

1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report ('EIAR') has been prepared by MKO on behalf of Curns Energy Ltd, which intends to apply to An Bord Pleanála for planning permission, in accordance with Section 37E of the Planning and Development Act 2000 (as amended), to construct a wind energy development and all associated infrastructure at Lyrenacarriga and other townlands, located in Counties Waterford and Cork.

The application meets the threshold for wind energy set out in the Seventh Schedule of the Planning and Development (Strategic Infrastructure) Act 2006, as confirmed by An Bord Pleanála, and is therefore being submitted directly to An Bord Pleanála ('the Board') as a Strategic Infrastructure Development (SID), in accordance with Section 37E of the Planning and Development Acts 2000 to 2019. This EIAR will accompany the planning application for the proposed development to be submitted to the Board. The planning application will also be accompanied by a Natura Impact Statement (NIS).

The proposed development site is located approximately 5 kilometres (km) southeast of Tallow, Co. Waterford and approximately 9 kilometres northwest of Youghal, Co. Cork. The site is accessed via local roads from the R634 Regional Road, which travels in a northwest-southeast direction between Tallow and Youghal, and the R627 Regional Road, which travels in northeast-southwest direction between Tallow and Midleton. The site itself is served by a number of existing forestry roads, access points and grid infrastructure, which will be used for the proposed development. The proposed development site encompasses two clusters of turbines located in eastern and western sections, which will be connected via underground connector cabling, as described in Section 1.3 below.

Current land-use on the subject site comprises coniferous forestry and agriculture. Land-use in the wider landscape comprises a mix of agriculture, commercial forestry and low density residential.

The proposed development is being brought forward in response to local, national, regional and European policy regarding Ireland's transition to a low carbon economy and associated climate change policy objectives. The portion of the proposed Lyrenacarriga Wind Farm site in Co. Waterford is located within an area designated as **'Preferred'** for wind energy development by the Wind Energy Strategy of the *'Waterford County Development Plan 2011-2017 (as extended)'*. The portion of the proposed development site in Co. Cork is located within an area designated as **'Open to Consideration'** for wind energy development by the Wind Energy Strategy as part of the *'Cork County Development Plan 2014-2020'*.

The townlands in which the proposed site and ancillary works are located, as well as the collector cabling route between the two turbine clusters are listed in Table 1-1.

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

Development Works	County	Townland
Wind turbines and access roads, Grid Connection and collector cabling, Substation including battery storage, Met mast, Construction Compound & Borrow pits	Cork	Lyremountain, Lyre, Ballyanthonny, Knockanarrig, Breeda, Rearour North, Rearour South
	Waterford	Lyrenacarriga, Dunmoon South, Coolbeggan West, Propoge, Ballycondon Commons, Ballynatray Commons, Shanapollagh
Accommodation works on turbine delivery route	Cork	Breeda and Rearour South (one works location, at boundary of these townlands)
	Waterford	Killea

The majority of the proposed wind farm site is currently used for commercial forestry, a small proportion of which will be felled to accommodate the wind farm development. A total area of approximately 45.6 hectares of commercial forestry will be required to be permanently felled as part of the proposed development. This area of forestry will require replanting elsewhere in the State and this forms part of the project for assessment. Details regarding forestry felling and replanting are provided in Chapter 4: Section 4.3.10 of this EIAR.

All elements of the proposed wind farm, including grid connection, forestry felling and replanting have been assessed as part of this EIAR.

There is a total of 52 No. dwellings located within one kilometre of the proposed turbine locations. The closest occupied dwelling is located approximately 700 metres from the nearest proposed turbine location. The proposed development achieves in excess of four times the tip height between turbine locations and any residential property.

1.2 The Applicant

The applicant for the proposed development is Curns Energy Ltd. Curns Energy is a joint venture between RWE Renewables Ireland Ltd (previously Innogy Renewables Ireland Ltd.), a subsidiary of the RWE Group and Highfield Energy Ltd.

RWE Renewables ranks among the largest global players in power generation from renewable energy with a total installed generation capacity of 9 Gigawatts (GW) and an additional 2.6 gigawatts under construction. RWE's technology portfolio covers onshore and offshore wind, utility-scale photovoltaic (PV) solar power and energy storage. RWE's 3,600 renewables experts develop, build and operate large renewable energy assets in 15 countries in Europe, the Americas and Asia-Pacific. RWE's goal is to rapidly expand the use of renewable energy with technologies that address the growing concern about energy security, energy affordability, and climate change.

Highfield Energy Ltd develops, constructs, owns and operates electricity generation projects with a particular focus on renewables. Possessing significant technical and market expertise, Highfield Energy optimises potential developments in order to provide the highest quality results. Highfield Energy has a proven track record of working in partnership with developers, landowners and wider

project stakeholders to promote sustainable energy sources. Highfield currently has over 1 gigawatt (GW) of utility-scale wind, solar photovoltaic (PV) and energy storage projects within their portfolio.

1.3

Brief Description of the Proposed Development

The proposed development comprises the construction of a wind farm comprising 17 wind turbines and all associated works. The proposed turbines will have a maximum blade tip height of up to 150 metres. The full description of the proposed development, as per the public planning notices, is as follows:

- i. Construction of up to 17 No. wind turbines with a maximum overall blade tip height of up to 150 metres;*
- ii. 1 no. Meteorological Mast with a maximum height of up to 112 metres;*
- iii. Construction of 1 no. staff welfare and storage facility including waste water holding tank;*
- iv. 1 no. permanent 110 kV electrical substation with 2 no. control buildings with welfare facilities, 10 no. battery containers, battery switchgear building, all associated electrical plant and equipment, security fencing, all associated underground cabling, waste water holding tank and all ancillary works;*
- v. Underground cabling connecting the turbines to the proposed substation and connection from the proposed substation to the national grid via a 110 kV loop in connection.*
- vi. Upgrade of existing tracks, roads and provision of new site access roads and hardstand areas;*
- vii. Construction of an access track in the townlands of Breeda and Rearour South to facilitate turbine delivery;*
- viii. Junction improvement works in the townland of Killea to facilitate turbine delivery;*
- ix. 3 no. borrow pits;*
- x. 2 no. temporary construction compounds;*
- xi. Site Drainage;*
- xii. Forestry Felling;*
- xiii. Signage; and*
- xiv. All associated site development works.*

This application is seeking a ten-year planning permission and 30-year operational life from the date of commissioning of the entire wind farm. A full description of the proposed development is provided in Chapter 4 of this EIAR.

