

GALETECH
ENERGY SERVICES

Islandmore Wind Farm

Environmental Impact Assessment Report

Annex 1.5: Environmental Impact Assessment Scoping Report

Islandmore Wind Farm Limited

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Approval	Senior Planner	Simon Carleton

RECORD OF CHANGES

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1.0 INTRODUCTION

Islandmore Wind Farm Limited ('the Developer') intends to apply for planning permission to construct and operate a wind energy development, to be known as the Islandmore Wind Farm. The proposed Islandmore Wind Farm (or 'project') is located in north County Roscommon, c. 2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo). The location of the project, in a regional context, is illustrated at **Figure 1** below.

The project provides for the construction and operation of a wind farm, comprising infrastructure including 10 no. wind turbines, hardstandings, access tracks, site entrances, underground electrical and communications cabling, spoil deposition areas, borrow pit and all associated site development works.

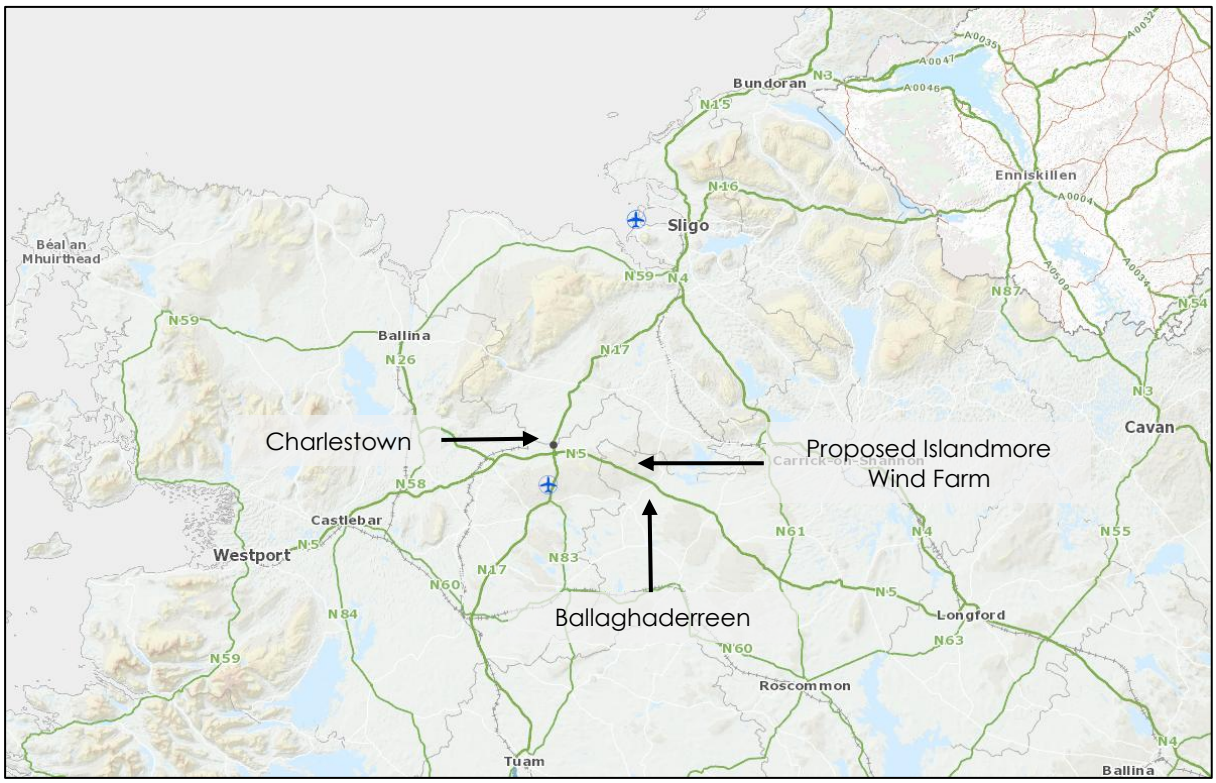


Figure 1: Site Location

1.1 THE DEVELOPER

Islandmore Wind Farm Limited, a subsidiary of Statkraft Ireland, is a renewable energy development company with substantial experience in the renewable industry. Statkraft Ireland is a leading developer, owner, and operator of onshore wind energy in Ireland and holds a comprehensive range of capabilities for the development of onshore wind energy projects of all scales, ranging from the initial feasibility stage to operational management. Statkraft Ireland is also responsible for the development of solar energy development, battery energy storage systems and other grid services infrastructure.

1.1.1 The Agent

Galetech Energy Services (GES) has been commissioned by the Developer to coordinate the preparation of an Environmental Impact Assessment Report (EIAR) including the scoping process. GES is an Irish multi-disciplinary renewable energy consultancy that specialises in the project management of planning, environmental

and technical engineering services of wind energy developments from project feasibility through to delivery and operation. GES combines the expertise of leading experts in wind farm design, planning and environmental assessment and has extensive experience in managing and coordinating EIAR projects for wind energy and associated electricity grid and substation developments.

1.1 PURPOSE OF THIS REPORT

The purpose of the Environmental Impact Assessment (EIA) scoping process is to identify key environmental elements which are likely to be important during the EIA process and to eliminate those which are not from further assessment. The scoping process identifies sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors which are likely to be affected. It defines the appropriate level of detail for the information to be provided in the Environmental Impact Assessment Report (EIAR). In essence, the primary focus of scoping is to define the most appropriate assessment of likely significant effects related to the project.

The aims of this document are to:-

- set out the overall approach to the preparation of the EIAR;
- describe the proposed content and structure of the EIAR;
- summarise key baseline information;
- describe the proposed assessment methodology;
- identify potential effects at all stages of the project; and,
- identify topics/factors which do not require further assessment and can be scoped out.

2.0 ENVIRONMENTAL IMPACT ASSESSMENT

2.1 WHAT IS EIA?

EIA is a process required by the European Union (EU) Environmental Impact Assessment Directive 2011/92/EU, as amended by 2014/52/EU, and transposed into Irish law by way of Part X of the Planning & Development Act 2000 (as amended) ('the 2000 Act').

EIA is carried out by the relevant competent authority to ensure that projects, where the likelihood of significant effects on the environment cannot be excluded, are subject to a comprehensive and independent examination, analysis and evaluation of their likely significant effects on the environment; including the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects; of both their construction, operation, and decommissioning phases, prior to being granted planning permission.

2.2 EIA SCREENING

In accordance with the provisions of the 2000 Act, EIA is mandatory when certain classes of projects exceed specific sizes and thresholds. Planning applications for such projects must be accompanied by an EIAR. Schedule 5 of the Planning and Development Regulations 2001 (as amended) ('the Planning Regulations') provides that the following class of development proposal shall be subject to EIA:-

"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"

The project consists of 10 no. wind turbines, with a total predicted output of 53.1-megawatts (MW), and is therefore of a scale which exceeds the mandatory threshold for EIA. Consequently, an EIAR will be prepared and submitted with the planning application.

2.3 WHAT IS AN EIAR?

An EIAR is a written statement prepared by a developer of the likely significant effects, if any, which the project, if carried out, will have on the environment. The EIAR consists of a systematic analysis of the project, including its construction, operation and decommissioning phases, in relation to the existing environment. It is an iterative process carried out throughout the full lifecycle of the project design and consenting process so as to allow for preventative and ameliorative action, as necessary, at a point in time when changes can still be made to the project that anticipate, avoid and mitigate any likely significant effects foreseen.

The EIAR is the principal document that informs the EIA process and provides integral information which a consenting authority can use; amongst other considerations, including, where appropriate, its own supplementary assessments; in independently undertaking EIA and informing its decision to grant (including subject to conditions and/or modifications) or to refuse planning permission, and/or to seek further information from a developer.

The EIAR can also be used by third parties, including members of the public concerned, as part of the public participation process to evaluate the project and its likely significant environmental effects and to inform any submissions made to the planning application process.

The EIAR will be prepared in accordance with the provisions contained within Schedule 6 of the Planning Regulations, as amended, which sets out the information to be contained in an EIAR. In addition, the EIAR will take account of the contents of Directive 2014/52/EU ('the 2014 EIA Directive'), which was adopted in the EU on 16 April 2014, amending Directive 2011/92/EU ('the 2011 EIA Directive') on the assessment of the effects of certain public and private projects on the environment. The 2014 EIA Directive was transposed into Irish planning law from the 1 September 2018 via the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

2.4 PURPOSE OF THE EIAR

The purpose of the EIAR is to inform decision making processes. The EIAR provides for a system of sharing information about the environment, within which a project sits, and enables effects to be foreseen and prevented during the design and consent stages. The purpose of the EIAR is to:-

- Anticipate, avoid and reduce significant effects;
- Assess and mitigate effects;
- Maintain objectivity;
- Ensure clarity and quality;
- Provide relevant information to decision makers; and
- Facilitate better consultation.

It is a statutory requirement that the EIAR pays particular regard to the:-

- Key alternatives;
- Proposed project;
- Receiving environment;
- Likely significant effects;
- Mitigation and monitoring measures; and
- Residual effects.

A non-technical summary must also be provided.

2.5 EIAR METHODOLOGY

In May 2022, the Environmental Protection Agency (EPA) published the *Guidelines on the Information to be contained within an Environmental Impact Assessment Report* ('the EPA Guidelines') and these guidelines reflect the 2014 EIA Directive and the provisions contained therein. The EPA Guidelines are a statutory document and provide guidance on the role of the EIAR in the EIA process, the key activities involved in the EIAR process, and guidance on the presentation of the information contained in the EIAR.

The EIAR team will have regard to these guidelines; while best practice guidance related to each individual environmental discipline or topic addressed by the EIAR will also be adhered to.

The EPA guidelines include a 7 no. stage approach (sequence) in the production of the EIAR. This includes:-

- Screening;
- Scoping;
- Consideration of Alternatives;
- Project Description;
- Baseline Description;
- Assessment of Likely Significant Impacts; and,
- Mitigation/Monitoring.

The guidelines outline that adherence to this sequence ensures an objective and systematic approach is achieved. Using this sequence, the environment is described using a number of specific headings and this provides for a separate section for each topic. The description of the existing environment, the likely significant effects (positive, negative, & cumulative), mitigation and monitoring measures, and residual effects are then grouped together in each section, covering each topic. This format allows for ease of investigation into each topic and for specialist studies/input to be integrated seamlessly.

2.6 CONTENT AND STRUCTURE OF THE EIAR

In order to be relevant, complete and legally compliant, the content of this EIAR includes all of the information required by the 2014 and 2011 EIA Directive and national legislation, as appropriate and necessary to the specific characteristics of the project, and includes:-

- A description of the project comprising information on the site, design, size and other relevant features of the project;
- A description of the likely significant effects of the project on the environment;
- 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;
- 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;
- A non-technical summary of the information referred to in points (a) to (d); and,
- Any additional information specified in Annex IV of the 2011 EIA Directive relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

In order to provide for a consistent approach and to communicate clear, concise, unambiguous information, each chapter of the EIAR will be systematically organised so as to follow a similar basic structure, as follows:-

- The existing environment: A description of the context, character, significance and sensitivity of the receiving (baseline) environment using standard descriptive methods, in order to predict the likely significant effects of the project;
- The likely significant effects of the project: The aspects of the construction, existence and operation of the project that are likely to affect the existing environment including, as appropriate, predicted, potential, residual, 'do nothing' and 'worst case' effects. The likely significance of any effects is determined with reference to magnitude, intensity, integrity, duration and probability; and,
- The measures to mitigate and monitor adverse effects: The range of methods which are proposed for mitigation by avoidance, reduction and remedy of any likely significant effects (including unplanned events) together with ongoing monitoring of the efficacy of mitigation measures.

This structure, which clearly separates data (descriptions of the receiving environment and of the project) from impact predictions (likely significant effects and mitigation measures), is designed to ensure that replicable impact assessments, based on rigorous scientific information and verifiable evidence, is carried out using recognised methods that are presented and documented in a fully legible, transparent and objective manner.

This methodological structure is designed to reduce any possible subjective information and bias in order to facilitate An Coimisiún Pleanála in its independent EIA of the project.

2.7 FORMAT OF THE EIAR

The format of the EIAR is set out below:-

- Introduction;
- Assessment of Project Alternatives;

- Description of the Project;
- Population and Human Health;
- Biodiversity;
- Land & Soil;
- Water;
- Air Quality;
- Climate;
- Landscape;
- Cultural Heritage;
- Noise & Vibration;
- Shadow Flicker;
- Material Assets; and,
- Interaction of the Foregoing.

Each chapter of the EIAR will be structured using the following general format:-

- Introduction;
- Methodology;
- Description of the Existing Environment;
- Description of Likely Significant Effects;
- Mitigation & Monitoring Measures;
- Residual Effects; and,
- Summary.

2.7.1 Introduction

This section will introduce the environmental topic to be assessed and the elements to be examined within the assessment.

2.7.2 Methodology

Specific topic related methodologies will be outlined in this section. This will include the methodology used in describing the existing environment and undertaking the impact assessment. It is important that the methodology is documented so that the reader understands how the assessment was undertaken.

2.7.3 Description of the Existing Environment

An accurate description of the existing environment is necessary to predict the likely significant effects of a new development. Existing baseline data will be used as a valuable reference for the assessment of actual effects from a development once it is in operation. To describe the existing environment, desktop reviews of existing data sources will be undertaken for each specialist area relying on published reference reports and datasets to ensure the objectivity of the assessment. Desktop studies will also be supplemented by field surveys in order to verify the accuracy of the desktop study and/or to gather additional environmental information for incorporation into the EIAR.

The existing environment will be evaluated to determine its importance, significance and sensitivity. The significance and sensitivity of a specific environment will be derived from legislation, national policies, local plans and policies, guidelines and/or professional judgements.

2.7.4 Description of the Likely Effects

In this section, assessments will be made as to how the receiving environment will interact with the project. The full extent of the project's effects prior to the implementation of proposed mitigation measures will be described. Effects from the construction, operation and decommissioning phases of the project will be discussed; while interactions with other environmental topics and cumulative effects with other developments will also be assessed.

The evaluation of the significance of the effect will be undertaken. Where possible, pre-existing standardised criteria for the significance of effects will be used in accordance with the EPA Guidelines. Additional assessment criteria can include Irish legislation, international standards, European Commission and good practice guidelines. Where appropriate criteria do not exist, the assessment methodology section will set out the criteria used to evaluate the significance.

2.7.5 Mitigation & Monitoring Measures

If significant effects are assessed as likely to arise, mitigation measures will be devised to minimise effects on the environment. Mitigation measures 'by avoidance', 'by reduction' and 'by remedy' may be implemented. It is likely that mitigation measures will also be proposed even where predicted effects are not assessed as likely to be significant which will ensure that environmental effects are minimised to the greatest possible extent.

Proposals to undertake pre- or post-construction monitoring, or monitoring during construction activities, may also be proposed to obtain additional information on the project site to inform construction methods to ensure that activities are being completed in accordance with best practice guidelines and/or to ensure the efficacy of the proposed mitigation measures. These measures, and a clear justification for their implementation, will be described in this section.

2.7.6 Residual Effects

This section will describe those environmental effects which will remain following the implementation of mitigation and monitoring measures. These effects will be described in detail and an assessment of their significance undertaken.

2.7.7 Summary

A summary of the assessment undertaken will be provided in this section along with an overall assessment of the significance of the likely effects.

2.8 CONTRIBUTORS TO THE EIAR

The 2014 EIA Directive requires that an EIAR must be prepared by a team of competent, qualified experts with an appropriate combination of experience, expertise and knowledge related to the significance, complexity and range of effects that an EIAR needs to assess, including the early anticipation of effects. In order to ensure that the information included in the EIAR is complete to a high level of objective quality, such competences include relevant prior experience and

knowledge of the characteristics of the project type and sensitivities likely to be present in the receiving environment; an understanding of the legal context of the decision-making process, including relevant case law; and an appropriate range of specialist technical experts to address different environmental factors, and their interactions.

The preparation of this Scoping Report has been managed by GES with recognised experts carrying out specialist scoping assessments within their individual field. GES will also coordinate the preparation of the EIAR and, in addition to the appointed specialist experts, will prepare a number of specific chapters, as detailed at **Table 1** below.

Chapter	Environmental Factor/Topic	Specialist Consultant
1	Introduction	GES
2	Assessment of Project Alternatives	GES
3	Description of the Project	GES
4	Population & Human Health	GES
5	Biodiversity	Woodrow (APEM Group)
6	Land & Soil	Hydro-Environmental Services
		Fehily Timoney & Company
7	Water	Hydro-Environmental Services
8	Air Quality	AWN Consulting
9	Climate	AWN Consulting
10	Landscape	Macro Works
		GES
11	Cultural Heritage	Dermot Nelis Archaeology[1]
12	Noise & Vibration	Bow Acoustics
		GES (baseline noise monitoring)
13	Shadow Flicker	GES
14	Material Assets	GES
15	Interaction of the Foregoing	GES
Non-Technical Summary		GES

Table 1: Specialist Consultants involved in the preparation of this Scoping Report

3.0 CONSULTATION

Following the completion of the EIA screening, the Developer undertook a range of informal scoping exercises to inform the scope of the EIAR; including:-

- Stakeholder engagement with statutory and non-statutory organisations;
- Public consultation; and,
- Environmental constraints analysis and scoping by EIAR project team.

A summary of the scoping exercises is provided in the following sections with further details provided under the relevant EIAR chapter headings at **Section 5.0**.

[1] It should be noted that, following the completion of the scoping phase, Atlantic Archaeology Limited was appointed to prepare the Cultural Heritage chapter of the EIAR.

3.1 STAKEHOLDER CONSULTATION

A wide range of statutory and non-statutory organisations were contacted in writing at an early stage in the scoping process to gather their views on the EIAR scope and the likely significant environmental effects of the project. The process involved furnishing each organisation with a 'Preliminary Scoping Report' accompanied by a set of maps and drawings, and requesting written feedback. All responses received will be fully assessed and will be taken into consideration in the scope of the EIAR and, where necessary, the layout and design of the project will be revised in accordance with specific recommendations.

The following stakeholders were consulted with:-

- AirNav;
- An Garda Síochana;
- An Taisce;
- Bat Conservation Ireland;
- Birdwatch Ireland;
- Bord Gáis Energy
- Broadcasting Authority of Ireland;
- BT Communications Ireland;
- Commission for Communications Regulations;
- Commission for Regulation of Utilities;
- Department of Agriculture, Food and the Marine;
- Department of Defence;
- Department of Climate, Energy and the Environment;
- Department of Housing, Local Government & Heritage;
- Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media;
- Department of Transport;
- Eir Limited;
- EirGrid plc;
- Enet Telecommunications Networks Limited;
- Environmental Protection Agency;
- ESB Networks;
- Fáilte Ireland;
- Gas Networks Ireland;
- Geological Survey of Ireland;
- Health & Safety Authority;
- Health Service Executive – Environmental Health Department;
- Iarnród Éireann;
- Imagine Group;

- Inland Fisheries Ireland;
- Integrated Media Solutions Limited (Ajisko Limited);
- Ireland West Airport Knock;
- Irish Aviation Authority;
- Irish Peatland Conservation Council;
- Irish Raptor Study Group;
- Irish Water;
- Irish Wildlife Trust;
- JFK Communications Limited;
- Lung-Lough Gara Way;
- Magnet+;
- Mayo County Council;
- National Ambulance Service;
- National Federation of Group Water Schemes;
- Northern & Western Regional Assembly;
- North & Western Regional Assembly;
- Office of Public Works;
- Open Eir;
- Ripplecom;
- Radio Services & Building Limited;
- Roscommon County Council;
- 2rn (RTE Transmission Network Limited);
- Sligo County Council;
- Sport Ireland;
- Sustainable Energy Authority of Ireland;
- Tetra Ireland Communications Limited;
- The Arts Council;
- The Heritage Council;
- Three (3) Ireland;
- Tibohine Flying Club;
- Towercom;
- Transport Infrastructure Ireland;
- Údarás na Gaeltachta;
- Uisce Éireann;
- Viatel Ireland Limited;
- Virgin Media Ireland;

- Vodafone Ireland Limited; and,
- Waterways Ireland.

3.2 COMMUNITY CONSULTATION

Public consultation has commenced and will be continued throughout the preparation of the EIAR as a means of identifying matters which the public consider as warranting inclusion in the scope of the EIAR and assessing public opinion towards the project.

Public consultation will take place through dedicated door-to-door consultations with the local community.

4.0 DESCRIPTION OF THE PROJECT

The project consists of the construction and operation of a wind farm, comprising infrastructure including 10 no. wind turbines, crane hardstandings, access tracks, site entrances, underground electrical and communications cabling, a borrow pit, spoil deposition areas and all associated site development works.

The project will also include a range of off-site or secondary developments including upgrade works to the turbine component haul route, delivery of construction materials and grid connection infrastructure. A set of location and layout drawings is provided at **Annex 1**.

The grid connection infrastructure comprises a 110kV electricity substation and approximately 7km of underground electricity line connecting to the existing Tonroe 110kV electricity substation.

4.1 WIND TURBINES

The wind turbines will have an overall tip height of 185m (T1-T3) and 150m (T4-T10). The rated electricity output for each turbine, based on the turbine models selected, is 7.2MW (T1-T3) and 4.5MW (T4-T10), resulting in a total rated output of 53.1MW for the project.

Details of the wind turbine makes, models and dimensions are provided at **Table 1** below.

Turbine	Hub Height (m)	Rotor Diameter (m)	Blade Length (m)	Overall Tip Height (m)
T1-T3	104	162	81	185
T4-T10	82	136	68	150

Table 1: Wind Turbine Specifications

The turbines will each consist of a three-bladed rotor attached to a nacelle (hub) which contains the mechanical drive train and electrical generation mechanisms, mounted on a steel/concrete tower of tubular construction. The blades will be constructed of glass reinforced plastic. The colour of the turbine towers and blades will be white, off-white or light grey in accordance with the *Wind Energy Development Guidelines for Planning Authorities 2006*, or as otherwise determined by An Bord Pleanála. The typical components of a standard wind turbine are illustrated in **Figure 2**.

The turbines will be geared to ensure that all turbines rotate in the same direction and will typically have a cut-in wind speed of 3 metres-per-second (m/s) and a cut-out

speed of 25m/s. At the cut-in speed, the turbine begins to rotate; and at the cut-out speed, the turbine will automatically shut down.

Each turbine will utilise its own transformer, which will be located inside the turbine tower. Transformers will either be oil-filled (and bunded to prevent spillage); or of a solid cast resin type which eliminates spill risk and the requirement for bunding requirements. The transformers will increase the electrical voltage and on-site electrical cables will connect the turbines to the electrical control building to be located within the electricity substation.

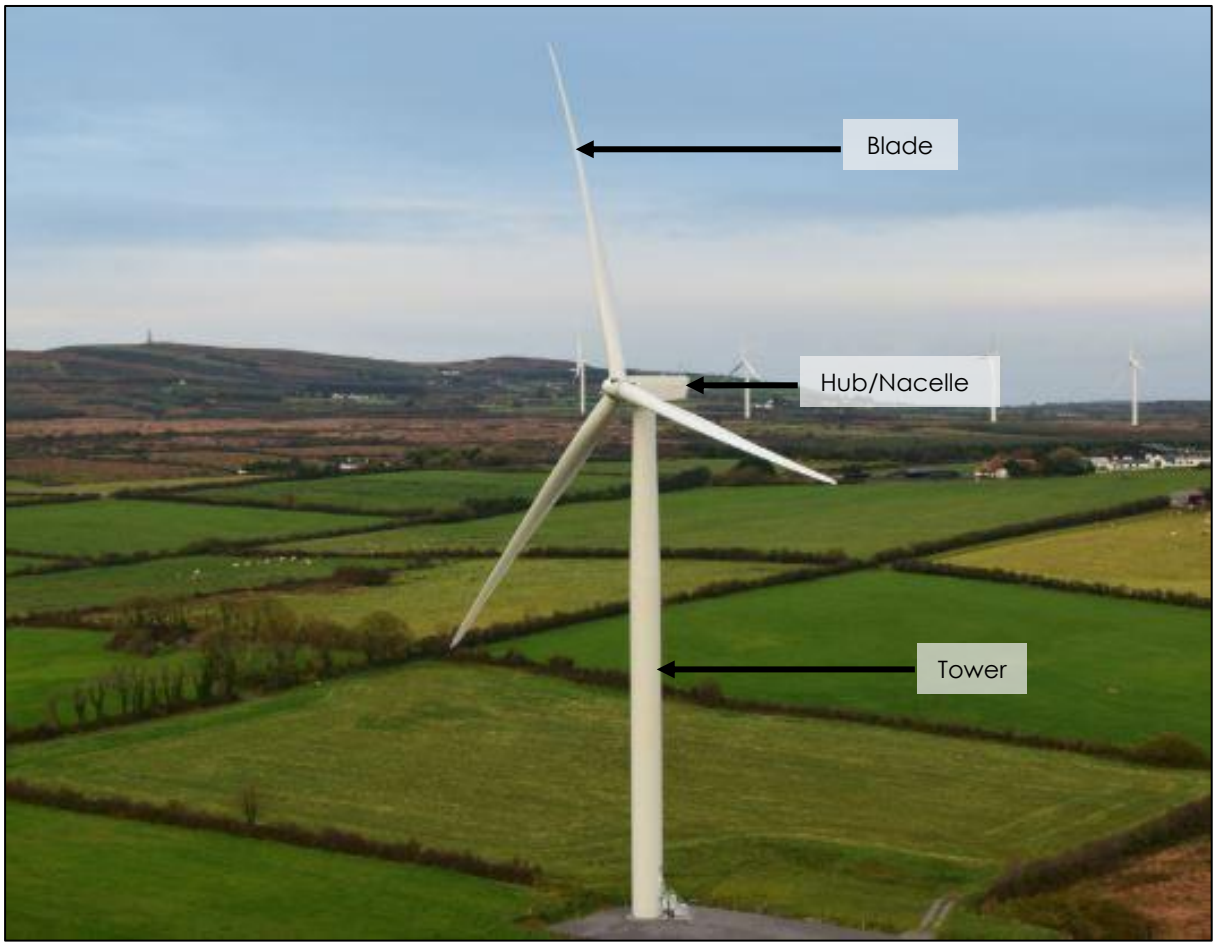


Figure 2: Typical Wind Turbine

3.1 TURBINE FOUNDATIONS

Each turbine tower is secured to a steel ring foundation which can comprise either a reinforced concrete (gravity) foundation or a piled foundation. The exact type of foundation shall be established through detailed technical design and geotechnical investigations, as is standard best-practice in all construction projects.

The depth of excavation required for each wind turbine foundation will vary depending on precise ground conditions. The diameter of a standard gravity raft foundation will range between 24m-27m; with raft footing depths ranging between 3m and 5m depending on ground conditions at each turbine location. In the event that piled foundations are required, this will comprise a circular concrete pile cap (c. 20m in diameter) supported by multiple piles ranging from 1m to 2m in diameter extending to depths of 15-30m below ground level depending on specific ground conditions.

3.2 CRANE HARDSTANDINGS

Hardstanding areas shall be established adjacent to each turbine to facilitate crane operations for installation and occasionally for maintenance and decommissioning. Each hardstanding area shall typically be 105m by 25m (T1-T3) and 65m by 25m (T4-T10) and will consist of levelled and compacted (unsealed) hardcore placed on top of a geotextile membrane. Due to ground conditions, the hardstands will generally be of a 'floated' construction type thus avoiding significant excavations; however, localised excavations will occasionally be required to avoid the requirement for the excessive placement of granular fill.

Temporary set down areas, also comprising levelled and compacted (unsealed) hardcore on a geotextile membrane, will be located immediately adjacent to each hardstand during the construction phase to accommodate the temporary storage of turbine components following their delivery to the project site, and crane components during crane assembly. Following the installation of the turbines, reinstatement will involve removing crushed stone and underlying geotextile and allowing the areas to revegetate naturally.

3.3 ON-SITE ACCESS TRACKS

A total of c. 4km of on-site access tracks will be required for construction purposes and for site access during the operational phase. The access tracks proposed shall be similar to normal agricultural tracks but with a slightly wider typical running width of approximately 5m.

The access tracks will be predominantly of a 'floating' construction type which, given the ground conditions and type of terrain present, is deemed an appropriate construction approach to minimise the need for excavation. This typically comprises the placement of a layer of geotextile, or geogrid, on the surface onto which aggregate is spread.

A total of 7 no. site entrances will be required to facilitate access to the project site. Of these, 6 no. will be new access points and 1 no. will comprise the upgrade of an existing agricultural entrance; with 4 no. entrances being from the L5501, 2 no. entrance from the L55018 and 1 no. entrance from an unnamed local road. These site entrances will be for the construction, operation and decommissioning phases of the project and each entrance will be appropriately designed to ensure all visibility splays (sightlines) are provided for[2].

3.4 ELECTRICAL AND COMMUNICATIONS CABLING

Electrical and communications cabling will be required to connect each turbine to the electrical substation. The cables will be located underground, installed of trenches of 1m in depth, and will generally follow the alignment of on-site access tracks.

3.5 TURBINE COMPONENT HAUL ROUTE

Whilst the final turbine component haul route has not been selected and will be entirely dependent on the turbine supplier and the chosen port of entry, it has been determined that turbine components will, most likely, enter via the Port of Galway. It is envisaged that, from here, the turbines will then be transported by specialised HGVs for the transport of turbine components along the L5048, R339, L5034, R336, N6, M6, M17, N17, N5, R293, L5501 and various local roads in the immediate vicinity of the

[2] Visibility splays will be provided in accordance with Section 12.4 (Roads and Transportation) of the *Roscommon County Development Plan 2022-2028*.

project site before accessing the site via the proposed site entrances.

Temporary works; including the removal of street furniture (street lighting, signage, etc) and verge/roundabout island hardcoring; will be required at various locations along the route. Permanent and temporary works will be undertaken along the local roads leading to the site entrances to accommodate the delivery of wind turbine components and other construction materials. These works will include junction upgrades and the widening of existing carriageways. The Developer will engage with the relevant stakeholders as part of the ongoing project design process.

3.8 GRID CONNECTION

The point of connection of the project to the national grid will ultimately be decided by ESB Networks and/or EirGrid and is beyond the control of the Developer. As such, it is not currently possible to definitively state the nature or routing of the grid connection infrastructure.

However, on the basis of detailed analysis by the Developer including an assessment of the existing grid network and grid capacity in County Roscommon, it is assessed that connection to the Tonroe 110kV substation is most likely.

The Tonroe 110kV electricity substation is located c. 2km south of the wind farm. As part of the project design, environmental scoping and constraints analysis process, the Developer has identified a preferred means of connecting to the substation which will involve the construction of a 110kV substation at the wind farm and the installation of c. 7km of underground electricity line. The underground electricity line will be located predominately within the carriageways of local public roads. It should be noted that while the grid connection infrastructure is assessed with the EIAR, planning permission for same is not currently being proposed.

4.0 SCOPE OF THE EIAR

The EIAR will provide an assessment of effects during the construction, operation and decommissioning of the project for each the environmental topics described in this section. The EPA *Advice Notes for Preparing Environmental Impact Statements* (Draft; September 2015) set out, at Project Type 33, considerations in the preparation of an EIAR (formerly termed an 'Environmental Impact Statement' (EIS). The EIAR for the project will have regard to the guidance set out in respect of this project type.

This section provides a brief overview of the level of scoping which has taken place to date[3], as well as the potential effects which have been identified and the proposed methodology for further assessment in the EIAR.

4.1 PROJECT ALTERNATIVES

Prior to the selection of the development under consideration, the Developer undertook an extensive iterative process to assess a range of alternatives at both the macro-level and micro-level. The assessment of alternatives ranged from alternative site locations, site layouts and designs, technologies, grid connection options and haul route options. This process has so far determined that the project as proposed represents the most environmentally sensitive project having regard to all reasonable available alternatives.

However, the project in its layout and design at the time of writing remains subject to

[3] It should be noted that, as part of the ongoing iterative project design process, the design and layout of the project may be further altered following the preparation of this Scoping Report and associated annexes.

further revision in line with continued project scoping.

4.2 POPULATION & HUMAN HEALTH

As part the scoping process, a desk based review of existing conditions in the area has been undertaken. It is anticipated that, during the construction phase, effects on community, recreation and tourism receptors will primarily be associated with traffic, noise, air quality and water impacts. Once the project becomes operational, effects will be primarily associated with visual impact and noise impact.

In terms of human health, it is noted that impacts here will be closely linked with other environmental aspects associated with the project which are relevant to human health, namely water, air quality, noise, and shadow flicker. Other effects may include employment effects and impacts on the local economy.

The potential effects identified above along with potential cumulative effects with other developments will be considered within the 'Population and Human Health' chapter of the EIAR. Effects which are not considered 'likely' or 'significant' have been scoped out from further assessment and include:-

- Safety issues connected with the operation of wind turbines; and,
- Health effects and wind turbine syndrome.

The following sections set out the proposed approach to the preparation of the Population & Human Health chapter of the EIAR.

4.2.1 Methodology

The spatial focus of the study will be undertaken at two levels. Firstly, effects on specific community, recreation and tourism receptors will be assessed at a local level which will be defined as 5km from the boundary of the project. This will be referred to as the 'Local Study Area'.

Economic effects will be considered with regard to a wider study area that takes account of a likely 'catchment' for provision of domestically sourced goods and services relating to the construction and operation of the wind farm. This study area will comprise the wider area of County Roscommon and will be referred to as the 'Wider Study Area'. Given the scale of the project, it is not intended to measure effects at a national or international level.

4.2.2 Description of the Existing Environment

A desk-based review of existing conditions in the area will be undertaken, including the following themes:-

- population demographics;
- labour market;
- economic diversity and investment including local business supply chain;
- education and skills;
- community receptors;
- visitor attractions (e.g. cultural heritage, fishing lakes, views);
- accommodation and other businesses/services serving the tourism economy;
- recreational assets (e.g. walking, cycling, views, equine use); and

- land use.

