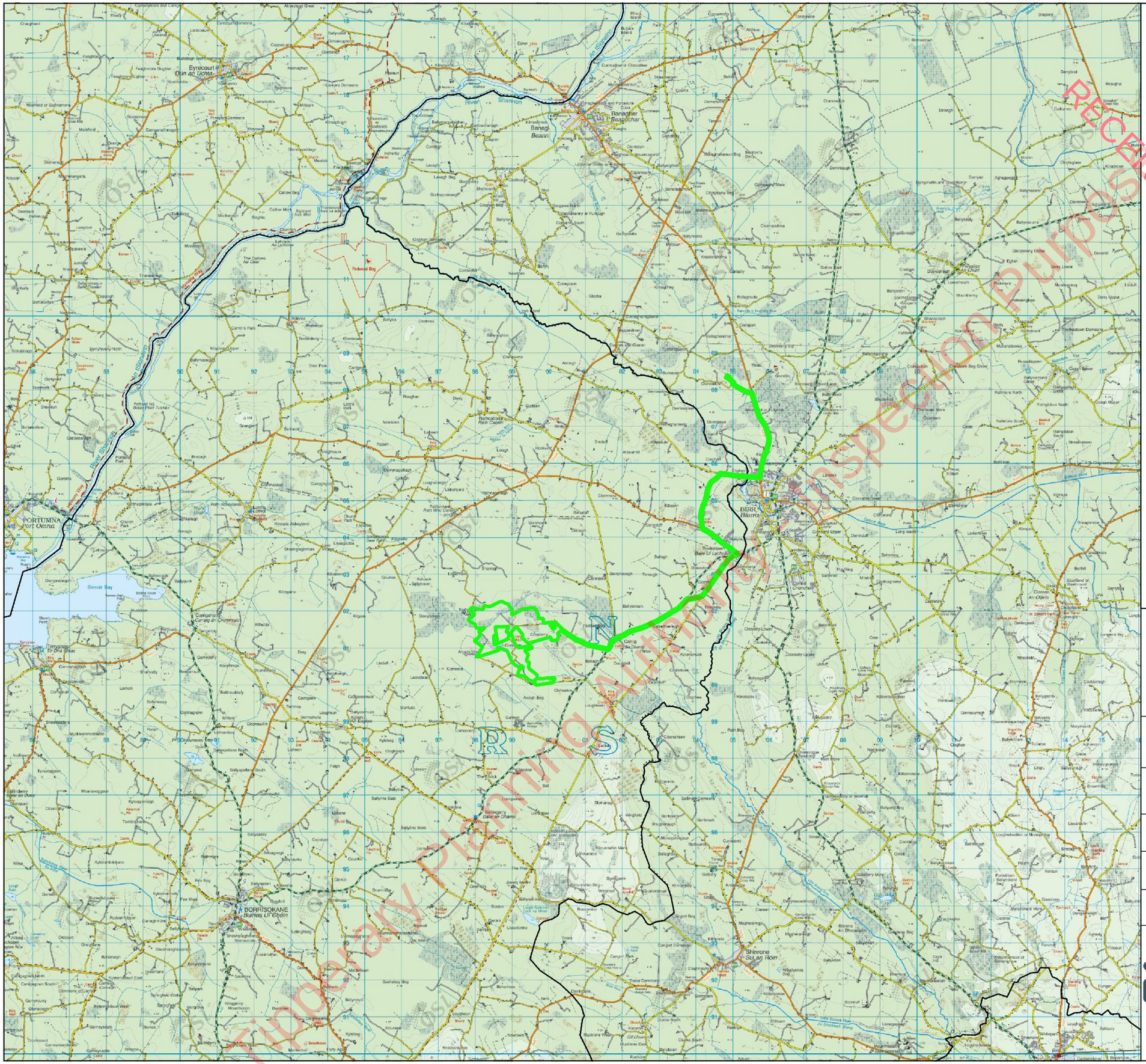
1.1.2 Proposed Development Site Location

The core of the Proposed Development site is located approximately 2 kilometres west of the village Carrig, Co. Tipperary, 5.7 kilometres to the southwest of Riverstown, Co Tipperary and 7 kilometres southwest of Birr, Co. Offaly. It is proposed to access the Proposed Development via a new access track off the L5040 Local Road to the southeast of the Proposed Development. The Proposed Development is served by a number of existing public and agricultural roads and tracks. A site location context map is included as Figure 1-1. A site location map is included as Figure 1-2. The core of the EIAR Site Boundary is shown overlain on aerial imagery in Figure 1-3. For clarity, the planning application boundary is shown on Figure 1-4.

The grid connection includes for underground 38kV cabling from the proposed onsite 38kV substation, in the townland of Faddan More, to the existing Dallow 110kV substation in the townland of Clondallow, County Offaly. The underground cabling route to Dallow, measuring approximately 13.7km in length, is primarily located within the public road corridor.

Current land-use on the Proposed Development comprises coniferous forestry, peat-cutting and agriculture. Current land-use along the grid connection comprises of public road corridor, public open space, discontinuous urban fabric, and agriculture. Land-use in the wider landscape of the Site comprises a mix of agriculture, peat cutting, quarrying, low density residential and commercial forestry.

The townlands in which the Proposed Development is located are listed in Table 1-1.



Map Legend

- EIAR Site Boundary
- County Boundary

Drawing Title

Site Location Context

Project Title

Carrig Renewables Wind Farm

Drawn By	Checked By
JF	EM
Project No.	**Drawing No.**
211016	Fig. 1-1
Scale	**Date**
1:100,000	2023-09-12

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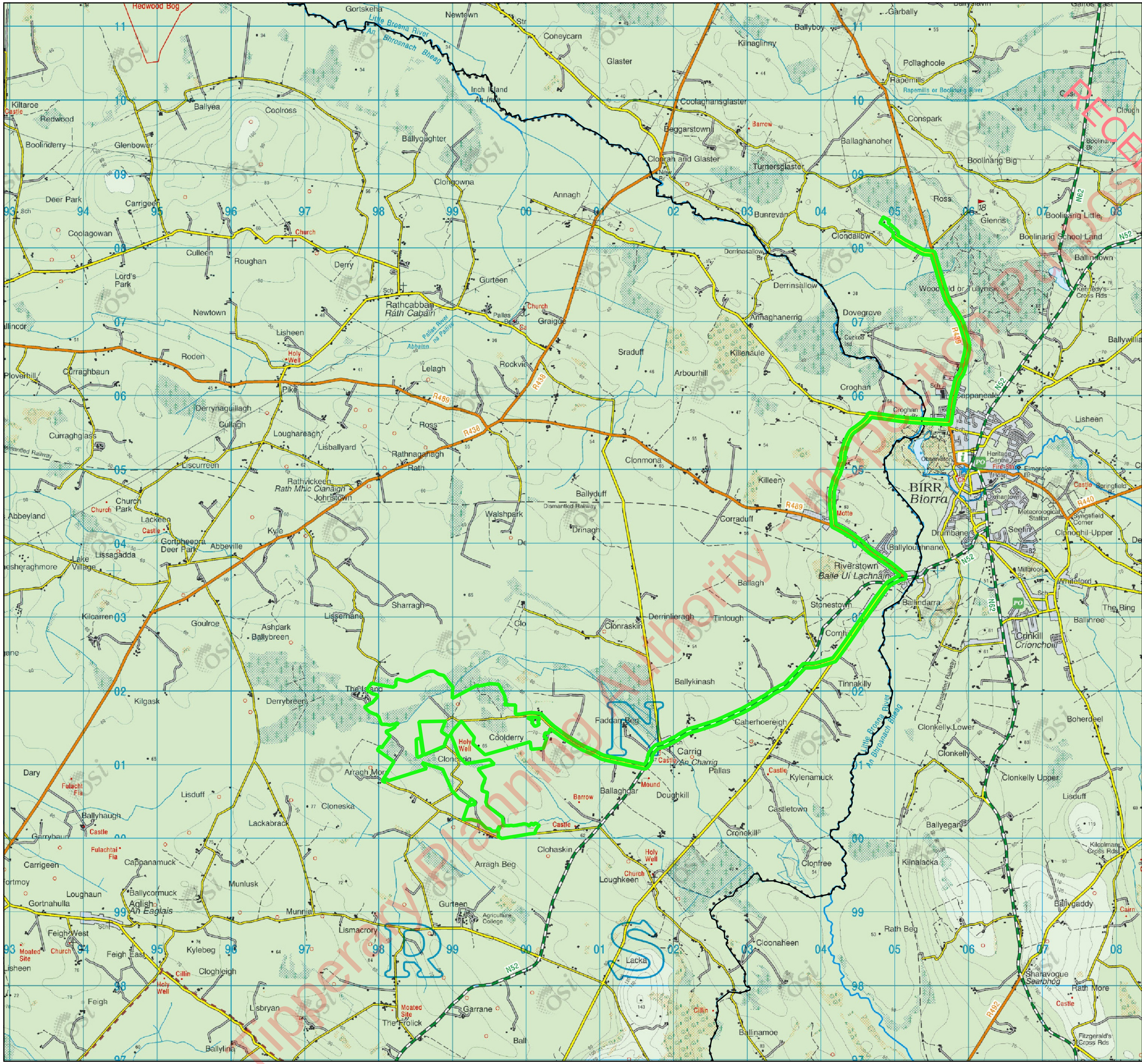