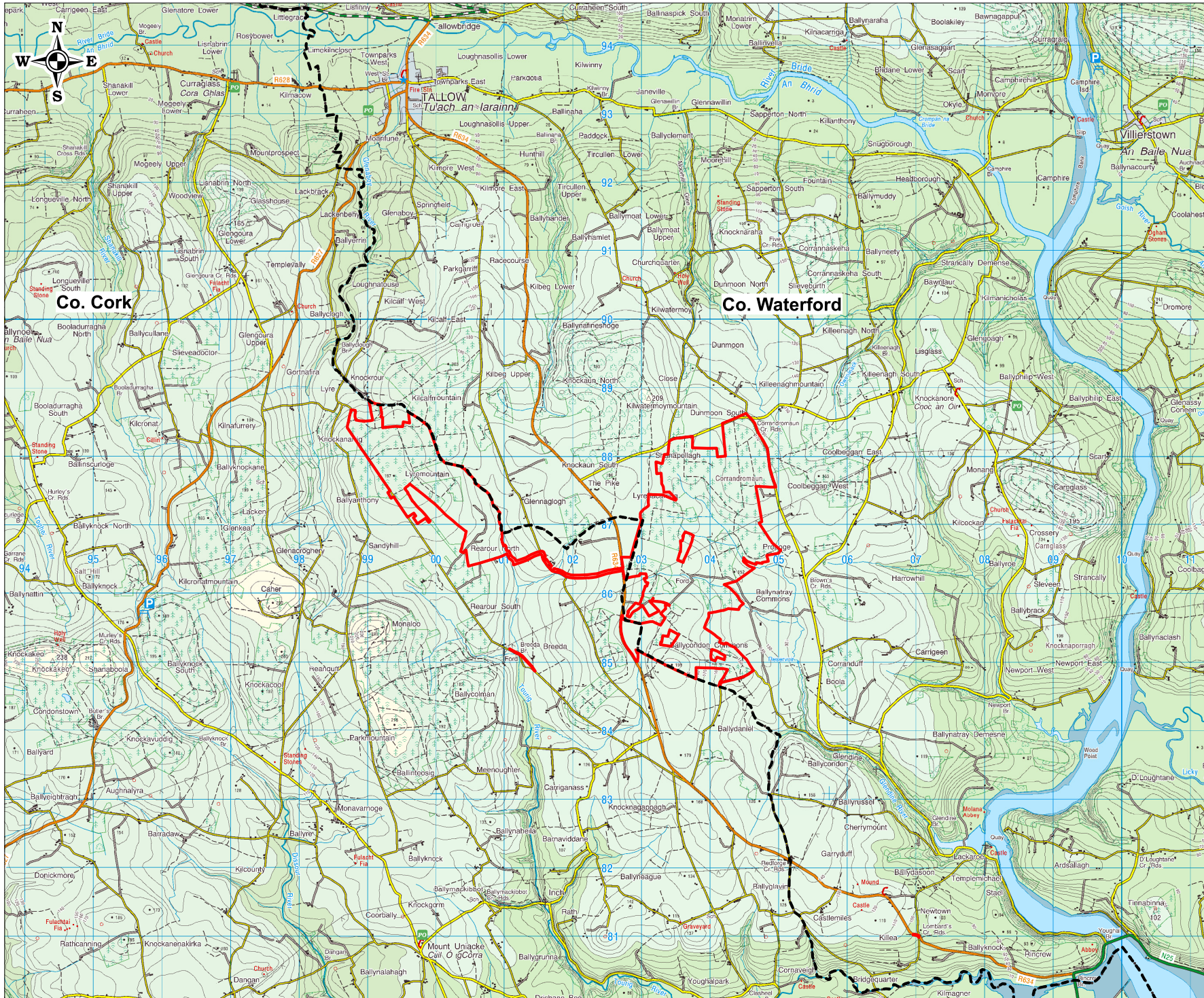
Wind turbine generator technology will ensure that the wind turbine model, chosen for the proposed development, will have an operational lifespan greater than the 30-year operational life that is being sought as part of this application.

Modern wind turbine generators typically have an output of between 3.0 and 5.2 Megawatts (MW) with increases in efficiency and output predicted to continue into the coming decade. For the purposes of this EIAR it is assumed that the wind turbine model installed as part of the proposed wind farm development will have an output of between 3.5 and 5.0 MW. Therefore, based on 17 No. wind turbines, the wind farm will have a total output between 60 MW and 85 MW.

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 maximises the use of the existing onsite access roads and tracks where possible, with approximately 10.7 kilometres of existing roadway/ tracks requiring upgrading and approximately 4.1 kilometres of new access road to be constructed onsite, plus 0.3 kilometres of temporary new access road on the turbine delivery route.

The EIAR site boundary of the proposed development encompasses a total area of approximately 733 hectares, the majority of which comprises commercial forestry plantation. Where the ‘site’ is referred to in this EIAR, this means the primary study area for the EIAR. Generally, the study area extends beyond the planning application site boundary, depending on the requirements of individual assessments. Where this occurs, the extent of the study area is outlined in the relevant chapter, as required. The proposed permanent footprint of the development measures approximately 23.3 hectares, which represents approximately 3% of the primary study area. The site location is shown on Figure 1-1.

The planning application for the proposed wind farm includes connection to the national electricity grid. It is proposed to construct a 110 kV substation within the site and to connect from here via a 110 kV loop-in connection to the existing 110 kV overhead line, which runs through the site. The electrical substation will have 2 No. wind farm control buildings, battery containers and associated switchgear room, electrical plant and equipment, and wastewater holding tank. It is proposed to connect the two clusters of turbines via underground cabling located within existing agricultural land and within the public road corridor. The collector cabling route measures approximately 3.3 km. The proposed substation, grid connection and collector route have been assessed as part of this EIAR.