Data on sensitive receptors will be gathered within the Local Study Area and this will focus on community receptors, recreational assets and visitor assets. Baseline data on population demographics and employment will be gathered within the Wider Study Area. The sensitivity of each receptor or receptor group will be based on its importance or scale and the ability of the baseline to absorb or be influenced by the identified effects.

Key literature sources, in evaluating the baseline environment, will include:-

- Central Statistics Office (CSO);
- The county development plan of Roscommon (including draft county plans) where applicable;
- Pobal Profiling GIS Data;
- Fáilte Ireland; and,
- Roscommon's *Tourism Strategy* 2017-2022.

4.2.3 Description of the Likely Effects

The assessment will be primarily focussed on assessing the likely effects arising from the construction and operational phases. Decommissioning phase effects are considered, based on experience, to be similar to construction phase effects but of a reduced magnitude. Effects on the local economy (employment opportunities and economic output), local population, recreation and tourism assets and land use will each be assessed.

Receptor Sensitivity

There are no published standards that define receptor sensitivity relating to Population and Human Health assessments. As a general rule the sensitivity of each receptor or receptor group will be based on its importance or scale and the ability of the baseline to absorb or be influenced by the identified effects. In assigning receptor sensitivity, consideration will be given to the following:-

- importance of the receptor e.g. local, regional, national, international;
- availability of comparable alternatives;
- ease at which the resource could be replaced;
- capacity of the resource to recover or adapt to identified impacts over a period of time; and
- level of usage and nature of users (e.g. sensitive groups such as people with disabilities).

Based upon professional judgement, it is proposed that four levels of sensitivity are used: High; Medium, Low and Negligible.

Magnitude Criteria

The magnitude of effect will be evaluated based on the change that occurs to the baseline conditions relating to supply chains, local labour market, tourism and visitor economy, land use, and tourism and recreation assets. It is proposed that four degrees of magnitude are used: high; medium; low and negligible.

Significance of Effect

The level of effect will be assessed by combining the magnitude of the effect and the sensitivity of the receptor. It is proposed that four levels of effect are used: negligible, minor, moderate or major. Where an effect is classified as Major, this is considered to represent a 'significant effect' in EIA terms. Where an effect is classified as Moderate, this may be considered to represent a 'significant effect' but should always be subject to professional judgement and interpretation, particularly where the sensitivity or magnitude levels are not clear or are borderline between categories or the effect is intermittent.

4.2.4 Mitigation & Monitoring Measures

Mitigation measures, additional to those incorporated into the project design, will be considered in order to mitigate any significant adverse effects that are identified.

4.2.5 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments. Fáilte Ireland has provided recommendations regarding the assessment of effects on tourism.

No other comments regarding the assessment of Population & Human Health effects have been received.

4.3 BIODIVERSITY

A detailed Constraints Report has been prepared by Woodrow (APEM Group) and is enclosed at **Annex 2**. The report has identified ecological receptors which are assessed to be at risk of experiencing effects due to the project and provides recommendations related to the refinement of the project design.

4.3.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments.

Responses were received from Bat Conservation Ireland, who advised that it does not have the resources to review and comment on the project, and the Department of Housing, Local Government and Heritage (Development Applications Unit [DAU]). The DAU provided recommendations in relation to ornithological surveys and assessment; the iterative design of the project; ground conditions and management of peat; protection of surface water quality; ecological surveys; the protection of watercourses and wetlands; the assessment of effects on bats and habitats, Appropriate Assessment; cumulative impacts assessment; monitoring and licensing.

No other comments regarding the assessment of effects on Biodiversity have been received.

4.4 LAND & SOIL

A Land, Soil and Water Scoping Report has been prepared by Hydro Environmental Services and is enclosed at **Annex 3**. Given the highly inter-related nature of the geological, hydrogeological and hydrological environments, a consolidated scoping assessment has been carried out. The report describes the characteristics of the

existing environment (based on a desktop survey), identifies environmental effects which may arise as a result of the construction, operation and decommissioning of the project, and describes the methodologies to be followed in the preparation of the Land & Soil chapter of the EIAR.

4.4.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments.

Geological Survey Ireland (GSI) has recommended that a suite of mapping databases and datasets available through its website are consulted to fully inform the proposed assessment; including in relation to geoheritage sites, geological composition mapping, geotechnical databases, geohazards, presence of natural resources, geochemistry and geophysical data.

No other comments regarding the assessment of Land & Soil effects have been received.

4.5 WATER

A Land, Soil and Water Scoping Report has been prepared by Hydro Environmental Services (HES) and is enclosed at **Annex 3**. Given the highly inter-related nature of the geological, hydrogeological and hydrological environments, a consolidated scoping assessment has been carried out. The report describes the characteristics of the existing environment (based on a desktop survey), identifies environmental effects which may arise as a result of the construction, operation and decommissioning of the project, and describes the methodologies to be followed in the preparation of the Water chapter of the EIAR.

4.5.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments.

Geological Survey Ireland has recommended that data available on various databases is consulted, particularly in relation to groundwater, surface water and flooding.

A response was provided by Uisce Éireann regarding an assessment of *inter alia* effects on water supplies, treatment of effluent and the protection of water quality. In particular, Uisce Éireann refers to water sources and abstraction points, protection of drinking water, water quality monitoring during construction, management of trade effluent, and effects on Uisce Éireann assets.

The Office of Public Works (OPW) were consulted and, in response, noted that it is not responsible for the maintenance of any channels at the project site, has no record of any flooding at the project site and that appropriate licensing will be required for the construction of any bridging structure over a watercourse.

4.6 AIR QUALITY & CLIMATE

An Air Quality and Climate scoping report has been prepared by AWN Consulting and is enclosed at **Annex 4**. The report describes the scope of work and methods to be applied in the identification and assessment of air quality effects associated with

the project.

4.6.1 Stakeholder Engagement

No specific comments regarding the assessment of Air Quality & Climate effects have been received.

The EIAR will assess the likelihood of significant levels of dust being generated during the construction, operation or decommissioning of the project and whether the installation of dust monitoring stations is required.

4.7 LANDSCAPE

A Landscape scoping report has been prepared by Macro Works and is provided at **Annex 5**. The report provides an initial evaluation of the baseline environment and discusses landscape and visual effects which are likely to arise and describes the findings of the scoping process to date. In addition the Scoping Report includes a Viewshed Reference Point (VRP) Report which identifies an initial broad set of potential views from a desk study using the Zone of Theoretical Visibility (ZTV) map. The VRP's include a mix of receptor types including:

- Key Views - from features of international or national importance;
- Amenity Views from important heritage or amenity locations;
- Designated Scenic Routes and Views;
- Local Community views;
- Centres of Population; and
- Major Routes.

4.7.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments.

No comments regarding the assessment of Landscape effects have been received.

4.8 CULTURAL HERITAGE

A Cultural Heritage scoping report has been prepared by Dermot Nelis Archaeology and is enclosed at **Annex 6**. The scoping report has been prepared to provide an initial evaluation of the baseline environment and to identify effects which the project may have on the archaeological, architectural and cultural heritage resource of the surrounding area.

4.8.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments.

The Department of Housing, Local Government & Heritage (Development Applications Unit [DAU])) advised that the cultural heritage assessment should include an assessment of likely effects on features located within the wider landscape and, specifically, references potential visual effects on the Rathcroghan complex of monuments and the passage tomb cemetery at Carrowkeel. The DAU offers further

advise in relation to the scope of the cultural heritage chapter including in respect of geophysical surveying, archaeological test excavations and archaeological monitoring.

No other comments regarding the assessment of Cultural Heritage have been received.

4.9 NOISE & VIBRATION

A Noise & Vibration scoping report has been prepared by Bow Acoustics and is enclosed at **Annex 7**. The scoping report has been prepared to identify the potential for noise and vibration effects at sensitive receptors surrounding the project. The scoping report also describes the principal objectives, and the proposed methodologies, of the assessment.

4.9.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments.

No comments regarding the assessment of Noise & Vibration effects have been received.

4.10 SHADOW FLICKER

4.10.1 Methodology

In order to determine the potential level of shadow flicker at the scoping stage, an assessment of the local environment has been carried out to identify potential receptors. All existing (occupied and unoccupied) dwellings and permitted dwellings (not yet constructed) within 10-times overall tip height of a proposed wind turbine, have been identified. The project is located in an area which has a dispersed rural settlement pattern and, consequently, the number of dwellings identified is relatively low.

The EIAR will assess the effects on human health from shadow flicker, i.e. the moving shadows cast by the turbine blades in times of direct sunlight and the resultant effect that can have on nearby properties. The EIAR will comprise a detailed assessment of the likelihood of shadow flicker affecting local receptors during the operation of the project. The assessment will be based on detailed shadow flicker prediction modelling for each dwelling within 10-times overall tip height of a proposed wind turbine. An assessment will be made to establish if the project will comply with shadow flicker limits prescribed within the *Wind Energy Development Guidelines for Planning Authorities 2006* and/or the *Draft Revised Wind Energy Guidelines 2019*. Proven and recognised technological mitigation will be introduced where necessary and appropriate to ensure adherence to the relevant guidance limit.

4.10.2 Description of the Existing Environment

A total of 125 no. properties (dwellings) have been identified as being located within 10-times overall tip height of a proposed wind turbine; however, further assessment and ground-truthing will be undertaken to confirm the status of a number of the identified properties. The Developer will monitor future planning applications to ensure that a comprehensive assessment is undertaken and that the potential shadow flicker effects are fully assessed for all existing and permitted dwellings.

4.10.3 Description of the Potential Effects

In times of direct sunshine, wind turbine blades may occasionally cast moving shadows on residences in close proximity to the proposed turbines. At certain times of the year, the moving shadows of the turbines blades can periodically reduce light to a room causing the light to appear to flicker. Shadow flicker would not generally have any effect on health or safety, but could on limited occasions present a nuisance effect.

4.10.4 Mitigation & Monitoring Measures

Shadow flicker is an issue which has been considered at the early stages of scoping and has been used to inform the design and layout of the project. A full shadow flicker projection will be provided within the EIAR which will determine the need for any further mitigation; while detailed mitigation measures and a preliminary Shadow Flicker Monitoring Programme will also be provided.

Technical solutions are available, and widely implemented, on wind farm developments to ensure that instances of shadow flicker do not result in significant effects. These mitigation measures effectively limit the operation of turbines during the infrequent periods when shadow flicker is predicted to occur. In summary, if a particular turbine is creating shadow flicker effects at a particular dwelling then that turbine may be temporarily shut down. This is usually addressed by turning off the turbines a predetermined times when shadow flicker is predicted to occur, if the sun is shining.

4.10.5 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments. No comments regarding the assessment of Shadow Flicker effects have been received.

4.11 Material Assets

4.11.1 Transport & Access

Methodology

A desktop review of the road network in the vicinity of the project site has been conducted at the scoping stage together with a desktop review of proposed site entrance locations and the proposed grid connection route. A route access survey has been carried out by a specialist transport consultant between the anticipated port of entry and the construction phase entrances. This survey has identified locations which will require off-site permanent and temporary upgrades to facilitate the safe delivery of turbine components to the project site. Swept path analyses have also been conducted for all internal tracks to ensure that they are adequate to allow delivery of turbine components while also minimising the required land take where feasible.

A transport and access impact assessment will be conducted generally in accordance with the Transport Infrastructure Ireland (TII) *Traffic and Transport Assessment (TTA) Guidelines*, May 2014. The methodology for the transport & access assessment will include a comprehensive assessment of the road networks ability to accommodate construction phase traffic, the suitability of the underground electricity line route for the accommodation of electrical infrastructure, a review of

predicted traffic volumes and effects likely to be generated during the construction and operation of the project, by the construction workforce, and by the transport of materials and equipment; while future traffic volumes associated with maintenance-related activities will be predicted. The potential disruption to the road network and local traffic movements during the construction phase and the availability of alternative routes (particularly in relation to the proposed grid connection route options) will be assessed, where required. Recommendations will be made to mitigate any potential traffic effects on the road network.

Description of the Existing Environment

The road network in the vicinity of the project generally comprises local roads; as evidenced by the fact that all access points to the wind farm are from local roads and the vast majority of the underground electricity line is located within the carriageway of locally-classed routes (the remainder being installed within private lands). The R293 is located c. 2km to the southeast of the wind farm; while, in terms of national routes, the N5 national primary road is located c. 500m to the south of the wind farm.

Road widths and carriageway surface-conditions are of a condition typical for their classification and are considered, initially, to be generally capable of accommodating construction traffic associated with the development of a wind farm.

It is noted, however, that the route access survey has identified locations along the anticipated haul route where both temporary and permanent upgrade works will be required; each of which will be fully assessed in the EIAR.

Based on anecdotal evidence and experience, the road network in the vicinity of the project is unlikely to carry significant volumes of traffic; however, it is anticipated that these routes will be of local importance to residents and landowners.

Description of the Likely Effects

The following effects have been identified as having the potential to arise as a consequence of the construction of the project:-

- Increased traffic flows (construction phase);
- Changes to traffic/vehicular composition;
- Temporary traffic disruption/delays;
- Reduced road safety due to construction activities; and
- Degradation of road structures/surfaces.

Operational stage effects on traffic are likely to be much less than that associated with the construction stage; however, the level of impact will be examined in line with the operational life span of the project.

Mitigation & Monitoring Measures

A comprehensive suite of mitigation measures will be set out, as required, to reduce the likely effects of the project on transport and access. The majority of such measures are likely to be techniques which will be inherent and intrinsic to the completion of works in accordance with accepted best practice construction methodologies (e.g. appropriate traffic management measures); however, specific measures are also likely to be proposed to minimise traffic disruption and maintain traffic flows, ensure

public safety is not adversely affected and to maintain the structural integrity of roads and associated structures.

Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments.

Transport Infrastructure Ireland (TII) has also offered recommendations regarding the scope of the EIAR including:-

- Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes;
- TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the project;
- Visual impacts from existing national roads should be assessed;
- In preparing the EIAR, regard should be had to TII Publications (*DMRB* and *Manual of Contract Documents for Road Works*);
- In preparing the EIAR, regard should be had to TII's *Environmental Assessment and Construction Guidelines*, including the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2006);
- The EIAR should consider the *Environmental Noise Regulations 2006* (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority;
- TII Publications should be consulted to determine whether a Road Safety Audit is required;
- In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network;
- TII recommends that the EIAR should clearly identify haul routes proposed and fully assess the network to be traversed. Where abnormal 'weight' loads are proposed, separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route through all the relevant County Council administrative area should be checked to confirm their capacity to accommodate any abnormal 'weight' load proposed;
- The national road network is managed by a combination of PPP Concessions, Motorway Maintenance and Renewal Contracts (MMaRC) and local road authorities in association with TII. The Developer should also consult with all PPP Companies, MMaRC Contractors and road authorities over which the haul route traverses to ascertain any operational requirements such as delivery timetabling, etc. and to ensure that the strategic function of the national road network is safeguarded.
- Any damage caused to the pavement on the existing national road at the temporary access due to the turning movement of abnormal 'length' loads

(e.g. tearing of the surface course, etc.) shall be rectified in accordance with TII Pavement Standards and details in this regard shall be agreed with the Road Authority prior to the commencement of any development on site; and,

- Cable routing should avoid all impacts to existing TII infrastructure such as traffic counters, weather stations, etc. and works required to such infrastructure shall only be undertaken in consultation with and subject to the agreement of TII. Any costs attributable shall be borne by the developer. The developer should also be aware that separate approvals may be required for works traversing the national road network.

No other comments regarding the assessment of Transport & Access have been received.

4.11.2 Telecommunications

Methodology

The scoping process was commenced at an early stage of project design to identify the presence of telecommunication links in the area and, if present, their specific route. Consultation with a number of key service providers was undertaken and all feedback and recommendations have been incorporated into the project design.

The scoping methodology, which is ongoing and will continue throughout the EIAR preparation process, will include:-

- Consultation with service providers, regulatory authorities and emergency services;
- Analyses of the effects of the project on telecommunications operators' point-to-point microwave radio links and apply appropriate buffer distances around links and masts where required;
- Further specialist investigations will be carried out where significant effects are likely to occur;
- Where necessary, mitigation measures to be agreed with operators including:-
  - Turbine relocation;
  - Telecommunications link relocation;
  - Underground fibre optic cables to replace microwave link;
  - Submission of final detailed layout to telecoms operators; and
  - Agree any layout alterations following final detailed assessment by telecoms operators, or agree suitable mitigation measures if necessary.

Description of the Existing Environment

While the project site is not assessed to be a particularly important location for telecommunications links or infrastructure, no links were identified as being traversing the subject site and having the potential to be affected.

Description of the Likely Effects

None of the electromagnetic and/or radio microwave link providers identified any particular concerns with the project during the consultation process. 2rn note that there is a risk of interference to broadcast services should the project be constructed.

Mitigation & Monitoring Measures

A wide range of technological measures are available to avoid any disruption to telecommunication links and services. Such measures will be fully examined within the EIAR and will be proposed for implementation where necessary.

It is noted that 2rn have recommended that a protocol between be entered into to ensure that appropriate remediation of any interference experienced by residents.

4.11.3 Aviation

Methodology

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

Description of the Existing Environment

Ireland West Airport (Knock) is located approximately 14km to the west of the project; while Sligo Airport is located c. 37km to the north. Dublin Airport is located approximately 160km to the southeast while Shannon Airport is located approximately 135km to the south.

There are also a number of aerodromes, airfields, and airstrips located in the wider environs of the project including Tibohine Airfield (c. 5km southeast) and Lough Conn Airfield (40km west).

The project site is not located within any 'Danger', 'Restricted' or 'Military Operating' area as identified at Annex A, B or C of the *Draft Air Corps Wind Farm/Tall Structures Position Paper*. Similarly, the subject site is not located within 3 no. nautical miles of any critical low level route identified at para. 2(2)(c) and illustrated at Annex D of the Paper.

Description of the Likely Effects

Following consultation with Ireland West Airport (Knock), it was identified that the presence of wind turbines could affect air traffic operations. Accordingly, the Developer was requested to carry out a Special Aeronautical Study and a Technical Safeguarding Assessment. The assessments concluded that, with the implementation of appropriate mitigation measures to be agreed with Ireland West Airport (Knock), the project would not result in a likely significant effect on aviation. Full details of the assessments will be provided in the EIAR.

5.0 CUMULATIVE ASSESSMENT

The assessment of cumulative effects arising from the project will take 2 no. forms, as follows:-

- The cumulative effects of the proposed wind farm, grid connection infrastructure and haul route upgrade works will be assessed to evaluate the effects of the project as a whole; and
- The cumulative effects of the entire project with other existing, permitted or projects (for which there is publicly available information).

The cumulative assessment will be undertaken under each individual chapter heading. Where potentially significant cumulative effects are identified, mitigation and monitoring measures will be proposed to minimise this effect.

The interactions between effects on different environmental factors will also be addressed, as relevant, throughout the EIAR by ensuring that effects are cross-referenced between topics, thus reducing the need to duplicate coverage of such topics. Close co-ordination and management within the EIA Project Team, and careful read-across editing, will ensure that assessors are vigilant for complex interactions (direct, indirect, secondary and cumulative) and, where they are likely to arise, they are adequately identified and assessed. This includes interactions between effects, and possible cumulative effects, arising from the mitigation measures proposed that could magnify effects through the interaction or accumulation of effects.

6.0 APPROPRIATE ASSESSMENT

As a separate, but interrelated, process, screening for the likelihood of any significant effects on European nature conservation sites (Natura 2000) designated under the EU Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC) will be undertaken through the preparation of what is known as an Appropriate Assessment (AA) Screening Report (Stage 1). This is formally a separate assessment process, with discrete reporting requirements, but is obviously highly interrelated with EIA.

Article 6(3) of the Habitats Directive provides for a two-stage assessment process, which is implemented into Irish law (with some additional requirements) by the provisions of sections 177U and 177V of the Planning & Development Act 2000 (as amended). Screening for AA in accordance with section 177U is the first stage of the AA process in which the possibility of there being a significant effect on a European site is considered. Plans or projects that have no appreciable effect on a European site are thereby excluded, or 'screened out', at this stage of the process.

The first step in the screening process is to develop a list of European-designated sites which may be affected by the construction, operation or decommissioning of the project. Each relevant European site is evaluated to examine whether or not the project is likely to have a significant effect on the European site.

The project site is not located within any European site designated for nature conservation nor are there any direct interactions with designated sites. However, a number of Natura 2000 sites were identified as being located within the Zone of Influence (ZoI) of the project; namely Bellanagare Bog Special Protection Area (SPA), Callow Bog Special Area of Conservation (SAC), Lough Gara SPA, River Moy SAC and Tullaghanrock SAC. within 2km of the Site boundary, namely Dovegrove Callows SPA (004137) and Ridge Road, SW of Rapemills SAC (000919). The project was assessed as having the potential to have likely significnat effects on the qualifying and special conservation interests of the Natura 2000 sites due to collision risk and displacement of bird species, water pollution and the spread on non-native invasive species.

An Appropriate Assessment Screening Report, prepared by Woodrow (APEM Group), found that that it could not be confirmed, in the absence of avoidance or reduction (mitigation/protective) measures, that designated conservation sites would not be adversely affected by indirect effects arising from the construction, operation and decommissioning of the project, either individually or in combination with other plans and projects, having regard to their conservation objectives.

As a result, and in accordance with the precautionary principle, it was concluded

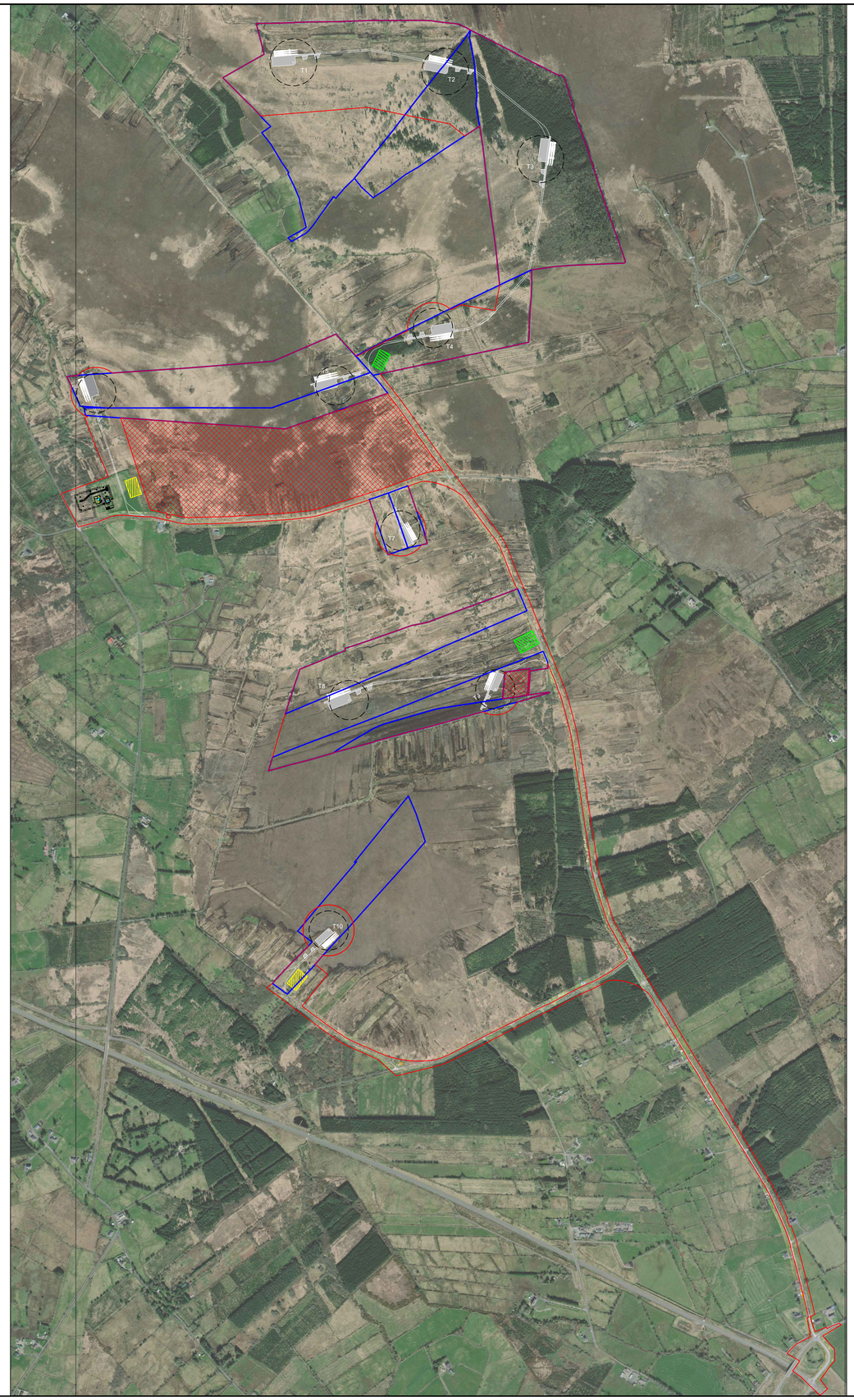
that the project should proceed to be subject to a Stage 2 AA and that a NIS should be prepared and submitted with the planning application alongside this EIAR. In the NIS, the effect of the project on the integrity of the European site(s), and its conservation objectives, will be assessed. Likely effects on species or habitats will be evaluated with respect to the scale, extent and nature; to make an overall assessment of the significance of the effect.

In the NIS, mitigation measures can be proposed to minimise effects on European sites to reduce the significance of any effects. Mitigation measures will follow the 'Avoidance – Reduction – Remedy' hierarchy. The mitigation measures will be described in detail, including in relation to their practical implementation, efficacy, timing and monitoring.

The Appropriate Assessment Screening Report and NIS are each presented and submitted as separate standalone documents.

The Biodiversity chapter of the EIAR (**Chapter 5**) will not repeat the detailed assessment included in the NIS but will cross reference the findings of the separate assessment, as necessary. This is in accordance with the EPA *Guidelines on the Information to be contained within an EIAR* (May 2022) which states "*a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement*" but should "*incorporate their key findings as available and appropriate*".

ANNEX 1 – MAPS AND DRAWINGS



LEGEND:

- LANDOWNER BOUNDARY
- APPLICATION BOUNDARY
- FOLIO NOT INCLUDED IN APPLICATION BOUNDARY
- SWEPT AREA
- PROPOSED TURBINE AND HARDSTANDS
- PROPOSED ACCESS TRACKS
- PROPOSED LAYDOWN AREAS
- PROPOSED TEMPORARY CONSTRUCTION COMPOUND

N

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Date:	Rev:	Description:	Drawn By:
31/01/25	03	RLB updated. T9 reoriented.	JB
28/01/25	02	Application boundary & swept area added	JB
03/12/24	01	Constraint area and landowner boundary removed	JB

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Job Title:

ISLANDMORE WIND FARM

Drawing Title:

FIGURE 1.1: SITE LAYOUT

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JB	BR	SC

ANNEX 2 – CONSTRAINTS REPORT

Galetech Energy Services

Islandmore Wind Farm

Constraints Report

M. Costigan, J. Ball, D. Craig, B. Keehan, D. McAndrew, M. Trewby

Woodrow Ref: P00012714

Date: 29 May 2025

COMMERCIAL IN CONFIDENCE

woodrow
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Project reference:	P00012714
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6	26/05/2025	All	All	V03 for issue	RN

STATEMENT OF AUTHORITY

Meadhbh Costigan is a Senior Ecologist with APEM Group Woodrow. She has conducted fieldwork in the Republic of Ireland and Northern Ireland – gaining experience in habitat identification (according to Fossitt 2000, Phase 1 JNCC, NVC, IVC, and the National Survey of Upland Habitats), botanical identification, the biodiversity-metric, and invertebrate surveys. She has been lead author on Appropriate Assessment's, Habitat Regulation Assessment's, Ecological Impact Assessments', Habitat Management Plans, and Local Biodiversity Action Plan's. She has a particular interest in the green energy sector. She is a qualifying member of CIEEM and is an elected member of the CIEEM Irish Section Committee.

John Ball is a Senior Ornithologist with APEM Group Woodrow. His prior experience stems from a career with the RSPB working on reserves delivering breeding and wintering bird habitat management. Areas of expertise include wet grassland and wetland management, coastal habitats and ornithological survey methods. Prior to this he worked for Natural England providing coast and marine advice for SPA connectivity and Site condition assessment.

Darren Craig is a Senior Ecologist and has over 13 years' experience working in a range of ecological projects including marine, freshwater and terrestrial projects. Darren studied Applied Aquatic Ecology at Atlantic Technological University, Galway and graduated in 2007. Darren has worked on development projects including wind farms, grid connection, national trails, overhead power lines, wastewater treatment plants, and smaller scale developments. He carries out multidisciplinary surveys and specialises in aquatic surveys, in addition to habitat surveys and protected species surveys for mammals. He is competent in the compilation of Ecological and Environmental reports, including biodiversity chapters for Environmental Impact Assessment reports (EIAR), and reports to inform the Appropriate Assessment process (Appropriate Assessment Screening and Natura Impact Statements).

Damien McAndrew is a Bat Ecologist with APEM Group Woodrow and has authored the bat section of this report. Damien has extensive experience in Appropriate Assessment and Natura Impact Statement reporting, along with authoring Ecological Impact Assessments and constraints reports for respective flood relief schemes. He has previously worked as an Assistant Ecologist and Project Ecologist within other consultancies in Ireland, and has authored multiple bat activity reports, conducted bat activity surveys within the Republic of Ireland and Northern Ireland, delivered toolbox talks, and performed Ecological Clerk of Works (ECoW) on bat-sensitive projects. Damien has undertaken bat surveys including static detector deployment and roost surveys and worked on numerous large-scale developments within the renewables sector. Damien has developed a high level of proficiency with Anabat, as well as working with Kaleidoscope, Ecobat and BatExplorer; the analysis software packages used to assess bat calls and activity. Damien holds a full bat derogation license issued by The NPWS (DER/BAT 2022-19).

Mike Trewby is an Associate Director with APEM Group Woodrow. Mike is a highly accomplished ecologist specialising in avian studies with over two decades of fieldwork and research experience,. However, his expertise is diverse and encompasses a variety of survey methodologies. He is also adept in conducting bat, invertebrate, and amphibian surveys. Mike is regarded as one of the preeminent authorities on chough ecology in Ireland. He has reported on the ecology of numerous regional chough populations and assisted in the establishment of Special Protection Areas (SPAs)

aimed at safeguarding chough habitats. He has studied some of the country's iconic avian species including red grouse, hen harriers, and the important seabird colonies that adorn the Irish coastline.

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MSc Ethnobotany, University of Kent, UK.

John Ball Qualifications:

BSc (Hons) Environmental Science, Edge Hill University, Ormskirk.

MSc Conservation Management, Edge Hill University, Ormskirk.

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BSc (Hons) Applied Aquatic Ecology, Atlantic Technological University, Galway.

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PGDip Environmental Studies University of Strathclyde.

BSc Zoology & Botany University of Namibia.

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1. INTRODUCTION

Statkraft Ireland ('the developer') has commissioned Galetech Energy Services (GES) to manage the preparation of an Environmental Impact Assessment Report (EIAR) for the proposed Islandmore Wind Farm ('the project') in County Roscommon. APEM Group Woodrow have been commissioned by GES to provide an ecological constraints report to precede the EIAR. This report aims to highlight any ecological constraints at an early stage of site design, in particular identifying any constraints considered not to be mitigatable, which may require amendments to the layout. The report also examines the application of appropriate buffers to avoid impact on sensitive ecological features identified, including working buffers for protected terrestrial mammals and tree felling buffers for bats.

This report outlines the indicative turbine layout and access tracks defined in Design Freeze 1, as submitted on 05 February 2025. The corresponding Redline boundary identifies the extent of the 'Site'. The current project layout is illustrated in Error! Reference source not found..

1.1. Project Description

The project will be located in north County Roscommon, *c.* 2km north of Ballaghaderreen, *c.* 13km east of Charlestown in County Mayo and *c.* 6km southwest of Gorteen in Co. Sligo.

The Project will comprise 9 no. wind turbines; 6 no. of which will have an overall tip height of 150 m and 3 no. with an overall tip height of 185 m (plus 1 no. turbine dimension TBC); turbine foundations; turbine hardstandings; internal site access tracks; internal wind farm underground cabling; site entrances; on-site 110kV electricity substation, underground grid connection infrastructure; and all associated site development, access and reinstatement works. This constraints report pertains exclusively to the proposed wind farm Site and does not extend to the grid connection or turbine delivery route.