Map Legend

- EIAR Site Boundary
- County Boundary

Drawing Title	
Site Location	
Project Title	
Carrig Renewables Wind Farm	
Drawn By: JF	Checked By: EM
Project No.: 211016	Drawing No.: Fig. 1-2
Scale: 1:50,000	Date: 2023-09-12

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Map Legend

EIAR Site Boundary

Drawing Title

Core of the EIAR Site Boundary

Project Title

Carrig Renewables Wind Farm

Drawn By	Checked By
JF	EM
Project No.	**Drawing No.**
211016	Fig. 1-3
Scale	**Date**
1:12,500	2023-09-18

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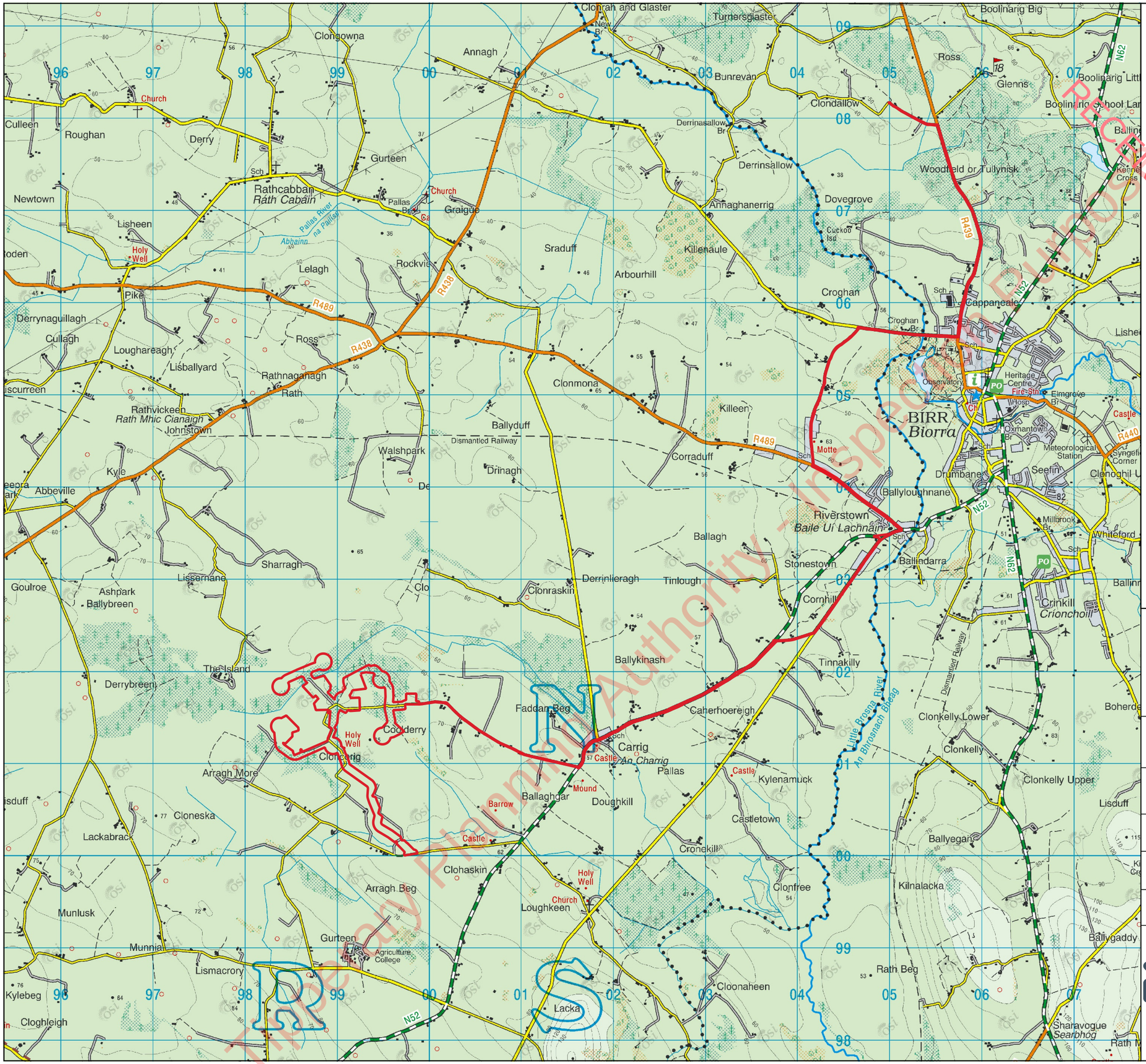

Map Legend

— Planning Application Boundary

Drawing Title

Planning Application Boundary

Project Title

Carrig Renewables Wind Farm

Drawn By	Checked By
JF	EM
Project No.	**Drawing No.**
211016	Fig. 1-4
Scale	**Date**
1:40,000	2023-09-13

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Table 1-1 Townlands within which the Proposed Development is Located

Development Works	Townlands in Co. Tipperary	Townlands in Co. Offaly
Wind Farm		
Wind Turbines, Access Roads, Temporary Construction Compounds, Permanent Meteorological Mast, Underground Cabling, Spoil Management, Tree Felling, Site Drainage and Operational Stage Site Signage.	Lissernane, Sharragh, Faddan More, Coolderry, Cloncorig, Arragh More, Clohaskin	N/A
Grid connection		
Onsite 38kV Substation and Battery Energy Storage System	Faddan More	N/A
Underground 38kV Cabling Route connecting to the existing Dallow 110kV substation	Faddan More, Ballaghgar, Doughkill, Faddan Beg, Caherhoereigh, Ballykinash, Tinlough, Cornhill, Tinnakilly, Killeen, Ballyloughnane, Croghan.	Townparks, Dovegrove, Woodfield or Tullynisk, Clondallow
Turbine Delivery		
Accommodation works to facilitate the delivery of large turbine components and other abnormally sized loads	Ballyloughnane	N/A

1.2 Legislative Context of Environmental Impact Assessment

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 Act 2000 as amended and the Planning and Development Regulations 2001 as amended. Directive 2011/92/EU was amended by Directive 2014/52/EU which has been transposed into Irish law with the recent 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 with a number of other provisions coming into operation on the 1st of January 2019.

This EIAR complies with the EIA Directive as amended by Directive 2014/52/EU.

The Environmental Impact Assessment (EIA) of the Proposed Development will be undertaken by both Tipperary and Offaly County Councils.

Article 5 of the EIA Directive 2011/92/EU 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, Article 94 of the Planning and Development Regulations 2001 (as amended) sets out the information to be contained in an EIAR, with which this EIAR complies.

MKO was appointed as environmental consultant on the Proposed Development and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive 2011/92/EU as amended by Directive 2014/52/EU.

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 the Schedule. The Proposed Development exceeds 5 Megawatts in scale and proposes more than 5 turbines, and therefore is subject to EIA.

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 EIA of the Proposed Development.

All elements of the Proposed Development have been assessed as part of this EIAR.

1.2.1 EIAR Guidance

The Environmental Protection Agency (EPA) published its *'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* in May 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 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 the EIAR in accordance with these guidelines also.

1.2.2 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 been taken into account during the preparation of this EIAR.

The '*Wind Energy Development Guidelines for Planning Authorities'* (DoEHLG, 2006) were the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments were outlined in the document Draft Wind Energy Development Guidelines (December 2019) (referred to as the Draft Guidelines). A consultation process in relation to the Draft Guidelines closed on 19th February 2020. The proposed changes presented in the Draft Guidelines give certain focus on the setback distance from residential properties (four times the proposed maximum tip height), along with shadow flicker and noise requirements relative to sensitive receptors.

At time of writing, the Draft Guidelines have not yet been adopted, and the relevant guidelines for the purposes of section 28 of the Planning and Development Act 2000, as amended, remain those issued in 2006. 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 in 2024 (refer to Section 1.4.3.2 below), it is possible that the Draft Guidelines are adopted during the consideration period for the current planning application. Should the Draft Guidelines be adopted in advance of a planning decision being made on the Proposed Development, it will be capable of achieving the noise and shadow flicker requirements of the new guidelines.

The distance from proposed turbines to third party sensitive receptors will achieve the proposed 4 times turbine tip height and any revised noise and shadow flicker requirements can be achieved by implementing mitigation through use of the turbine control systems.

1.3 The Applicant

The applicant for the Proposed Development, Carrig Renewable Energy Ltd, is a subsidiary of Atlantic Infrastructure Renewables Ltd. (AIR), which is an Irish-owned, Limerick-based company.

AIR invests in infrastructure projects across Ireland. Our projects help deliver high-quality infrastructure assets that are essential to society and the communities where they are located. AIR helps bridge funding, capacity and delivery gaps and provides critical infrastructure ahead of when others might have been able to so.