Map Legend

- County Boundary
- Site Location

Site Location

PROJECT TITLE:
Lyrenacarriga Wind Farm

MAP NO.: **Figure 1-1**

DRAWING BY: **L Meehan** CHECKED BY: **M Watson**

SCALE: **1:75,000** DATE: **31-08-2020**

OS SHEET NO.: **2008**



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Legislative Context of Environmental Impact Assessment

On the 29th of May 2020 the Board determined that the proposed development met the requirements for Strategic Infrastructure Development (SID) under Section 37 A(2)(a) of the Planning and Development Act 2000 (as amended).

The consolidated European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, is currently 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 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). The provisions of the new regulations have all come into operation as of 1st January 2019.

The European Union Directive 2011/92/EU, amended by EU Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment (the ‘EIA Directive’), requires Member States to ensure that a competent authority carries out an assessment of the likely significant effects of certain types of project, as listed in the Directive, prior to development consent being given for the project.

The Environmental Impact Assessment (EIA) of the proposed development will be undertaken by An Bord Pleanála as the competent authority.

This EIAR complies with the EIA Directive in terms of the structure and content of the information required.

Article 5 of the EIA Directive provides where an EIA is required, the developer shall prepare and submit an EIAR, previously referred to as an Environmental Impact Statement (‘EIS’). 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, Schedule 6 to the Planning and Development Regulations 2001 to 2020 sets out the information to be contained in an EIAR, with which this EIAR complies.

MKO was appointed as environmental consultants on the wind farm project and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive.

The relevant classes/scales of development that require Environmental Impact Assessment (EIA) are set out in Schedule 5 (Part 1 and Part 2) of the Planning and Development Regulations 2001 (as amended). 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 paragraph 3(i) of Part 2 of Schedule 5. The proposed development exceeds 5 turbines and 5 Megawatts in scale, and therefore is subject to EIA.

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

All elements of the proposed project including the grid connection, proposed tree felling and replanting, and junction accommodation works have been assessed as part of this EIAR.

1.5 EIAR Guidance

In 2017, the Environmental Protection Agency (EPA) published its *‘Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports’* (EPA, August 2017), 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 with regard to these guidelines also.

1.5.1 Wind Energy Development Guideline for Planning Authorities

The relevant considerations under the *‘Wind Energy Development Guidelines for Planning Authorities’* (Department of the Environment, Heritage and Local Government (DEHLG), 2006) have been taken into account in preparing this EIAR.

The *‘Wind Energy Development Guidelines for Planning Authorities’* (DEHLG, 2006) are currently the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments are outlined in the document *‘Proposed Revisions to Wind Energy Development Guidelines 2006 – Targeted Review’* (December 2013), the *‘Review of the Wind Energy Development Guidelines 2006 – Preferred Draft Approach’* (June 2017), and the *‘Draft Revised Wind Energy Development Guidelines’* (December 2019). A consultation process in relation to the 2019 document concluded on the 19th of February 2020.

Should the revised Wind Energy Guidelines be finalised in advance of a planning decision being made on the proposed development, with current noise and shadow flicker thresholds being amended, if necessary, the proposed development can comply with any revised noise and shadow flicker requirements by implementing mitigation by design, through turbine selection and use of the flexible built-in turbine control systems. Please refer to Chapter 6 Shadow Flicker and Chapter 13 Noise and Vibration for further detail.

1.6

Purpose and Scope of the EIAR

The purpose of this EIAR is to document the current state of the environment in the vicinity of the proposed development site and to quantify the likely significant effects 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 An Bord Pleanála, 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 by Article 5 of the EIA Directive and the Planning and Development Regulations 2001 - 2020, as described in Section 1.4 above.

1.7

Structure and Content of the EIAR

1.7.1

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 human beings, biodiversity - flora and fauna, biodiversity - birds, 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.

The chapters of this EIAR are as follows:

1. *Introduction*
2. *Background to the Proposed Development*
3. *Consideration of Reasonable Alternatives*
4. *Description of the proposed Development*
5. *Population and Human Health*
6. *Shadow Flicker*
7. *Biodiversity (excluding Birds)*
8. *Birds (Ornithology)*
9. *Land, Soils and Geology*
10. *Water*
11. *Air and Climate*
12. *Landscape and Visual*

13. *Noise and Vibration*
14. *Cultural Heritage*
15. *Material Assets (including Traffic and Transport, Telecommunications and Aviation)*
16. *Interactions of Effects*
17. *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.

1.7.2 Description of Likely Significant Effects and Impacts

As stated in the ‘*Guidelines on the Information to be contained in Environmental Impact Statements*’ (EPA, 2002), an assessment of the likely impacts of a proposed development is a statutory requirement of the EIA process. The statutory criteria for the presentation of the characteristics of potential impacts requires that potential significant impacts are described with reference to the extent, magnitude, complexity, probability, duration, frequency, reversibility and trans-frontier nature (if applicable) of the impact.

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

- ‘*Guidelines on the Information to be contained in Environmental Impact Assessment Reports – Draft August 2017*’ (EPA, 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)
- ‘*Guidelines on the Information to be contained in Environmental Impact Statements*’ (EPA, 2002).

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 referred to.

Table 1-2 presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, duration and type of impacts associated with a proposed development on the receiving environment. The use of pre-existing standardised terms for the classification of impacts ensures that the EIA employs a systematic approach, which can be replicated across all disciplines covered in the EIAR. The consistent application of terminology throughout the EIAR facilitates the assessment of the proposed development on the receiving environment.

Table 1-2 Impact Classification Terminology (EPA, 2017)

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 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

Impact Characteristic	Term	Description
	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)
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

Impact Characteristic	Term	Description
	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 16: Interaction of Effects.