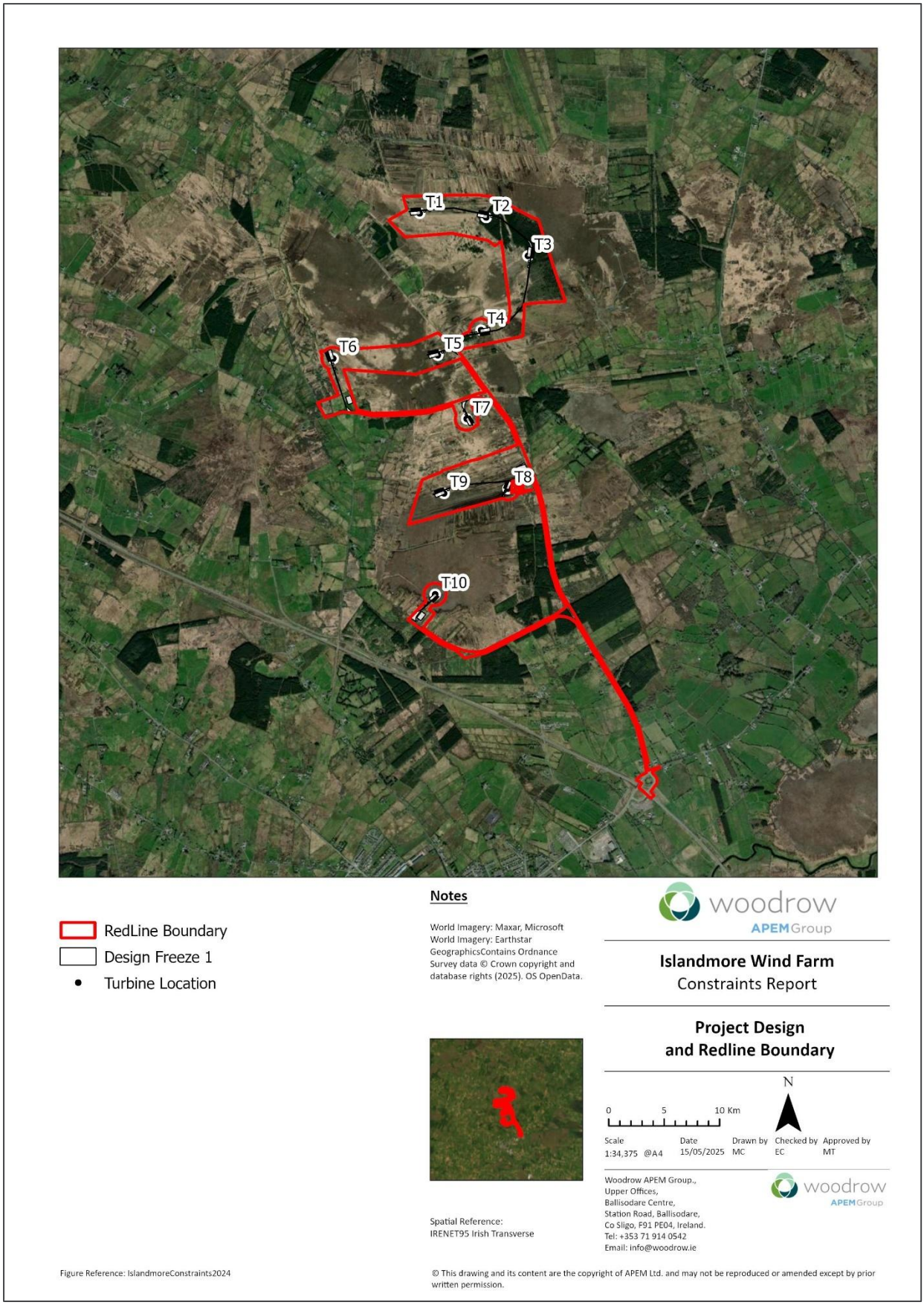


Figure 1: Project design as of 05 February 2025.

2. DESIGNATED SITES

A screening matrix for assessing Natura 2000 sites with potential to be within the Zone of Influence (ZoI) of the Project is presented in **Appendix I**. The ZoI can be defined as "*the area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities*" (CIEEM 2024, p.74)

The distribution of Natura 2000 sites in relation to the Project is shown in **Figure 2** for Special Protection Areas (SPAs) and in **Figure 3** for Special Areas of Conservation (SACs).

Seven Natura 2000 sites were identified, as falling within the ZoI, including:

- Bellanagare Bog SPA [004105]
- Callow Bog SAC [000595]
- Lough Gara SPA [004048]
- River Moy SAC [002298]
- Tullaghanrock Bog SAC [0002354]

The potential for the Project to have likely significant effects of on several Qualifying Interests (QIs) and Special Conservation Interests (SCIs) were identified, including:

- Collision risk and displacement of waterbird species associated with SPAs during construction, operation and decommissioning phases of the Project, namely:
    - Greenland white-fronted goose (*Anser albifrons flavirostris*) [A395]
    - Whooper swan (*Cygnus cygnus*) [A038]
- Water pollution (hydrocarbon and sediment) and fluctuation in surface water flows causing indirect effects on waterbird species through adverse effects on foraging habitats and food sources for birds listed as SCIs for SPAs during construction, operation and decommissioning phases of the Project, namely:
    - Greenland white-fronted goose (*Anser albifrons flavirostris*) [A395]
    - Whooper swan (*Cygnus cygnus*) [A038]
- Water pollution (hydrocarbon and sediment) and fluctuation in surface water flows causing indirect effects on sensitive QIs of downstream SACs, during wind farm construction, operation, and decommissioning phases, namely:
    - Active raised bogs [7110]
    - Alkaline fens [7230]
    - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]
    - Brook lamprey (*Lampetra planeri*) [1096]
    - Degraded raised bogs still capable of natural regeneration [7120]
    - Depressions on peat substrates of the Rhynchosporion [7150]
    - Salmon (*Salmo salar*) [1106]
    - Sea lamprey (*Petromyzon marinus*) [1095]
    - Otter (*Lutra lutra*) [1355]
    - White-clawed crayfish (*Austropotamobius pallipes*) [1092]
- Spread of non-native invasive plant species to downstream SACs through hydrological connectivity causing indirect effects on sensitive QIs during construction, operation and decommissioning phases of the Project, namely:
    - Active raised bogs [7110]

- Alkaline fens [7230]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]
- Degraded raised bogs still capable of natural regeneration [7120]
- Depressions on peat substrates of the Rhynchosporion [7150]

The effects of the Project on several QIs listed for the Natura 2000 sites within the ZoI were assessed as unlikely given the separation distances involved and/or the terrestrial nature of the habitats and/or the ombrotrophic nature of the habitats, including:

- Calcareous and calcschist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) [8120]
- Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510]
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]
- Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid Sites) [6210]
- Turloughs [3180]

Appendix 1 provides a list of Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) within the ZoI.

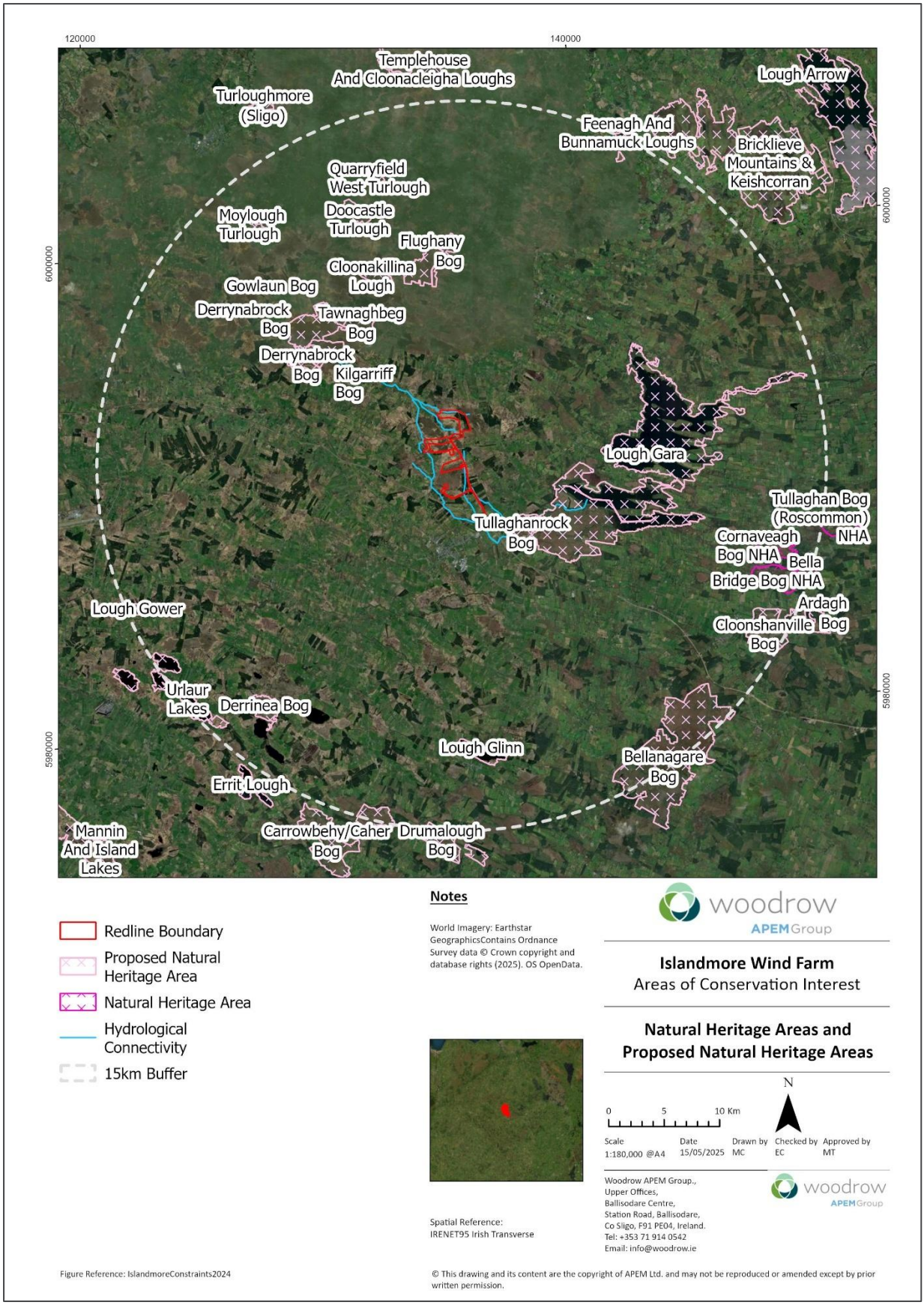


Figure 4 shows the distribution of NHAs and pNHAs in relation to the Project area. There are no NHAs identified within the ZoI.

Several pNHAs were assessed as within the ZoI, including:

- Gowlaun Bog pNHA [000502]
- Kilgarriff Bog pNHA [000510]
- Feenagh and Bunnamuck Loughs pNHA [001905]
- Lough Gara pNHA [000587]
- Lough Glinn pNHA [001644]
- Quarryfield West Turlough pNHA [001901]
- Tullaghanrock Bog pNHA [002013]

The potential for likely significant effects of the Project on the conservation interests of these pNHAs were identified, including:

- Collision risk and displacement of waterbird species associated with pNHAs during construction, operation and decommissioning phases of the Project, namely:
    - Coot (*Fulica atra*)
    - Crested grebe (*Podiceps cristatus*)
    - Goldeneye (*Bucephala clangula*)
    - Lapwing (*Vanellus vanellus*)
    - Mallard (*Anas platyrhynchos*)
    - Mute swan (*Cygnus olor*)
    - Pochard (*Aythya farina*)
    - Whooper swan (*Cygnus cygnus*)
    - Tufted duck (*Aythya fuligula*)
    - Wigeon (*Anas penelope*)
    - Teal (*Anas crecca*)

- Water pollution (hydrocarbon and sediment) and fluctuation in surface water flows causing indirect effects on waterbird species associated with pNHAs during construction, operation and decommissioning phases of the Project, namely:
    - Coot (*Fulica atra*)
    - Crested grebe (*Podiceps cristatus*)
    - Goldeneye (*Bucephala clangula*)
    - Lapwing (*Vanellus vanellus*)
    - Mallard (*Anas platyrhynchos*)
    - Mute swan (*Cygnus olor*)
    - Pochard (*Aythya farina*)
    - Whooper swan (*Cygnus cygnus*)
    - Tufted duck (*Aythya fuligula*)
    - Wigeon (*Anas penelope*)
    - Teal (*Anas crecca*)
- Water pollution (hydrocarbon and sediment) and fluctuation in surface water flows causing indirect effects on downstream pNHAs, during wind farm construction, operation, and decommissioning phases, namely:
    - Peatlands
- Spread of non-native invasive plant species to downstream pNHAs through hydrological connectivity during construction, operation and decommissioning phases of the Project, namely:
    - Peatlands

2.1. Design stage recommendations to protect designated Sites

Section 3.2 outlines the design stage recommendations to protect water quality, which will protect hydrologically connected SACs and SPAs downstream of the Project.

Section 4.3 outlines design stage recommendations to protect avian receptors including sensitive SCIs of SPAs within the ZoI.

Section 5.2 outlines design stage recommendations to protect non-volant terrestrial mammals including those listed as QIs for SACs within the ZoI.

Section 6.2 outlines design stage recommendations to protect bats, however bats are not associated with any designated Sites within the ZoI.

Section 7.3 outlines design stage recommendations to protect other taxa including those listed as QIs for SACs within the ZoI.

Section 8.4 outlines design stage recommendations to protect habitats including sensitive QIs within the ZoI as well as Annex I habitats identified outside of designated Sites but within the immediate vicinity of the Project.

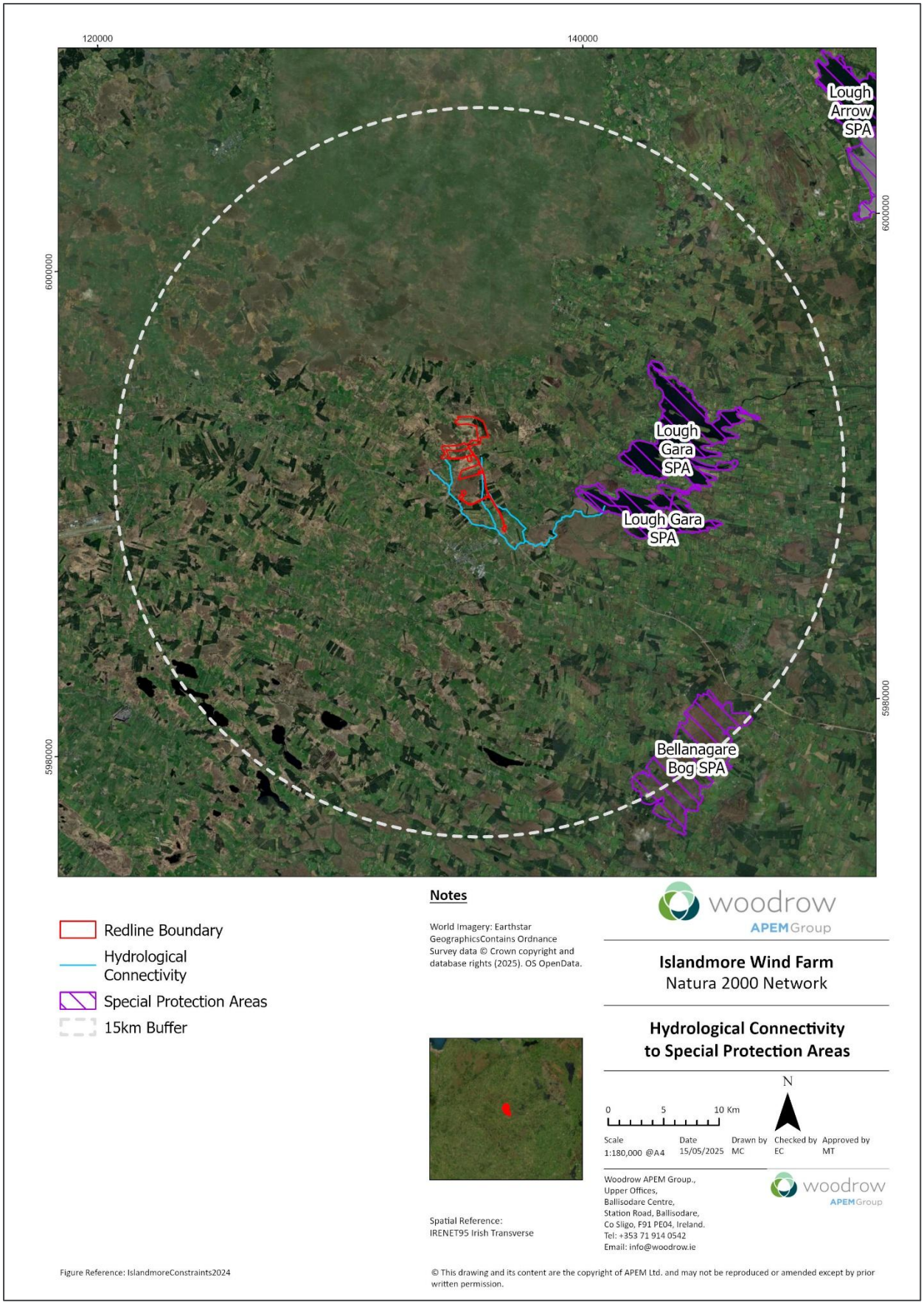


Figure 2: Special Protection Areas assessed for potential inclusion within the Zone of Influence.

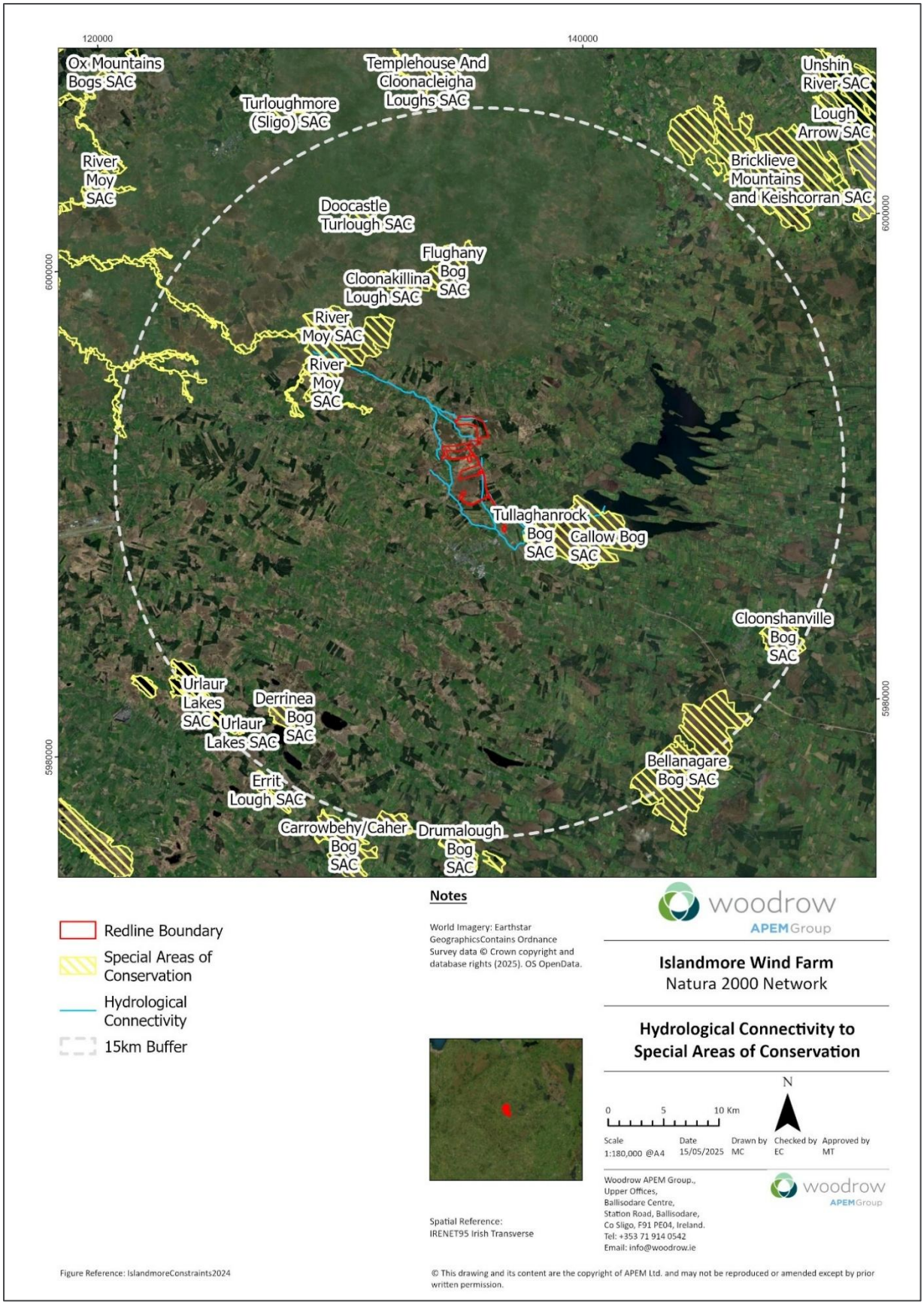


Figure 3: Special Areas of Conservation assessed for potential inclusion within the Zone of Influence.

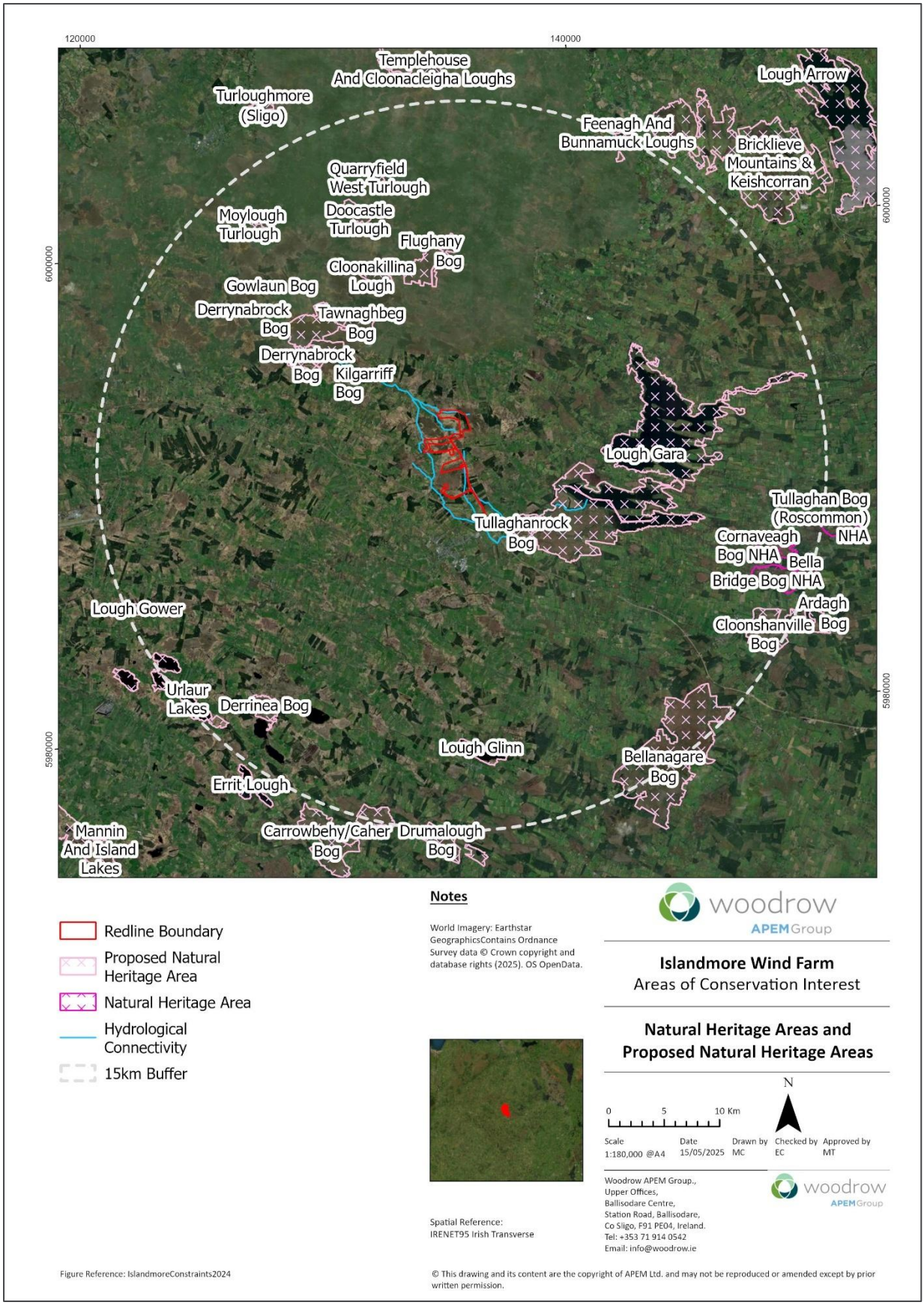


Figure 4: Natural Heritage Areas and Proposed Natural Heritage Areas within the Zone of Influence.

3. AQUATIC ECOLOGY

3.1. Desk study

As shown in Error! Reference source not found., the Project is hydrologically linked to the River Moy SAC, via the Owengarve River to the north. The River Moy SAC is designated for white-clawed crayfish (*Austropotamobius pallipes*), sea lamprey (*Petromyzon marinus*), brook lamprey (*Lampetra planeri*), salmon (*Salmo salar*) and otter (*Lutra lutra*).

It is possible that suitable spawning gravels for salmon occur in the upper catchment of the River Moy SAC which includes the Owengarve River and its tributaries. Brook lamprey spawning habitat also has the potential to occur in the Owengarve River and tributaries, however it is unlikely that Sea Lamprey will occur in these reaches due to their nature of spawning in lower reaches of large watercourses. White-clawed crayfish reported range includes the Owengarve catchment, and their reported distribution is reported in the lower reaches of the Owengarve catchment and River Moy catchment according to Article 17 reporting (NPWS, 2019).

To the south, the Project is hydrologically linked to Tullaghanrock Bog SAC, Callow Bog SAC and Lough Gara SPA via the Lung River. These watercourses link the Project to Lough Gara, which is outside the current range for salmon. However, these watercourses are within the current range and distribution for white-clawed crayfish and brook lamprey according to Article 17 reporting (NPWS 2019).

3.2. Further survey requirements for freshwater ecology

The following surveys were conducted within the period 25th September - 11th October 2024:

- An assessment of waterbodies within the Site which are hydrologically connected to River Moy SAC for salmonid and lamprey suitability.
- Deployment of traps for white-clawed crayfish in the tributary downstream of the Project flowing into the Owengarve River and subsequently the River Moy SAC.
- Other baseline aquatics, including:
    - Kick sampling at downstream locations to generate Q-values.
    - Collection of water samples for detailed physio-chemical analysis in the lab.

No further surveys are required for freshwater ecology.

3.3. Design stage recommendations to protect the freshwater ecology

The relationship between aquatic ecology, hydrology, peat stability and current/historical land-use is going to require detailed surveying and analysis to:

- Avoid and mitigate construction works in watercourses with hydrological connectivity to the River Moy SAC and Lough Gara SPA.
- Avoid and mitigate construction works adjacent to watercourses with hydrological connectivity to the River Moy SAC and Lough Gara SPA.
- Implement appropriate watercourse buffers to ensure there is no risk of runoff into watercourses with hydrological connectivity to the River Moy SAC and Lough Gara SPA.

- Identify locations within the Site where existing land-use (e.g. agriculture and turf cutting) may be impacting downstream water quality.
- Where damaging activities are occurring, determine if these can be limited as part of a habitat management plan (HMP) for the Project.

As an overall design phase recommendation, it is suggested that a 50 m setback from watercourses for infrastructure and construction works is employed as an aquatic protection zone. This will limit the risk of any increased water pollution due the Project and importantly will also mitigate for any potential adverse effects on the downstream Natura 2000 sites, River Moy SAC and Lough Gara SPA.

It is recommended that all project infrastructure is designed to avoid watercourses, and the number of watercourse crossings is minimised. Depending on gradient, substrate and recourse to other mitigation measures (silt traps, settlement ponds, bunded storage areas) design for all infrastructure and associated construction areas, including deposition and storage areas, should consider employing a 50 m setback from watercourses where possible. It should be noted, in the current project design the access track between T1 and T2 is <15m from a watercourse, the Owengarve_010 (IE_WE_34O030050), identified by the WFD database .

For areas where felling will be required, e.g. bat feature buffers, a setback from watercourse of 20-25 m should be maintained to limit sediment entering watercourses, as a result of this dispersed source of sedimentation. Where a requirement for stream crossings cannot be avoided, it is recommended that crossings which do not require instream works are employed.

A detailed Sustainable Drainage System (SuDS) will be required to manage surface water, taking account of water quantity (flooding), water quality (pollution) and biodiversity (wildlife and plants). This SuDS should include the following elements:

- Open constructed drains for development run-off collection and treatment.
- Infiltration interception drains for upslope ‘clean’ water collection and dispersion.
- Flow attenuation and filtration check dams to reduce velocities, with consideration given to gradient within drains to determine spacing requirements for check dams.
- Settlements ponds and buffered outfalls to control and store development runoff to allow settlement prior to discharge at greenfield runoff rates.
- No outflow will be permitted directly into natural watercourses.
- The Project drainage and attenuation system is required to attenuate, hydraulically (flow) and hydrochemically (pollutants), the projected worst-case scenario increase in runoff that will arise from the creation of additional areas of hardstanding.

As part of the design phase, lands for inclusion within a HMP for the Project should be identified. It is likely that these areas will be required to ensure protection and restoration of peatland habitats as a compensatory measure for direct habitat loss. Protecting and restoring bog, e.g. reducing the amount of turf cutting within 50 m of watercourses and blocking drains, will slow water flowing through the Site and limit the amount of peat entering the water. Prolonged turbidity, caused by peat entering watercourses, results in siltation of spawning gravels for salmonids and lamprey. The HMP should, in agreement with landowners, seek to limit the amount of drain maintenance works across the Site.

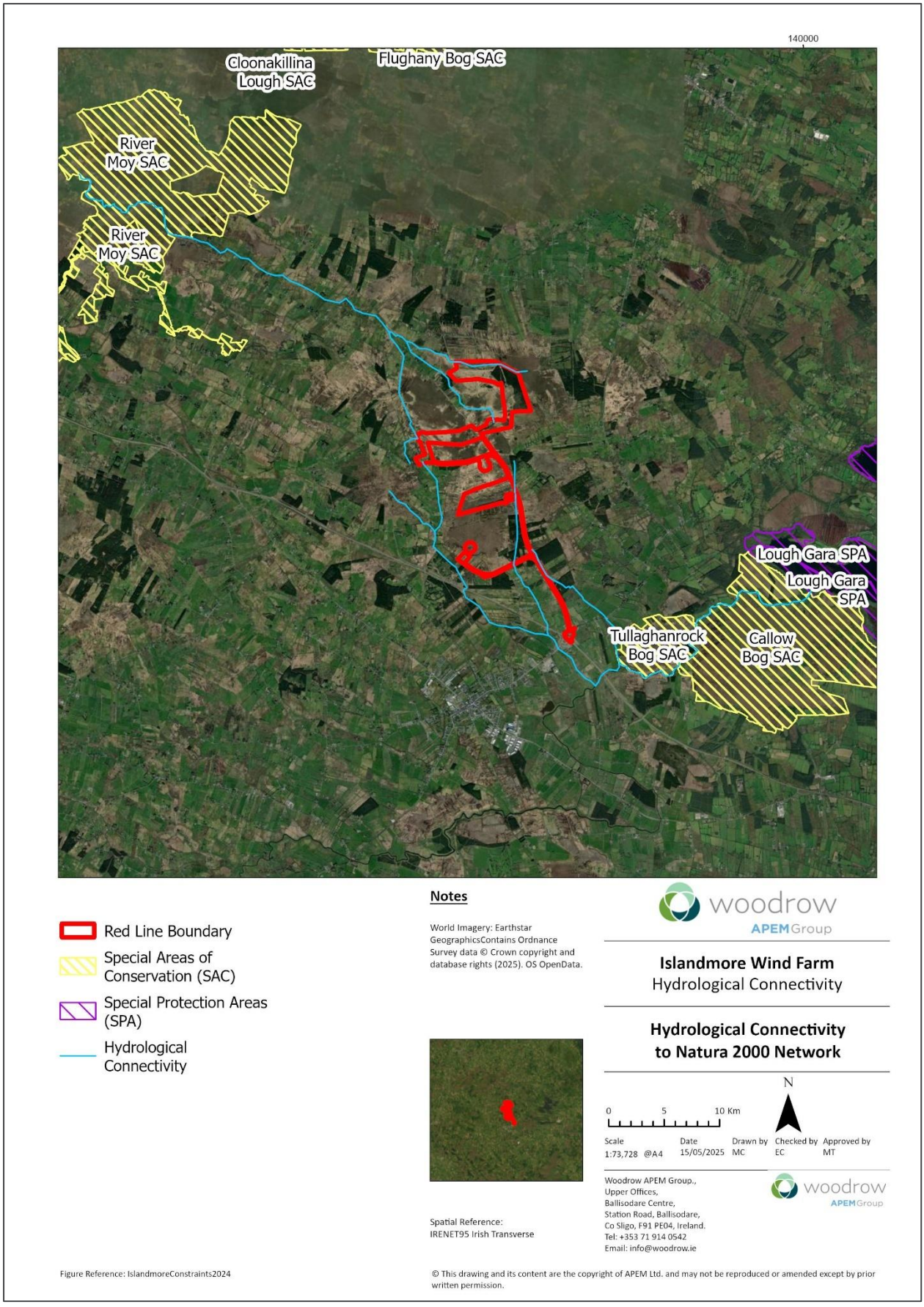


Figure 5: Hydrological connectivity from the Site to the Natura 2000 Network.