1.4 Brief Description of the Proposed Development

The Proposed Development will comprise the construction of 7 No. wind turbines with a maximum blade tip height of up to 185 metres and all associated works and a 38 kV substation and associated works, including underground 38kV cabling to connect to the national grid at Dallow 110kV substation. The full description of the Proposed Development is detailed in Chapter 4 of this EIAR. The project description for the Proposed Development planning application as appears in the public notice is as follows:

Proposed Development –Project Description

i. *The construction of 7 no. wind turbines and associated hardstand areas with the following parameters (all within Co. Tipperary):*
   a) *Total tip height range of 179.5m – 185m,*
   b) *Rotor diameter range of 149m – 163m*
   c) *Hub height range of 103.5m to 110.5m*
ii. *1 no. permanent 38kV electrical substation which will be constructed in the townland of Faddan Beg, Co. Tipperary. The proposed electrical substation consists of a single storey control building with welfare facilities, all associated electrical plant and equipment, battery energy storage system, security fencing, all associated underground cabling, wastewater holding tank and all ancillary works and equipment;*
iii. *All works (within County Tipperary and Co. Offaly) associated with the connection of the proposed wind farm to the national electricity grid, via the provision of underground electrical cabling (38kV) to the existing Dallow 110kV substation in the townland of Clondallow, Co. Offaly;*
iv. *Provision of 14 no. joint bays, communication chambers and earth sheath links along the underground electrical cabling route (within Co. Tipperary and Co. Offaly);*
v. *Reinstatement of the road or track surface above the proposed cabling trench along existing roads and tracks;*
vi. *All associated underground electrical and communications cabling connecting the turbines to the proposed wind farm substation (within Co. Tipperary);*
vii. *1 no. meteorological mast with a height of 107m above ground and associated foundation and hard-standing area (within Co. Tipperary);*
viii. *Upgrade of existing tracks and roads and the provision of new site access roads (within Co. Tipperary);*
ix. *All works associated with the provision of a new permanent site entrance off the L5040 local road (within Co. Tipperary);*
x. *Provision of 5 no. new access and egress points along the L5041 local road in the townlands of Cloncorig, Faddan More and Coolderry (within Co. Tipperary);*
xi. *Provision of 4 no. peat repository areas and 3 no. spoil repository areas (within Co. Tipperary);*
xii. *2 no. temporary construction compounds with temporary site offices and staff facilities (within Co. Tipperary);*
xiii. *Accommodation works along the public road network along the N52 national secondary road in the townland of Ballyloughnane to facilitate the delivery of turbine components and other abnormal sized loads (within Co. Tipperary);*
xiv. *Site Drainage;*
xv. *Tree Felling (within Co. Tipperary);*
xvi. *Operational stage site signage; and,*
xvii. *All associated site development works, ancillary works and apparatus.*

This application is seeking a ten-year permission and 35-year operational life from the date of commissioning of the wind farm development.

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 the 35-year operational life that is being sought as part of the planning application.

Modern wind turbine generators currently have a typical generating capacity in the 5 to 7 MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by the turbine manufacturers. For the purposes of this EIAR it is assumed that the wind turbine model installed as part of the Proposed Development will have an output of 6.2MW. Therefore, on this basis, the proposed 7 no. wind turbines would have a combined generating capacity of 43.4MW. The actual turbine procured as part of a competitive tender process may have a power output that is marginally

lower or greater than the 6.2MW turbine described in the EIAR. Irrespective of the power output of the actual turbine procured, the conclusions of the EIAR will not be materially affected.

The layout of the Proposed Development has been led by consideration of constraints and facilitators, thereby avoiding the environmentally sensitive parts of the site. The roads layout for the Proposed Development makes the use of the existing onsite roads and access tracks where possible, with approximately 1.6 kilometres of existing roadway/ tracks requiring upgrading and approximately 4.7 kilometres of new access road to be constructed.

The Proposed Development includes for an onsite 38kV electricity substation and underground grid connection cabling, connecting the Proposed Development to the national electricity grid via the existing Dallow 110kV electricity substation located in the townland of Clondallow, Co. Offaly. The cabling will be located within the public road corridor or existing tracks for its entire length. The total length of the proposed underground grid connection route is approximately 13.7km.

There are 61 habitable dwellings located within 2 kilometres of the proposed turbine locations. There are no dwellings located within 740 metres of any proposed turbine location. This equates to 4 times the proposed maximum blade-tip height of 185m. This complies with the requirements of the Department of Housing, Local Government and Heritage's Draft Revised Wind Energy Development Guidelines, December 2019 (Draft WEGs 2019).

All elements of the Proposed Development have been assessed as part of this EIAR. Need for the Proposed Development

1.4.1 Overview

In July 2021, the Climate Action, and Low Carbon Development (Amendment) Act 2021 was signed into law, committing 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). On this pathway to decarbonisation, the Government published the Climate Action Plan 2023[1] announcing a renewable electricity target of 80% by 2030, without compromising security of energy supply. The Proposed Development is expected to be operational before 2030 and would therefore contribute to this 2030 target. In July 2023, the EPA[2] report stated a provisional total of national greenhouse gas emissions in 2022 to be 60.76 million tonnes carbon dioxide equivalent ($MtCO_2eq$) which is 1.9% lower (or 1.19 Mt CO2eq) than emissions in 2021 (61.95 $MtCO_2eq$) and follows a 5.1% increase in emissions reported for 2021. Emissions are 0.5% lower than pre-pandemic 2019 figures. In 2022, the energy industries, transport and agriculture sectors accounted for 74.1% of total GHG emissions. Agriculture is the single largest contributor to the overall emissions, at 38.4%. Transport, energy industries and the residential sector are the next largest contributors, at 19.1%, 16.6% and 10.0%, respectively. The report also states that there was a substantial reduction in coal, oil and peat used in electricity generation (-16%, -29% and -25% respectively), and renewables increased from 35% in 2021 to 39% in 2022. The report highlights that whilst emissions are beginning to reduce, transformative measures will be needed to meet National Climate ambitions.

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. The need for the Proposed Development is driven by the following factors:

i. *A legal commitment from Ireland to limit greenhouse gas emissions under the Kyoto protocol to reduce global warming.*
ii. *A requirement to increase Ireland's national energy security as set out in Ireland's Transition to a Low Carbon Energy Future 2015-2030.*

[1] *Government of Ireland (2022) Climate Action Plan 2023*
[2] *Ireland's Provisional Greenhouse Gas Emissions (1990-2022) <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/2023-EPA-Provisional-GHG-Report_Final_v3.pdf>*

iii. *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).*
iv. *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.*
v. *Increasing energy price stability in Ireland through reducing an over reliance on imported fossil fuels.*
vi. *Provision of cost-effective power production for Ireland which would deliver local benefits; and*
vii. *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 in Chapter 2 of this EIAR on 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.

1.4.1.1 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 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 agreement, Governments also agreed on the need for global emissions to peak as soon as possible, recognising that this will take longer for developing countries and to undertake rapid reductions thereafter in accordance with the best available science. The most recent Sharm el- Sheikh climate conference (COP27) in November 2022 pushed increases to financing for adaptation measures globally and reiterated the agreement to work towards a limit well below 2°C global warming.

The International Panel on Climate Change (IPCC) put forward its clear assessment in their Fifth Assessment Report[3], that the window for action on climate change is rapidly closing and that renewable energy sources such as wind will have to grow from 30% of global electricity at present to 80% by 2050 if we are to limit global warming to below 2 degrees and in accordance with the COP 21 agreement to limit global warming to well below 2°C above pre-industrial levels. Former Minister Kelly remarked in 2015 that "*As a nation we must do everything in our power to curb our emissions".*

In February 2022, the International Panel on Climate Change (IPCC) released the report 'Working Group II-Climate Change 2022: Impacts, Adaptation and Vulnerability' 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 CO2 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:

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

In April 2022, the IPCC released the report 'Working Group-III – Climate Change 2022: Mitigation Of Climate Change, which assesses literature on the scientific, technological, environmental, economic, and social aspects of mitigation of climate change. The report reflects new findings in the relevant

[3] IPCC Fifth Assessment Synthesis Report, Intergovernmental Panel on Climate Change AR5 Report

literature and builds on previous IPCC reports, including the WGIII contribution to the IPCC's Fifth Assessment Report (AR5), the WGI and WGII contributions to AR6 and the three Special Reports[4] in the Sixth Assessment cycle. This report outlines developments in emission reduction and mitigation efforts, assessing the impact of national climate pledges in relation to long-term emissions goals in a global context.; and states that '*Unless there are immediate and deep emissions reductions across all sectors, limiting global warming to 1.5°C will be beyond reach.*'In June 2023, the EPA[5] reported, for the 2021 year, that the energy sector contributed to 17% of Ireland's total emissions. Under a With Existing Measures (WEM) scenario, emissions from the energy industries sector are projected to decrease by 50% from 10.3 to 5.2 $MtCO_2eq$; under a With Additional Measures (WAM) scenario, emissions from the energy sector are projected to decrease by 60% from 10.3 to 4.2 $MtCO_2eq$ over the period 2021-2030.

The EPA '*Ireland's Provisional Greenhouse Gas Emissions 1990-2022*' report stated that in 2022, overall electricity generation in Ireland increased by a 2.1% and renewable electricity generation increased from 35.0% in 2021 to 38.6%, mainly due to an increase in wind energy production of 14.6%. The increase in renewables, combined with decreases in coal, oil, and peat use, resulted in the emissions intensity of power generation in 2022 decreasing by 4.8%, 331 g CO2/kWh compared with 348 g CO2/kWh in 2021.