1.8 Project Team

1.8.1 Project Team Responsibilities

The companies and staff listed in Table 1-3 were responsible for completion of the EIAR of the proposed development. Further details regarding project team members are provided below.

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

Table 1-3 Companies and Staff Responsible for EIAR Completion

Consultants	Principal Staff Involved in Project	EIAR Input
MKO Tuam Road, Galway, H91 VW84	Brian Keville Michael Watson Jimmy Green Lorraine Meehan Eoin O’Sullivan Pat Roberts Dervla O’ Dowd Padraig Cregg Ian Hynes Patrick Manley Owen Cahill Paul Sweeney Stephen Corrigan John Hynes David McNicholas Julie O’Sullivan David Naughton Dr Úna Nealon	Project Managers, Scoping and Consultation, Preparation of Natura Impact Statement, Preparation of EIAR Sections: <ul style="list-style-type: none"> > 1. Introduction > 2. Background to the Proposed Development > 3. Consideration of Reasonable Alternatives > 4. Description of the Proposed Development > 5. Population & Human Health > 6. Shadow Flicker > 7. Biodiversity. Flora & Fauna. > 8. Biodiversity. Birds (with Paddy Crushell; see below) > 11. Air & Climate > 12. Landscape & Visual > 15. Material Assets (non-Traffic) > 16. Interaction of Effects

Consultants	Principal Staff Involved in Project	EIAR Input
	Luke Dodebier Karen Mulryan Joanna Mole James Newell Joseph O'Brien	> 17. Schedule of Mitigation
Fehily Timoney & Company The Grainstore Singletons Lane Bagnelstown Co. Carlow	Gerry Kane Ian Higgins Paul Jennings	Preparation of Geotechnical Assessment Report
Hydro Environmental Services 22 Lower Main Street Dungarvan Co. Waterford	Michael Gill David Broderick	Flood Risk Assessment, Drainage Design, Preparation of EIAR Sections: > 9. Land, Soils & Geology > 10. Water
AWN Consulting The Tecpro Building Clonsgaugh Business & Technology Park Dublin 17	Dermot Blunnie Aoife Kelly Damian Kelly	Baseline Noise Survey, Preparation of EIAR Section 13: Noise and Vibration
Tobar Archaeological Services Saleen Midleton Co. Cork	Annette Quinn Miriam Carroll	Preparation of Report Section 14: Cultural Heritage
Alan Lipscombe Traffic and Transport Consultants Claran, Headford, Co. Galway	Alan Lipscombe	Swept Path Analysis, Preparation of Report Section 15: Material Assets - Traffic and Transport
Bird Surveyor: Paddy Crushell	Paddy Crushell	Bird Surveys
Bat Surveyor: Pat Doherty	Pat Doherty	Bat Surveys
Mullan Grid Consulting	Rory Mullan	Strategic Review of Grid Connection options

1.8.2 Project Team Members

1.8.2.1 MKO

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 (now MKO). 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 CEnv PGeo

Michael Watson has over 19 years' experience in the environmental sector. Following the completion of his Master's Degree in Environmental Resource Management from National University of Ireland, Maynooth he worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy. Michael's professional experience includes managing Environmental Impact Assessments on behalf of clients in the renewable energy, waste management, commercial and industrial sectors nationally. These projects have required liaising with the relevant local authorities, EPA and statutory consultees as well as coordinating the project teams and sub-contractors. Michael has significant experience in the EPA Industrial Emissions, IPPC and Waste licensing regimes managing licence applications and subsequent regulatory compliance on behalf of clients in the waste and industrial sectors. Michael also has a Bachelor of Arts Degree in Geography and Economics from NUI Maynooth, is a Member of IEMA, a Chartered Environmentalist and Professional Geologist.

Jimmy Green - BA, MRUP; MIPI

Jimmy Green is Principal Planner with MKO, with over 18 years of experience in both private practice and local authorities. Jimmy holds a Bachelor of Arts Degree (BA) in both Human and Physical Geography from the National University of Ireland, Galway as well as a Masters in Regional and Urban Planning (MRUP) from University College Dublin. Prior to taking up his position with McCarthy Keville O'Sullivan in 2004, Jimmy worked as an Assistant Planner, Executive Planner and Senior Executive Planner in Galway County Council and as an Assistant Planner in Donegal County Council. Jimmy is primarily involved in co-ordinating and preparing Environmental Impact Assessment Reports, leading significant and complex development proposals through the planning process (from feasibility, through application, appeals and judicial processes) and has a strong ability to work with many other disciplines and individuals, as well as with Council officials, elected members and members of the public. Jimmy also manages a planning team within MKO in order to ensure timely delivery of project outputs. Jimmy has significant experience in dealing with Strategic Infrastructure Development proposals, Environmental Impact Assessment Reports, Environmental Impact Assessment, Renewable Energy, Electrical Infrastructure proposals, as well as the full range of Commercial, Retail, Residential and Industrial developments. Jimmy is a corporate member of the Irish Planning Institute.

Lorraine Meehan - B.Sc. (Env.)

Lorraine Meehan is a Senior Environmental Scientist with MKO, with over 12 years of experience. Lorraine graduated from NUI Galway in 2006 with a first class honours degree in Environmental Science and has gained extensive experience since joining the company in 2007, working primarily as an Environmental Scientist and Project Manager on a wide range of projects and plans requiring environmental assessment. Key project experience includes renewable energy projects up to 100 MW in scale, electricity infrastructure, roads, waste management facilities, and municipal services projects. Lorraine's key strengths and responsibilities relate to the efficient and effective management of projects, including coordination of multidisciplinary project teams, engagement with the relevant authorities, stakeholders and members of the public on proposed and ongoing projects, organisation of extensive scoping and consultation exercises, and coordination and production of final project outputs, including Environmental Impact Statements/Environmental Impact Assessment Reports, Strategic Environmental Assessment Environmental Reports, and Constraints & Feasibility and Site Selection Studies. Within MKO, Lorraine is also involved in the training of junior members of staff and review of outputs, and completes mapping, desk studies and report-writing for a range of development and strategy-related projects.