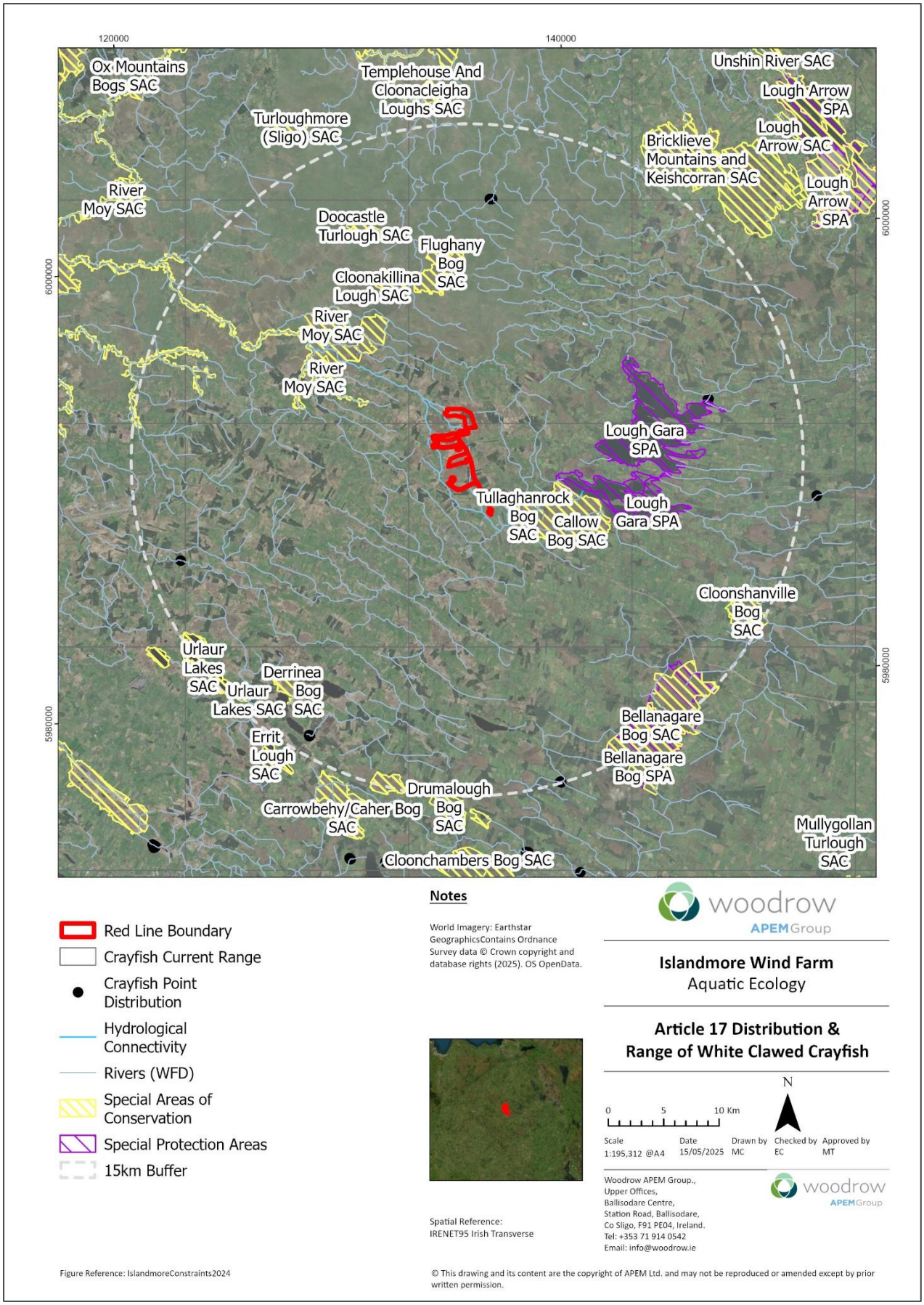


Figure 6: Range of white-clawed crayfish, as reported in Article 17 reporting (2019)

4. AVIFAUNA

4.1. Desk study

A desk study was undertaken to gather ornithological information for the 'Study Area', which includes the Site and the surrounding area. The study found habitats suitable for waterbirds and breeding waders, including woodland, scrub, peatland and wetland habitat. In addition, mature conifer plantations adjacent to open peatland will provide favourable roosting and foraging habitat for raptor species. An examination of the data provided by the National Biodiversity Data Centre (NBDC) resulted in a list of bird species recorded within national grid square M69 (**Table 1**). Interrogation of the National Parks and Wildlife Service (NPWS) designated site viewer was undertaken to establish protected sites with an ecological link to the Study Area (**Table 2**). This is supplemented by the I-WeBS Site Summary report for Lough Garra to provide an overview of ornithological assemblage in the region of the Study Area (**Table 3**) (Birdwatch Ireland, 2024).

Table 1: NBDC bird records for target species from national grid square M69 2011-2024

Name	Scientific Name	BoCCI 2020-2026	Date
Red listed species are those which are of highest conservation concern where the population is rapidly declining in abundance or range, has experienced a historic rapid decline (without recovery) or are globally threatened			
Goldeneye	*Bucephala clangula*	Red Win[1].	31/12/2011
Kestrel	*Falco tinnunculus*	Red Br[2].	31/12/2011
Pochard	*Aythya ferina*	Red Br. & Win.	31/12/2011
Redshank	*Tringa totanus*	Red Br. & Win.	31/12/2011
Snipe	*Gallinago gallinago*	Red Br. & Win.	19/09/2015
Swift	*Apus apus*	Red Br.	11/07/2023
Curlew	*Numenius arquata*	Red Br. & Win.	28/07/2018
Lapwing	*Vanellus vanellus*	Red Br. & Win.	31/12/2011
Shoveler	*Anas clypeata*	Red Br. & Win.	31/12/2011
Amber listed species are those with unfavourable European status, occur in internationally important numbers or are moderately declining in abundance or range. May also be Amber listed if population occurs in very small numbers.			
Black-headed Gull	*Larus ridibundus*	Amber Br. & Win.	10/05/2020
Coot	*Fulica atra*	Amber Br. & Win.	31/12/2011

[1] Wintering population only.

[2] Breeding population only.

Name	Scientific Name	BoCCI 2020-2026	Date
Common gull	*Larus canus*	Amber Br. & Win.	10/05/2020
Kingfisher	*Alcedo atthis*	Amber Br.	31/12/2011
Common Sandpiper	*Actitis hypoleucos*	Amber Br.	31/12/2011
Common Tern	*Sterna hirundo*	Amber Br.	10/05/2020
Teal	*Anas crecca*	Amber Br. & Win.	31/12/2011
Wigeon	*Anas penelope*	Amber Br. & Win.	31/12/2011
Gadwall	*Anas strepera*	Amber Br. & Win.	31/12/2011
Goosander	*Mergus merganser*	Amber Br.	31/12/2011
Cormorant	*Phalacrocorax carbo*	Amber Br. & Win.	10/05/2020
Greenland white-fronted goose	*Anser albifrons flavirostris*	Amber Win	31/12/2011
Greylag goose	*Anser anser*	Amber Win.	10/05/2020
Mallard	*Anas platyrhynchos*	Amber Br. & Win.	10/05/2020
Merlin	*Falco columbarius*	Amber Br.	31/12/2011
Mute swan	*Cygnus olor*	Amber Br. & Win.	10/05/2020
Tufted duck	*Aythya fuligula*	Amber Br. & Win.	31/12/2011
Whooper swan	*Cygnus cygnus*	Amber Br. & Win.	11/03/2016
Green listed species are not considered threatened.			
Buzzard	*Buteo buteo*	Green	28/03/2019
Moorhen	*Gallinula chloropus*	Green	31/12/2011
Sparrowhawk	*Accipiter nisus*	Green	31/12/2011
Grey heron	*Ardea cinerea*	Green	19/03/2016
Little grebe	*Tachybaptus ruficollis*	Green	31/12/2011
Whimbrel	*Numenius phaeopus*	Green	10/05/2020

***** Considered a feral population in this region Burke *et al*. (2022)

Table 2: Special Protection Areas within the ZoI and with a functional link to SCIs.

Natura 2000 Site [Site code]	Direct distance from the Project (at closest point)	Species of Special Conservation Interest
Lough Gara SPA [004048]	*c.* 4km east	Whooper Swan *(Cygnus cygnus)* [A038] Greenland White-fronted Goose *(Anser albifrons flavirostris*) [A395]
Bellanagare Bog SPA [004105]	*c.* 11km south	Greenland White-fronted Goose *(Anser albifrons flavirostris*) [A395]
Lough Arrow SPA [004050]	*c.* 17km northeast	Little Grebe (*Tachybaptus ruficollis*) [A004] Tufted Duck (*Aythya fuligula*) [A061] Wetland and Waterbirds [A999]

Table 3: I-WeBS summary Site data for Lough Gara SPA (Birdwatch Ireland, 2024).

Species	5 Year mean[3]	Peak count months	1% National importance	1% International importance
Mute swan	69	Dec	90	100
Bewick's swan	0	Feb, Sep, Oct, Nov	20	220
Whooper swan	61	Feb, Nov	150	340
Greenland white-fronted goose	38	Nov	100	190
Greylag goose	28	Feb, Dec	35	980
Barnacle goose	0	Mar	160	810
Shelduck	0	Dec	100	2500
Wigeon	51	Feb	560	14,000
Gadwall	0	Dec	20	1200

[3] Mean with 0 equals no records in last five years but indicates historic records. Wider population distribution/migration changes are often the drivers for this.

Species	5 Year mean[3]	Peak count months	1% National importance	1% International importance
Teal	23	Dec	360	5000
Mallard	92	Dec	280	53,000
Shoveler	3	Mar	20	650
Pochard	1	Feb, Dec	110	2,000
Tufted duck	138	Jan, Dec	270	8,900
Goldeneye	4	Dec	40	11,400
Goosander	1	Feb	-	-
Little grebe	3	Feb	20	4,700
Great crested grebe	9	Feb, Dec	30	6,300
Cormorant	10	Dec	110	1,200
Grey heron	3	Dec	25	5,000
Moorhen	10	Feb, Dec	-	-
Coot	8	Feb, Mar	190	15,500
Ringed plover	2	Mar, Nov	120	540
Golden plover	10	Feb, Mar, Nov	920	9,300
Lapwing	89	Jan	850	72,300

Species	5 Year mean[3]	Peak count months	1% National importance	1% International importance
Jack snipe	3	Oct	-	-
Snipe	11	Dec	-	-
Woodcock	0	Dec	-	-
Black-tailed godwit	0	Dec	200	1,100
Whimbrel	4	Jan	-	-
Curlew	7	Nov	350	7,600
Black-headed gull	0	Mar, Dec	-	-
Common gull	3	Mar	-	-
Lesser black-backed gull	0	Feb, Mar, Nov	-	-
Herring gull	5	Feb, Sep, Oct, Nov, Dec	-	-
Great black-backed gull	1	Feb	-	-

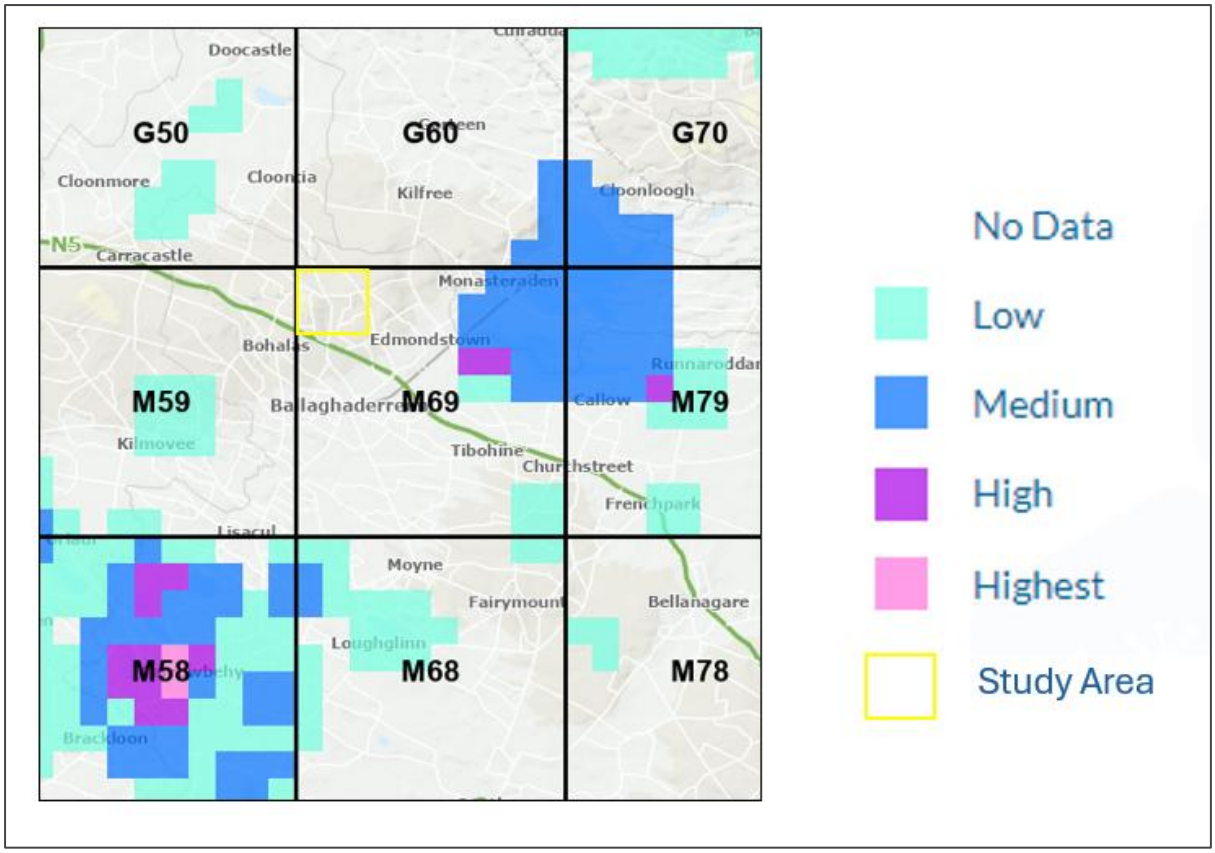


Figure 7 Bird sensitivity to wind energy map[4]

Birds' sensitive to wind energy map produced by NBDC was consulted, showing no data for the Study Area. In the same tetrad, M69 there is areas of high/highest sensitivity habitat present at Lough Gara and in adjacent tetrads.

[4] Available at Biodiversity maps https://maps.biodiversityireland.ie/

4.2. Ornithological Surveys

Nine seasons of ornithological survey work has been completed within the Study Area following NaureScot (2017) guidelines.

- Season 1: December-2019 to Febuary-2020
- Season 2: March – August 2020
- Season 3: September 2020 – March 2021
- Season 4: March – August 2021
- Season 5: October 2021 – March 2022
- Season 6: April – August 2022
- Season 7 December 2022 – March 2023
- Season 8 April- September 2024
- Season 9 October 2024 – March 2025

Information on full survey effort is provided in a separate Excel sheet due to volume and the following outline the surveys seasons.

4.2.1. Vantage point survey 2019-2023

Aims: To record all bird activity within the Study Area (500 m buffer) and specifically record flight hights and durations of target species to inform collision risk modelling (CRM).

During VP (vantage point) watches, surveyors record bird activity within the 500 m turbine buffer by mapping flightlines of selected target species. This data is collected to support the assessment of avian collision risk. Three vantage points (VPs) were initially used to provide view sheds of the 500 m indicative turbine buffer during the first three survey seasons (

Figure 8 Vantage Point Locations

). Following the expansion of the Study Area, 4 VPs were utilised to cover the revised Study Area and two years of data was collected in compliance with NatureScot (2017), including a minimum of 36 hours of watches per VP per season.

The overall results of VP watch show the raw aggregated flight seconds for target species recorded both within and beyond the 500 m turbine buffer (Error! Reference source not found.). Therefore, flight times are highly precautionary, subject to further analysis using collision risk modelling. Kestrel *(Falco tinnunculus)* and golden plover (*Pluvialis apricaria*) are standout as species requiring consideration.

The VPs selected to cover the Study Area are compliant with the NatureScot/Scottish Natural Heritage (SNH) guidelines (SNH, 2017), which stipulate that viewsheds from VPs should not extend more than 2 km and that the angle of view should also not be extended beyond an arc of 180 degrees. To mitigate observer fatigue, surveyors typically limited VP watches to three hours without a break. Exceptions were made during brief pauses for inclement weather, when watches were temporarily halted until conditions improved.

Target species are those identified as being at risk from displacement effects caused by wind farm developments or from collision with turbines. Target species for which flight-line data was captured were defined as all birds of prey and all water bird species.

Table 4: Raw aggregated flight times for species in the Project area using data with 4 VPs.

Species	Aggregated flight time in 500 m buffer (seconds)	Aggregated flight time in the Site (seconds)	Aggregated flight time project area (seconds)
Buzzard	190	290	5
Common gull	13	-	-
Curlew*	2	88	1
Golden plover*	370	4,999	12
Great black-backed gull	-	432	3
Grey heron	-	521	3
Hen harrier	136	-	3
Herring gull	38	168	1
Kestrel*	711	10,095	24
Lesser black-backed gull	257	936	11
Mallard	-	48	-
Merlin	-	44	-
Raven	120	-	-
Snipe*	-	1239	4
Sparrowhawk	27	83	2
Swift	12	-	-
Whooper swan	-	389	3

*Species in **bold** are noted as stand out constraint species for collision risk and further analysis will be undertaken outside the scope of this report.

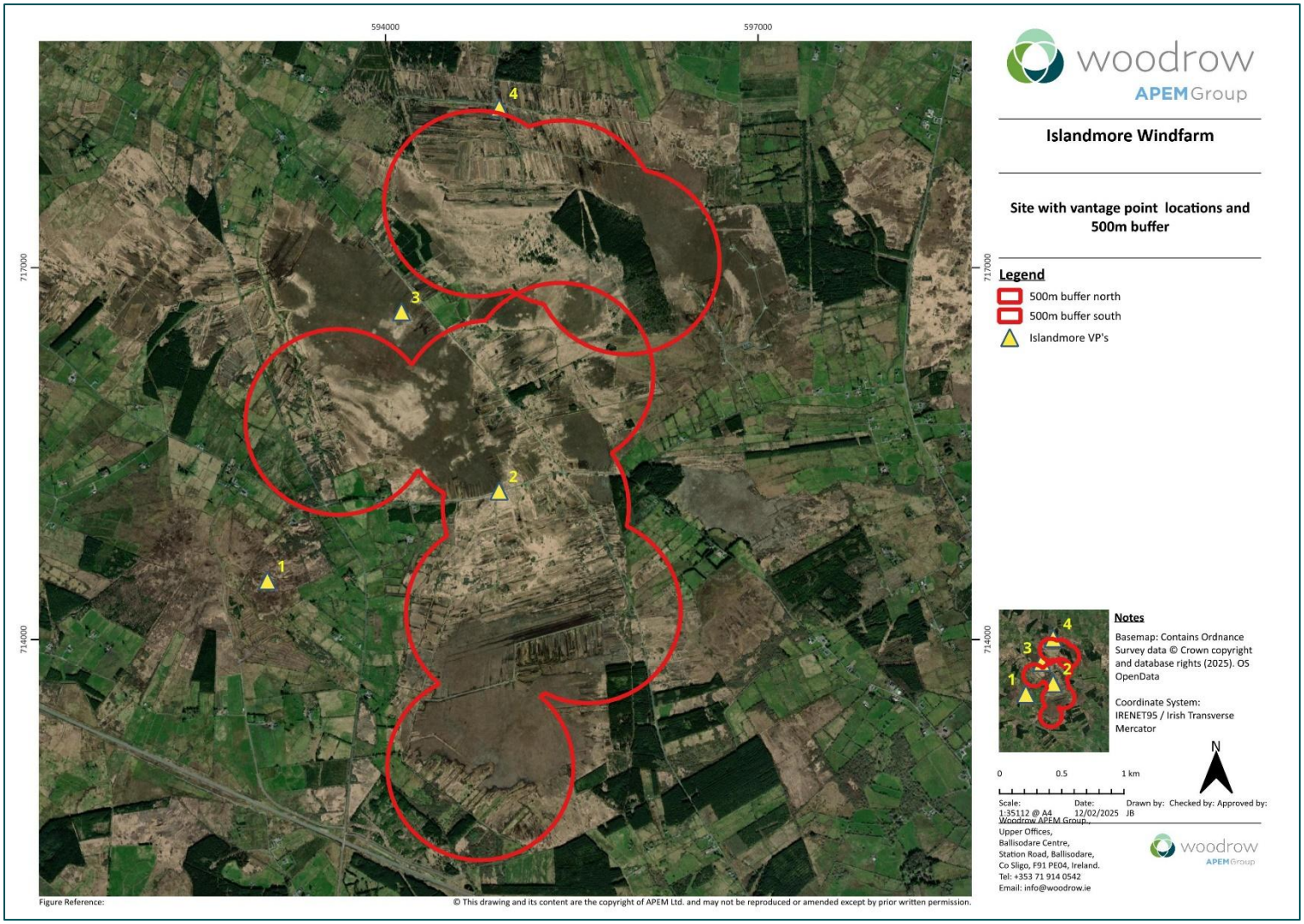


Figure 8 Vantage Point Locations

4.2.2. Walkover surveys 2019-2023

Breeding season: To sample the habitats present within the 500 m turbine buffer, forming the study area with a focus on the suitable habitats for target species, including waders and birds of prey within the Study Area. This gives a full indication of avian usage and the abundance of prey species.

Non-breeding season: To record all birds present. During these surveys, surveyors systematically walked the Study Area, recording all bird species encountered and ensuring coverage of a representative sample of all habitat types. Observations were aimed to be made at a maximum of 250 m from every point within the 500 m buffer.

These walkovers provide insights into the distribution of bird species across the Study Area and their utilisation of various habitat types. They are particularly effective for detecting species that are challenging to observe during VP watches, such as wintering woodcock (*Scolopax rusticola*).

4.2.3. Wider area water bird surveys 2019-2021

Aims: Waterbird species are using the wider Study Area (5km) and based off these findings' records were taken of commuting paths of wildfowl from roost to foraging areas.

In assessing the impact of the Project, it is important to provide contextual data on the numbers of wintering waterbirds in the wider Study Area relative the usage of the Site by these species. SNH guidelines (SNH 2017) require monitoring of swan and geese foraging and roosting locations when occurring in the environs of the Project, and specifically where SPAs are designated for these species. A Study Area of up to 500 m from the Site for foraging locations is recommended and a Study Area up to 1km from the Site for roost locations is recommended, although this distance may be extended where high levels of activity are anticipated.

In Ireland, swan and goose distribution is often not well documented beyond SPAs. In addition, many wintering waterbirds occur outside of SPAs. As such, the number of surveys undertaken was dependent upon the results of the surveys and how much waterbird activity was noted in the Study Area. The surveys were based on the approach employed by I-WeBS, and the Study Area was extended up to 5 km from the Site to cover suitable habitats in the vicinity.

During surveys, counts were taken of waterbird species at all publicly accessible/viewable bogs, ponds, rivers, and other wetland habitats within a 5 km buffer. Other species, notably raptors, present during the survey were also recorded.

4.2.4. Hen harrier roost survey 2020 -2025

Aims: To locate winter hen harrier (*Circus cyaneus*) roosts, observe their numbers, and track their flight paths to and from the roosts. To rule out areas with no hen harriers present within the 2km study area.

Suitable habitat was assessed during the desk review and hen harrier roost searches were undertaken. SNH guidance (2017) stipulates in relation to surveying for communal raptor roosts, including those of hen harriers, that roosts within 2 km of a proposed wind farm should be identified.

With respect to the Project, the approach to surveying for hen harrier roosts was determined by two factors:

- Availability of potentially suitable roosting habitat in the vicinity of the Study Area, as described by Clarke and Watson (1990) and in the Irish national hen harrier winter roost survey guidelines (O'Donoghue 2019)
- Hen harrier activity observed during VP watches, Site walkovers and Study Area surveys.

SNH (2017) defers to Hardey *et al*. (2009) for specific roost survey methodology requiring surveyors to employ professional judgement in identifying and targeting potential roosts based on observed flight activity within or adjacent to a site. Hardey *et al*. (2009) recommend locating birds in the late afternoon and then attempting to track them back to roosts. O'Donoghue (2019) notes that the best times to conduct a roost watch are at least 40 minutes before sunset until dark, or 30 minutes before sunrise until at least 30 minutes after sunrise. Based on these guidelines surveyors arrived one hour before sunset, to wait in an appropriate vantage point location, affording a good view of the roost locations yet as not to stand out in the landscape and influence bird behaviour. The survey continued until it was too dark to reasonably identify a bird.

4.3. Species of consideration

4.3.1. Waders

The waders using the Site that pose a constraint comprise golden plover (*Pluvialis apricaria*) snipe (*Gallinago gallinago*) curlew (*Numenius arquata*) and woodcock (*Scolopax rusticola*). All these species are BoCCI 2020-2026 Red listed.

Golden plover

Golden plover is an Annex I species and was recorded with high flight times through the 500 m buffer (**Table 4**), that will be examined further with collision risk modelling. Instances of resting behaviour near VP2 were also recorded. The species was predominantly observed in the non-breeding season with a few breeding season observations which were in late March and connected to non-breeding behaviour. There was no breeding behaviour observed on site.

Snipe

Snipe were recorded during within the side on the dusk walkovers surveys and were exhibiting breeding behaviour. This confirms nesting habitat suitability within the site and 500 m buffer (figure 8). Pearce-Higgins *et al*. (2012) observed a 53% decline in snipe densities at wind farm Sites during construction. Displacement of breeding birds is likely during construction and in the operational life.

Curlew

Curlew were observed within the 500 m buffer in flocks with generating high flight times that could pose a collision risk. This was in the non-breeding season and will be investigated further with collision risk modelling. There were two sporadic sightings in the breeding season of curlew, but no breeding behaviour observed.

Woodcock

Woodcock was recorded in the non-breeding season on vantage point surveys and walk over; There were a total of three observations this species is often under recorded due to its cryptic nature. Suitable breeding habitat is present in the 500 m buffer, but no birds were observed in breeding season dusk surveys.

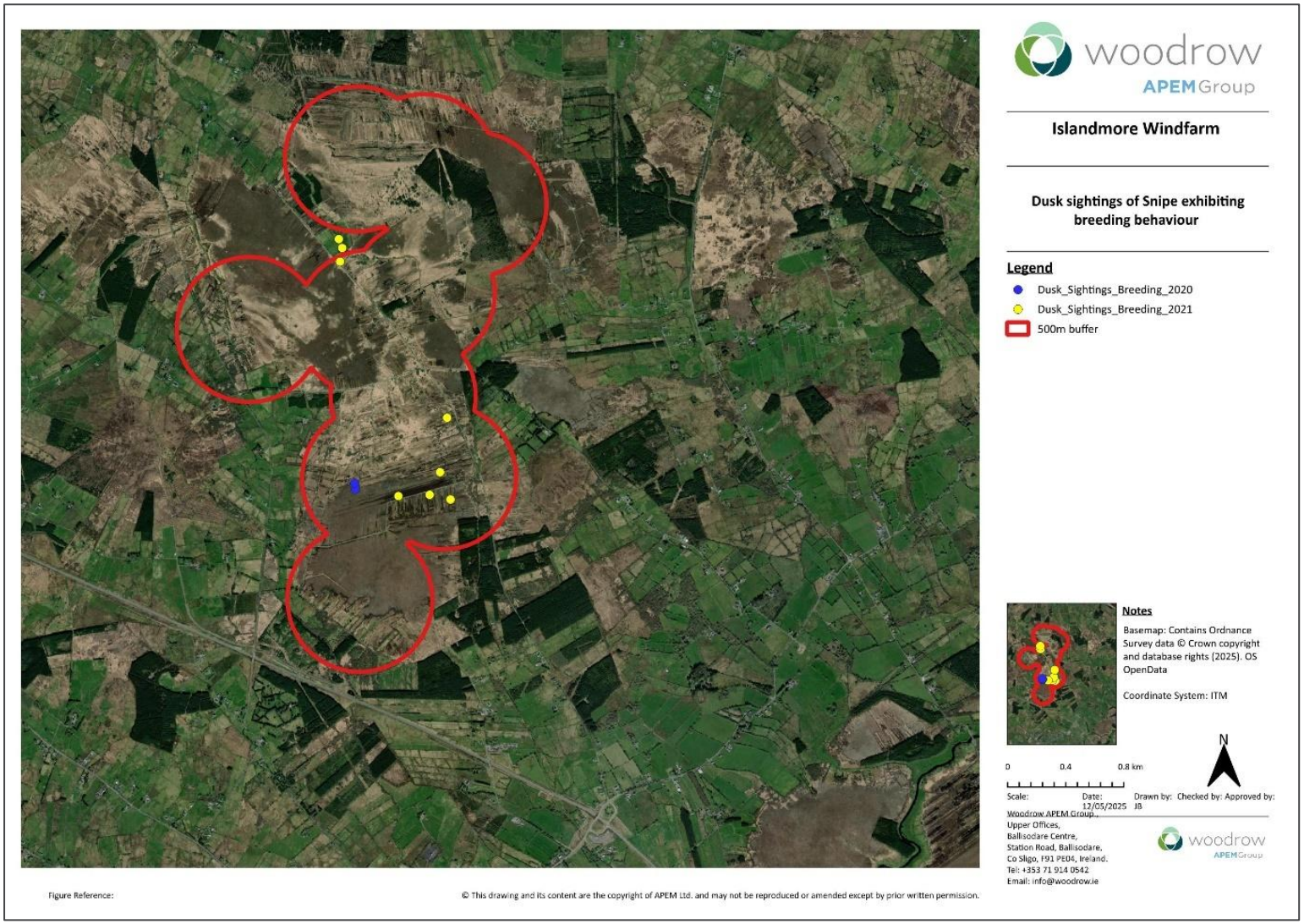


Figure 9 Locations recorded on dusk surveys of breeding behaviour of snipe.

4.3.2. Raptors

Hen harrier

Hen harriers have been identified as regularly using the Site and the surrounding raptor Study Area (2km). Up three birds have been recording using separate two non-breeding season roost locations within 2km of the Site. Furthermore, hen harriers have been observed hunting within the 500 m buffer of the Site.

Traditionally hen harriers in Ireland nest in areas of dense heather. Following the decline of this habitat, pairs are increasingly being recorded utilising young conifer of 2-8 years plantations or areas of regeneration following tree felling (Wilson *et al.*, 2006). With breeding success reportedly, the second highest (40%) in this type of habitat after heather moorland (54%) (Ruddock *et al.*, 2016). Outside of the breeding season this species is mobile throughout the wider countryside and utilizes communal roosts from which the local population can radiate out up to 20km from (O'Donoghue and Murphy NPWS, 2015a).

The threats to hen harrier winter roosts from wind energy are primarily construction related disturbance and construction/operational based displacement of birds into the wider landscape away from existing roost sites. (NPWS, 2022). SNH (2017) guidelines stipulate that communal raptor roosts, including those of hen harriers, within 2km of a proposed development site should be identified and hen harrier are afforded a level of protection while outside SPA's and utilizing the wider countryside by article 4 of the bird's directive.

The most recent national hen harrier survey in 2022 reports that in 2013 Irish grid square [M69] which encompasses most of the Project site had a regular winter roost present (NPWS, 2022) and (Balmer *et al.*, 2013). This presents that the roost located within the 2km buffer is likely to be long standing, although exact location of the [M69] roost is not presented in the report. The closest SPA with a qualifying interest for wintering hen harrier is Lough Corrib *c.* 60km southwest of the Site. This is outside the connectivity of the Project site but important when considering the wider winter hen harrier populations in Ireland.

The adjacent 10km square to the Project site to the east [M79] holds a historic possible breeding record for one pair of hen harrier in 2015 (NPWS, 2022). The nearest breeding SPAs for hen harrier is *c.* 87km south, the Slieve Aughty Mountains and Slieve Beagh *c.* 97km northeast both outside the connectivity for the Project site. The nearest important but non-designated sites for breeding hen harrier is Slieve Rushen mountains and Leitrim uplands both *c.* 60km northwest from the Site.

With a declining population nationally hen harrier has multiple known breeding and wintering locations of importance, both designated and non-designated. Within the context of the Project site the presence of a regular, longstanding communal winter roost signifies the importance of this suitable wintering location/habitat in supporting the regional population. Roost location one is in proximity to significant site infrastructure. It is likely this roost is of regional/national importance and disturbance distances/mitigation options will be further investigated.

Kestrel

Additional raptor activity within the Study Area includes kestrel (*Falco tinnunculus*), which was recorded as having high flight times within the Study Area, with most records show hunting behaviour (**Table 4**). This will need to be further examined with collision risk modelling. There are breeding season observations in 2021 of juvenile birds within the 2km breeding raptor study area. No nests were found within this study area and in other breeding seasons no breeding activity was observed. Its likely any breeding activity is taking place outside the 2km study area and there is not breeding activity within the Site. This species recently moved onto the red list, likely due to the negative impacts of agricultural intensification (Wilson-Parr & O'Brien 2019).

Merlin

Merlin (*Falco columbarius*) was recorded hunting in the Study Area over multiple years in both non-breeding and breeding season. This species is listed in Annex I of the Habitats Directive and is an Amber listed species (BoCCI 2020-2026) and is afforded a higher level of protection. There was no breeding behaviour observed within the Site. There is a potential collision risk which will be further investigated.

Additional species

Surveys highlighted a high abundance of meadow pipit (*Anthus pratensis*) within the Study Area, which is a Red listed species. Typically, this species does not need to be considered for collision risk models, but as a ground nesting bird it will be susceptible to effects such as habitat loss and disturbance during the construction, operational, and decommissioning phases. Swift (*Apus apus*) was also observed using the Study Area, predominantly for feeding in the breeding season. This species is also Red listed (BoCCI 2020-2026). This has the potential to be a collision risk.

4.4. Design stage recommendations

- Avoid construction activities in areas where breeding snipe are present by undertaking pre works surveys to prevent displacement in the breeding season (**Figure 9**). Establishing a 400 m buffer zone from nests to each turbine base/work area.
- Construction activities within 750 m of the hen harrier roost will require specific mitigation as this disturbance may give rise to displacement or abandonment of roost location one.
- Collision Risk Modelling will be conducted to assess the operational impacts of the Project based on existing flight times in the 500 m buffer and flight patterns.
- Appropriate compensation measures should be identified and included in the Habitat Management Plan (HMP) to offset any residual impacts associated with the Project.

5. NON-VOLANT TERRESTRIAL MAMMALS

5.1. Desk study

Otter (*Lutra lutra*) is listed as a QI for the River Moy SAC and there is potential that the species uses watercourses in the north of the Site. There is potential for breeding sites (holts) to occur within 150 m of the Site and construction activity could directly (destroy) and indirectly (displacement through disturbance) affect these protected features. Otter is listed in Annex II of the Habitats Directive, requiring the designation of conservation areas for the species.

The NBDC database was interrogated for records of protected mammals within 2 km of the Site since 2014. There is only one record of a protected mammal species within this time period, namely pine marten (*Martes martes)*. It is likely the species occurs within the Site as suitable habitat has been identified, namely (WD4) Conifer plantation and (WS1) Scrub [NBDC n.d. (a)]. Habitat loss and fragmentation are major threats to the species. However, Article 17 reporting lists the conservation status of the species as favourable [NBDC n.d. (a)].

Other protected mammals likely to occur within the Site include badger (*Meles meles*), Irish stoat (*Mustela erminea hibernica*), Irish hare (*Lepus timidus hibernicus*), and red squirrel (*Sciurus vulgaris*). Construction works have the potential to impact directly and indirectly on the resting places for these species.