It is estimated that the Proposed Development will have a potential output of 43.4 MW. On this basis, the Proposed Development will result in the net displacement of approximately 40,512 tonnes of carbon dioxide (CO_2) per annum, including accounting for back-up generation. The carbon offsets resulting from the Proposed Development are described in detail in Section 11.5.2 of Chapter 11 of this EIAR: Climate.

1.4.2 Energy Security

At a national level, Ireland currently has one of the highest external dependencies on imported sources. A report by the Sustainable Energy Authority of Ireland (SEAI), published in September 2020 (Energy Security in Ireland, 2020 Report), presents national energy statistics on energy production and consumption in Ireland during 2018. Renewable energy sources (which include wind) accounted for 32.5% of Ireland's gross electricity consumption in 2018, which was well over halfway to Ireland's 2020 target of 40%. EirGrid in their '*All Island Generation Capacity Statement 2022 - 2031'* (October 2022), states that new wind farms commissioned in Ireland in 2021 brought total wind installed capacity to over 4,300MW, contributing to the overall RES-E percentage of 36.4% with wind energy accounting for 32.5%.Prior to 2015, Irelands import dependency of energy was over 90% but dropped to 71% in 2016 with the Corrib gas field starting production. Since 2018, Ireland's import dependency has been increasing as the output from the Corrib gas field reduces faster than we are adding new renewable sources. In 2021, our import dependency for energy was 80% compared to the EU average of 57.5%[6].

Total indigenous energy production in Ireland reached the highest level ever in 2018 of 5,048 ktoe but has fallen since due to declining natural gas and peat production. The overall renewable energy share for gross final energy consumption for 2021 was 12.5%, however, due to a low wind year for renewable generation in 2021, we used more coal and oil for electricity generation, which increased the carbon intensity of our electricity by 12.5%. We also supplemented our indigenous electricity generation with

[4] *The three Special Reports are: Global Warming of 1.5°C: an IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018); Climate Change and Land: an IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (2019); IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (2019)*

[5] *Ireland's Greenhouse Gas Emission Projections 2022-2040* <https://www.epa.ie/publications/monitoring-assessment/climate-change/air-emissions/EPA-GHG-Projections-2022-2040_Finalv2.pdf>

[6] *Energy in Ireland – 2022 Report, SEAI, December 2022*

1600 GWh of net imports through the interconnects with Northern Ireland ('*Energy in Ireland – 2022 Report,* SEAI, December 2022).

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 has stated that our heavy dependence on imported fossil fuels, *"is a lost opportunity in terms of keeping this money here in Ireland and further developing our abundant renewable resources"*[7].

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. Coal and peat generate almost 5% of Ireland's electricity, while gas generates 51%, but the Climate Action Plan calls for an aggregate reduction in carbon dioxide emissions in the electricity sector of 62-81% (compared to 2018 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.

The Energy White Paper 2015[8] notes "There will be a substantial increase in the cost of carbon in the short and medium term, through the EU Emissions Trading Scheme". Any steps to reduce dependence on imported fossil fuels will add to financial autonomy and stability in Ireland. As the White Paper notes:

> *"In the longer term, fossil fuels will be largely replaced by renewable sources".*

1.4.2.1 REPowerEU

In a Communication from the European Parliament on Joint European Action for more affordable, secure, and sustainable energy[9], 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[10] 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.

In April 2022, the Government published the National Energy Security Framework (NESF) providing a single overarching and initial response to address Ireland's energy security needs in the context of the war in Ukraine. This framework mirrors that of the EU, in which accelerating Ireland's transition from the use of fossil fuel to renewable energy sources is a key objective.

[7] *Dr Eimear Cotter, Head of Low Carbon Technologies, SEAI - "Energy Security in Ireland 2015"*
[8] *Ireland's Transition to a Low Carbon Energy Future 2015-2030 (Department of Communications, Energy & Natural Resources, 2015)*
[9] *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
[10] *https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131*

1.4.3 Competitiveness of Wind Energy

While Ireland has a range of renewable resources, as the White Paper states "[Onshore Wind] *is a proven technology and Ireland's abundant wind resource means that a wind generator in Ireland generates more electricity than similar installations in other countries. This results in a lower cost of support*".

In fact, the cost of support is more than offset by the fact that adding large quantities of wind to the wholesale market drives down auction prices in any half hour trading period when the wind is blowing, i.e. for 80% of the hours of the year. Wind has a capacity factor of approx. 35%, which is its average output throughout the year relative to its maximum output. However, wind is generating power at some level for 80% of the hours of the year. A Pöyry study from 2015 showed that reaching our targets in 2020 would reduce wholesale prices by more than costs of new grid infrastructure, backup and the subsidies paid to wind, resulting in a net saving of €43m per year in 2020. The EU has noted that Ireland has one of the lowest costs of supporting renewables mainly because onshore wind is on a par with the cost of power from conventional generation when a full cost-benefit analysis is undertaken.

1.4.3.1 EU 2020 Renewable Energy Targets

The burning of fossil fuels for energy 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 meet the challenges of the future. The EU adopted the Renewable Energy Directive (2018/2001 EU) on the Promotion of the Use of Energy from Renewable Sources in December 2018 which sets EU 2030 Renewable Energy Targets.

The Directive sets a legally binding mandatory national target for the overall share of energy from renewable sources for each Member State. This package is 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 must follow an indicative trajectory towards the achievement of their target as outlined in Ireland's National Renewable Energy Action Plan (NREAP).

The first Renewable Energy Directive (RED)[11] is legislation that influenced the growth of renewable energy in the EU and Ireland for the decade ending in 2020. From 2021, RED was replaced by the second Renewable Energy Directive (REDII),[12] which continues to promote the growth of renewable energy out to 2030. 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). Ireland fell just short of this target with total GFC reaching 13.5%. REDII introduced a binding EU-wide target for overall RES of 32% in 2030 and requires Member States to set their national contributions to the EU-wide target. As per the National Energy and Climate Plan (NECP) 2021-2030, Ireland's overall RES target is 34.1% in 2030.

Under RED, the RES-E target was for 40% of gross electricity consumption to come from renewable sources in 2020 The actual RES-E achieved in 2020 by Ireland was 39.1%, falling just short of the national target. Under REDII, Ireland's National Energy and Climate Plan 2021-2030 included a planned RES-E of 70% in 2030, which has been replaced by the 80% by 2030 RES-E target as detailed in the more recent CAP23, which will ensure that renewable electricity continues to form the backbone of Irish renewable energy use for the coming decade and beyond.

[11] *Directive 2009/28/EC on the promotion of the use of energy from renewable sources. Available from: https://eur-lex.europa.eu/legalcontent/EN/ALL/?uri=celex%3A32009L0028*
[12] *Directive (EU) 2018/2001 on the promotion of the use of energy from renewable resources (recast). Available from: https://eurlex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L2001*

1.4.3.2 EU 2030 Renewable Energy Targets

The Climate Action and Low Carbon Development (Amendment) 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). Under the 2021 Act, Ireland's national climate objective requires the state to pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy.

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.

In December 2022, the Government published the most recent Climate Action Plan 2023, announcing a renewable electricity target of 80% by 2030 for Ireland. This is in line with the previous target of 80% by 2030, as announced in the Climate Action Plan 2021.

The Climate Action Plan 2023 states that in order to meet the required level of emissions reduction by 2030 and the 80% renewable electricity generation target by 2030, the installed generation capacity of onshore will need to reach 9GW and at least 7GW of offshore wind. By July 2023, the installed wind capacity in the Republic of Ireland is over 4.3GW according to Wind Energy Ireland[13].As noted previously, Ireland missed it's 2020 renewable energy target of 40% with a renewable share in electricity of 39.1%, and by the end of 2021, Irelands renewable energy share for electricity generation was 32.5%. With a renewable share of electricity generation at 80% in mind and a target of 8GW installed onshore wind by 2030, 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 targets. Further detail on the EU 2030 targets is noted in Chapter 2.

1.4.4 Increasing Energy Consumption

As detailed above, the Climate Action Plan 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 installed capacity of wind generation is set to increase to at least 12 GW between onshore and offshore capacity as Ireland endeavours to meet its renewable targets in 2030 and beyond.

Failure to meet Ireland's targets for renewable energy will result in substantial EU sanctions. The Department of Public Expenditure and Reform (DPER) in their report 'Future Expenditure Risks associated with Climate Change/Climate Finance'[14] concluded that *'potential costs of purchasing non-ETS GHG compliance for the Irish Exchequer for the 2020 to 2030 period could have a cumulative total in the billions in the absence of any further policy changes'*. If Ireland decided to backfill shortfalls in the RES-H target with additional renewable electricity this could significantly reduce these costs.

In April 2016[15] SEAI estimated the historic build rate for wind energy deployment as 180 MW per year since 2005. If this average build rate over the remaining period between 2018 and 2020 is assumed, then approximately 3.85 GW of wind would be built up to 2020. By July 2023, the installed wind capacity in the Republic of Ireland is over 4.3GW according to Wind Energy Ireland[16].