Eoin O'Sullivan - M.Sc., B.Sc., CWEM; CEnv

Eoin O'Sullivan is a Senior Environmental Consultant with MKO with over 10 years of experience working in the fields of environmental and human health risk assessment, waste management, waste policy and permitting. Eoin holds a Bachelor of Science (BSc) (Hons) in Environmental Science & Technology and a MSc in Environmental Engineering. Prior to taking up his position with McCarthy Keville O'Sullivan in July 2017, Eoin worked as a Chartered Senior Engineer with CGL in Surrey, UK. Prior to this Eoin worked as a Project Engineer with RPS Consulting Engineers in Belfast. Eoin has wide experience in the project management of large-scale brownfield developments and has routinely undertaken detailed quantitative risk assessment for the protection of controlled waters and ground gas risk assessments. Eoin has also experience in completing PPC Permit Applications and in the preparation of Environmental Impact Statements/Environmental Impact Assessment Reports for renewable energy projects, quarries and a number of non-hazardous landfill sites and anaerobic digesters for both public and private clients. Other key strengths and areas of expertise include remediation options appraisals, remediation method assessments and waste management planning. Eoin is a Chartered Member of the Chartered Institute of Water and Environmental Management and Chartered Environmentalist with the Society of Environment.

Pat Roberts - B.Sc. (Env.)

Pat Roberts is Principal Ecologist with MKO with over 12 years post graduate experience of providing ecological services in relation to a wide range of developments at the planning, construction and monitoring stages. Pat holds B.Sc. (Hons) in Environmental Science. Pat has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage. He has worked closely with construction personnel at the set-up stage of numerous construction sites to implement and monitor any prescribed best practice measures. He has designed numerous Environmental Operating Plans and prepared many environmental method statements in close conjunction with project teams and contractors. He has worked extensively on the identification, control and management of invasive species on numerous construction sites. Prior to taking up his position with MKO in June 2005, Pat worked in Ireland, USA and UK as a Tree Surgeon and as a nature conservation warden with the National Trust (UK) and the US National Park Service. Pat's key strengths include his depth of knowledge and experience of a wide range of ecological and biodiversity topics and also in his ability to understand the requirements of the client in a wide range of situations. He currently manages the ecological team within MKO and ensures that the outputs from that team are of a very high standard and meet the requirements of the clients and relevant legislation and guidelines. He is a full member of the Chartered Institute of Ecologists and Environmental Managers (CIEEM).

Dervla O’Dowd - B.Sc. (Env.)

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

Padraig Cregg - M.Sc., B.Sc.

Padraig Cregg is a Senior Ornithologist with MKO with over 7 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.

Ian Hynes – B.Sc.

Ian Hynes is an Ornithologist with MKO. Ian graduated with an Honours Degree in Environmental Science from National University of Ireland, Galway in 2017 and joined the Ornithology team in December of the same year. Ian has a broad knowledge of ecology ranging from invertebrate sampling and identification, habitat classification and vegetation surveys. In his time with MKO he has developed a broad understanding of SNH Guidance and its application to bird surveys for wind farm developments. Ian has over three years of experience in using GIS software. Ian has also gained experience in report writing through his final year thesis and assisting in the production of EIARs and ornithological reports.

Patrick Manley – B.Sc.

Patrick Manley is an Ornithologist at MKO. He attended University College Dublin where he completed a BSc (Hons) in Geology. Prior to joining the company Patrick worked as part of the conservation team in BirdWatch Ireland, on projects such as the Dublin bay birds project, Kilcoole Little Tern conservation project and the results based agri-environmental scheme for breeding waders. He has extensive experience surveying birds through other projects such as the Irish wetlands bird

survey, the Inishmurray all-island breeding birds survey, the national Hen Harrier survey and the countryside bird survey

Owen Cahill - B.Sc., M.Sc.

Owen is an Environmental Engineer with MKO with over 10 years of experience in the environmental management and construction industries. Owen holds BSc. (Hons) and MSc. in Construction Management and a Master's in Environmental Engineering. Prior to taking up his position with MKO in October 2013, Owen worked as an Environmental Officer with Kepak and prior to which he held a post with Pentland Macdonald Contaminated Land & Water Specialist in Northern Ireland. Prior to working in planning and environmental consultancy, Owen was employed within the construction industry where he gained significant experience on a variety of civil, residential and commercial projects. Owen's wide ranging multi sector experience has provided him with specialist knowledge and understanding of the challenges in the planning and delivery of developments with the minimum environmental impact and with practicality and constructability in mind. Owen's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy & solar energy construction & environmental management planning and waste permit management. Since joining MKO Owen has been involved as a Project Manager on a range of energy infrastructure, commercial, residential, waste facility and quarry projects as well as managing the licensing requirements of a number of EPA licensed facilities. Within MKO Owen plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIA Reports. Owen has project managed the Environmental Impact Assessment of a range of development projects across the Ireland and holds Affiliate Membership with the Institute of Environmental Management & Assessment and is currently awaiting interview and assessment to become a Full Member and Chartered Environmentalist.

Stephen Corrigan - B.Sc.

Stephen Corrigan is an Environmental Scientist with MKO with over 3 years of experience in private and public sector positions. Stephen holds a B.SC in Environmental Science. Stephen has specialist knowledge in environmental field surveys, database management, geographic information systems and data analysis. Stephen's key strengths and areas of expertise are in data management and GIS. Since joining MKO Stephen has been involved as an Assistant Environmental scientist on a significant range of energy infrastructure and private/public development projects, hydrological and ecological monitoring projects. Within MKO Stephen has a role in site construction monitoring, report writing and database management. Stephen works as part of a large multi-disciplinary team to produce EIA Reports, operational compliance reports and monitoring reports for MKO.