Badger, Irish stoat, Irish hare, red squirrel, and pine marten are protected under the Irish Wildlife Act 1976.and the Irish Wildlife Amendment Act 2000, meaning it is illegal to intentionally injure, hunt or kill these animals. These species are also listed under Annex III of the Bern Convention for Conservation of European Wildlife and Natural Habitats. Pine marten is listed as an Annex V species under the Habitats Directive.

5.2. Further survey requirements for mammals

Protected mammal surveys will be conducted over winter 2024-25. These searches will identify the resting places of protected mammals and will focus on the Project layout, with appropriate buffers applied to account for disturbance distances for each species, based on NRA (2009) guidelines. For each species, the survey area will be as follows:

- Otter: 150 meters upstream and downstream of the Site, as well as along the watercourse crossings of the grid connection route.
- Badger: Within a 50 m buffer of the proposed construction corridor, which will be increased to a 150 m buffer should rock breaking and/or blasting be required.
- Pine marten: Suitable habitat (woodland) within 100 m buffer of proposed construction corridor, as well as felling zones required to create bat feature buffers.
- Red squirrel: Suitable habitat (woodland) within 50 m buffer of proposed construction corridor, as well as felling zones required to create bat feature buffers.

5.3. Design stage recommendations to protect mammals

- As described in Section 2.2 covering design phase mitigation for freshwater ecology, the prevention of water pollution will protect habitats utilised by aquatic species including otter.
- avoidance zone buffers will be implemented.
- Consider additional mammal surveys including camera trap / bait surveys and DNA analysis of droppings to confirm their presence / absence of pine martin in the forestry in the immediate vicinity of T3 and T4

Table 5: Mammal species of conservation interest previously recorded in a 2 km radius of the Project since 2014 taken from NBDC (Grid Square G60A, G60F, M69D, M69E, M69I, M69J)

Key to likelihood of species presence: 1 = Confirmed; 2 = Likely; 3 = Possible; 4 = Unlikely; 5 = None

Key to Red List Status: CR = Critically Endangered; NT = Near Threatened; VU = Vulnerable; LC = Least Concern; DD = Data Deficient

Common Name	Scientific Name	Habitats Dir.	Wildlife Order	Red List Status	Likelihood on Site	Likelihood within 2 km	Most recent record	Grid Square	Dataset
Mammals									
Pine Marten	*Martes martes*	Annex V	Y	Y	2	1	26/11/2021	M69D	Mammals of Ireland 2016-2025

6. BATS

6.1. Desk Study

A data request for bat records, including known roosts within 10 km of the Project has been submitted to Bat Conservation Ireland (BCI). Based on the National Biodiversity Data Centre (NBDC) Biodiversity Maps database, six species of bats have been recorded within *c.* 10 km of the Project, including:

- Common pipistrelle *Pipistrellus pipistrellus*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Leisler's bat *Nyctalus leisleri*
- Brown long-eared bat *Plecotus auritus*
- Natterer's bat *Myotis nattereri*
- Daubenton's bat *Myotis daubentoniid*

The other regularly occurring Irish bat species not recorded within 10 km of the proposal are Nathusius' pipistrelle (*Pipistrellus nathusii)*, whiskered bat (*Myotis mystacinus)*, and lesser horseshoe bat (*Rhinolophus hipposideros)*. Nathusius' pipistrelle is migratory across most of its range in Ireland, with the majority of the visits being recorded in the spring, and therefore this species is likely to be under recorded throughout the rest of the year. Whiskered bats although a widely distributed species, has been under-recorded in Ireland. Typically found in woodland, often near water. Whiskered bat prefers to roost in buildings, under slates, lead flashing or exposed beneath the ridge beam within attics. However, they also use cracks and holes in trees and are known to use bat boxes. Whiskered bat is one of our least studied species and further work is required to establish its status in Ireland. Lesser horseshoe bat is confined to six counties along the western seaboard: Mayo, Galway, Clare, Limerick, Kerry and Cork. It is further listed under Annex II of the Directive, requiring the designation of conservation areas for the species. Under this Directive, Ireland is obliged to maintain the favourable conservation status of Annex-listed species.

Bat surveys following NatureScot guidance (NatureScot *et al*. 2021), incorporating static bat detector deployments at turbine locations, have been completed during the 2023 active bat season and results have been processed. Levels of relative bat activity across the Site have not been analysed and so far, at least 7 species have been recorded including: common pipistrelle, soprano pipistrelle, Leisler's bat, small numbers of Nathusius' pipistrelle, *Myotis* spp., brown long-eared bat and lesser horseshoe bat. Based on the placements of static detectors (i.e. on features) it is anticipated that some locations will generate relatively high levels of bat activity. The summer deployment saw increased Leisler's bat activity within the Site.

An area of 300 m around all proposed turbine locations has been searched for potential roost features (PRF), including undertaking roost inspections under licence. Trees, where identified, are categorised as having no suitability if they lack PRFs or are highly unlikely to have any; further assessment required (FAR) if it's unclear whether PRFs are present and more investigation is needed; and PRF, where at least one PRF is confirmed to be present in the tree (BCT 2024).

All other PRFs identified have been classed as none, negligible, low, moderate or high status in terms of potential to support roosting bats, according to criteria set out in the BCT guidance (Collins 2016). Dusk emergence/dawn re-entry surveys have been undertaken for features classed as moderate or high. The main findings of the surveys to date have been the discovery of a confirmed soprano pipistrelle roost at a derelict house within the Site (**Figure 10**). The results of this survey, including

the observed bat activity and species identification, are presented in **Table 6**. No other bat roosts have been identified within the 300 m turbine buffer.

Table 6: Results of Roost re-entry and emergence surveys

Feature ID	Feature description	Location (ITM: X, Y)	Result
F.1	Derelict building (west)	E561375 N798952	**Survey 1 – Re-entry survey: 4 August 2023** No bats were seen re-entering the derelict house. An orange streetlight illuminated the front of the building. A brown long-eared bat was recorded foraging nearby but did not enter, confirmed by IR footage. A single soprano pipistrelle and a common pipistrelle also foraged intermittently around the building without entering.
F.2	Derelict building (east)	E561375 N798952	**Survey 2 – Emergence survey: 30 August 2023** Two bats emerged from the rear of the derelict house under the roof soffit. One was confirmed as a soprano pipistrelle; the second, presumed a common pipistrelle, did not echolocate but was likely identified based on nearby activity. Both bats were observed tandem flying, foraging, and social calling around the roost.

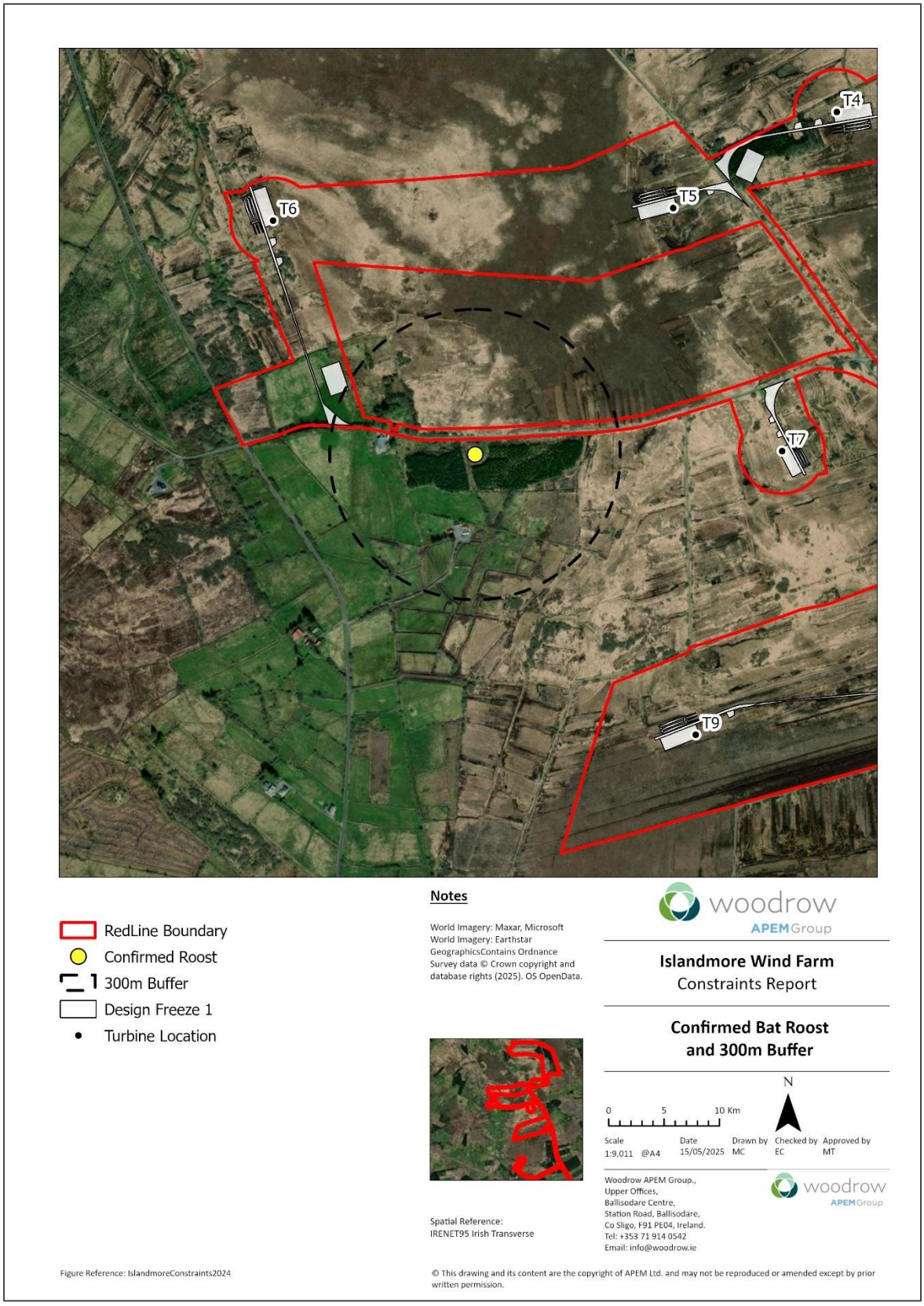


Figure 10: Soprano pipistrelle roost at Islandmore WF with 300 m buffer and core Site footprint

6.2. Turbine to bat feature standoff distance

Recommended felling distances were calculated using the buffer distance equation (**Figure 11**) and the turbine specifications supplied by the developer (**Table 7**). Turbine height for T2 and T3, which are located within the forestry plantation, is 185 m (V-162). Feature height was assumed to be 25 m because commercial forestry plantations are typically 20-25 m at felling. It is important that feature heights at the end of the Project life span, (i.e. after 30 years) are used to calculate the standoff distances. A minimum recommended buffer distance of 101 m was calculated (**Table 7**).

6.3. Further survey requirements for bats

The following surveys have been conducted:

- Surveys compliant with NatureScot, (2021) guidance have been completed in 2023. These have provided a robust assessment of potential impacts based on relative levels of bat activity across the Site.
- Mapping of bat potential roost features (PRFs) within the Site to show areas of existing connectivity and where connectivity could be enhanced. Feature heights will also be recorded to allow appropriate bat feature buffers to be determined. Based on the height of the features recorded within the Site, appropriately sized buffers will need to be placed around all identified PRFs. Buffers can also be applied to proposed turbine locations to determine where vegetation removal will be required and design re-planting schemes to encourage bat to utilise areas away from turbines.

Additional surveys are yet to be conducted to collect, including:

- Surveys of grid connection route and turbine delivery route, particularly in the areas where vegetation removal and watercourse crossings are required.

6.4. Design stage recommendations to protect bats

One of the main ecological constraints to contend with throughout the design phase is the requirement for felling zones around turbine locations and vegetation removal for construction of access tracks, while retaining connectivity through the Site. It would also be useful to consider designing enhancement measures aimed at compensating for habitat loss and enhancing connectivity through the Site and the wider landscape.

- Implement 101 m standoff distances within the forestry plantation around T2 and T3 for the creation of bat buffer zones.
- Calculate additional standoff distances as appropriate for proposed turbine locations to determine where vegetation removal will be required of vegetation features potentially utilised by bats, including hedges, treelines, scrub and woodland edge within the viable area.
- Design re-planting schemes to encourage bats to utilise areas away from turbines, as part of the HMP.
- Map existing connectivity and locations where connectivity could be enhanced around the potential roost features (PRFs) near the substation location.
- Avoid habitat fragmentation.
- Mitigate the loss of linear features used as foraging routes.

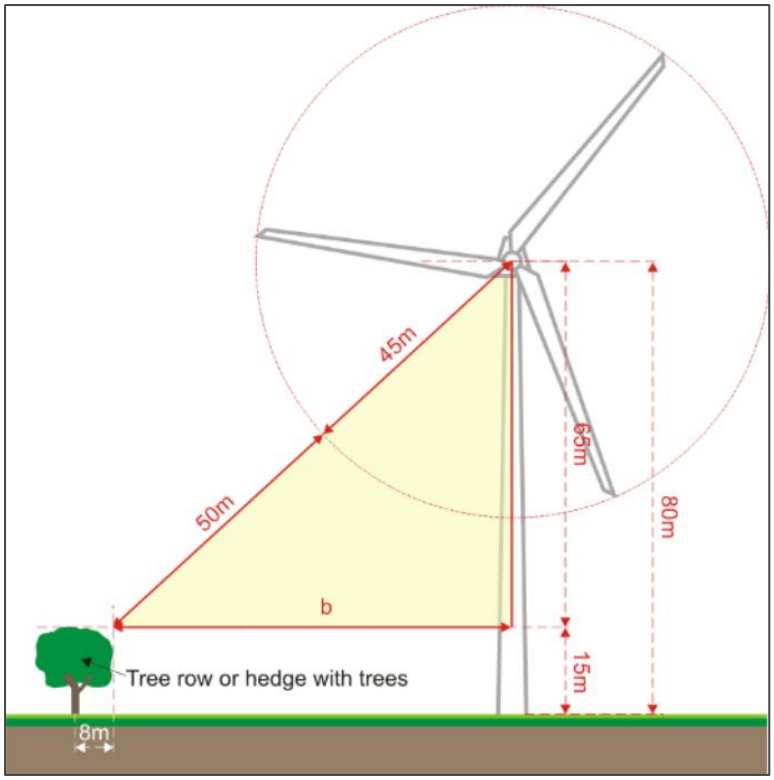


Figure 11: Illustration of buffer distance equation ($b = \sqrt{(50 + bl)2 - (hh - fh)2}$ where bl = blade length, hh = hub height, fh = feature height)

Table 7: Example turbine specifications with appropriate buffer recommendations

	Turbine Model			50 m turbine (tower)-feature buffer	
Calculations based on:	**V-162**	**V-136**	**Feature height *f***	**V-162**	**V-136**
Tip height	185 m	150 m	40 m feature	114 m	110 m
Rotor diameter	162 m	136 m	30 m feature	108 m	105 m
Blade length *bl*	81 m	68 m	25 m feature	105 m	103 m
Hub height *hh*	104 m	82 m	20 m feature	101 m	100 m
			15 m feature	96 m	97 m
			10 m feature	91 m	94 m
			5 m feature	86 m	89 m
			3 m feature	83 m	88 m
			0 m feature	80 m	84 m

7. OTHER TAXA

7.1. Desk Study

7.1.1. Marsh Fritillary

Marsh fritillary (*Euphydryas aurinia)* is listed on Annex II of the Habitats Directive, meaning its conservation requires designation of SACs. Recent records of marsh fritillary have been recorded within 2 km of the Site (**Table 8**). This species is likely present within the Site, given the presence of suitable supporting habitats, namely (PB2) Upland Blanket Bog, (PB4) Cutover Bog, (HH3) Wet Heath, and (GS4) Wet Grassland. (NPWS 2013).

The larval food plant of the marsh fritillary, devil's-bit scabious (*Succisa pratensis*), has been identified within the Site adjacent to T2 and within the footprint of the Project at T10. Larval web surveys have been carried out within the optimum survey season, on 27th August 2024 and 19th September 2024 (**Table 13**). The optimum survey season is late August to late September according to guidance provided by the National Biodiversity Data Centre [NBDC n.d. (b)]. Methods followed the standard approach for larval web surveys and habitat condition assessment surveys established under the All-island Marsh Fritillary Monitoring Scheme [NBDC n.d. (b)].

The presence of marsh fritillary larval webs was confirmed within the footprint of T10. This population occurs outside of any Special Area of Conservation (SAC) designated for the species and is located beyond the typical dispersal distance (*c.* 10 km) for colonisation (NIEA, 2017). Consequently, the presence of this population within the Site is likely to represent a moderate constraint to development. Avoidance of areas containing larval webs is strongly recommended. In addition, habitat enhancement measures may be implemented to compensate for the direct loss of suitable habitat. These could include the management or restoration of areas with suitable host plants and microhabitats to support the species in the longer term.

7.1.2. Large Heath

A recent record of the large heath butterfly (*Coenonympha tullia*) was recorded within 2 km of the Site (

). This species is likely present within the Site, given the presence of suitable supporting peatland habitats, namely Upland Blanket Bog (PB2) (Ragan *et al.* 2010). The large heath butterfly is a specialist species, as the larvae primarily feed on hare's-tail cottongrass (*Eriophorum vaginatum*) [NBDC n.d. (c)].

This species is listed on the European Red List of Butterflies as vulnerable. However, it is not currently afforded legal protection in the Republic of Ireland as it is not listed under the Wildlife Act, 1976 or the Wildlife (Amendment) Act, 2023. As such, no further survey work is required for this species at this time.

Table 8: Invertebrate species of conservation interest previously recorded in a 2 km radius of the Project since 2014 taken from NBDC (Grid Square G60A, G60F, M69D, M69E, M69I, M69J)

Key to likelihood of species presence: 1 = Confirmed; 2 = Likely; 3 = Possible; 4 = Unlikely; 5 = None

Key to Red List Status: CR = Critically Endangered; NT = Near Threatened; VU = Vulnerable; LC = Least Concern; DD = Data Deficient

Common Name	Scientific Name	Habitats Dir. (Annex II / IV)	Wildlife Order	Red List Status	Likelihood on Site	Likelihood within 2 km	Date of record	Grid Square	Dataset
Insect									
Marsh Fritillary	*Euphydryas aurinia*	Annex II	-	VU	1	1	28/06/2019	M69I	Butterflies of Ireland pre-2022
Marsh Fritillary	*Euphydryas aurinia*	Annex II	-	VU	1	1	10/06/2020	M69J	Butterflies of Ireland pre-2022
Large Heath	*Coenonympha tullia*	-	-	VU	2	2	12/06/2016	G60A	Butterflies of Ireland pre-2022

7.1.3. Amphibians & Reptiles

Potentially suitable habitats for common lizard (*Zootoca vivipara*) were identified within the Site, specifically within the (PB2) Upland blanket bog and (HH3) Wet heath habitats. Although specialist surveys were not conducted, the species was identified at T10 and T2 during marsh fritillary surveys, which require careful study of the vegetation.

Similarly, frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*) are likely to be present in peatland habitats across the Site. Pools and slow-moving drains within the Project area provide suitable spawning habitat for both of these species. No specialist surveys are planned for these species.

Common lizard and frog are both protected under the Irish Wildlife Act 1976.and the Irish Wildlife Amendment Act 2000, meaning it is illegal to intentionally injure, hunt or kill these animals.

7.2. Further survey requirements for other fauna

No further survey work is required for other taxa. However, a series of related tasks are yet to be completed for inclusion in the upcoming EIAR.

- Map areas surveyed during habitat condition assessment surveys.
- Tabulate results from habitat condition assessment surveys.
- Map location of Marsh Fritillary larval webs identified during surveys, highlight moderate-high risk areas and avoid during design.
- Design habitat enhancement measures to improve potential marsh fritillary habitat within the Site.

7.3. Design stage recommendations to protect other fauna

- Where possible and practicable mitigate the loss of ponds and pools.
- Avoid direct impact on breeding population of marsh fritillary at T10.
- Where possible and practicable mitigate the loss of potential marsh fritillary habitat elsewhere within the Site, as identified by occurrence of devil's bit scabious.
- Implement habitat enhancement measures marsh fritillary habitat identified within the Site, such as scrub control and the removal on non-native conifer saplings on wet heath.

8. HABITATS

8.1. Desk study

The Site is predominantly an upland site with the dominant habitat types being (PB2) Upland Blanket Bog, (PB4) Cutover bog, and (WD4) Conifer Plantation. A standard approach to habitat classification following Fossitt (2000) was carried out during walkover surveys (25th – 28th September 2023) to identify preliminary constraints for development. Identification of habitats within and around the footprint of the Project were prioritised during initial visits to the Site. The associated Blueline boundary (which delineates the 'Site') was provided during a follow-up habitat constraints exercise, which was issued to the client on 16 January 2024, and was selected to encompass a wider area of study to help identify further lands suitable for development. Satellite imagery was consulted as this provided the primary source for habitat identification during the desk study. Both ArcGIS Pro and Google Earth Pro were consulted in order to access the most up to date images available for the Site. On ArcGIS Pro, the base map World Imagery was used and the images for the Site are dated 02 April 2021. The Google Earth Pro images are more recent and are dated 06 September 2023. These images provided valuable information on active and historic turf cutting.

Consideration was given to classification of the habitat as (PB1) Raised Bog due to the high proportion of raised bogs in the surrounding landscape (**Appendix I**). However, these other sites tend to be at much lower elevations (<100 m), which is typical for raised bogs. The elevation of the Site varies from 145 m at T10 to 177 m at T3, which is more typical of (PB2) Upland Blanket Bogs (Fossitt 2000, p. 46). The closet peatland to the Site which is mapped by the National Parks and Wildlife Service (NPWS) is blanket bog located 1.5 km to the east of T3 with an elevation between 140-150 m, i.e. within the elevation range of the Site. This unnamed bog is classified as Annex I 7130 Blanket bog. Consideration was also given to classification of the habitat as (PB1) Raised Bog because of the considerable depth of peat (0.3-5.5 m) noted at some locations within the Site. Acknowledgement of this variation in peat depth can be found in Fossitt (2000), which states for (PB2) Upland Blanket Bogs: "*peat depths vary and normally fall within the range of 1-2m but can be much deeper in pockets*" (Fossitt 2000, p. 46). Indeed, peatland systems which may have begun as raised bogs can merge into "*a general expanse of blanket bog, losing their distinctive marginal features*" (European Commission 2013, p. 84). This is likely the case here with the flatter expanses of bog have accumulated deeper peat and formed an intermediate type between blanket bog and raised bog with characteristics of both presenting themselves (Lindsay 1995, pp. 53).

The Irish Vegetation Classification (IVC) was used to identify vegetative communities [NBDC n.d. (d)]. Detailed botanical data was recorded across 52 quadrats within the Site to allow classification of vegetative communities according to the IVC. Surveys were conducted over 8 days between 29th July 2024 and 12th September 2024 (**Table**). Standard monitoring criteria for upland habitats were applied at each quadrat location to provide a conservation assessment of Annex I habitats identified across the Site, as described by Perrin *et al*. (2014). This assessment methodology allows two failures per monitoring stop for Annex I 7130* Blanket Bog (active) and three failures for Annex I 4010 North Atlantic Wet Heath (Perrin *et al*. 2010, p. 28). These results will determine habitat affinity to Annex I as well as the geographic hierarchy of importance of habitats necessary for the impact assessment (international, national, regional etc.) (NRA 2009, p. 15).

Ongoing threats to the integrity of the habitat include; turf cutting, drainage, forestry, and scrub encroachment. These threats adversely impact the integrity of the peatland habitats and the "*future prospects*" for Annex I habitats within the Site (Perrin *et al.* 2014, p. 59).

Table 9: Dates of botanical field surveys carried out for the Project

Type of fieldwork	Surveyor Initials	Date
Phase 1 Fieldwork	MC, BB	11/07/2023 06/09/2023 12/09/2023 19/09/2023 25/09/2023 28/09/2023
Detailed Botanical Fieldwork (Quadrat data & Annex 1 assessment)	MC	29/07/2024 30/07/2024 31/07/2024 01/08/2024 28/08/2024 10/09/2024 11/09/2024 12/09/2024

8.2. Habitat Constraints Categories

Four constraints level were assigned to the habitats located within the Site – high (red), high-moderate (orange), moderate-low (yellow), and low (green) to help inform avoidance and design stage mitigation. **Figure 12** displays the combined results of the habitat constraints categories assigned to the Site in 2023 following Phase 1 surveys and 2024 following desk top study of an extended area (delineated by the Blueline boundary) for the purposes of identifying any alternative lands for development.

8.2.1. High (red) constraint level

The following habitats pose a high constraint to development as they are considered to be of *National importance*:

- (PB2) Upland blanket bog with affinity to Annex I habitat type 7130* Blanket bog (active) in favourable condition.

8.2.2. Moderate-high (orange) constraint level

The following habitats pose a moderate-high constraint to development as they are considered to be of *County importance*, namely:

- (PB2) Upland blanket bog (PB2) with affinity to Annex I habitat type 7130* Blanket bog (active) in unfavourable condition.

- Cutover bog (PB4) – active peat - with affinity to Annex I habitat type 7130* Blanket bog (active) in unfavourable condition.

8.2.3. Moderate-low (yellow) constraint

These habitats include pose a moderate-low constraint to development as they are "semi-natural habitat types with high biodiversity" and/or habitats that are "essential in maintaining links and ecological corridors" and as such are considered of *Local (Higher) importance* (NRA 2009, p. 17). There is only one habitat type which constitutes the moderate-low category in the current dataset, namely:

- Cutover bog (PB4) – inactive peat – with affinity to Annex I habitat type 7130 Blanket bog (inactive) in unfavourable condition.
- Scrub (WS1).

8.2.4. Low (green) constraint

These habitats pose a low constraint to development as they are considered of *Local (Lower) importance* and are generally suitable for development. Habitats in the low constraint category include:

- Improved grassland (GA1),
- Dry-humid acid grassland (GS3),
- Wet grassland (GS4),
- Conifer plantation (WD4)

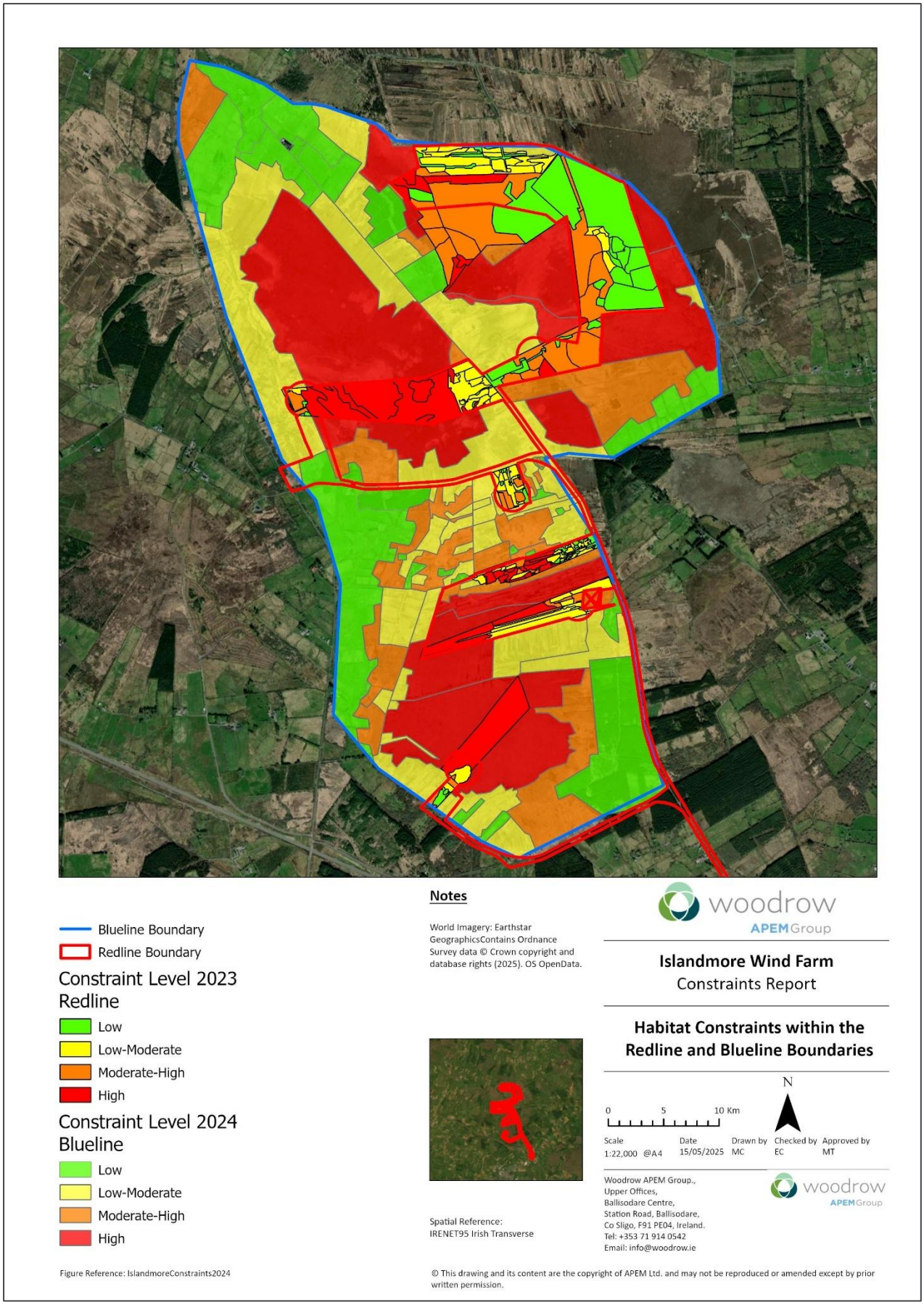


Figure 12: Habitat constraint categories assigned within the Site.

8.3. Non-native invasive species

The National Biodiversity Data Centre (NBDC) Biodiversity Maps data base was interrogated to identify records of non-native invasive species within 2 km of the Site. A report was generated by drawing a polygon around the Site encompassing several grid squares NBDC (Grid Square G60A, G60F, M69D, M69E, M69I, M69J). Historic records (pre-2014) were included in the tabulated results owing to the general persistence of invasive species within the landscape (**Table 9**). In addition, the species Red-osier dogwood (*Cornus sericea*) was included in the results although it is not listed as an invasive species on the NBDC database, however it is included in Invasive Species Ireland's Amber List (Invasive Species Ireland n.d.). The Amber List refers to a classification of potentially invasive species that have been assessed as medium risk to native species and habitats, including those designated as Special Areas of Conservation (SACs) (Invasive Species Ireland n.d.). As such, it is of relevance to the Project as transmission of Red-osier dogwood has potential to impact the integrity of the Site.

During botanical survey work, invasive species were identified and target noted across the Site. lists the non-native invasive species which were identified and their locations (**Table 10)**. These results include *Rhododendron ponticum*, which is listed on the Third Schedule of the European Communities ('Birds and Natural Habitats') Regulations 2011 (S.I. No. 477/2011 (as amended). Regulations 49 and 50 prohibit the introduction and dispersal of the invasive species of flora and fauna that are included on the Third Schedule list appended to these regulations.

Several cherry laurel shrubs (*Prunus laurocerasus*) were also identified across the Site. Although this species is not listed within the Third Schedule, it is considered a 'High Impact' invasive species (NBDC 2024).

A stand of montbretia (*Crocosmia x crocosmiiflora*) was identified within the Site and this species is listed on the Invasive Species Ireland's Amber List.

Table 9: Non-native invasive species previously recorded in a 2 km radius of the Project taken from NBDC (Grid Square G60A, G60F, M69D, M69E, M69I, M69J)

Key to likelihood of species presence: 1 = Confirmed; 2 = Likely; 3 = Possible; 4 = Unlikely; 5 = None

Key to Red List Status: CR = Critically Endangered; NT = Near Threatened; VU = Vulnerable; LC = Least Concern; DD = Data Deficient

Species	Scientific Name	Status	Likelihood on Site	Likelihood within 2 km	Most recent record	Grid Square
Invasive Species						
Montbretia	*Crocosmia x crocosmiiflora*	Invasiveness: Low impact	1	1	16/09/2023	M69J
Rhododendron	*Rhododendron ponticum*	NBDC Status: Invasive Invasiveness: High Impact Legal Status: Third Schedule Regulation S.I. 477 (Ireland)	1	1	16/09/2023	M69J
Red-osier Dogwood	*Cornus sericea*	N/A	3	1	02/08/2013	M69D
Cherry Laurel	*Prunus laurocerasus*	Invasiveness: High Impact	1	1	31/12/1999	M69J
Japanese Knotweed	*Fallopia japonica*	Invasiveness: High Impact Legal Status: Third Schedule Regulation S.I. 477 (Ireland)	4	1	31/12/1999	M69J
Sycamore	*Acer pseudoplatanus*	Invasiveness: Medium Impact	2	1	02/08/2013	M69I
Black Currant	*Ribes nigrum*	Invasiveness: Medium Impact	3	1	31/12/1999	M69J

Table 10: Non-native invasive species identified within the Site during fieldwork 2023-2024

Common Name	Scientific Name	Designation	Location (ITM)	Date of Record	Photograph
Cherry laurel	*Prunus laurocerasus*	NBDC: High Impact Invasive	E 561980 N 798707 E 561982 N 798668 E 561753 N 797354 E 561746 N 797342	12 Sep. 2024	
Montbretia	*Crocosmia x crocosmiiflora*	NBDC: Low impact Invasive Invasive Species Ireland: Amber List	E 561223 N 798960	11 Jul. 2024	
Rhododendron	*Rhododendron ponticum*	NBDC: High Impact Invasive Legal Status: Third Schedule Regulation S.I. 477 (Ireland)	E 561526 N 799427	25 Sep. 2023	

8.4. Further Survey requirements for habitats

Additional habitat survey work is required inclusion in the upcoming EIAR, namely:

- An invasive species survey is to be carried out along the grid route connection and turbine delivery route.