It is noted that the key driver for electricity demand in Ireland for the next number of years is the connection of new large energy users, such as data centres. This statement notes that '*Large industrial*

[13] *https://windenergyireland.com/about-wind/facts-stats*
[14] https://igees.gov.ie/wp-content/uploads/2013/10/Future-Expenditure-Risks-associated-with-Climate-Change-Climate-Finance1.pdf
[15] *https://www.seai.ie/publications/Ireland___s-Energy-Targets-Progress-Ambition-and-Impacts.pdf*
[16] *https://windenergyireland.com/about-wind/facts-stats*

connections normally do not dominate a country's energy demand forecast but this is the case for Ireland at the moment'. EirGrid analysis shows that demand from data centres could account for 28% of all demand by 2031 in a median demand scenario (accounts for the connection of all 1400MVA of potential demand in the connection process). The median demand scenario is now higher than for last year's forecast for high demand, indicating the progression of many of the data centre projects.

In 2015, IWEA commissioned a study '*Data Centre Implications for Energy Use in Ireland'* which concluded that an extra approx. 1 Gigawatt (GW) of electricity demand could materialise between 2015 and 2020 due to growth in data centres. More recently, data available from Bitpower[17] at the end of 2020 noted that there is currently 66 operational data centres in Ireland, totalling 834MW; with an additional 778MW having received planning approval and 295MW under construction. The increase in growth of data centres means an increase in electricity demand, with many of the proposed data centres committing to using 100% renewable energy which will result in an increased demand for renewable electricity as detailed above.

In the context of increasing energy demand and prices, uncertainty in energy supply and the effects of climate change, our ability to harness renewable energy such as wind power plays a critical role in creating a sustainable future. The Department of the Environment, Climate and Communications have set a target for Ireland of 80% of total electricity consumption to come from renewable resources by 2030, this target forms part of the Government's strategy to make the green economy a core component of its economic recovery plan for Ireland. It is envisaged that wind energy will provide the largest source of renewable energy in achieving this target, with a target of 9GW onshore wind installed generation capacity and a target of 5GW offshore wind installed generation capacity.

The Department of Communications, Energy & Natural Resources (DCENR) noted in their Draft Bioenergy Plan 2014, that achieving the anticipated renewable energy usage in the three energy sectors will be challenging, with the 12% for renewable heat being particularly so. SEAI estimate that the shortfall could be in the region of 2% to 4% of the 12% RES-H target. Given that individual member states 2030 targets are set at a more challenging level than 2020, fines could persist for an extended number of years, and so the total cost to Ireland could run to billions. For comparison, the entire wholesale electricity market has an annual value of around €3bn.

In the medium-term, with the introduction of electric vehicles and uptake of smart demand such as storage heating and heat pumps, emissions in the heat and transport sector will be substantially reduced. A high renewables electricity system is the foundation of such a transformation.

The Energy White Paper published by DCENR in December 2015 expanded on the vision set out above. It outlines a radical transition to a low carbon future which will involve amongst other things, *'generating our electricity from renewable sources of which we have a plentiful indigenous supply'* and *'Increasing our use of electricity and biogas to heat our homes and fuel our transport'.*

The DCENR confirmed in the publication of the White Paper '*Ireland's Transition to a Low Carbon Future' 2015 – 2030*, that wind is the cheapest form of renewable energy:

> *"(Onshore wind) is a proven technology and Ireland's abundant wind resource means that a wind generator in Ireland generates more electricity than similar installations in other countries. This results in a lower cost of support."*

EU countries have agreed on a new 2030 Framework for climate and energy, including EU-wide targets and policy objectives for the period between 2020 and 2030. These targets aim to help the EU achieve a more competitive, secure, and sustainable energy system and to meet its long-term 2050 greenhouse gas reductions target. It is noted that a binding EU target of 32% for renewable energy by 2030 has been set

[17] *http://www.bitpower.ie/images/Reports/2020_H2_Report.pdf*

by the EU 2030 Framework for Climate and Energy, with Ireland confirming its own targets for 2030 as detailed below.

Ireland will therefore have to meet even more demanding climate change and renewable energy supply obligations in order to play its part in achieving the European climate and energy ambitions. As announced in December 2022, the Irish Government have pledged to generate 80% of the country's electricity supply from renewable sources by 2030. The development of additional indigenous wind energy generating capacity, such as that proposed at the Proposed Development, will not only help to reduce carbon emissions but will also improve Ireland's security of energy supply. Such penetration levels of wind are technically and economically feasible once paired with other energy system changes such as increasing electric vehicle penetration and electrification of heat. Further information on the 2030 commitments for Ireland are noted in Chapter 2, Section 2.2.

These sources of 'flexible demand' allow the system to match intermittent renewable energy resources with minimal extra cost. Additional interconnection is also planned with the UK and France, further assisting in the integration of wind (and in the future solar) on the power system.

A number of alternative energy types have been examined when considering how best to meet this renewable energy target.

In 2014, a report prepared by UK consultant BW Energy for the Rethink Pylons campaign group has suggested that converting Moneypoint generation station (which runs solely on coal) from coal to biomass would have enabled Ireland to meet 2020 renewable energy targets. Dr Brian Motherway, Chief Executive SEAI[18] refutes this claim. While Dr Motherway agrees that biomass offers benefits and is helping Ireland to move away from fossil fuels, he states that "*the conversion of Moneypoint to biomass has been considered a number of times over the years, including actual trials of small amounts of biomass in the station. However, the technical and economic challenges have proven far greater than some would have us believe*".

The reason being that the move of Moneypoint from coal to biomass would not entail a clean swap. In fact, '*to allow for combustion of biomass, a full redesign and rebuild of much of the station would be required*'. In the UK where this has been done, energy generation stations have required significant financial support to make the process viable and with each unit of energy in the UK being worth approx. 13 cents, almost double that of Ireland which is approx. 7 cents, wind energy works out cheaper in Ireland. Also, the amount of biomass required to feed Moneypoint would require 300,000ha of land; an equivalent area of Counties Wexford and Carlow being planted with willow which is far more than Ireland currently produces which means we would need to import.

Importation raises the question; would this be cost effective? As prices are volatile and availability of biomass is difficult to predict Ireland would become dependent on the uncertainty of imported biomass. It is also noted that there will be emissions from transport and distribution. The further the biomass is transported, the greater the greenhouse gas emissions[19]. So, while biomass is currently contributing to a move to renewable energy production, on its own it is not the sole answer to meeting Ireland's renewable energy targets. Ireland has a legal obligation to diversify its energy sources requiring the development of renewable energy to avoid substantial fines.

The Joint Committee on Climate Action published its cross-party report entitled, '*Climate Change: A Cross- Party Consensus for Action'* (March 2019). This report highlights the requirements for alternate energy production. More specifically, the report notes that it is currently planned to stop burning coal at Moneypoint by 2025 as well as peat at Bord na Mona and ESB stations by 2030. In December 2022, the Department of Environment, Climate and Communications published its Climate Action Plan (CAP),

[18] http://www.seai.ie/News_Events/Press_Releases/2014/Biomass-is-a-big-part-of-the-solution-but-not-the-whole-solution.html
[19] *Sustainability Criteria Options and Impacts for Irish Bioenergy Resources (SEAI 2019)*

which notes the need for renewable alternatives to coal and peat. Further information on the CAP can be seen in Chapter 2, Section 2.2.2.

The Climate Action Plan 2021 states that in Ireland, total electricity demand over the next ten years is forecast to grow by between 19% and 50%, largely driven by new large energy users, many of which are data centres, based on existing policies and strategies. In the high demand scenario outlined in the Programme for Government, electricity demand will almost double by 2030, while electricity emissions are to be reduced by 60-80% at the same time. While building upon the demands identified in the Climate Action Plan 2021, the Climate Action Plan 2023 identified specifically the increase of 3.5 TWh of electricity demand from the electrification of heat in industry.

Underlying drivers of changes in electricity demand include:

- Data centres are forecast to continue to grow by up to ~9 TWh in 2030 (~2316% of total demand)
- Transport electricity demand is forecast to grow (~23% p.a.) as a result of fast uptake of EV charging.
- Electrical heating in industry will increase by more than 2.5 times in 2030 from 2017 levels.
- Building energy efficiency improvements from an extensive retrofit programme will moderate the growth in electricity demand from new heat pumps in buildings.

Against this backdrop, the importance of wind energy as the main component of Ireland's renewable energy development is acknowledged, and wind energy is accepted as the main contributor to meeting the Country's national climate change and energy supply obligations. Notwithstanding this, it must also be acknowledged that not every part of Ireland is well endowed with wind resources 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 in operation, 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.

1.4.5 Reduction of Carbon Emissions and Other Greenhouse Gases

The production of renewable energy from the Proposed Development will assist in achieving the Government's and EU's stated goals of ensuring safe and secure energy supplies, promoting an energy future that is sustainable and competitively priced to consumers whilst combating energy price volatility and the effects of climate change. The Energy White Paper in 2015 outlines an ambitious Greenhouse gas reduction target of between 80% to 95% compared to 1990 levels out to 2050. Furthermore, if national carbon emissions targets are divided out amongst each county, each Local Authority may be responsible for meeting its own targets.

In addition to a reduced dependence on oil and other imported fuels, the generation of electricity from wind power by the Proposed Development will displace approximately 40,512 tonnes of carbon emissions per annum from the largely carbon-based traditional energy mix, the detail of which is presented in Section 11.5.2.1.2 in Chapter 11 of this EIAR.