Paul Sweeney - M.Plan

Paul Sweeney is a Planner with MKO having joined the planning team in April 2018. Paul holds a Bachelor of Arts (BA (Hons)) in Geography and English from University College Cork which he graduated in 2015 as well as holding a Masters in Planning and Sustainable Development (M.Plan) also from University College Cork where he graduated in 2017. Since joining MKO in 2018 Paul has worked as part of a multidisciplinary team and has developed a range of experience across a number of sectors which include commercial, residential and energy. He has become experienced in a wide range of planning issues having been involved as a planning consultant across a wide scope of projects. As part of his role Paul has both managed and assisted with the coordination of Planning Applications through the statutory planning process from preparation to final grant of permission. Paul has a current focus within the environmental and energy sector where has had a key involvement in numerous projects including the renewable energy sector.

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

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

David McNicholas – B.Sc., M.Sc., MCIEEM

David McNicholas is a Senior Ecologist at MKO. David holds a BSc (First Class Hons) Environmental Science and an MSc (Hons) Environmental, Health and Safety Management. David has 7 years professional ecological consultancy experience. David specialises in the preparation of EIAs, EcIAs and NISs including ecological surveys and monitoring. David has worked on all phases of wind farm development from feasibility/scoping, ecological surveys, preparation of full EIAR chapters, construction phase environmental monitoring and post-construction ecological monitoring. David has worked as an Ecological Clerk of Works (ECoW) during the construction phase of ten large scale wind farms in Ireland and Northern Ireland, gained significant experience on the implementation of the environmental and ecological measures. David is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM).

Julie O'Sullivan – M.Sc. (Ecology), B.Sc.

Julie is an Ecologist with MKO. She holds a BSc (Hons) in Biology from University College London and a Masters in Ecological Assessment from University College Cork. Prior to taking up her position with us, Julie gained experience in practical habitat management and developed a range of field skills in plant, habitat, bird and bat surveying through working with several conservation organisations in the UK and Ireland including the RSPB, Cumbria Wildlife Trust and Bat Conservation Trust. Julie has experience surveying birds through her involvement with the RSPB in Northern Ireland. Julie is trained in bat survey, terrestrial invertebrate and freshwater macroinvertebrate sampling and in taking vegetation relevés of vascular plants and bryophytes. She also has experience in habitat identification, habitat mapping, Annex I habitat quality assessment and Phase 1 habitat survey. Julie has worked within our Ornithology Team on several renewable energy developments, utilising a broad range of bird survey methodologies including vantage point surveys, breeding raptor, adapted brown & shepherd and waterfowl distribution surveys. Julie was part of a team of bird usage surveyors working on the Shannon/Fergus Estuary. Within MKO Julie is responsible for independently carrying out and planning Ornithological field surveys in accordance with required Scottish Natural Heritage standards as part of the ornithology team, and for carrying out bat surveys, habitat surveys, and Appropriate Assessment screenings as part of the ecology team.

Una Nealon - PhD, B.Sc.

Úna Nealon is an Ecologist with over 8 years of experience in consultancy, research and conservation management. After gaining a first-class honours degree in Environmental Science at NUIG, Úna worked as an Environmental Consultant for OES Consulting where she gained experience in multidisciplinary ecological surveys and impact assessment. In addition, she has held research roles in Tanzania and Madagascar, studying local flora and fauna, and developing conservation management plans. Before joining MKO in 2016, she completed her PhD with the Centre for Irish Bat Research,

examining the impacts of wind farms on Irish bat species. Úna's primary expertise lies in bat ecology, particularly in relation to wind farm EIA. Beyond this, she is a skilled general ecologist, with experience in flora identification, habitat classification, GIS mapping, mammal surveys, Ecological Impact Assessment and Appropriate Assessment. Within MKO Úna was responsible for managing bat survey requirements for a variety of wind and solar energy planning applications, as well as other commercial, residential and infrastructure projects. This includes scope development, roost assessments, acoustic surveying, sonogram analyses, impact assessment, report writing, ecological constraint identification, EIA Report production as well as Appropriate Assessment Screening Reports and Natura Impact Statements. Úna is a member of the Irish Ecological Association, Bat Conservation Ireland and is Secretary of Galway Bat Group.

Luke Dodebier - B.Sc. (Env.)

Luke Dodebier is a Graduate Ecologist with MKO. After gaining an honours degree in Wildlife Biology IT Tralee, Luke worked as a Graduate Bat Ecologist for MKO. He gained experience in bat survey techniques such as transect, roost and static detector surveys, sonogram analysis and report writing. Luke has also gained experience in multidisciplinary walkover surveys. In 2018 Luke worked as a student ecologist with MKO, gaining experience in multidisciplinary survey techniques including floral and faunal identification, habitat assessment, GIS Mapping, Ecological Impact Assessment and Appropriate Assessment. Luke works with an expert bat team focused on surveying bats, identifying ecological constraints and producing ECIA, Appropriate Assessment screening reports and Natura impact statements.

Karen Mulryan – MA, B.Sc.

Karen Mulryan is an Environmental Scientist with MKO with over 3 years' experience in the private consultancy sector and two years' experience in the commercial archaeology sector. Karen's key strengths area in Project Management, for wind and solar developments, desk-based assessments, particularly heritage, and feasibility studies.

David Naughton - B.Sc. (Env.)

David Naughton is an Ecologist with two years of professional experience, working within the Ornithology Department for MKO. David graduated with an honours B.Sc. degree in Environmental Science from NUIG in 2016. David has a wide range of ecological experience including bird surveys, vegetation surveys, terrestrial invertebrate surveys, freshwater invertebrate surveys, river surveys for salmonids and other fish species, small mammal surveys and habitat identification. David is also very accomplished in GIS software systems for use in interpreting ecological data. David has experience in report writing and has been involved the production of several EIS/EIARs for various windfarm projects as well as numerous interim bird survey reports issued to clients on an ongoing basis. David has also been responsible for the production of collision risk modelling for bird activities at several windfarm sites over the past year, many of which have been peer reviewed by experts in CRM and were found to be appropriate. David's key strengths and areas of expertise are applications of GIS systems, including viewshed analysis and collision risk modelling, project management, survey planning and analysing & interpreting large scale datasets. Since joining MKO David has been involved in a wide range of various projects, acting as project manager for many bird survey projects while providing a pivotal contact link between clients and field surveyors.