Additionally, the following tasks related to habitat surveys must be completed for inclusion in the upcoming EIAR, namely:

- Finalise habitat map for the Site, including mapping of linear features. This will be required to assess habitat loss.
- Process data collected during detailed habitat assessments, including baseline quadrats undertaken along proposed construction corridor to inform the assessment of direct loss.
- Process Annex I assessment data taken at quadrat locations to inform impact assessment.
- Map the distribution of invasive species along the grid connection route and turbine delivery route.
- Run a Digital Terrain Model to assess the hydrology of the Site and incorporate findings from Peat Stability and Hydrology reports to inform the HMP.

8.5. Design stage recommendations to protect habitats

- Avoidance of Annex I 7130* Blanket bog (active) in favourable condition
- Avoidance of Annex I 4010 North Atlantic Wet Heath in favourable condition
- Mitigating impacts on peatland habitats which do not meet the monitoring criteria for Annex I habitat in favourable condition but are nevertheless of conservation importance
- Identify plots within the lands-made-available, where compensatory habitat measures can be implemented to offset any unavoidable habitat loss or indirect effects.
- Avoid areas supporting non-native invasive species or if unavoidable, implement measures to limit the spreading of these species.

9. CONCLUSION

The developer must take into account several Important Ecological Features (IEFs) upon which the Project will have a likely significant effect, unless the effects can be avoided or mitigated during the design stage.

The IEFs which pose a high constraint to development, namely:

- Hen harrier: The local hen harrier population is using the Site for foraging and numbers exceed 1% of the Irish population. A winter roost is located within 2 km of the Site with multiple birds recorded using the roost.
- Annex I habitats: Project design must avoid sensitive habitats, namely:
    - Annex I habitat type 7130* Blanket Bog (active),
- Other Taxa: The avoidance of a breeding population of marsh fritillary and supporting habitat at T10.

Mitigation measures have been identified to avoid significant negative effects on other IEFs, which pose a moderate constraint to development, namely:

- Aquatics: In the current project design the access track between T1 and T2 is <15 m from a watercourse, Owengarve_010 (IE_WE_34O030050), identified by the WFD database. A 50 m Set back distances from all watercourses is recommended along with industry standard mitigation measures to protect water quality (silt traps, settlement ponds, bunded storage areas) with specific reference to the hydrologically connected Natura 2000 sites and their QI/SCI species, namely River Moy SAC and Lough Gara SPA. A construction management plan for will be required to demonstrate that runoff during wind farm construction will not result in deterioration of water quality.
- Birds: Disturbance to breeding birds can be limited by avoiding commencement of construction works during the breeding season and ensuring that the works corridor has been rendered unsuitable for nesting birds by clearing vegetation prior to the breeding season. The Project build should move forward in a phased bases with works on T6 (within 2 km of the hen harrier winter roost) taking place in summer months and works on T4-T10 to take place during the winter months to avoid the snipe breeding season.
- Mammals: Consider additional terrestrial mammal surveys including camera trap / bait surveys and DNA analysis of droppings to confirm their presence / absence of pine martin in the forestry in the immediate vicinity of T3 and T4. Appropriate exclusion buffer zones around the resting places of protected mammals occurring in the immediate vicinity (c. 150 m) of the Project will need to be implemented during construction to avoid disturbance to these species.
- Bats: Recommended 101 m stand-off distances will need to be implemented between the conifer plantation and T2 and T3, to mitigate bat interactions with turbines. The loss of linear features used as foraging routes by local bat populations will need to be limited and appropriately compensated.
- Annex I habitats: Mitigate the loss of Annex I habitats in unfavourable condition. Compensate for effects through habitat enhancement measures for peatland habitats identified elsewhere within the Site.
- Invasive species: Control measures during construction will need to be implemented to avoid the spread of non-native invasive species, including rhododendron (*Rhododendron ponticum*) and cherry-laurel (*Prunus laurocerasus*).

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APPENDIX I: SCREENING MATRIX A & B

Table 11: Screening Matrix A

Potential significant effects matrix for Natura 2000 sites with the potential to be significantly affected by the Project

Explanation of terms used in Significance of Effect Matrix:

Likely Significant Effect - Where a plan or project is likely to undermine any of the Natura 2000 Site's conservation objectives;

Possible Significant Effect - Where a plan or project has an indicated potential to undermine any of the Natura 2000 Site's conservation objectives, but where doubt exists about the risk of a significant effect in the current context. Nevertheless, where doubt exists about the risk of a significant effect, use of the precautionary principle requires this effect to be considered appropriately within the Article 6 assessment.

Sites highlighted in grey have the potential to be affected by the Project.

Site name and code	Summary of Qualifying Interest (QI)	Closest distance to the Site	Likely Significant Effects?
Special Areas of Conservation (SAC)			
Bellanagare Bog SAC [000592]	Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150].	The SAC is located c. 10.2km to the south-east of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project, given the distance between the Site. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Bricklieve Mountains and Keishcorran SAC [001656]	Turloughs [3180]. Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]. Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) [6510].	The SAC is located 13.5km north-east of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site. Marsh fritillary can colonise suitable habitat at distance of 3-10km, according to best practice guidelines (DAERA, 2017).

Site name and code	Summary of Qualifying Interest (QI)	Closest distance to the Site	Likely Significant Effects?
	Calcareous and calcschist screes of the montane to alpine levels (Thlaspietea rotundifolii) [8120]. Marsh Fritillary (Euphydryas aurinia) [1065]. White-clawed Crayfish (Austropotamobius pallipes) [1092].		
Callow Bog SAC [000595]	Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150].	The SAC is located 1.8km south-east of the Site.	Yes. The SAC is 3.6 km downstream of the SAC with hydrological connectivity via the Lung River. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on hydrologically connected QI habitats and species.
Carrowbehy/Caher Bog SAC [000597]	Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150].	The SAC is located 13.6km to the south-east of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Cloonakillina Lough SAC [001899]	Transition mires and quaking bogs [7140].	The SAC is located 5.6km to the north-west of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.

Site name and code	Summary of Qualifying Interest (QI)	Closest distance to the Site	Likely Significant Effects?
Cloonchambers Bog [000600]	Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150].	The SAC is located 14.9km to the south of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Cloonshanville Bog SAC [000614]	Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150]. Bog woodland [91D0].	The SAC is located 11.3km to the north-west of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Derrinea Bog SAC [000604]	Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150].	The SAC is located 10.9km to the south-west of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Doocastle Turlough SAC [000492]	Turloughs [3180].	The SAC is located 8.3km to the north-west of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Drumalough Bog SAC [002338]	Active raised bogs [7110].	The SAC is located 12.3km to the	No. There is no potential for significant effects to occur within this European site as a result of the Project.

Site name and code	Summary of Qualifying Interest (QI)	Closest distance to the Site	Likely Significant Effects?
	Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150].	south-west of the Site.	There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Errit Lough SAC [000607]	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140].	The Site is located 13.9km to the south-west of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Flughany Bog SAC [00497]	Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150].	The Site is located 5.1km to the north of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
River Moy SAC [002298]	Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510]. Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150]. Alkaline fens [7230]. Old sessile oak woods with ilex and Blechnum in the British Isles [91A0].	The SAC is located 3.3km north-west of the Site.	Yes. The SAC is 4.9km downstream of the Site with hydrological connectivity via the Owengarve. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on hydrologically connected QI habitats and species.

Site name and code	Summary of Qualifying Interest (QI)	Closest distance to the Site	Likely Significant Effects?
	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]. White clawed Crayfish (*Austropotamobius pallipes*) [1092]. Sea Lamprey (*Petromyzon marinus*) [1095]. Brook Lamprey (*Lampetra planeri*) [1096]. Salmon (*Salmo salar*) [1106]. Otter (*Lutra lutra*) [1355].		
Templehouse and Cloonacleigha Loughs SAC [0002354]	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]. Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260].	The SAC is located 13.4km to the north of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Tullaghanrock Bog SAC [0002354]	Active raised bogs [7110]. Degraded raised bogs still capable of natural regeneration [7120]. Depressions on peat substrates of the Rhynchosporion [7150].	The SAC is located 0.7km to the south-east of the Site.	Yes. The SAC is 2.3 km downstream of the Site. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on hydrologically connected QI habitats and species.
Turloughmore (Sligo) SAC [000637]	Turloughs [3180].	The SAC is located 14.1km north-west of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.

Site name and code	Summary of Qualifying Interest (QI)	Closest distance to the Site	Likely Significant Effects?
Urlar Lakes SAC [001571]	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140].	The SAC is located 12.9km to the south-west of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. There is no direct hydrological connectivity between the SAC and the Site. The SAC does not share a groundwater body (GWB) connection with the Site.
Special Protection Areas (SPA)			
Bellanagare Bog SPA [004105]	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395].	The SPA is located 10.4km to the south-east of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. Greenland white-fronted goose has a core range of 5-8 km from their night roosts (SNH, 2016).
Lough Gara SPA [004048]	Whooper Swan (*Cygnus cygnus*) [A038]. Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395].	The SAC is located 3.2km to the south-east of the Site.	No. There is no potential for significant effects to occur within this European site as a result of the Project. Whooper swan has a foraging range of less than 5km from night roost. Greenland white-fronted goose has a core range of 5-8 km from their night roosts (SNH, 2016). The SPA is 9.5km downstream of the Site with hydrological connectivity via tributaries of the Lung River.

Table 12: Screening Matrix B

List of NHAs and pNHAs within the Zone of Influence of the project

Sites highlighted in grey have the potential to be affected by the project.

Site name and code	Conservation Interest	Closest distance to the Site	Likely significant effects?
Natural Heritage Areas (NHAs)			
Bella Bridge Bog [000591]	Peatlands.	The NHA is located 11km south-west of the Site.	Yes. The NHA is located 11.7km downstream of the Site, with hydrological connectivity via the Lung and Boyle rivers which discharge into Lough Gara, after which the Boyle River continues downstream to the Breedoge_10 (IE_SH_26B090300) before reaching the NHA. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on the NHA.
Cornaveagh Bog [000603]	Peatlands.	The NHA is located 11.1km south-west of the Site.	Yes. The NHA is located 12.8km downstream of the Site, with hydrological connectivity via the Lung and Boyle rivers which discharge into Lough Gara, after which the Boyle River continues downstream to the NHA. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on the NHA.
Tullaghan Bog [001652]	Peatlands.	The NHA is located 13.6km west of the Site.	Yes. The NHA is located 14.4km downstream of the Site, with hydrological connectivity via the Lung and Boyle rivers which discharge into Lough Gara, after which the Boyle River continues downstream to the NHA.

Site name and code	Conservation Interest	Closest distance to the Site	Likely significant effects?
			This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on the NHA.
Proposed Natural Heritage Areas (pNHAs)			
Ardagh Bog [001222]	No synopsis available.	The pNHA is located 12.8km south-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Bellanagare Bog [000592]	See SPA/SAC.	The pNHA is located 10.2km south-east of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Bricklieve Mountains & Keishcorran [001656]	See SAC.	The pNHA is located 13.6km north-east of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Carrowbehy/Caher Bog [000597]	See SAC.	The pNHA is located 13.6km south-east of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.

Site name and code	Conservation Interest	Closest distance to the Site	Likely significant effects?
Cloonakillina Lough [001899]	See SAC.	The pNHA is located 5.6km north-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Cloonchambers Bog [000600]	See SAC.	The SAC is located 14.9km south of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Cloonshanville Bog [000614]	See SAC.	The SAC is located 11.3km north-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Derrinea Bog [000604]	See SAC.	The SAC is located 10.9km south-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Derrynabrock Bog [000457]	No synopsis available.	The pNHA is located 5.1km north-west of the Site.	Yes. The pNHA is located 6km downstream of the Site, with hydrological connectivity via the Owengarve. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on the pNHA. It is likely the pNHA is of conservation interest for its peatland habitat.

Site name and code	Conservation Interest	Closest distance to the Site	Likely significant effects?
Doocastle Turlough [000492]	See SAC.	The pNHA is located 8.2km north-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Drumalough Bog [001632]	No synopsis available.	The pNHA is located 12.3km south of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Errit Lough [000607]	See SAC.	The pNHA is located 13.9km south-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Feenagh and Bunnamuck Loughs [001905]	Lake and fen with waterfowl, including great crested grebe (*Podiceps cristatus)* and mute swan (*Cygnus olor)*.	The pNHA is located 12.2km north-west of the Site.	Yes. Potential collision risk and displacement of waterbird species associated with the pNHA.
Flughany Bog [000497]	See SAC.	The pNHA is *c.* 5.1km due north of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Gowlaun Bog [000502]	No synopsis available.	The pNHA is *c.* 5.1km north-west of the Site.	Yes. The pNHA is located 6.6km downstream of the Site, with hydrological connectivity via the Owengarve. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an

Site name and code	Conservation Interest	Closest distance to the Site	Likely significant effects?
			increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on the pNHA. It is likely the pNHA is of conservation interest for its peatland habitat.
Kilgarriff Bog [000510]	No synopsis available.	The pNHA is *c.* 4.5km north-west of the Site.	Yes. The pNHA is located 5.2km downstream of the Site, with hydrological connectivity via the Owengarve. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on the pNHA. It is likely the pNHA is of conservation interest for its peatland habitat.
Lough Gara [000587]	See SAC/SPA.	The pNHA is located 1.8km to the south-east of the Site.	Yes. Potential collision risk and displacement of bird species associated with the pNHA.
Lough Glinn [001644]	Meso-eutrophic lake with waterfowl including, nationally important numbers of mute swan (108) (*Cygnus olor)*, whooper swan (128) (*Cygnus cygnus)* and tufted duck (200) (*Aythya fuligula).* and regionally/locally important numbers of Wigeon (150), Teal (110), Mallard (69), Pochard (200), Goldeneye (15), Coot (62) and Lapwing (100).	The pNHA is located *c.* 8.9km to the south of the Site.	Yes. Potential collision risk and displacement of waterbird species associated with the pNHA. This is considered on a precautionary basis as survey records seem to be outdated (4 counts, 1 season 1984/85-86/87). Whooper swan (*Cygnus cygnus)* has a core range of <5km from their night roost.

Site name and code	Conservation Interest	Closest distance to the Site	Likely significant effects?
Lough Gower [000523]	A lake of low nutrient status, which shows no sign of eutrophication, with semi-natural reed-bed/swamp vegetation.	The pNHA is located 13.1 km south-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Moylough Turlough [001677]	No synopsis available.	The pNHA is located 10.3km to the north-west of the Site.	Yes. Potential collision risk and displacement of waterbird species associated with the pNHA. This is considered on a precautionary basis. It is likely the pNHA is of conservation interest for its turlough habitat which may support waterbird species.
Quarryfield West Turlough [001901]	Turlough with rich fen of regional importance with visiting whooper swan (*Cygnus cygnus).*	The pNHA is located 9.6km north-west of the Site.	Yes. Potential collision risk and displacement of waterbird species associated with the pNHA. This is considered on a precautionary basis. Whooper swan (*Cygnus cygnus)* has a core range of <5km from their night roost.
Tawnaghbeg Bog [000547]	No synopsis available.	The pNHA is located 4.1km north-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Templehouse and Cloonacleigha Loughs [000636]	See SAC.	The pNHA is located 13.5 km due north of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.

Site name and code	Conservation Interest	Closest distance to the Site	Likely significant effects?
Tullaghanrock Bog [002013]	See SAC.	The pNHA is located 0.7km to the south-east of the Site.	Yes. The pNHA is located 1.7km downstream of the Site, with hydrological connectivity via the Lung. This provides a pathway for water quality effects to arise during the construction or operational phase of the Project through an increase in suspended sediments and/or accidental pollution spill and/or the spread of invasive species, which has the potential to result in LSEs on the pNHA. It is likely the pNHA is of conservation interest for its peatland habitat.
Turloughmore (Sligo) [000637]	See SAC.	The pNHA is located 14.2km north-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.
Urlaur Lakes [001571]	See SAC.	The pNHA is located 12.9km south-west of the Site.	No. There is no potential for significant effects to occur within this pNHA as a result of the Project. There is no direct hydrological connectivity between the pNHA and the Site.

APPENDIX II: FIELDWORK SURVEY DATES

Table 13: Fieldwork survey dates for aquatics, bats, habitats, and other taxa.

Type of Fieldwork	Surveyor Initials	Date
Aquatic Surveys	DC, ROC	25/09/24, 26/09/24, 10/10/24, 11/10/24
Bat Surveys	NM [STATICS (Ecol)]	05/05/2020, 21/07/2020, 14/09/2020
	NM [STATICS (Ecol)]	06/05/2020 to 19/05/2020, 21/07/2020 to 05/08/2020, 14/09/2020 to 29/09/2020, 04/08/2023, 30/04/2024
	KO'R, DL , FH [STATICS (WSS)]	26/04/2023 to 11/05/2023, 27/05/ 2023 to 14/07/2023, 30/08/2023 to 13/09/2023
Phase 1 Fieldwork	MC, BB	11/07/2023, 06/09/2023, 12/09/2023, 19/09/2023, 25/09/2023, 28/09/2023
Phase 2 Botanical Fieldwork	MC	29/07/2024, 30/07/2024, 31/07/2024, 01/08/2024, 28/08/2024, 10/09/2024, 11/09/2024, 12/09/2024
Marsh Fritillary Surveys	MC	27/08/2024, 19/09/2024

ANNEX 3 – LAND, SOIL & WATER SCOPING REPORT

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Prepared for:
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Prepared by:
HYDRO-ENVIRONMENTAL SERVICES

REPORT NO.: P1662-1
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1. INTRODUCTION

1.1 OVERVIEW

Hydro-Environmental Services (HES) were commissioned by Islandmore Wind Farm Ltd to undertake a Land Soils Geology (LSG) and Water Scoping Assessment for the proposed Islandmore Wind Farm and grid connection.

The Islandmore Wind Farm ('project') site is located in north County Roscommon, c. 2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo). A site location map is shown as **Figure A** below.

This scoping assessment report, which is largely desk-top based, is also informed by an initial site visit/meeting carried out by David Broderick of HES on 6th September 2023.

The purpose of this scoping assessment is to identify potential receptors in the local (and downstream) geological, hydrological and hydrogeological environments that could potentially be affected by the project works. A brief overview of the potential receptors is described along with their importance / sensitivity, likelihood of impact and if mitigation is likely to be required.

The main objectives of the scoping assessment are:

- To complete a desk study review of available information relating to the baseline geological, hydrological and hydrogeological regime in the area of the project;
- To identify any geological, hydrological and hydrogeological receptors/constraints that may affect the proposed wind farm layout or overall feasibility;
- To identify potential downstream receptors such as designated sites/habitats, geological heritage sites and drinking water supplies;
- To Identify receptors scoped in for further assessment in the EIAR; and,
- To determine likelihood of impact and if mitigation is likely to be required.

1.2 DEVELOPMENT DESCRIPTION

The project will comprise 10 no. wind turbines; turbine foundations; turbine hardstandings; internal site access tracks; internal wind farm underground cabling; site entrances; borrow pit, 2 no. temporary construction compounds, on-site 110kV electricity substation, underground grid connection infrastructure; and all associated site development, access and reinstatement works.

The initial proposed layout was a 12 no. turbine layout (September 2023). The layout was reduced to a 9 no. turbine layout in June 2024 due to site constraints such as intact bog (refer to the original version of this scoping report issued on 17th November 2023). There 1 no. preferred grid connection route.

Design Freeze 1 layout was reached in September 2024 and comprises 10 no. turbines. An indicative potential borrow pit location (south of proposed turbine location T5) was also introduced in September 2024.

1.3 GUIDANCE

The land/soils and water scoping assessments were carried out using the following guidance documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2009): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Farm Development Guidelines for Planning Authorities (2006);
- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh; and,
- COFORD (2004): Forest Road Manual – Guidelines for the Design, Construction and Management of Forest Roads.

1.4 METHODOLOGY

1.4.1 Desk Study

A desk study of the project site and underground cable (UGC) route were completed using the following data sources:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- EPA/Water Framework Directive Map Viewer (www.catchments.ie);
- Bedrock Geology 1:100,000 Scale Map Series;
- Geological Survey of Ireland – Groundwater Bodies Initial Characterisation Reports - Draft (2004);
- OPW Past Flood Event Mapping (www.flooding.ie);
- Environmental Protection Agency – Catchments Map Viewer (www.catchments.ie);
- CFRAM/NIFM Flood Risk Assessment maps (www.floodinfo.ie); and,
- OSI aerial photography.

1.4.2 Site Visit

An initial wind farm site visit was carried out by HES on 6th September 2023 in the company of Islandmore Wind Farm Ltd (Adrain Garvey), Galetech Energy Services (Bláithín Rafferty and Conor Foy) as well as other members of the project team (Ian Higgins of Fehily Timoney and Company, and Will Woodrow and Mike Trewby of Woodrow Sustainable Solutions Ltd).

A walkover of the project site and field discussions were carried out at turbine locations T5, T6 and T10 (Design Freeze 1 layout turbine numbering). Peat depths were recorded by HES and Fehily Timoney and Company (FTC).

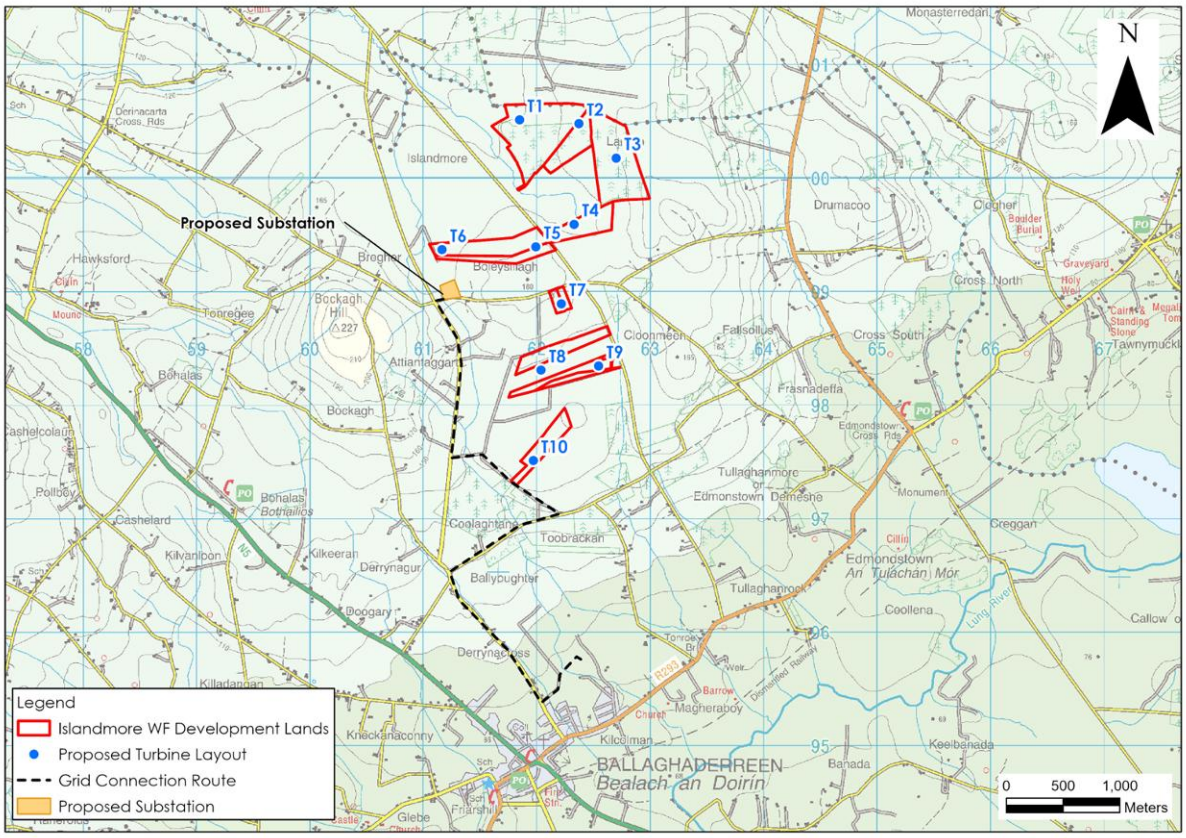


Figure A: Site Location Map

1.4.3 Receptor Importance/ Sensitivity Criteria

Using the National Roads Authority (2009) guidance, an estimation of the importance of the soils/geology, hydrological and hydrogeological environments within the study area are quantified, using the criteria set out in **Table A**, **Table B** and **Table C**.

Table A: Estimation of Importance of Soil and Geology Criteria (NRA, 2009)

Importance	Criteria	Typical Example
Very High	• Attribute has a high quality, significance or value on a regional or national scale. • Degree or extent of soil contamination is significant on a national or regional scale. • Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	• Geological feature rare on a regional or national scale (NHA/SAC). • Large existing quarry or pit. • Proven economically extractable mineral resource.
High	• Attribute has a high quality, significance or value on a local scale. • Degree or extent of soil contamination is significant on a local scale. • Volume of peat and/or soft organic soil underlying site is significant on a local scale.	• Contaminated soil on site with previous heavy industrial usage. • Large recent landfill site for mixed wastes. • Geological feature of high value on a local scale (County Geological Site). • Well drained and/or high fertility soils. • Moderately sized existing quarry or pit. • Marginally economic extractable mineral resource.
Medium	• Attribute has a medium quality, significance or value on a local scale. • Degree or extent of soil contamination is moderate on a local scale. • Volume of peat and/or soft organic soil underlying site is moderate on a local scale.	• Contaminated soil on site with previous light industrial usage. • Small recent landfill site for mixed Wastes. • Moderately drained and/or moderate fertility soils. • Small existing quarry or pit. • Sub-economic extractable mineral resource.
Low	• Attribute has a low quality, significance or value on a local scale. • Degree or extent of soil contamination is minor on a local scale. • Volume of peat and/or soft organic soil underlying site is small on a local scale.	• Large historical and/or recent site for construction and demolition wastes. • Small historical and/or recent landfill site for construction and demolition wastes. • Poorly drained and/or low fertility soils. • Uneconomically extractable mineral resource.

Table B: Estimation of Importance of Hydrology Criteria (NRA, 2009)

Importance	Criteria	Typical Example
Extremely High	• Attribute has a high quality or value on an international scale.	• River, wetland or surface water body ecosystem protected by EU legislation, e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid Waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	• Attribute has a high quality or value on a regional or national scale.	• River, wetland or surface water body ecosystem protected by national legislation – NHA status. • Regionally important potable water source supplying >2500 homes. • Quality Class A (Biotic Index Q4). • Flood plain protecting more than 50 residential or commercial properties from flooding. • Nationally important amenity site for wide range of leisure activities.
High	• Attribute quality or value on a local scale.	• Salmon fishery Locally important potable water source supplying >1000 homes. • Quality Class B (Biotic Index Q3-4). • Flood plain protecting between 5 and 50 residential or commercial properties from flooding. • Locally important amenity site for wide range of leisure activities.
Medium	• Attribute has a medium quality or value on a local scale.	• Coarse fishery. • Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3). • Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	• Attribute has a low quality or value on a local scale.	• Locally important amenity site for small range of leisure activities. • Local potable water source supplying <50 homes. • Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1residential or commercial property from flooding. • Amenity site used by small numbers of local people.

Table C: Estimation of Importance of Hydrogeology Criteria (NRA, 2009)

Importance	Criteria	Typical Example
Extremely High	• Attribute has a high quality or value on an international scale.	• Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation, e.g. SAC or SPA status.
Very High	• Attribute has a high quality or value on a regional or national scale.	• Regionally Important Aquifer with multiple wellfields. • Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status. • Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	• Attribute quality or value on a local scale.	• Regionally Important Aquifer Groundwater • Provides large proportion of baseflow to local rivers. • Locally important potable water source supplying >1000 homes. • Outer source protection area for regionally. • important water source. • Inner source protection area for locally important water source.
Medium	• Attribute has a medium quality or value on a local scale.	• Locally Important Aquifer • Potable water source supplying >50 homes. • Outer source protection area for locally important water source.
Low	• Attribute has a low quality or value on a local scale.	• Poor Bedrock Aquifer Potable water source supplying <50 homes.

2. EXISTING ENVIRONMENT

2.1 SITE DESCRIPTION & TOPOGRAPHY

The proposed wind farm site is located in north County Roscommon, c. 2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo).

Land within the proposed wind farm site is predominately a mixture of cutover/cutaway and intact bogs. The GSI have the bogs mapped as cutover raised bogs but some of the bog areas, particularly the northern portion of the project site, have a more blanket bog appearance. The bog, on the southern portion of the project site, has a raised bog appearance. There are also pockets of some forest and semi-natural areas on the northeast portion of the project site.

The wind farm site is set in an upland area where the topography of the surrounding lands is generally undulating and sloping. The middle of the site is centred on a hill (180m OD), which slopes away to 160m OD to the east and west, 140m OD to the south and 150m to the north.

The proposed UGC connects to the Tonroe 110kV Substation which is situated 1.6km to the south of the wind farm site. The length of UGC is approximately 5.7km.

2.2 SUPERFICIAL GEOLOGY

Soils within the proposed wind farm site are mapped by the EPA (www.epa.ie) as mainly cut peat. The surrounding areas are mapped as having poorly drained acidic mineral soils (AminPD).

Subsoils within the project site are mapped by the GSI (www.gsi.ie) as mainly consisting of cutover raised bog. Areas of sandstone till derived chiefly from Lower Palaeozoic rocks (TLPDSs) are generally mapped in the lands to the south of the site, whilst till derived from Devonian and Carboniferous sandstones (TDCSs) are mapped north of the site. There are fragments of bedrock outcrop (RckCa) dotted around the southwestern section of the site also.

All 10 no. proposed turbine locations as well as the proposed substation location and potential borrow pit area are mapped on cutover raised bog.

With regards to mapped soils along the UGC route, it predominantly overlies cut peat in the northern and central sections and more poorly drained acidic mineral soils (AminPD) along the southern section.

A review of aerial photography indicates there are large areas of intact bog, particularly on the south of the wind farm site.

Much like the subsoils described for the wind farm site, subsoils along the UGC are generally mapped by the GSI (www.gsi.ie) as mainly consisting of cutover raised bog along the north and central parts with areas of sandstone till derived chiefly from Lower Palaeozoic rocks (TLPDSs) along the south nearer to the existing Tonroe 110kV substation. Areas of bedrock outcrop (RckCa) are occasionally mapped along UGC.

As described above, the UGC is predominately along public roads and therefore soils and subsoils types are unlikely to significantly influence feasibility.

Based on criteria shown in the **Table A** above, the local soils and subsoils have a Low to High Importance, with the latter representing intact bog and the former cutover bog.

A GSI subsoil geology map is shown as **Figure B** below.

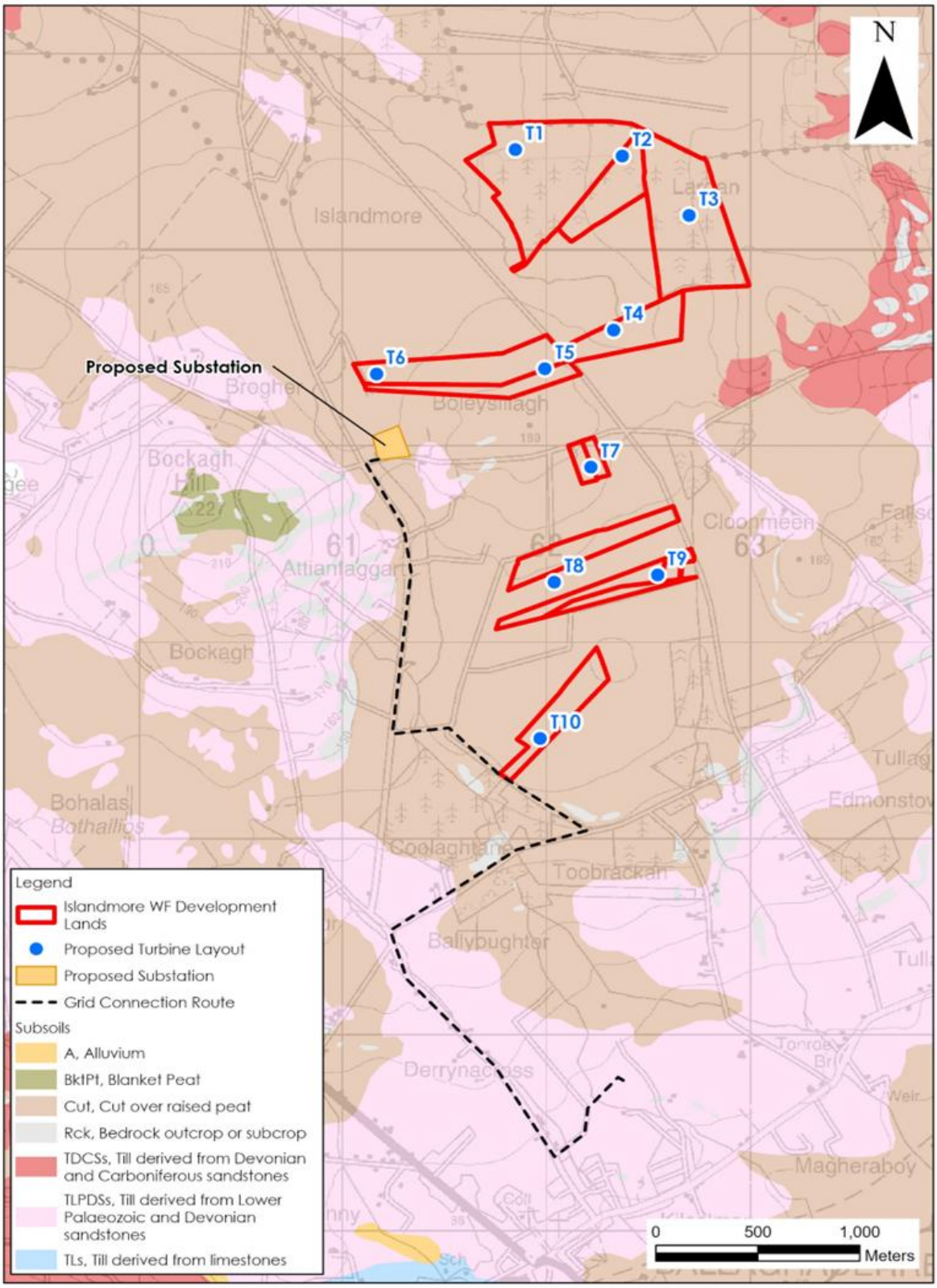


Figure B: GSI Subsoil Mapping

2.3 BEDROCK GEOLOGY

The GSI bedrock map (www.gsi.ie) for the area shows that the project site is underlain by 4 no. bedrock types. From south to north, the wind farm site is underlain by the Bockagh Member, of the Keadew Formation, denoted by its andesitic volcanic rocks, followed by a narrow section of the Keadew Formation itself which is characterised as a thin mudstone and sandstone. Further north lies the Moygara Formation, which is described as a red conglomerate and pebbly sandstone. The furthest north lithology mapped to underlie the Site is a band of Silurian (undifferentiated) rock which has grey-green sandstone and siltstone present.