The World Health Organisation (WHO) in 2016 estimated that ambient air pollution caused 4.2 million deaths worldwide in 2016 (WHO, 2018). The Environmental Protection Agency (EPA) report '*Air*

Quality in Ireland 2021[20] noted that in Ireland, the premature deaths attributable to poor air quality are estimated at 1,300 people per annum. A more recent European Environmental Agency (EEA) Report, '*Air Quality in Europe – 2022 Report'* highlights the negative effects of air pollution on human health. The report assessed that poor air quality in Europe accounted for premature deaths of approximately 238,000 people in Europe in 2021, with regards to deaths relating to $PM_{2.5}$. The estimated impacts on the population in Europe of exposure to NO_2 and O_3 concentrations in 2021 were around 49,000 and 24,000 premature deaths per year, respectively.

Of these numbers, 610 deaths due to poor air quality were estimated in Ireland in 2020 with 490 Irish deaths attributed to $PM_{2.5}$, 50 Irish deaths attributed to nitrogen oxides (NO_2) and 70 Irish deaths attributed to Ozone (O_3). These emissions, along with others, including sulphur oxides (SO_x), are produced during fossil fuel-based electricity generation in various amounts, depending on the fuel and technology used, emissions from industry and power plants, vehicles emissions and transport fuels.

The EPA 2016 report '*Ireland's Environment – An Assessment'* states that the pollutants of most concern are NOx, (the collective term for the gases nitric oxide and nitrogen dioxide, PM (particulate matter) and O_3 (ozone). The EPA 2016 report goes on to state that:

> *"Ireland has considerable renewable energy resources, only a fraction of which are utilised to address our energy requirements.*
>
> *Wind, ocean, solar, hydro, and geothermal energy do not produce GHG (greenhouse gas) emissions or emissions of air pollutants such as particulates, sulphur dioxide and nitrogen dioxide. Use of these renewable resources can have* ***considerable co-benefits for human health and ecosystems****. Meeting energy requirements from renewable resources can provide significant economic and employment benefits at local to national scales."*

The Proposed Development therefore represents an opportunity to further harness Ireland's significant renewable energy resources, with valuable benefits to air quality and in turn to human health. The consumption of fossil fuels for energy results in the release of particulates, sulphur dioxide and nitrogen dioxide to our air. The use of wind energy, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, results in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide SO_2, thereby resulting in cleaner air and associated positive health effects.

1.4.6 Economic Benefits

In addition to helping Ireland avoid significant fines and reducing environmentally damaging emissions, the Proposed Development will have significant economic benefits. 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. As detailed in the SEAI Report '*Energy in Ireland 2022*', Ireland has a high import dependence on oil and gas and is essentially a price-taker on these commodities. The report states that 2021 was the first year since 2016, in which Irelands indigenous production of energy from renewables (17,500 GWh) exceeded that of indigenous gas (14,600 GWh); as well the data shows that electricity emissions were 'on trajectory' in 2021 (10.3 MtCO2), despite the greater dependence on coal- and oil-fired electricity generation resulting from the continued decline in outputs from the Corrib Gas Field and a low wind year which increase Ireland's carbon intensity by 12.5% ('*Energy in Ireland 2022*', SEAI, 2022).

The SEAI report '*Energy in Ireland 2022*' indicated that wind energy:

- Accounted for 84% of renewable energy generated in 2021
- Capacity increased by an average of 12% (about 300MW) annually between 2009 to 2019.

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. If Ireland instead chooses to not develop any more wind, then by 2030 the country will be reliant on natural gas for most of our electricity generation, at a cost of €671 million per annum in fuel import costs.

In April 2021, Wind Energy Ireland published a report produced by KPMG on the '*Economic Impact of Onshore Wind in Ireland*' stating that Irish wind farms are worth €400 million to the economy every year and it is expected to rise to €550 million by the end of the decade. If Ireland are to achieve the 8,200 MW target set in the Climate Action Plan 2021, the total industrial output across operating and capital activities would rise from €1.1bn in 2020 (from the 4,200 MW installed capacity) to €1.5bn in 2030.

The Proposed Development will be capable of providing power to approximately 31,682 households every year, as presented in the calculations in Section 4.3.1.6 of this EIAR.

The Proposed Development will help to supply the rising demand for electricity, resulting from renewed economic growth. The EirGrid report '*All-Island Generation Capacity Statement 2022 – 2031*' (December 2022) notes that the median electricity demand forecast on the island of Ireland is expected to grow by 21% in 2030. Much of this growth is expected to come from new data centres in Ireland.

The Proposed Development will have both long-term and short-term benefits for the local economy including income to local landowners, job creation, work opportunities for local businesses and service providers, local authority commercial rate payments and a Community Benefit Scheme.

Commercial rate payments from the Proposed Development will be provided to Tipperary County Council and to Offaly County Council each year during the construction phase, which will be redirected to the provision of public services within Co. Tipperary and Co. Offaly. These services include provisions such as road upkeep, fire services, environmental protection, street lighting, footpath maintenance etc. along with other community and cultural support initiatives.

It is estimated that the Proposed Development has the potential to create up to 70 jobs during the construction phase and 3-4 jobs during operational and maintenance phases of the Proposed Development. During construction, additional indirect employment will be created in the region through the supply of services and materials to the renewable energy development. There will also be income generated by local employment from the purchase of local services i.e., travel, goods, and lodgings.

Should the Proposed Development receive planning permission, there are substantial opportunities available for the local area in the form of Community Benefit Funds. Based on the current proposal, a Community Benefit Fund would attract a community contribution in the region of approximately €265,000 per year, assuming it becomes a Renewable Energy Support Scheme project, for the local community over the lifetime of the project. The exact value of this fund will be directly proportional to the installed capacity and/or energy produced at the site and will support and facilitate projects and initiatives including youth, sport and community facilities, schools, educational and training initiatives, and wider amenity, heritage, biodiversity enhancement and environmental projects.

Further details on the proposed Community Gain proposals are presented in Section 4.5 in Chapter 4 of this EIAR.

1.5 Purpose and Scope of the EIAR

The purpose of this EIAR is to document the current state of the environment on and in the vicinity of the site and to quantify the likely significant effects of the Proposed Development on the environment. The compilation of this document served to 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 Planning Authority, from the EIAR accompanying the 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 Environmental Impact Assessment Directive, the direct and indirect significant effects of the project on the following:

a) *population and human health*
b) *biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC.*
c) *land, soil, water, air, and climate*
d) *material assets, cultural heritage, and the landscape*
e) *the interaction between the factors referred to in points (a) to (d)*

The EIAR submitted by the applicant provides the relevant environmental information to enable the EIA to be carried out by the competent authority. The information to be contained in the EIAR is prescribed Article 5 of the revised EIA Directive described in Section 1.2 above.

1.6 Structure and Content of the EIAR

1.6.1 General Structure

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, with specific attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EEC; land, soils and geology, water, 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, schedule of mitigation and monitoring, and vulnerability to natural disasters.

The chapters of this EIAR are as follows:

- Introduction
- Background to the Proposed Development
- Considerations of Reasonable Alternatives
- Description of the Proposed Development
- Population and Human Health
- Biodiversity (excluding Birds)
- Birds
- Land, Soils and Geology
- Water
- Air Quality
- Climate
- Noise and Vibration
- Landscape and Visual
- Cultural Heritage
- Material Assets (including Traffic and Transport, Telecommunications and Aviation)
- Major Accidents and Natural Disasters
- Interactions of the Foregoing

- Schedule of Mitigation 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.

1.6.2 Description of Likely Significant Effects and Impacts

As stated in the *'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, May 2022), an assessment of the likely impacts of a 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–boundary 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):

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, May 2022)
- 'Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report' (EC, 2017).
- 'Revised Guidelines on the Information to be contained in Environmental Impact Statements – Draft September 2015' (EPA, 2015).
- 'Advice Notes for Preparing Environmental Impact Statements – Draft September 2015' (EPA, 2015).
- 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (EPA, 2003).

The European Commission 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*', which have also been consulted.

Table 1-2 presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided 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 this EIAR. The consistent application of terminology throughout this EIAR facilitates the assessment of the Proposed Development on the receiving environment.

Table 1-2 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 & Context	Extent	Describe the size of the area, number of sites and the

Impact Characteristic	Term	Description
		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
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)

Impact Characteristic	Term	Description
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

Each impact is described in terms of its quality, significance, duration, 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 17: Interaction of the Foregoing.

1.7 Project Team

1.7.1 Project Team Responsibilities

The companies and staff listed in Table 1-3 were responsible for completion of this 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.