Joanna Mole - BSc PGDipLA MSc CMLI

Joanna Mole is a Landscape and Visual Impact Assessment Specialist and Chartered Landscape Architect with MKO with over 15 years of experience in both private practice and local authorities. Joanna holds a BSc (Hons) in Landscape Design & Plant Science from Sheffield University, a Postgraduate Diploma in Landscape Architecture from Leeds Beckett University, and a MSc in

Renewable Energy Systems Technology from Loughborough University. Prior to taking up her position with MKO in October 2017, Joanna worked as a Landscape Architect with Kav-Banof in Israel and held previous posts with CSR in Cork, LMK in Limerick, Geo Architects in Israel and Groundwork Bridgend in South Wales. Joanna is a Chartered Landscape Architect with specialist knowledge in Landscape and Visual Impact assessments for projects ranging from individual houses to large windfarms, cycle route design and landscape contract management. Since joining MKO Joanna has been involved in projects such as energy infrastructure, extraction industry and residential projects. Joanna holds chartered membership of the British Landscape Institute since 1998 and has been an examiner for British Landscape Institute professional practice exam.

James Newell

James holds the position of CAD and Information Technology Technician with MKO since joining the Company in May 2006. Prior to joining MKO, he worked as a graphic designer and illustrator for over eight years. In recent years James' role has extended to include all wind farm visual modelling completed by the company. He is proficient in the use of MapInfo GIS software in addition to AutoCAD and other design and graphics packages.

Joseph O'Brien

Joseph O'Brien holds the position of CAD Technician. Joseph holds a BA Honours Level 8 Modelmaking, Design and Digital Effect, Institute of Art Design and Technology (IADT), Dun Laoghaire & City & Guilds Level 3 2D & 3D AutoCAD certificates. Joseph's role entails various wind and solar farm projects which require various skills such as mapping, aerial registration and detailed design drawings for projects. Prior to joining us, Joseph worked as a free-lance Modelmaker and CAD Technician. His previous experience included designing various models and props through CAD and then making them for various conventions such as Dublin Comic Con and Arcade Con.

1.8.2.2 Fehily Timoney

Dr. Paul Jennings – Geotechnical Engineer

Dr. Paul Jennings is a Geotechnical Engineer with over 30 years' experience of design and construction of sub-surface structures, foundations, earthworks, infrastructure and earth-retaining structures; planning, supervision and interpretation of ground investigation; and providing expert geotechnical advice and reporting. Paul has particular experience in providing expert advice for slope stability problems, soft ground engineering, infrastructure, deep-excavations and forensic investigation of landslides.

Gerry Kane – Geotechnical Engineer

Gerry Kane joined Fehily Timoney (formerly AGECC) as a Geotechnical Engineer in 2008. Gerry graduated from IT Carlow in 2008 with a BEng (Hons) degree in Civil Engineering. Gerry is a Geotechnical Engineer with over seven years' experience in geotechnical design and analysis, supervision and interpretation of ground investigations, foundation & earthwork design, supervision of construction of bulk earthworks and structure foundations, slope stability analysis, desk studies and walkover surveys. Previous and current experience in the wind energy field has included work for wind farm developments in Ireland, Northern Ireland, Scotland, Wales and England. This work has covered Peat Stability Assessment Reports, Soils and Geology Chapters of EIAR's, site assessments for wind farm developments and the investigation of peat failures at wind farm sites.

Ian Higgins – Geotechnical Engineer

Ian is a Geotechnical Engineer with over 18 years' experience in the design and supervision of construction of bulk earthworks, geotechnical foundation design, geotechnical monitoring and reviewing, reinforced earth design and 3rd party checking of piling and ground improvement designs. Ian's experience also includes the design, supervision and interpretation of ground investigations, including desk studies, walkover surveys, hazard mapping of rock excavations and slopes.

Ian has experience in many areas of civil engineering including highways, railways, energy projects and commercial developments. Ian's responsibilities include managing junior engineers, reviewing work carried out for ground investigation, reporting and design. Ian has also experience in using a number of geotechnical software packages including slope stability, finite element, pile design and retaining wall design.

1.8.2.3 Hydro Environmental Services Ltd.

Michael Gill - Civil / Environmental Engineer & Hydrologist / Hydrogeologist

Michael Gill (B.A., B.A.I., M.Sc., Dip. Geol, MIEI) is a Civil/Environmental Engineer and Hydrologist/Hydrogeologist with over 18 years' environmental consultancy experience. Michael has completed numerous hydrological and hydrogeological impact assessments in relation to wind farms in Ireland and Northern Ireland. Michael has completed numerous wetland characterisation and drainage and water resource projects and has extensive regional knowledge of peatland drainage systems across Ireland. Michael has also completed hydrological and hydrogeological assessments and Environmental Impact Statement reports for energy-related projects (wind farms, 60 no. in Ireland and 10 no. in Northern Ireland), quarries, and linear developments such as gas pipelines, and also for road schemes and other infrastructural and SID developments. He has also managed EIA/EIS assessments for infrastructure projects and private residential and commercial developments with emphasis on hydrology and hydrogeology, and where required wetland/peatland assessment for Natura Impact Assessments.

David Broderick - Hydrogeologist

David Broderick (BSc, H. Dip Env Eng, MSc) is a hydrogeologist with 15 years' experience in the public and private sectors. David has completed numerous (35+) Soils and Geology Sections and Water Sections for Environmental Impact Statements (EIS) / Environmental Impact Assessment Reports (EIARs) for wind farm developments of up to 49 turbines.

David holds a B.Sc. in Environmental Science, University of Wales, Aberystwyth (2001), as well as a H. Dip. Environmental Engineering, Trinity College Dublin (2004). David also completed a M.Sc. in Hydrogeology at University of Leeds (2006). David is a member of International Association of Hydrogeologists (IAH). Previous project collaborators have included local authorities, drinks and food sector, private developers, environmental consultants, architects and civil engineering consultants requiring specialist hydrological and hydrogeological expertise. David has also formed an integral part of the preparation of EIS and AA/NIS and LAP/SEA documents with direct liaison with ecologists and planners.