The 2 no. northern turbines (T1 & T2) are underlain by Silurian (undifferentiated) rocks. The middle portion of the project site, including 5 no. turbines (T3 – T7) as well as the substation and borrow pit location, are underlain by the Moygara Formation.

3 no. turbines in the southernmost part of the site (T8, T9 & T10) are mapped on the Bockagh Member.

With regards to the mapped GSI Bedrock Geology along the UGC route, its underlain by all the formations described above with the exception of the Silurian (undifferentiated) rock.

Bedrock at the project site and UGC have mapped faults with the majority of faults running in a southeast-northwest direction. These faults are unlikely to be of any significance with regard the project.

The GSI bedrock geology map for the area is shown as **Figure C** below.

According to the GSI, natural resource mapping, the area of the proposed wind farm site has a 'very low to low' crushed rock aggregate potential.

Based on criteria shown in the **Table A** above and the GSI aggregate potential the local bedrock underlying the project site has a Low Importance.

2.4 GEOHAZARDS

The GSI Landslide database (www.gsi.ie) does not record any historic landslides in the vicinity of the project site or in the surrounding lands.

The GSI Landslide Susceptibility Map (www.gsi.ie) classifies the probability of a landslide occurring at a given location. The probability of a landslide occurring at the project site is mapped as being Low to Moderately Low.

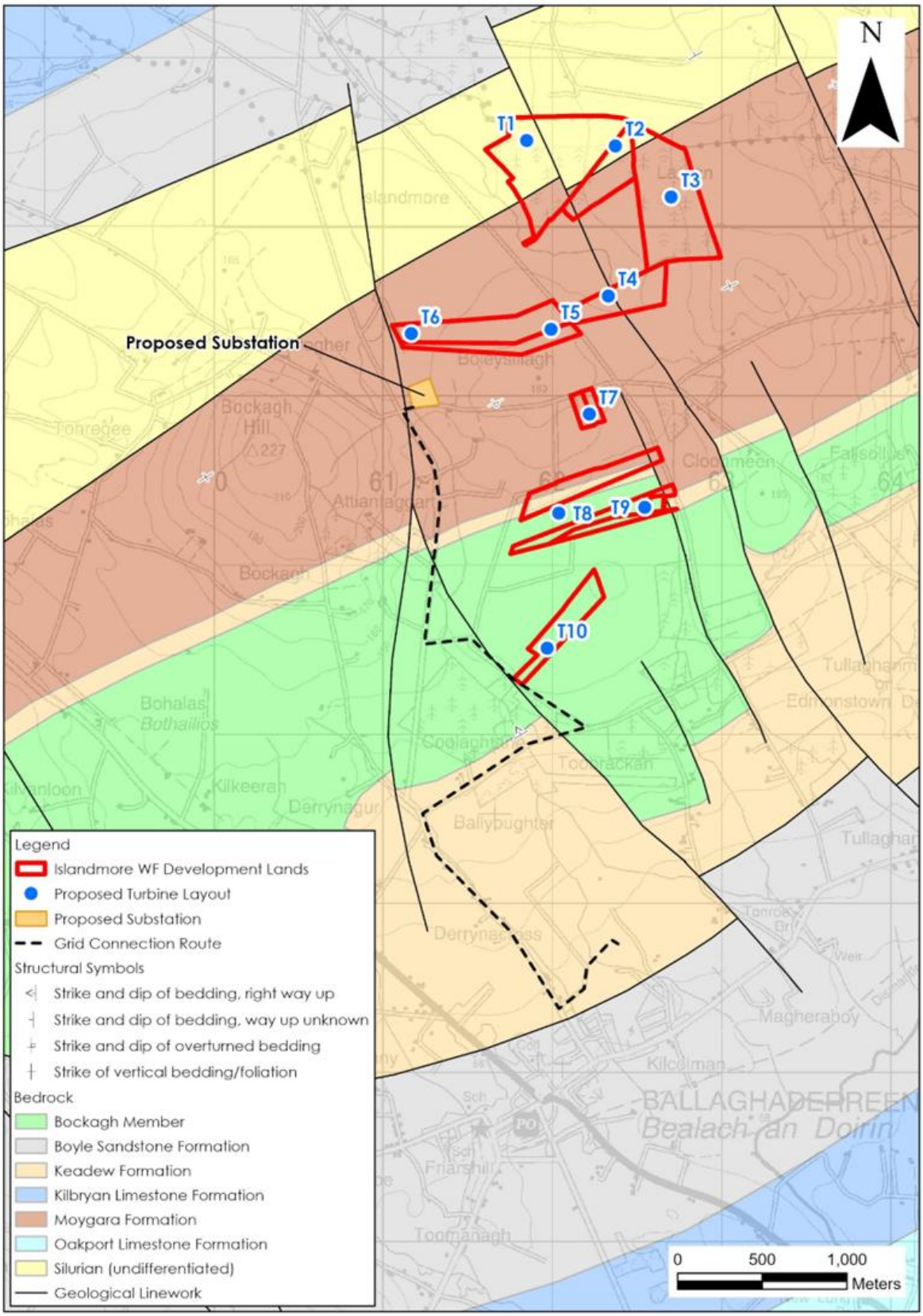


Figure C: GSI Bedrock Mapping

2.5 GEOLOGICAL HERITAGE SITES

No part of the wind farm site or UGC are mapped within a geological heritage site. The closest geological heritage site to the project site is the Boyle Drumlins (Site Code: RO004) ~11km to the east. This field of drumlins forms part of a small, discrete field southwest of Boyle.

Based on criteria shown in the **Table A** above, geological heritage sites have a High Importance.

2.6 HYDROLOGY & DRAINAGE

On a regional scale, the proposed wind farm site is mapped within 2 no. WFD Catchments. The northern portion of the project site, including 6 no. turbines (T1 – T6), as well as the substation, are within the Moy and Killala Bay Catchment (HA: 34) and the Moy_SC_030 sub catchment.

The southern section of the proposed wind farm site, including 4 no. turbines (T7 – T10), borrow pit area and the UGC are mapped within the Upper Shannon Catchment (HA: 26B) and the Lung_SC_020 sub catchment. Surface water catchment mapping is shown as **Figure D** below.

On a more local scale, the northern portion of the proposed wind farm site within the Moy & Killala Bay Catchment, is located in the Owengarve (Sligo)_010 river sub basin. An unnamed tributary of the Owengarve [Sligo] river travels westwards along the northern site boundary and enters the main channel ~1.2km northwest of the site. A headwater stream of the Owengarve [Sligo] River originates near the centre of the site, roughly 1km northwest of turbine T4. The Owengarve [Sligo] River meanders in a northwesterly direction for approximately 20km before entering the Moy River.

The southern portion of the proposed wind farm site, within the Upper Shannon Catchment, lies within the Lung_050 river sub basin. This section of the site is drained by 5 no. tributaries that flow in a southernly direction towards the main channel of the River Lung. From this point the Lung River travels northeastwards for approximately 4.5km, where it then discharges to the Lough Gara.

EPA mapped watercourses are shown on **Figure E** below. A 50m watercourse buffer is applied to the mapped EPA watercourse for constraints mapping purposes. The proposed substation is partially located inside a watercourse buffer zone as well as sections of the UGC. Turbine location T4 is located close to the edge of a buffer zone. The EPA watercourse mapping is not exhaustive and needs to be ground checked.

The UGC route is located within the Upper Shannon Catchment and the Lung_050 river sub basin. The UGC crosses EPA mapped watercourses at 7 no. locations. 6 no. of these locations are on existing roads where a culvert or bridge is likely to exist.

The watercourses crossed by the UGC are all headwater streams (1st or 2nd) of the Lung River. A local/regional hydrology map is shown as **Figure D** below.

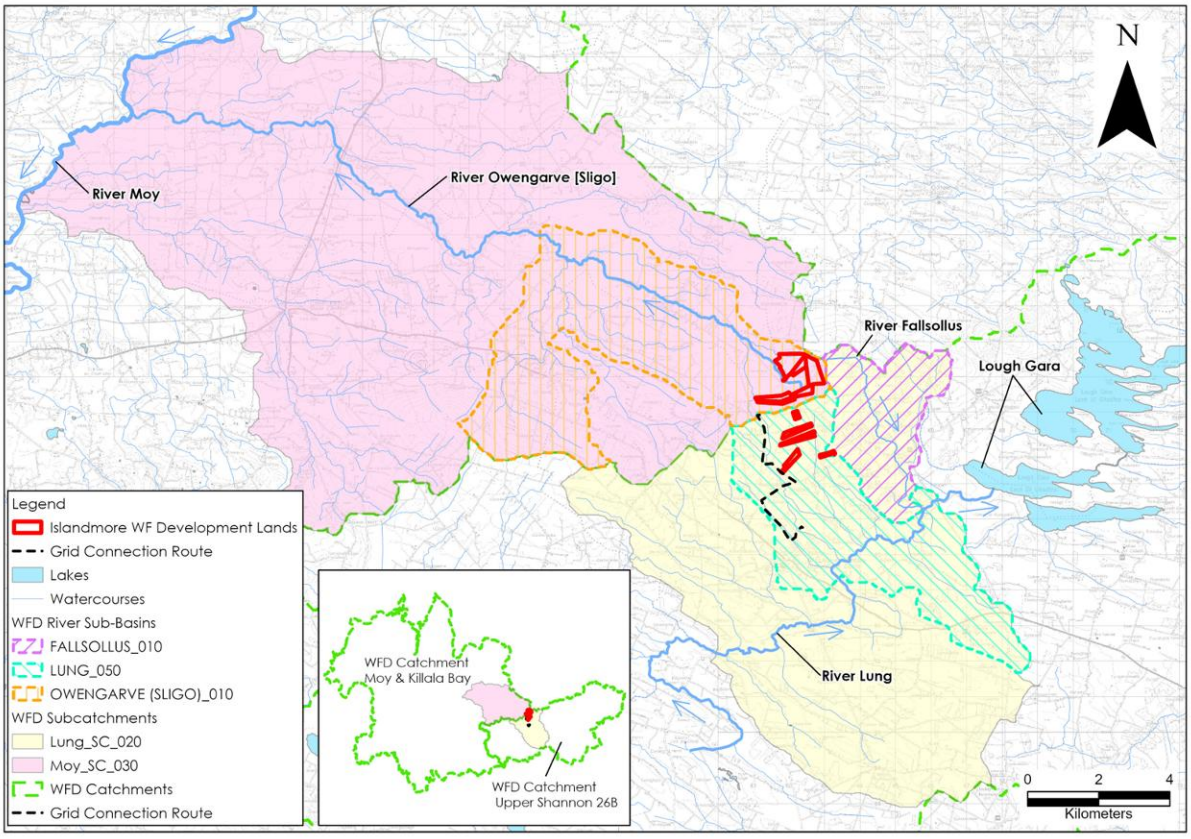


Figure D: Regional/Local Hydrology Mapping

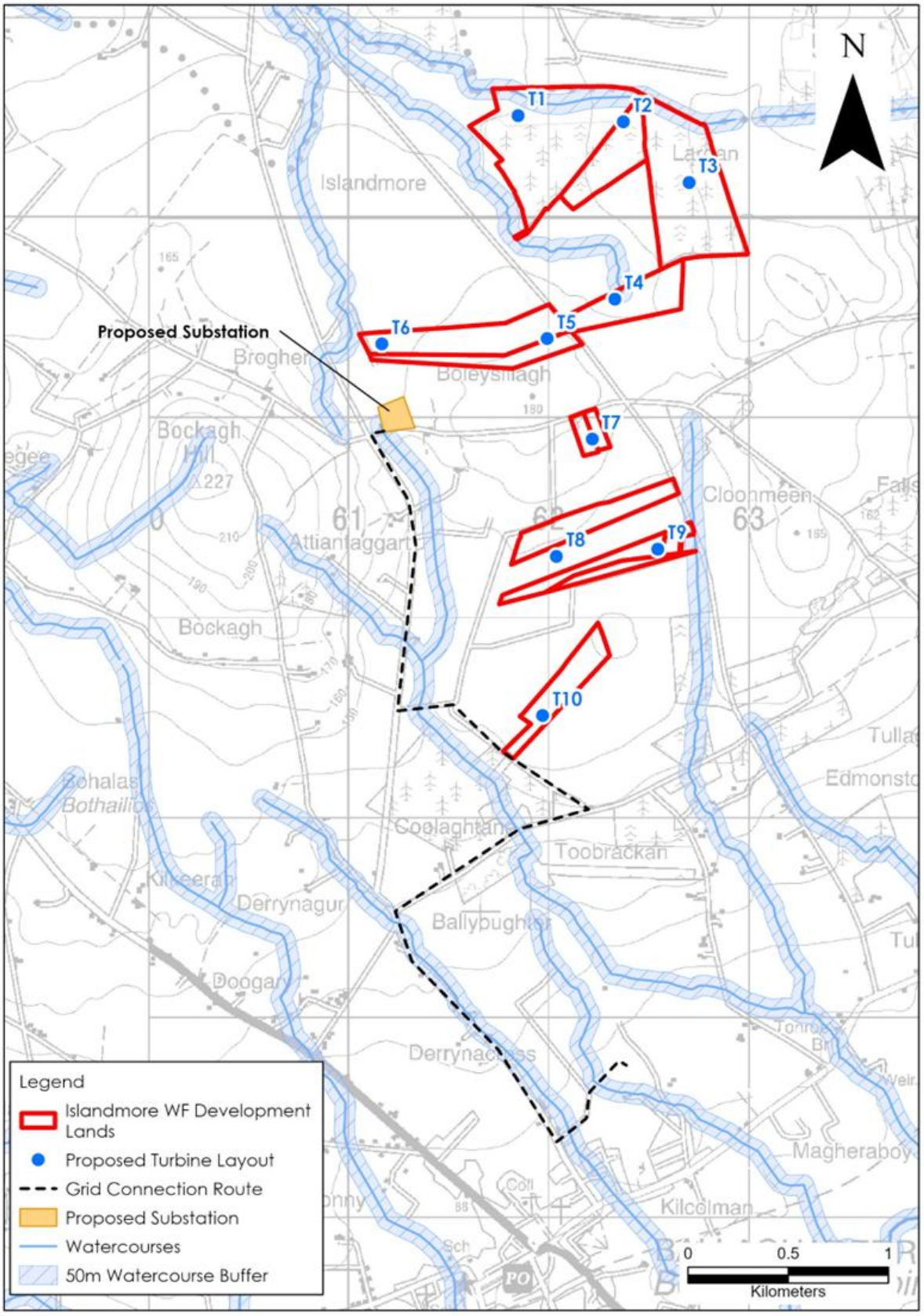


Figure E: EPA Watercourse Mapping

2.7 WATERBODY QUALITY & STATUS

Biological Q-rating data for EPA monitoring points on nearby river water bodies are shown in **Table D** below. Most recent data available (2020-2022) show that the Q-ratings are 'High' downstream of the northern portion of the site in the Owengarve River catchment.

However, Q values range from 'Bad' to 'Good' downstream of the southern portion of the proposed wind farm site, including the UGC in the Lung River catchment.

Station Name	River Waterbody	Year	Q-Value Score	Status
Bridge at Derrynabrock	Owengarve (Sligo)_010	2022	Q4-5	High
Ford N.W. of Srah Upper	Owengarve (Sligo)_010	2022	Q4-5	High
Bridge in Curry	Owengarve (Sligo)_020	2022	Q4-5	High
Dawros Br	Owengarve (Sligo)_030	2022	Q4-5	High
Ford near Bellanacurra	Moy_060	2022	Q4-5	High
~20m d/s effluent point (LHS)	Lung_050	2022	Q1	Bad
Just u/s Ballyoughter Trib. conflu (~0.3km d/s discharges)	Lung_050	2022	Q3	Poor
Br on Ballaghaderreen Bypass	Lung_050	2020	Q4	Good
Edmundstown bridge/bridge u/s L Gara	Lung_050	2020	Q4	Good

Table D: EPA Biological Q-rating data

River Water Body status information is available for view from www.catchments.ie. A summary of WFD status of river waterbodies immediately downstream of the project is shown in **Table E** below.

Within the area of the proposed wind farm site, river water body status information is available for the Owengarve (Sligo) River and Lung Rivers. The Owengarve (Sligo)_010 SWB, which includes streams which emerge from within the vicinity of the proposed wind farm site (*i.e* Owengarve (Sligo) and Brogher streams), have been assigned an overall 'Good Status'. Within the Upper Shannon catchment, where the southern portion of the project are located, the Lung_050 river waterbody achieved 'Moderate Status'.

Both the Owengarve (Sligo)_010 and Lung_050 river waterbodies are deemed to be "at risk" of failing to meet their WFD objectives in the future. Hydromorphology is a significant pressure on the Owengarve (Sligo)_010 river waterbody. No significant pressures have been identified for the Lung_050 waterbody currently.

Regional Catchment	Water Body	Overall Status (2016-2021)	Development Infrastructure
Moy & Killala Bay	Owengarve (Sligo)_010	Good	Northern portion of proposed wind farm site (6 no. turbines and substation)
Upper Shannon	Lung_050	Moderate	Southern portion of proposed wind farm site (3 no. turbines) & UGC

Table E: WFD Summary Information for Surface Water Bodies

Taking the view that all watercourses are required to have at least "Good Status" in terms of the WFD and by applying the criteria in **Table B** above, local and downstream watercourses have a High Importance.

2.8 FLOOD RISK

To identify those areas as being at risk of flooding, the OPW's Past Flood Events Maps, the National Indicative Fluvial Mapping (NIFM), CFRAM River Flood Extents, historical mapping (i.e. 6" and 25" base maps) and the GSI Groundwater Flood and Surface Water Flood Maps were consulted.

There are no areas on the historical 6" or 25" mapping in the area of the wind farm site or UGC that are identified as an area that is "*Liable to Floods*". No recurring flood incidents were identified near the proposed wind farm site from OPW's Past Flood Event Mapping. The closest recurring flood is situated in a low-lying area ~1.5km west of the site at Tonregee (ID: 66).

Where complete the CFRAM River Flood Extents mapping is now the primary reference for flood risk planning in Ireland. There is no CFRAM mapping available for the area of the proposed wind farm site or UGC. The nearest available CFRAM mapping is along the Boyle River as it exits Lough Gara ~10.5km east of the site.

National Indicative Fluvial Mapping (NIFM) is available for the watercourses immediately downstream of the project site (**Figure F** below).

For the NIFM Present-Day Scenario, no medium (1 in 100 year) or low probability (1 in 1,000 year) fluvial flood zones are mapped within the wind farm site or along the grid connection.

Due to the site elevation and its sloping nature, significant surface water flooding/pluvial flooding is not likely at the proposed wind farm site or along the UGC.

In addition, the GSI Groundwater and Surface Water flood maps do not map any potential flood zones within the proposed wind farm site or along the proposed UGC.

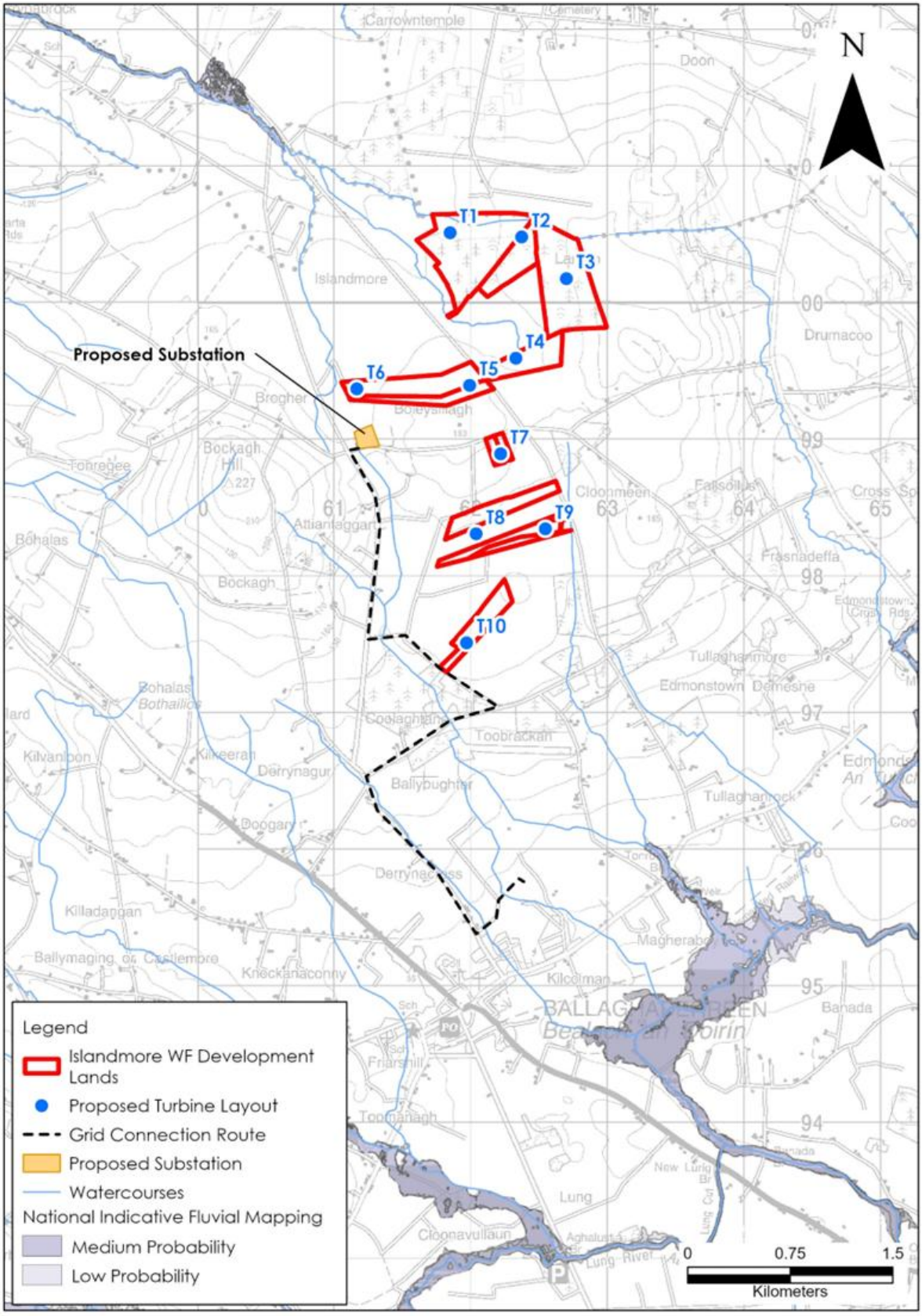


Figure F: NIFM Flood Zone Mapping

2.9 HYDROGEOLOGY

The proposed wind farm site is located over alternating bands of 2 no. different bedrock aquifer classifications. The northern part of the project site including 7 no. turbines (T1 – T7), borrow pit area and the substation, are mapped within a large band of a Poor Aquifer (Pl) - Bedrock which is Generally Unproductive except for Local Zones.

The southern portion of the proposed wind farm site, including 3 no. turbines (T8 to T10), are overlying a Locally Important Aquifer (Ll) - Bedrock which is Moderately Productive only in Local Zones. The UGC overlies both these aquifer types.

Groundwater flow in these local aquifers is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Generally, water levels are 0-10 m below ground level. Flow paths are only likely to be up to 300m, with groundwater discharging rapidly to nearby streams and small springs. Groundwater flow directions are expected to mimic topography (GSI, 2004).

Therefore, groundwater flow directions at the project site are expected to be in a northerly and southerly direction with discharge into the local streams draining the site.

In terms of local Groundwater Bodies (GWBs), the northern portion of the proposed wind farm site is located in the Kilkelly Charlestown GWB (IE_WE_G_0032). The southern portion of the wind farm site and the UGC are mapped in the Curlew Mountains GWB (IE_SH_G_073). Both of these groundwater bodies are characterised as having "Poorly productive bedrock" by the WFD mapping.

There are no karst features mapped by the GSI within or in the vicinity of the project. The non-calcareous bedrock formations at the project site would not typically be susceptible to karstification.

The closest mapped karst feature is the Tobernaneagh Spring ~3.3km northeast of the proposed wind farm site.

Based on criteria shown in the **Table C** above, the Poor bedrock aquifer and Locally Important aquifer in the area of the proposed wind farm site has a Low to Medium Importance respectively.

2.10 DESIGNATED SITES

Within the Republic of Ireland, designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), candidate Special Areas of Conservation (cSAC), Special Areas of Conservation (SAC) and Special Protection Areas (SPAs).

Local designated sites in the area and downstream of the proposed wind farm site and UGC are shown on **Figure G** below. The proposed wind farm site or the UGC are not located within or adjacent to any designated conservation site.

The project site is hydrologically connected to the River Moy SAC (Site Code: 002298). At its closest point this designated site is located approximately 4.9km to the northwest and downstream of the wind farm site and is hydrologically connected via the Owengarve [Sligo] River.

The following key aquatic species and habitats of the River Moy SAC are potentially likely to be at risk from a deterioration in water quality:

- Water courses and vegetation;

- White-clawed Crayfish;
- Sea Lamprey;
- Brook Lamprey;
- Atlantic Salmon; and,
- Otter

The River Moy SAC is therefore considered to be Very Sensitive to the effects of water quality deterioration.

Tullaghanrock Bog SAC (Site Code: 002354) and Callow Bog SAC (Site Code: 000595) are located approximately 4km to the southeast of the project site. Given the poorly productive aquifers and localised groundwater flowpaths in the area of the project and UGC (~300m), there is unlikely to be any groundwater hydrological connection to these designated sites.

Lough Gara SPA (Site Code: 004048) and pNHA (Site Code: 000587) is located 3.6km east of the proposed wind farm site, at its nearest (as the crow flies), and the lakes main inflowing river is the River Lung which drains the southern portion of the proposed wind farm site and UGC.

Lough Gara SPA is therefore considered to be Very Sensitive to the effects of water quality deterioration.

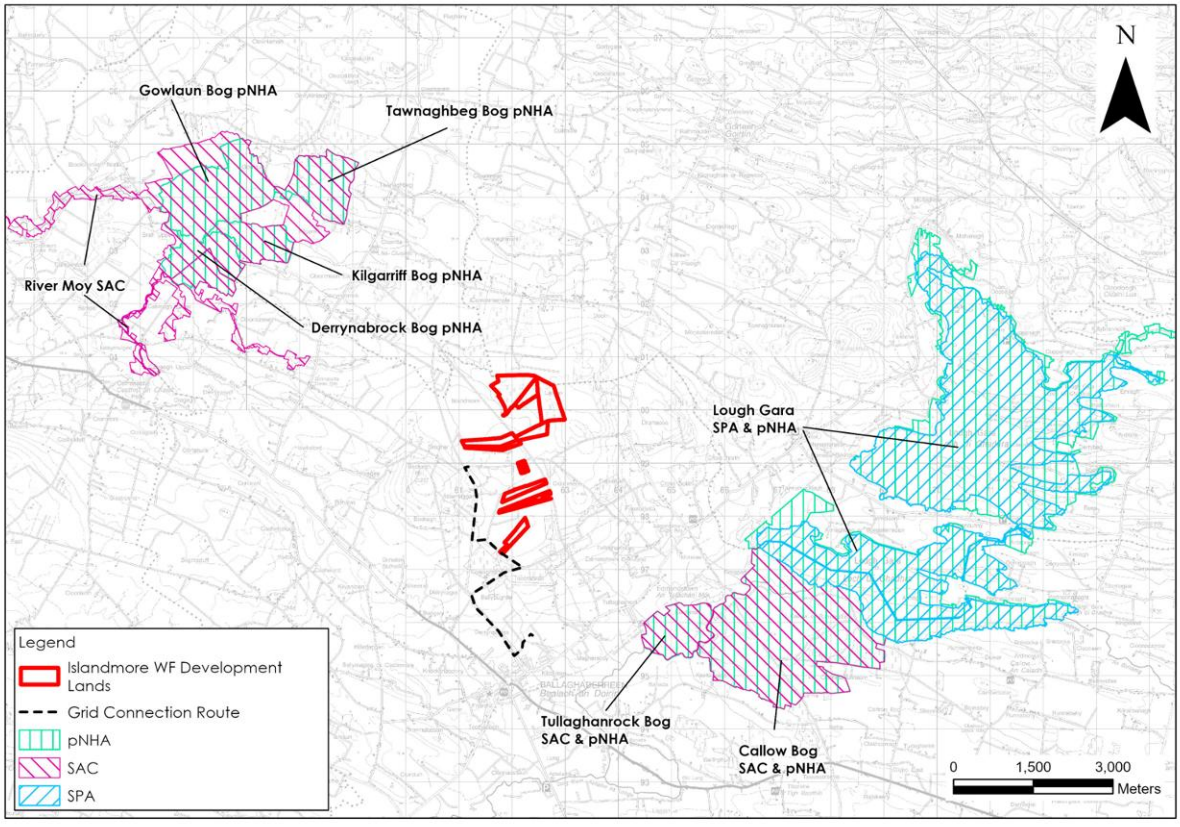


Figure G: Designated Site Mapping

2.11 DRINKING WATER SUPPLIES

According GSI mapping, there are no Public Water Supply or National Federation Group Water Scheme groundwater source protection areas (SPAs) within the vicinity of the project site.

The nearest mapped SPA relates to the Brosna GWS, located approximately 3.95km west of the project site.

Lough Gara, downstream of the River Lung and 3.6km east of the proposed wind farm site, is a Drinking Water Protected Area (Article 7 Abstraction for Drinking Water) according to the EPA Abstraction Register. Lough Gara met its DWPA objective in 2019.

Based on the GSI well database, there are no mapped wells in the area of the wind farm site which may suggest that residents are connected to a public water main. However, the GSI database is not exhaustive meaning private are still likely to be present.

Information on private local water supplies should be gathered during the public consultation meetings if possible.

2.12 INITIAL SITE VISIT FINDINGS

An initial wind farm site visit was carried out by HES on 6th September 2023 in the company of Islandmore Wind Farm Ltd (Adrain Garvey), Galetech Energy Services (Bláithín Rafferty and Conor Foy) as well as other members of the project team (Ian Higgins of Fehily Timoney and Company, and Will Woodrow and Mike Trewby of Woodrow Sustainable Solutions Ltd).

A walkover and field discussions were carried out at proposed turbine locations T5 and T6. Peat depths were also recorded by HES. The group walked a direct line between turbines T5 and T6. Proposed turbine location T10 was then visited.

Proposed turbine T5 is located on the edge of a bog where it is extensively cutover and drained. Peat depths are shallow (0.3m) and the underly mineral is very firm. The topography is relatively flat.

Moving in a direct westerly line towards turbine location T6, there is a localised basin of intact bog with wet and soft surface areas. Peat depths between 2 – 3m were recorded along the intact bog.

The colouration of the intact bog vegetation nearing T6 may indicate previous burning as suggested by Woodrow Sustainable Solutions Ltd on the day of the visit. The peat depth at proposed turbine location T6 was recorded at 3.3m.

Proposed turbine T10 is located on the south of the wind farm site where the bog has a more typical raised bog characteristics (i.e. domed topography) and is largely intact with cutaway edges.

Turbine T10 is located on cutaway peat at the southern edge of the bog. The intact bog north of the turbine location has numerous sphagnum pools and is quaking in places.

Probing of cutaway bog in the area of turbine T10 indicated bedrock is close or at the surface.

3. IDENTIFICATION OF POTENTIAL EFFECTS

3.1 POTENTAL EFFECTS AND CONSTRAINTS

A summary of receptors, likelihood of Impact and potential constraints is shown in **Table F** below.

Firstly, the primary constraint with regard the initial proposed wind farm layout (September 2023) was intact bog. Areas of intact bog have largely been avoided by the Frozen 1 layout (September, 2024).

On-site watercourses (i.e. streams and rivers) are also potential constraints, the proposed substation is mapped within 50m of an EPA mapped watercourse as shown on **Figure E** above. Proposed turbine location T4 is on the edge of a buffer.

On a more general note, potential impacts on surface water and groundwater will mainly be water quality related during the construction phase. However, due to the shallow nature of the works and the potential for site runoff, surface waters will be the main sensitive receptor in terms of water quality impacts.

No significant effects on surface water or groundwater flows levels or volumes (assuming no bedrock borrow pit is proposed as part of the development) are likely (*i.e.* quantity). Potential effects on the soils, subsoils and geology will be both quantity (excavations) and quality (spills and leaks).

The main mitigation requirements will be drainage/runoff control and mitigation and best practice use for oils/fuels and cement. Best practice wind farm drainage will have to be implemented.

The close proximity and downstream setting of the River Moy SAC makes it a very sensitive receptor. The presence of protected water dependant species such as the White-clawed Crayfish means surface water quality protection measures will have to be of a high standard.