Table 1-3 Companies and Staff Responsible for EIAR Completion

Consultants	Principal Staff Involved in Project	EIAR Input*
MKO Tuam Road, Galway, H91 VW84	Gus McCarthy Brian Keville Michael Watson Eoin McCarthy Jonny Fearon Edward Ryan Ellen Costello Catherine Johnson John Willoughby Ronan Dunne John Hynes Patrick Ellison Rachel Walsh Cora Twomey Brónagh Boylan Aoife Joyce Laura McEntegart Padraig Cregg Donnacha Woods Jack Workman Jack Smith Darragh Buckley Killian Devereux	Project Managers, Scoping and Consultation, Preparation of Natura Impact Statement, EIAR Report Sections: 1. Introduction 2. Background to the Proposed Development 3. Considerations of Reasonable Alternatives 4. Description of the Proposed Development 5. Population & Human Health 6. Biodiversity 7. Birds 10. Air 11. Climate 14. Landscape & Visual 15.2. Material Assets (non-Traffic) 16. Vulnerability of the Project to Major Accidents and Natural Disasters 17. Interaction of the Foregoing 18. Schedule of Mitigation
Hydro Environmental Services 22 Lower Main Street Dungarvan Co. Waterford	Michael Gill David Broderick	Flood Risk Assessment, Drainage Design, Preparation of EIAR Sections: 8. Land, Soils & Geology 9. Hydrology & Hydrogeology
TNEI Ireland Ltd. Unit S12, Synergy Centre TU Dublin Tallaght Campus, Tallaght,	Ewan Watson Jim Singleton Moise Coulon Will Conway	Baseline Noise Survey, Preparation of EIAR Section 12. Noise and Vibration

Consultants	Principal Staff Involved in Project	EIAR Input*
Dublin.		
Tobar Archaeological Services Saleen Midleton Co. Cork	Miriam Carroll	Preparation of EIAR Section 13. Cultural Heritage
Gavin & Doherty Geosolutions Unit A2, Nutgrove Office Park, Rathfarnham, Dublin 14	Andria Loppas Chris Engelman Alaister Lewis Paul Quigley	Peat Management Plan Peat Stability Risk Assessment
Alan Lipscombe Traffic and Transport Consultants Claran, Headford, Co. Galway	Alan Lipscombe	Swept Path Analysis, Preparation of EIAR Section 15.1. Material Assets - Traffic and Transport

* (A Statement of Authority is included in each chapter of this EIAR detailing the experts who contributed to the preparation of this report, identifying for each such expert the part or parts of the report which he or she is responsible for or to which he or she contributed, his or her competence and experience, including relevant qualifications in relation to such parts, and such additional information in relation to his or her expertise that demonstrates the expert's competence in the preparation of the report and ensures its completeness and quality.

1.7.2 Project Team Members

1.7.2.1 MKO

Gus McCarthy BA, MRUP, MIPI

Augustine (Gus) McCarthy is a Company Director with MKO and is a professional planner with over 35 years of experience in both private practice and local authorities combined. Prior to establishing AP McCarthy Planning Consultants in 2000, Gus worked as a Senior Planner for both Galway County Council and Galway City Council. Gus has significant experience in a wide range of projects and extensive experience in both terrestrial and coastal/marine based developments. He is retained as planning advisor for development programmes of large organisations and has been the lead planning consultant on a wide range of infrastructure, energy, commercial and other projects throughout the Country.

Brian Keville B.Sc. (Env.)

Brian Keville has over 18 years' professional experience as an environmental consultant having graduated from the National University of Ireland, Galway with a first-class honours' degree in Environmental Science. Brian was one of the founding directors of environmental consultancy, Keville & O'Sullivan Associates Ltd., prior to the company merging in 2008 to form McCarthy Keville O'Sullivan Ltd. Brian's professional experience has focused on project and environmental management, and environmental impact assessments. Brian has acted as project manager and lead-consultant on numerous environmental impact assessments, across various Irish counties and planning authority areas.

These projects have included large infrastructural projects such as roads, ports, and municipal services projects, through to commercial, mixed-use, industrial, and renewable energy projects. The majority of this work has required liaison and co-ordination with government agencies and bodies, technical project teams, sub-consultants, and clients.

Michael Watson, MA; MIEMA, CEng, PGeo

Michael Watson is Project Director and head of the Environment Team in MKO. Michael has over 19 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 Senior Environmental Scientist with McCarthy O'Sullivan Ltd. with over 11 years of environmental consultancy experience. Eoin holds a 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 progressed from Graduate to Senior level and has been heavily involved 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 projects 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 and EIAR co-ordinator on over 700MW 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.

Jonny Fearon B.Sc. (Env.), M.Sc.

Jonny Fearon is an Environmental Scientist with MKO having joined the company in March 2022. Jonny holds a BSc (Hons) Environmental Science, a MSc (Hons) in Environmental Leadership and a Specialist Diploma in Corporate Environmental Planning. Jonny's key strengths are GIS, data analysis, fieldwork and report writing. Since joining MKO, Jonny has been involved in a range of wind farm projects. In his role as an Environmental Scientist, Jonny 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.

Edward Ryan B.Sc. (Env), M.Sc.

Edward is an Environmental Scientist with a B.Sc. (Hons) in Environmental Science from the University of Limerick and a M.Sc. (hons) in Environmental Systems from Atlantic Technological University: ATU (formally GMIT). Edward has been involved in a myriad of environmental service offerings at MKO including EIA Screenings and Reports, and renewable energy infrastructure projects.

Ellen Costello B.Sc. (Env), M.Sc.

Ellen Costello is a Project Environmental Scientist with MKO with over three years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a project manager, Ellen 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. Ellen is a Practitioner Member of the Institute of Environmental Management & Assessment.

Catherine Johnson B.Sc. (Hons), LLM

Catherine is a Climate Practitioner and Environmental Scientist with MKO with over one year of private consultancy experience and expertise in climate and sustainability matters. Catherine holds a BSc in Earth and Ocean Science and a LLM in Global Environment and Climate Change Law. Prior to joining MKO in 2022, Catherine worked as an Environmental Social Governance (ESG) analyst for Acasta in Edinburgh. Catherine has expertise regarding international climate law and policy, earth processes, ocean science, and sustainability/ESG. Catherine has been involved in a myriad of environmental service offerings at MKO including EIA Screenings and Reports, climate and sustainability related work and renewable energy infrastructure projects.

John Willoughby BA (Hons.), M.Sc.

John is a Project Planner in MKO with over 7 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.

Ronan Dunne B.Sc. (Hons), M.Sc.

Ronan Dunne is a Planner with MKO having joined the company in June 2022. Ronan holds a BSc (Hons) in City Planning and Environmental Policy, and a MSc (Hons) in Urban and Regional Planning from University College Dublin where he focused his studies on wind energy development.

Since joining MKO, Ronan has been involved in a range of infrastructure projects, including onshore wind, solar, battery storage and grid infrastructure developments. In his role as a planner, Ronan works with multidisciplinary teams including members from MKO's Environmental, Ecological and

Ornithological departments as well as sub-contractors from various fields in the develop/deliver reports to facilitate the planning process.

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

John Hynes is a Senior Ecologist with MKO with over nine 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 EIAR Reports. John has project managed a range of strategy and development projects across Ireland and holds CIEEM membership.

Rachel Walsh B.Sc. (Env)

Rachel is an ecologist with MKO since June 2020, with over 3 years' experience in professional ecological consultancy. Rachel holds a BSc (Hons) in Environmental Science from National University of Ireland, Galway. Rachel's key strengths are in terrestrial flora and fauna ecology, including vegetation surveys, habitat mapping, invasive species surveys, mammal surveys, bat surveys and roost site potential assessment, Appropriate Assessment Screening reporting and Ecological Impact Assessment. Since joining MKO, Rachel has worked widely on energy infrastructure, commercial, recreational, and residential projects, and plays a role in preparing Ecological Impact Assessment reports and Appropriate Assessment reports. Rachel is trained in carrying out bat surveys, non-volant mammal surveys and in recording vegetation relevées. She also has experience in habitat identification and habitat mapping. Within MKO, Rachel is responsible for independently carrying out and planning ecological field surveys in accordance with NRA Guidelines, carrying out bat surveys in accordance with Scottish Natural Heritage 2019 Guideline standards, habitat surveys, and Appropriate Assessment screenings as part of the ecology team. Rachel is a member of CIEEM and holds a current Bat Roost Disturbance licence.

Cora Twomey B.Sc. (Hons)

Cora is an Ecologist with MKO, since July 2022 with one year of experience in professional ecological consultancy. Cora holds a BSc (Hons) in Ecology and Environmental Biology from University College Cork. Cora's key strengths and areas of expertise are in terrestrial flora and fauna ecology, including vegetation surveys, habitat mapping, mammal surveys, bat surveys and roost site potential assessment, Appropriate Assessment Screening reporting and Ecological Impact Assessment. Since joining MKO Cora has worked widely on energy infrastructure, commercial, recreational, and residential projects and plays a role preparing Ecological Impact Assessment reports and Appropriate Assessment reports, along with a role as an Ecological Clerk of Works for site supervision. Cora is trained in carrying out bat surveys, terrestrial invertebrate surveys and in taking vegetation relevées of vascular plants. She also has experience in habitat identification and habitat mapping. Within MKO Cora is responsible for independently carrying out and planning ecological field surveys in accordance with NRA Guidelines, and for carrying out bat surveys in accordance with Scottish Natural Heritage 2019 Guideline standards, habitat surveys, and Appropriate Assessment screenings as part of the ecology team. Cora holds a current Bat Roost Disturbance licence.