1.8.2.4 AWN Consulting Ltd.

Damian Kelly – Technical Director (Acoustics)

Damian Kelly (Technical Director) holds a BSc from DCU and an MSc from QUB. He has over 15 years' experience as an acoustic consultant and is a member of the Institute of Acoustics. He has extensive knowledge in the field of noise modelling and prediction, having developed many of the

largest and most complex examples of proprietary noise models prepared in Ireland to date. He is a sitting member of the committee of the Irish Branch of the Institute of Acoustics.

Dermot Blunnie - Senior Acoustic Consultant

Dermot Blunnie (Senior Acoustic Consultant) holds a BEng in Sound Engineering, MSc in Applied Acoustics and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. He has been working in the field of acoustics since 2008 and is a member of the Institute of Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA). He has extensive knowledge of all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, energy, industrial, commercial and residential. Dermot specialises in wind farm noise modelling, compliance and complaint investigations.

Aoife Kelly - Acoustic Consultant

Aoife Kelly (Acoustic Consultant) holds a BSc (Hons) in Environmental Health and a PhD in Occupational Noise. She has completed the IOA Diploma in Acoustics and Noise Control and won the 2016 Acoustics and Noise Consultants (ANC) best diploma project for speech intelligibility in schools. Working in the area of acoustics since 2013, she has extensive experience in occupational noise surveying and environmental acoustics.

1.8.2.5 Tobar Archaeological Services

Tobar Archaeological Services has been in operation since 2003. Numerous EIS assessments have been undertaken by Tobar since 2003, in particular for wind farms, overhead lines, water supply schemes and sewerage schemes. Tobar has a proven track record in wind energy projects from EIS stage through to construction stage when archaeological monitoring is frequently required. Tobar's Directors, Annette Quinn MA, MIAI, CifA and Miriam Carroll MA, MIAI, CifA both graduated from University College Cork in 1998 with a Master's degree (MA) in Methods and Techniques in Irish Archaeology. Annette and Miriam are both licensed by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs to carry out excavations in Ireland and have carried out work directly for the National Monuments Services (Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs). Both directors are members of the Institute of Archaeologists of Ireland (IAI) and have participated in the Continuing Professional Development Programme (CPD).

Annette Quinn – BA, MA

Annette holds a Degree in Archaeology and Geography (1993-1996) and a 2-year Masters in Methods and Techniques in Irish Archaeology (1996-1998) from UCC. With 17 years' experience in both the public and private sector, she has project managed many of the large-scale projects and Environmental Impact Assessments that Tobar Archaeological Services have been involved in. She has worked with a variety of clients on previous projects and is adept at ensuring reports are delivered on time and to the required standard.

Miriam Carroll – BA, MA

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 15 years' experience in private sector archaeology. Miriam has managed and coordinated numerous projects from commencement stage to completion on behalf of numerous small and large companies. Miriam is a partner of Tobar Archaeological Services and is a Member of the Institute of Archaeologists of Ireland.

1.8.2.6 Alan Lipscombe Traffic and Transport Consultants

Alan Lipscombe - (B.Eng. Hons.) MIHT

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 and is an accomplished analyst who has experience of a wide variety of modelling packages and methods.

1.8.2.7 Dr Patrick Crushell BSc, MSc, PhD, CEcol, MCIEEM

Dr Patrick Crushell established Wetland Surveys Ireland in 2007. He received an honors degree in Applied Ecology from UCC, a Master's degree in Environmental Resource Management from UCD and defended his PhD (Environmental Sciences) at Wageningen University, the Netherlands. The focus of his PhD research was on soak systems of Clara bog, Co. Offaly. His research also took him to the Netherlands, Estonia, Latvia and Argentina. He is a Chartered Ecologist and full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM), adhering to their code of professional conduct.

1.8.2.8 Pat Doherty BSc, MSc, MCIEEM

Pat Doherty established Doherty Environmental Consulting in 2008. He holds a Bachelor of Science Degree in Environmental Earth Science from the University of Aberystwyth and a Master of Science Degree from University College Dublin. Mr. Doherty a Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Mr. Doherty is a consultant ecologist with over 17 years' experience in completing ecological impact assessment and contributing to Environmental Impact Assessment. He has been involved in the completion of assessments of multiple wind farm developments in both the Republic of Ireland and Northern Ireland where he has completed detailed habitat and fauna surveys to inform the assessment process. He has completed focused certified professional development training in a range of ecological survey techniques and assessment processes. Training has been completed for National Vegetation Classification (NVC) and Irish Vegetation Classification (IVC) surveying, bryophyte survey for habitat assessment and identification, professional bat survey and assessment training, mammal surveying and specific training for bird surveys for wind farm developments. Training has been completed by approved training providers such as CIEEM, Bat Conservation Trust, British Trust for Ornithology and the Field Studies Council.

1.8.2.9 Mullan Grid Consulting

Mullan Grid Consulting is an electrical engineering consultancy specialising in the grid connection of renewable generators. Rory Mullan, Director and Senior Project Engineer, is a recognised expert in the connection of renewable generation in Ireland and Northern Ireland. Rory has been working in the Irish electricity industry since 1998. Prior to becoming a senior consultant, Rory has a background of working in commercial and technical roles in NIE, ESB and EirGrid. Through his roles in the renewable trade associations he has been at the forefront of the development of connection policy.

1.9 Difficulties Encountered

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

1.10 Viewing and Purchasing the EIA

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

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

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

An Bord Pleanála

64 Marlborough Street,
Dublin 1

Cork County Council

County Hall
Carrigrohane Road
Cork

Waterford County Council

The Mall
Waterford

The EIA 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 set up by the Department as an electronic notification to the public of requests for development consent which are accompanied by an EIA: <https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal>.

Copies of this EIA, including the Non-Technical Summary, along with all Planning Drawings will also be available online at the following dedicated project website:

- www.lyrenacarrigawindfarm.com