Brónagh Boylan B.Sc. (Env)

Brónagh is an Ecologist with MKO, since July 2022 with one year of experience in professional ecological consultancy. Brónagh holds a BSc (Hons) in Environmental Science from National University of Ireland, Galway. Brónagh's key strengths and areas of expertise are in terrestrial flora and fauna ecology, including vegetation surveys, habitat mapping, mammal surveys, bat surveys and roost site potential assessment, Appropriate Assessment Screening reporting and Ecological Impact Assessment. Since joining MKO Brónagh has worked widely on energy infrastructure, commercial, recreational, and residential projects and plays a role preparing Ecological Impact Assessment reports and Appropriate Assessment reports, along with a role as an Ecological Clerk of Works for some site supervision. Brónagh is trained in carrying out bat surveys, terrestrial invertebrate surveys and in taking vegetation relevées of vascular plants. She also has experience in habitat identification and habitat mapping. Within MKO Brónagh is responsible for independently carrying out and planning ecological field surveys in accordance with NRA Guidelines, and for carrying out bat surveys in accordance with Scottish Natural Heritage 2019 Guideline standards, habitat surveys, and Appropriate Assessment screenings as part of the ecology team. Brónagh is a member of CIEEM (QCIEEM membership), Irish Whale and Dolphin Group (IWDG) and holds a current Bat Roost Disturbance licence.

Aoife Joyce M.Sc. (Agribioscience), B.Sc.

Aoife Joyce is an Ecologist with MKO 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, sound analysis, 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 managing bat survey requirements for a variety of wind farm planning applications, as well as commercial, residential and infrastructure projects. This includes scope, roost assessments, deploying static bat detectors and weather stations nationwide, dawn and dusk bat detection surveys, acoustic analysis, mapping, impact assessment, mitigation 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 CIEEM and holds a current Bat Roost Disturbance licence.

Laura McEntegart B.Sc. (Hons).

Laura is an Ecologist with MKO having joined the company in March 2021. Laura holds a BSc (Hons) in Botany and Plant Science at National University of Ireland, Galway for which she studied the species richness, abundance and diversity of pollinators and flowering plants in High Nature Value (HNV) farmland in a Results Based Agri-environment Payment Scheme (RBAPS). She has a wide range of experience from bat roost identification, acoustic sampling, sound analysis, mammal and habitat surveying to GIS, Ecological Impact Assessments (EcIAs) and mapping techniques. Since joining MKO, Laura has been involved in roost assessments, deploying static bat detectors and weather stations nationwide, dawn and dusk bat detection surveys, sonogram analysis, mapping, impact assessment, mitigation and report writing. She attended Wildlife Acoustics and CIEEM courses on the use of Kaleidoscope Pro Software and on assessing the impact of developments on bats. Within MKO, she works as part of a multidisciplinary team to help in the production of ecological reports and assessments. Laura is a member of CIEEM and Bird Watch Ireland and holds a current Bat Roost Disturbance licence.

Padraig Cregg M.Sc., B.Sc.

Padraig Cregg is a Senior Ornithologist with MKO with over 9 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.

Donnacha Woods B.Sc., M.Sc.

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.

Jack Workman B.Sc., MSc

Jack is the Landscape & Visual Team manager at MKO and is a Technician Member with the British Landscape Institute. He is a Landscape and Visual Impact Assessment Specialist with an academic background in the field of Environmental Science and Geography. Jack's primary role at MKO is conducting Landscape and Visual Impact Assessment (LVIA) for Environmental Impact Assessment reports. Jack holds a BSc. in Psychology, and an MSc. in Coastal and Marine Environments (Physical Processes, Policy & Practice) where he was awarded the Prof. Máirín De Valéra distinction in science research award. Prior to taking up his position with MKO, Jack worked as a Geospatial Analyst and Research Assistant with NUIG and also held previous posts in the coastal engineering sector with Royal Haskoning DHV and Saltwater Technologies. Since joining MKO in February 2020, Jack has conducted and project managed all aspects of LVIA for a broad range of commercial infrastructure developments including wind and solar energy projects, grid infrastructure, extraction industry and Strategic Housing Developments. Jack holds a membership with the Chartered Institute of Water and Environmental Management and is also a member of the Landscape Research Group.

Jack Smith BCL (Hons.), LLM, M.Sc. (Env)

Jack is an Environmental Scientist and Landscape and Visual Impact Assessment (LVIA) specialist with MKO. Jack is an Affiliate member of the British Landscape Institute and holds membership with the Landscape Research Group. Jack's primary role at MKO is producing the LVIA chapter of EIA reports. Jack specialises in preparing Landscape and Visual Impact Assessment Reports for large-scale renewable energy projects including wind farms, solar farms, quarry extraction and strategic housing schemes. Jack has additional experience in preparing landscape feasibility reports for large wind farm projects.

Darragh Buckley B. Eng.

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.

Killian Devereux B.Sc. (Hons)

Killian is a CAD Technician at MKO with over 6 years of drafting experience in various sectors of the building industry. He holds BSc (Hons) in Architectural Technology from Galway Mayo Institute of Technology. Prior to taking up his position with MKO in October 2022, Killian worked as a Structural CAD/BIM Technician for Tobin Consulting Engineers and as an Architectural Technician for some small-scale Consultants. He was primarily involved in a variety of Commercial / Residential projects where he was responsible for the structural drawing packages but also has experience working in RC concrete Drawings, Architectural and Civil drawings, FSC's /DAC's, and one-off housing planning applications. His key strengths and areas of expertise are in Auto CAD, Revit, Cads RC, and Google Sketch up.

1.7.2.2 Hydro Environmental Services Ltd

Michael Gill

Michael Gill P. Geo (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 22 years' environmental consultancy experience in Ireland. Michael has completed numerous geological, hydrological, and hydrogeological impact assessments of wind farms and renewable projects in Ireland. He has substantial experience in surface water drainage design and SUDs design and surface water/groundwater interactions. For example, Michael has worked on the EIS for Oweninny WF, Cloncreen WF, and Yellow River WF, and over 100 other wind farm-related projects.

David Broderick

David Broderick P. Geo (BSc, H. Dip Env Eng, MSc) is a Hydrogeologist with over 17 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 geological, hydrogeological/hydrological investigations in relation to developments such as quarries and wind farms. David has completed numerous geology and water sections for input into EIARs for a range of commercial developments. David has worked on the EIS/EIARs for Derrykillew WF, and Oweninny WF, and over 60 other wind farm related projects across the country.

1.7.2.3 TNEI Ltd

TNEI is a specialist energy consultancy with an Acoustics team that has undertaken noise assessments for over 4.5 GW of onshore wind farm developments. The construction noise assessment was undertaken by Will Conway (BSc), who is an Affiliate Member of the Institute of Acoustics. The operational noise assessment was undertaken by Ewan Watson (BEng, Dip) who is an Associate Member of the Institute of Acoustics. The construction and operational noise assessments were reviewed and approved by Jim Singleton (BSc, Dip) and Moise Coulon (Dip) respectively. Jim and

Moise are both full members of the Institute of Acoustics and both hold the Diploma in Acoustics and Noise Control.

1.7.2.4 Tobar Archaeological Services

Tobar Archaeological Services is a Cork-based company in its 17th 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 Director Miriam Carroll is licensed by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs to carry out excavations in Ireland and has 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 EIS/EIAR stage through to construction stage when archaeological monitoring is frequently required.

Miriam Carroll

Miriam holds a Degree in Archaeology (1993-1996) and a 2-year Masters in Methods and Techniques in Irish Archaeology (1996-1998) from UCC and has over 20 years' experience in private sector archaeology. Miriam has managed and co-ordinated numerous projects from commencement stage to completion on behalf of numerous small and large companies.

1.7.2.5 Gavin & Doherty Geosolutions

Gavin & Doherty Geosolutions Ltd. (GDG) is a specialist geotechnical and marine civil design consultancy, providing innovative engineering solutions to a broad infrastructure problem. Established in 2010, GDG has since grown to more than 200 people. GDG has been involved in many wind farm developments in both Ireland and the UK at various stages of development, i.e., preliminary feasibility, planning, peat stability assessment, design, and construction. The GDG team of engineering geologists, geomorphologists, geotechnical engineers, and environmental scientists has developed expertise in the design and construction of developments in peat areas.

The Peat Stability Risk Assessment Report was written by Alastair Lewis (GDG Head of Infrastructure, MEng (Hons) Civil Engineering) and Chris Engleman (GDG Graduate Geologist, M. Geol Geological Sciences). Alastair is GDG's Head of Infrastructure and has twenty-five years' experience in civil engineering and ground engineering. Chris is a Graduate Geologist with GDG and has 4 years' experience in geotechnical engineering and geology.

The Peat Management Plan Report was written by Paul Quigley (GDG Director, BE (Hons) Civil Engineering) and Chris Engleman (GDG Graduate Geologist, M. Geol Geological Sciences). Paul is a GDG Director and has twenty-five years' experience in civil engineering and ground engineering.

1.7.2.6 Alan Lipscombe Traffic and Transport Consultants

Alan Lipscombe

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.

1.8 Difficulties Encountered

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

1.9 Viewing and Purchasing of the EIAR

This EIAR and associated documentation will be available online for the planning application, including the Non-Technical Summary (NTS), on the Planning Sections of the Tipperary County Council and Offaly County Council websites, under the relevant Planning Reference Number (to be assigned on lodgement of the application).

- Tipperary County Council: https://www.eplanning.ie/TipperaryCC/searchexact
- Offaly County Council: https://www.eplanning.ie/OffalyCC/searchexact

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.

The EIAR will also be available to view online on its dedicated website: https://carrigrenewables.com/