Table F: Summary of Receptors, likelihood of Impact and Constraints

Potential Receptor	Likelihood of Potential Impact	Impacts Type	Mitigation Required	Layout Constraint
Mineral Soil/Subsoil	High	Quantity, Quality & Stability	Yes	No
Cut Bog	High	Hydrological & Peat Stability	Yes	Potentially
Intact Bog	Low	Hydrological, Peat Stability & Ecological	Yes	Unlikely
Bedrock	High	Quantity & Quality	Yes	No
Watercourses	High	Quality/Quantity	Yes	Yes
Flood Risk	Low	Quantity/Level	Yes	Unlikely
Groundwater	Low/Medium	Quality	Yes	Unlikely
River Moy SAC	High	Quality	Yes	Unlikely
Tullaghanrock Bog SAC	Low	Quality	No	No
Callow Bog SAC	Low	Quality	No	No
Lough Gara SPA/DWPA	Medium/High	Quality	Yes	Unlikely
Brosna GWS	Low	Quantity & Quality	No	No
Local Private Wells	Low	Quantity & Quality	Yes	Unlikely

4. EIAR ASSESSMENT METHODOLOGY

4.1 SITE SURVEYS AND INVESTIGATIONS

The following site surveys and investigations will be undertaken to address the Land/Soil and Water chapters of the EIAR:

- Intrusive site investigations will be undertaken by means of boreholes, trial pitting, peat probes and gouge cores to investigate peat and mineral subsoil lithology along with depth to bedrock;
- Bedrock conditions need to be investigated, particularly at the potential borrow pit area;
- Inspection and mapping of all relevant hydrological features, such as existing drainage ditches, streams and springs etc in terms of potential receptors, constraints and pathways;
- Complete field hydrochemistry measurements (electrical conductivity, pH and temperature) to determine the origin and nature of surface water and groundwater flows;
- Surface water samples will be undertaken to assess the contemporary baseline water quality of the primary surface waters originating from the proposed wind farm site and along the UGC;
- Assessment of downstream receptors such as public water supplies, private wells, surface water abstractions and designated sites using the Source-Pathway-Receptor model (see below; and,
- WFD Compliance Assessment and Site Specific Flood Risk Assessment.

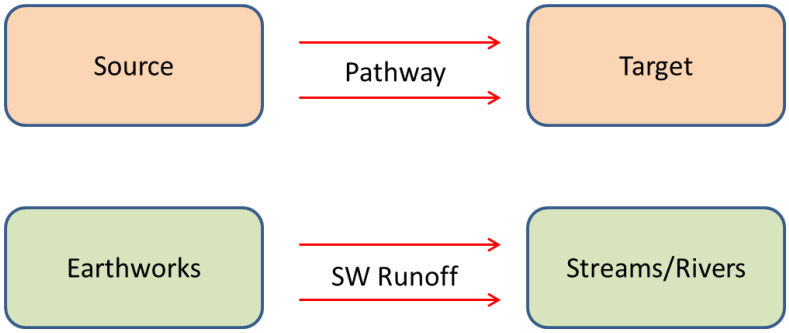
4.2 GEOTECHNICAL CONSIDERATIONS

In light of recent planning decisions with regard wind farms on peatland sites, the following need to be addressed:

- A robust site investigation strategy needs to be incorporated into the planning stage design;
- The geotechnical input needs to be thorough enough to gain a good understanding of the geological setting (i.e. peat, mineral soil and bedrock conditions); and,
- Peat/spoil storage proposals need to be well examined and backed up by site investigation data.

4.3 IMPACT ASESSMENT PROCESS

The conventional source-pathway-target model (see below, top) will be applied to assess potential impacts on local and downstream environmental receptors (see below, bottom as an example) as a result of the project.



Where potential impacts are identified, the classification of impacts in the assessment follows the descriptors 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 (EPA, 2022);

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

In order to provide an understanding of the stepwise impact assessment process that will be applied, we have firstly presented below a summary guide that defines the steps (1 to 7) taken in each element of the impact assessment process. The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

Using this defined approach, this impact assessment process is then applied to all project (wind farm and grid connection) construction and operation activities which have the potential to generate a source of significant adverse impact on the geological and hydrological/ hydrogeological (including water quality) environments.

Step 1	**Identification and Description of Potential Impact Source** This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	**Pathway / Mechanism:**	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of wind farm/grid connection developments, surface water and groundwater flows are the primary pathways, or for example, excavation or soil erosion are physical mechanisms by which a potential impact is generated.
Step 3	**Receptor:**	A receptor is a part of the natural environment which could potentially be impacted upon, *e.g.* human health, plant/animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present.
Step 4	**Pre-mitigation Impact:**	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place.

Step 5	**Proposed Mitigation Measures:**	Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. In relation to wind farm/grid connection developments, these measures are generally provided in two types: (1) mitigation by avoidance, and (2) mitigation by engineering design.
Step 6	**Post Mitigation Residual Impact:**	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place.
Step 7	**Significance of Effects:**	Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.

5. REPORT CONCLUSIONS

The conclusions of this scoping assessment are presented as follows:

- The site is set in an upland area where areas of cutover/cutaway and intact bog.
- The project drains to the Owengarve River in the north and to the Lung River in the south;
- The main potential site layout constraints identified by this desk based scoping assessment are on-site watercourses (a 50m buffer should be applied to all on-site watercourses) and the presence of intact peat on site which appear to have high ecological importance;
- The main downstream receptors identified by this assessment include the River Moy SAC and the Lough Gara DWPA;
- River Moy SAC and the Lough Gara SPA/DWPA will not constrain the layout of the project, but increased mitigation will be required particularly during the construction phase;
- The bedrock underlying the site is typically poorly productive with localised groundwater flowpaths, therefore off-site effects on potential groundwater users is not likely; and,
- A Stage II flood risk assessment should be prepared after site investigations and detailed drainage mapped has been completed.

* *

6. REFERENCES

British Standards Institution (BSI). (2015) BS5930 - Code of Practice for Site Investigations.

Department of Housing, Planning and local Government, 2018: Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.

Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports.

European Union, 2017: Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU).

Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements.

National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

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ISLANDMORE WIND FARM

PEAT STABILITY SCOPING ASSESSMENT

Prepared for:

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Statkraft

Date: October 2023

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PEAT STABILITY SCOPING ASSESSMENT

REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT

User is responsible for Checking the Revision Status of This Document

Rev. No.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
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1	Final	IH	TC	BdH	20/10/2023
2	Draft following layout revisions	IH	TC	BdeH	25/11/2024

Client: Statkraft Ireland Ltd.

Keywords: Wind Farm, EIA Scoping, Renewable Energy, Planning Application

Abstract: This is a scoping assessment in relation to peat stability prepared for a proposed wind farm development in Co. Roscommon.

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1. INTRODUCTION

1.1 General

Fehily Timoney & Company (FT) were retained by Statkraft Ireland Limited to undertake a scoping assessment in relation to peat stability for the proposed Islandmore Wind Farm (the 'proposed development').

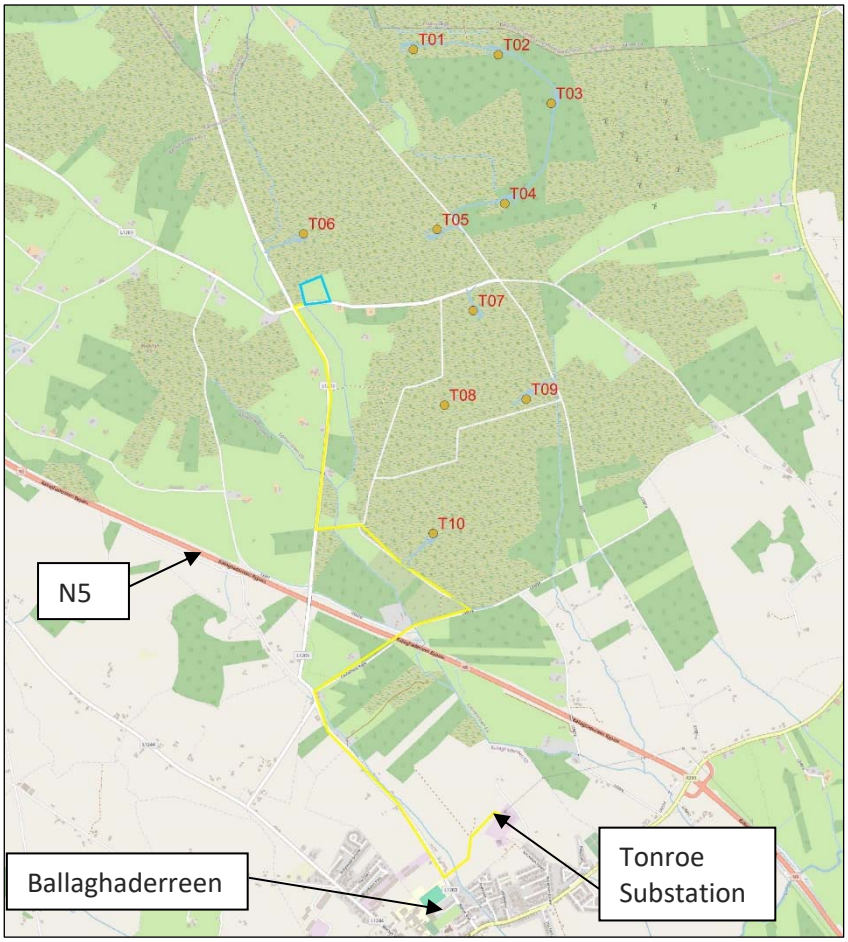
The Islandmore Wind Farm site is located in north County Roscommon, c. 2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo).

The proposed development is currently at an early stage of development. Detailed environmental assessments are ongoing to determine the suitability of the site to accommodate wind farm infrastructure, and as such the final site boundary is yet to be confirmed.

The purpose of this report is to review available data and to identify potential constraints with respect to peat stability.

A general site location map is shown in Figure 1.1:

Figure 1-1: Site Location

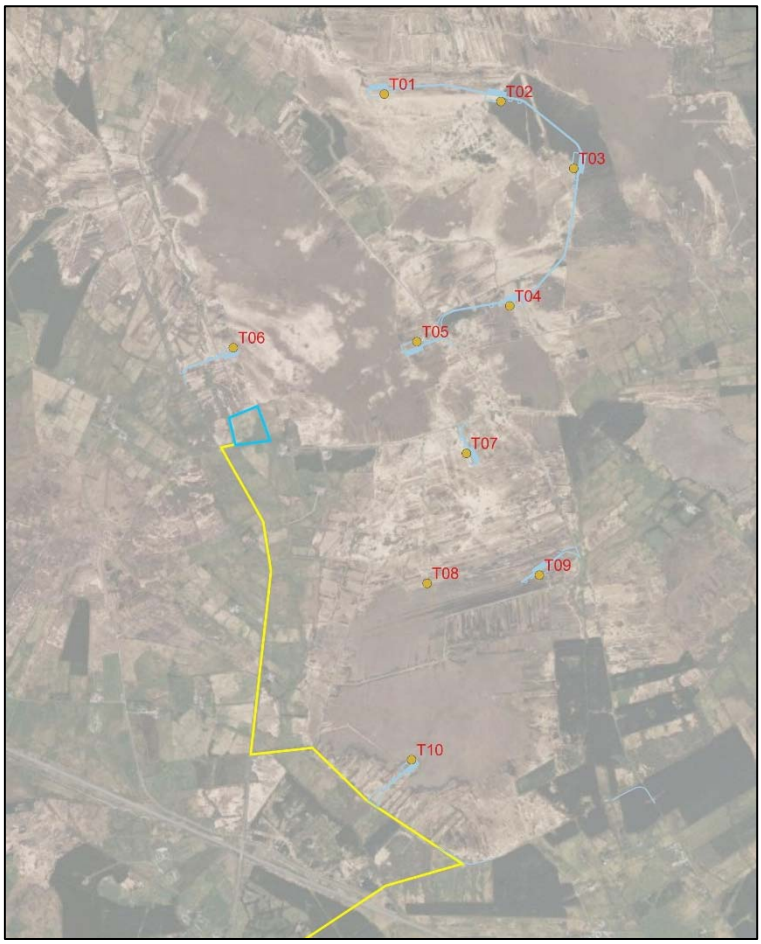


1.2 Development Description

The development will comprise 10 no. wind turbines; 7 no. of which will have an overall tip height of 150m and 3 no. with an overall tip height of 185m; turbine foundations; turbine hardstandings; internal site access tracks; internal wind farm underground cabling; site entrances; on-site 110kV electricity substation, underground grid connection infrastructure; and all associated site development, access and reinstatement works. Draft turbine locations are shown in Figure 1.2.

It is proposed to assess 1 no. underground grid connection route in the EIAR (and Natura Impact Statement). The route option (shown in yellow in the figure below) will terminate at the Tonroe 110kV substation located to the north of Ballaghaderreen.

Figure 1-2: Draft Turbine Layout



1.3 Methodology

1.3.1 Desk Study

A desk study of the proposed Islandmore Wind Farm site and the surrounding area was completed using the following data sources:

- Geological Survey of Ireland, Online Viewer (www.gsi.ie)
- Geological Survey of Ireland Landslide Database (www.gsi.ie)

2. EXISTING ENVIRONMENT

2.1 Introduction

The Islandmore Wind Farm will be located in north County Roscommon, c. 2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo).

Current land use comprises open peatland and localised forestry. Non-commercial scale peat cutting has been undertaken across the majority of the open peatland.

2.2 Overburden Geology

GSI mapping indicates that the site is generally underlain by cutover raised peat, with small pockets of Till derived from Lower Paleozoic and Devonian Sandstones and bedrock outcrop/subcrop.

2.3 Peat Stability

A review of the GSI Landslide Database shows that there have been no recorded peat failures or landslides within the proposed site or in the surrounding area. The nearest recorded peat failure is some 17km to the northeast of the site, to the west of Lough Arrow in County Sligo. The GSI Landslide Susceptibility mapping indicates that the site has a low to moderately low susceptibility classification.

3. SITE VISITS

Note that the proposed layout changed between the two site visits undertaken to date. The turbine numbers for each site visit refer to the layout that was current at the time of that particular visit.

3.1 Preliminary Site Visit (2023)

A preliminary site visit was undertaken by FT on 6 September 2023 in order to inspect the ground conditions at several of the proposed turbine locations across the site. The area around T5 to T7 and T11 to T12 was walked, and peat depths and peat strengths recorded. The area of the north that contains the proposed locations of T1 to T4 was not walked.

Peat depths between T5 and T7 ranged from 0.3 to 3.3m in depth. T7 is located in an area of peat cutting, which is reflected in the peat depth. T7 is in an area of recovering blanket bog, with no evidence of peat cutting at the turbine location. Slope angles ranged from 1 to 3 degrees across this area.

Peat depths at T11 and T12 were significantly deeper, between 4.8 and 5.5m in depth. T12 is currently located on the edge of a worked area of peat, where the remaining peat is less than 1m in thickness. The peatland between these two turbines, and around T11, comprises intact blanket bog, with areas of quaking peat noted, indicating that the peat is completely saturated. Slope angles are almost flat in this area (around 1 degree).

Peat strengths were recorded using a handheld shear vane, and were typically >10kPa, except in the area between T11 and T12 where values as low as 2kPa were recorded. It is recommended that any proposed infrastructure or turbine locations avoid this area.

3.2 Site Visit (2024)

A second site visit was undertaken by FT from the 19th to the 21st August 2024. The site was walked and peat depths and strengths recorded.

Peat depth ranged from 0 to 7.2m, with the deepest peat recorded at and to the west of T08.

Peat strengths were recorded using a handheld shear vane, and were typically >10kPa, except for T01 (7-9kPa), T03 (8-9kPa), and between T08 and T09 (8-9kPa).

The deep peat recorded around T09 would normally require both the turbine and the hardstand area to be piled. Excavating this area would generate a significant volume of peat for storage across the site. It would be recommended that a borehole is undertaken at this location to confirm the actual peat depth, as it is possible that the base of peat was not reached by the peat probes.

4. PEAT STABILITY

A review of the GSI mapping indicates that peat is present across the proposed site. The results of the site visits have confirmed that this is accurate, and as such a peat stability assessment is required, in line with the Wind Energy Guidelines (DoEHLG, 2006).

4.1 Site Surveys and Investigations

A site walkover including peat probing and recording of peat shear strength has been undertaken across the site. An additional visit will be undertaken should there be any changes to the current layout, and to undertake peat probes along the grid connection route. Sufficient data will be recorded in order to undertake a peat stability assessment. Intrusive ground investigation (trial pits) is also proposed at turbine and other infrastructure locations where access is possible.

4.2 Peat Stability Assessment

A peat stability assessment will be undertaken following the guidelines contained in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Projects (Second Edition, 2017), published by the Scottish Government. A Peat Management Plan will also be produced, which will provide options for road construction types, expected peat excavation volumes and proposed storage areas for excavated materials.

Based on the available data and the shallow slopes on the site, peat stability is not anticipated to be a significant risk for the proposed development, subject to the avoidance of an area of open bog with very low peat strengths to the north of T10 (referred to as the area between T11 and T12 in the preliminary site visit summary). The foundation options for T09 (turbine and hardstand) will have to be confirmed prior to the planning submission.

Ground investigation, in the form of trial pits and boreholes, is recommended to confirm the ground conditions below the peat at the turbine locations, and for T09, to confirm the actual peat depth. A borehole is also recommended at a potential borrow pit in an area to the south of T05.

5. CONCLUSION

The conclusions of this scoping assessment are as follows:

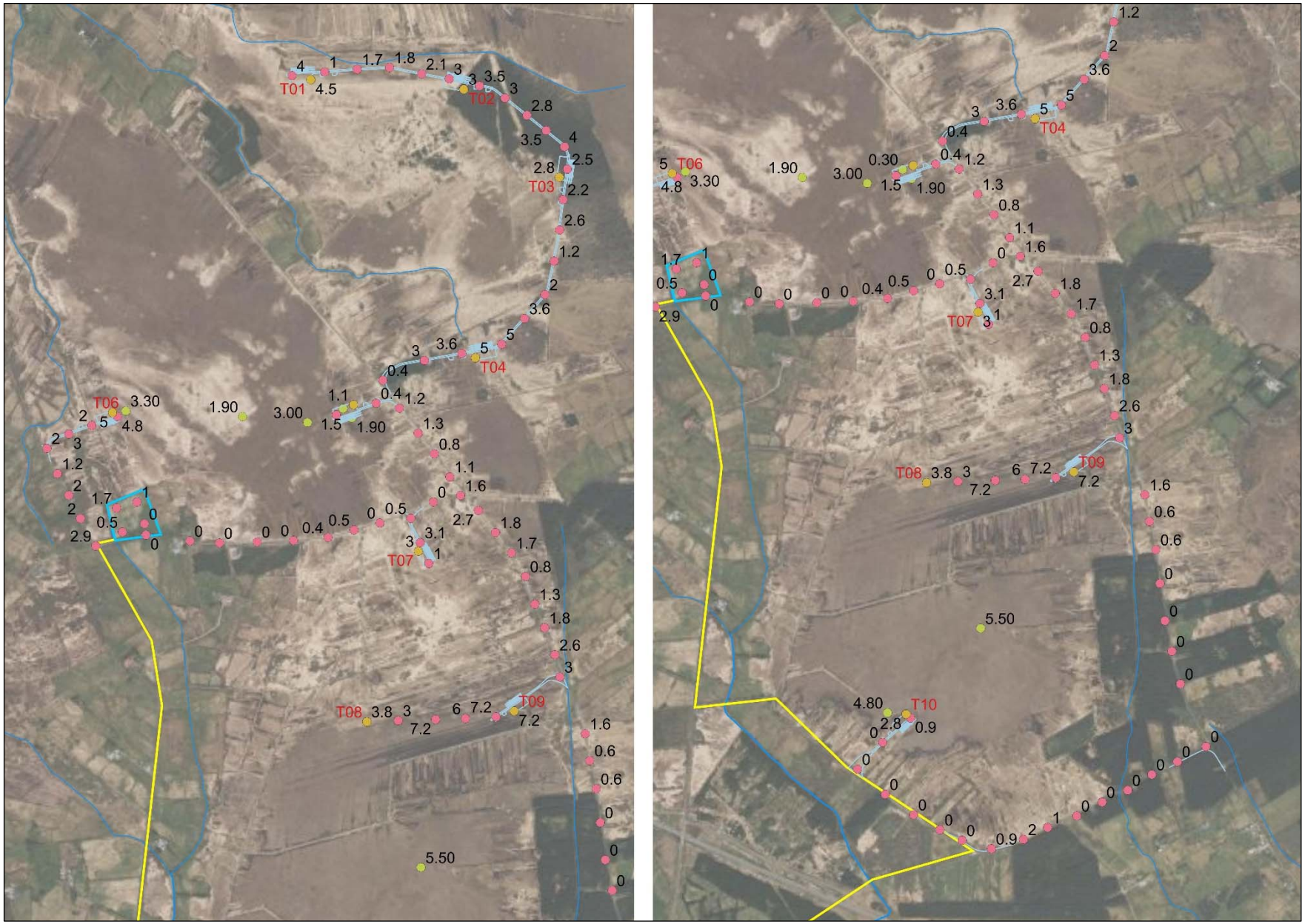
- The proposed development is located in north County Roscommon, c. 2km north of Ballaghaderreen, and comprises open peatland and forested lands.
- The underlying geology comprises mainly cutover raised peat with pockets of Till and Bedrock outcrop/subcrop.
- In terms of constraints; peat depth, strength and condition in the area of open bog to the north of T10 indicate that this area should be avoided in terms of the proposed development.
- A peat stability assessment and peat management plan will be undertaken for the proposed development once a layout has been further defined.
- Peat storage areas will be required across the site, some within the forestry at T02/T03, and others within the cutover bog.
- The recorded peat depth at T09 is in excess of 7m. If this location cannot be moved, then a piled solution will be required for both the turbine and the hardstand.
- Ground investigation (trial pits and boreholes) is recommended to confirm ground conditions below the peat and to investigate a potential borrow pit.

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APPENDIX A

Peat Depth Layout Plan



Islandmore Wind Farm - Combined Peat Depths from Site Visits

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ANNEX 4 – AIR QUALITY & CLIMATE SCOPING REPORT

AIR QUALITY AND CLIMATE SCOPING REPORT
-
ISLANDMORE WIND FARM

Technical Report Prepared For

Islandmore Wind Farm Ltd

Technical Report Prepared By

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Title	Senior Environmental Consultant	Environmental Consultant
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1.0 INTRODUCTION

The purpose of this report is to describe the scope of work and methods to be applied in the identification and assessment of air quality and climate impacts associated with the proposed Islandmore Wind Farm ('proposed development'). A high-level overview of the baseline conditions is included, together with the proposed methodology and a scope of work likely to be required to undertake a detailed assessment of the impact of the proposed development on air quality and climate as part of the Environmental Assessment.

1.1 Policy and Plan Context

1.1.1 Air Quality

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022, which incorporate the European Commission Directive 2008/50/EC (on ambient air quality and cleaner air for Europe). Council Directive 2008/50/EC (CAFÉ Directive) combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC) and also includes ambient limit values relating to Particulate Matter (as $PM_{2.5}$).

The limit values or "Air Quality Standards" are health or environmental-based levels and for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 1).

In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland, which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target (IT) 3 by 2026, the IT4 targets by 2030 and the final targets by 2040. The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that "meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2". Ireland will revise its air quality legislation in line with the proposed EU revisions to the CAFE Directive, which will set interim 2030 air quality standards and align the EU more closely with the WHO targets.

For the purposes of this assessment, the appropriate limits for the assessment of air quality impacts are those outlined the Air Quality Standards Regulations 2022.

Table 1. Air Quality Standards Regulations 2022 (based on EU Council Directive 2008/50/EC)

Pollutant	Regulation	Limit Type	Value
Nitrogen Dioxide (NO_2)	S.I. 739 of 2022	Hourly limit for protection of human health - not to be exceeded more than 18 times / year	200 µg/m^3 NO_2
	S.I. 739 of 2022	Annual limit for protection of human health	40 µg/m^3 NO_2
Nitrogen Oxides (NO + NO_2)	S.I. 739 of 2022	Critical limit for the protection of vegetation and natural ecosystems	30 µg/m^3 NO + NO_2

Pollutant	Regulation	Limit Type	Value
Particulate Matter (as PM_{10})	S.I. 739 of 2022	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3 PM_{10}
		Annual limit for protection of human health	40 µg/m^3 PM_{10}
Particulate Matter (as $PM_{2.5}$)	S.I. 739 of 2022	Annual limit for protection of human health	25 µg/m^3 $PM_{2.5}$

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. The Verein Deutscher Ingenieure (VDI) German Technical Instructions on Air Quality Control – TA Luft standard for dust deposition (VDI, 2002) (non-hazardous dust) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Heritage & Local Government (DEHLG, 2004) apply the Bergerhoff limit of 350 mg/m^2/day to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the development.

The assessment of air quality will be conducted with consideration of the relevant legislation and guidance including:

- Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC);
- European Union Directive on air quality assessment and management (96/62/EC) and the associated “daughter Directives”, which set the Limit Values;
- Air Quality Standards Regulations 2022 (S.I. 739 of 2022), which incorporates European Commission Directive 2008/50/EC which has set limit values for the pollutants sulphur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (PM_{10}), benzene and carbon monoxide (CO);
- Air Pollution Act 1987 (No. 6 of 1987);
- A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1) (Institute of Air Quality Management (IAQM) 2020);
- Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2023);
- Local Authority air quality and planning guidance; and
- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (Transport Infrastructure Ireland (TII), 2022a).

1.1.2 Climate

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements. In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). Ireland’s obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019 followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (hereafter referred to as the 2021 Climate Act) in July 2021 (Government of Ireland, 2021a). The 2021 Climate Act was prepared for the purposes of giving statutory effect to the core objectives stated within the Climate Action Plan (CAP).

The purpose of the 2021 Climate Act is to provide for the approval of plans *'for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'*.

In relation to carbon budgets, the Climate Action and Low Carbon Development (Amendment) Act states 'A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')'. The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 2. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published July in 2022 and are shown in

Table **3**.

The 2023 Climate Action Plan (CAP23) (Government of Ireland, 2022) outlines the status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The CAP23 set a national target of up to 80% of electricity demand by renewables by 2030 for the national electricity grid. Currently, approximately 40% of the national grid electricity comes from renewable sources.

Table 2. 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025 (Department of the Taoiseach, 2022)

Budget Period	**Carbon Budget**	**Reduction Required**
2021-2025	295 Mt CO_2eq	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2eq	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2eq	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 3. Sectoral Emission Ceiling 2030 (Government of Ireland, 2022)

Sector	Baseline (MtCO2e)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Transport	12	54	37	6	50
Electricity	10	40	20	3	75
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Agriculture	23	106	96	17.25	25
LULUCF	5	TBC Note 1	TBC	TBC	TBC
Industry	7	30	24	4	35
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Unallocated Savings	-	7	5	-5.25	-
Total	**68**	**TBC**	**TBC**	**-**	**-**
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	**-**	**295**	**200**	**-**	**51**

Note 1 Not given in CAP23.

In April 2023 the Government published a draft Long-term Strategy on Greenhouse Gas Emissions Reductions (Government of Ireland, 2023). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the Climate Action Plan. The strategy will be updated on the basis of a second round of public consultation throughout 2023 with an updated strategy published after this is complete.

A Climate Change Adaptation Strategy was published in 2019 by Roscommon County Council (Roscommon County Council, 2019). The National Adaptation Framework outlines the measures of each county council to help in mitigating and adapting to climate change. One of the key measures to be included in these documents includes the increased use of renewable energy sources as opposed to traditional fossil fuels.

The assessment of climate will be conducted with consideration of the relevant legislation and guidance including:

- European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the effects of certain public and private projects on the environment (the EIA Directive);
- European Union (EU) Regulation (EU) 2021/1119 of the European Parliament and of

the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law');
- The Planning and Development Act, 2000 (as amended);
- The Planning and Development Regulations, 2001 (as amended);
- Council Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC;
- Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (hereafter referred to as the 2021 Climate Act);
- Local Authority's climate and planning guidance;
- Transport Infrastructure Ireland (TII) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022b);
- Transport Infrastructure Ireland (TII) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2022c);
- Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency 2019b)
- Institute of Environmental Management & Assessment (IEMA) Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the IEMA 2022 GHG Guidance) (IEMA, 2022);
- IEMA Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the IEMA 2020 EIA Guide) (IEMA, 2020a);
- IEMA GHG Management Hierarchy (hereafter referred to as the IEMA 2020 GHG Management Hierarchy) (IEMA, 2020b);
- IEMA Principles Series: Climate Change Mitigation & EIA (IEMA, 2010);
- Publicly Available Specification (PAS) 2080:2016 on Carbon Management in Infrastructure (BSI, 2016): and
- Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (European Commission, 2021a).

1.2 Study Area

The Islandmore Wind Farm will be located in north County Roscommon, c. 2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo).

The development will comprise 12 no. wind turbines; 9 no. of which will have an overall tip height of 150 m and 3 no. with an overall tip height of 185 m; turbine foundations; turbine hardstandings; internal site access tracks; internal wind farm underground cabling; site entrances; on-site 110kV electricity substation, underground grid connection infrastructure; and all associated site development, access and reinstatement works.

The land use in the immediate vicinity of the proposed development is rural farmland with a low number of one off houses. Landcover is varied within the proposed development site, comprising a mix of wet and dry grassland, forestry, raised bog and upland blanket bog.

It is determined that the scheme will require assessment of the degree of sensitivity of the siting and design (i.e. sensitivity of surroundings) of the infrastructure associated with the proposed development. It is expected that there will be sensitive residential receptors located within 200m of the grid connection infrastructure and construction traffic routes for the proposed development.

The construction phase study area is focused on potential impacts generally due to dust. Dust impacts during the construction phase due to material handling activities, including excavation and backfill, on site may typically emit dust. Deposition typically occurs in close proximity to each site and therefore the study area is limited to a 350m radius from any dust generating activities and up to 250m along haul routes from the a medium site exit.

The study area with respect to impacts to air quality due to emissions from vehicle and HGV movements is limited to sensitive receptors less than 200m from road links which are affected by significant changes in traffic volume, as determined by the criteria given in TII guidance PE-ENV-01106 (TII, 2022a). This study area is the same for designated areas of conservation (either Irish or European designation) with respect to ecology as the potential impact is highest within 200 m of the road links and when significant changes in AADT (>5%) occur.

Due to the nature of climatic effects, if significant emissions occur, they will have the potential to impact Ireland's commitments and targets under various EU Climate Agreements and other international agreements. Therefore, the study area can be classed as Ireland.

2.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

2.1 Air Quality

2.1.1 Meteorological Conditions

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Knock Airport, which is located approximately 15 km southwest of the site. Knock Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period. For data collated during five representative years (2018 - 2022), the predominant wind direction is westerly to south-westerly, with generally moderate wind speeds averaging 4.7 m/s (Met Eireann, 2023).

2.1.2 Baseline Ambient Air Quality

A desktop review of available baseline air quality data within the study area will be undertaken. Assessment Criteria for the impact of dust during the construction phase are set out in the TII guidelines (TII, 2022a) and the Institute of Air Quality Management (IAQM) guidelines (IAQM 2023). These are used to assess the impact of dust emissions from construction and demolition activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. It is important to note that the predicted impacts associated with the earthworks and construction phases of the proposed development are short term in nature.
The following data sources will be referred to during the air quality assessment:

- Environmental Protection Agency – National Ambient Air Quality Monitoring Data Archive;

- Environmental Protection Agency – Air Quality in Ireland 2022 Report and previous reports (1997 – 2022);
- National Parks and Wildlife Service Maps; and
- Environmental Protection Agency – Integrated Pollution Control Licences.

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "Air Quality in Ireland 2022" (EPA 2023), details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2023a). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D. In terms of air monitoring, the region of the proposed development is categorised as being rural Zone D (EPA, 2023a).

In 2020 the EPA reported (EPA, 2023a) that Ireland was compliant with EU legal air quality limits at all air monitoring locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA report '*Air Quality in Ireland 2020*' details the effect that the Covid-19 restrictions had on monitoring stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. For this reason, they have not been included in the baseline section. Long-term monitoring data from previous years has been used to inform estimated background concentrations for this assessment.

NO_2 monitoring was carried out at two rural Zone D locations in 2022, Emo and Kilkitt (EPA 2023). The NO_2 annual average in 2022 for Emo was 3 µg/m^3 and for Kilkitt was 2 µg/m^3. Hence, long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 40 µg/m^3. The average results over the last five years at these rural Zone D locations range from 2-5 µg/m^3. Based on the above information a conservative estimate of the background NO_2 concentration in the region of the proposed wind farm is 5 µg/m^3.

Long-term PM_{10} monitoring was carried out at the rural Zone D locations of Kilkitt and Claremorris in 2022 (EPA, 2023a). The PM_{10} annual average in 2022 for Claremorris was 8 µg/m^3 and for Kilkitt was 9 µg/m^3. The average results over the last five years at these rural Zone D locations range from 7-12 µg/m^3. Hence long-term average PM_{10} concentrations measured at this location were significantly lower than the annual average limit value of 40 µg/m^3. Based on the above information a conservative estimate of the background NO_2 concentration in the region of the proposed wind farm is 12 µg/m^3.

The results of $PM_{2.5}$ monitoring at Claremorris (Zone D) indicated an average $PM_{2.5}$ concentration of in 6.1 µg/m^3 2022 (EPA, 2023a). Long-term average concentrations were significantly lower than the annual average limit value of 25 µg/m^3. . The average results over the last five years suggest an average of no more than 8.2 µg/m^3 as a background concentration.

In summary, existing baseline levels of NO_2, PM_{10} and $PM_{2.5}$ based on extensive long-term data from the EPA are estimated to be well below ambient air quality limit values in the vicinity of the proposed wind farm.

2.2 Climate

2.2.1 Greenhouse Gas Assessment (GHGA) Receiving Environment

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 a European Parliament approval of a resolution declared a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its binding EU targets under Regulation 2018/842 (European Union, 2018), results in either beneficial or adverse changes in GHG emissions being of more significance than previously considered prior to these declarations.

Data published in July 2023 (EPA, 2023b) predicts that Ireland exceeded (without the use of flexibilities) its 2022 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 3.72 Mt CO_2eq. When the available flexibilities are taken into account, the limit is exceeded by 1 Mt CO_2e. The sectoral breakdown of 2022 GHG emissions is shown in Table 4. The sector with the highest emissions in 2022 was agriculture at 38.4% of the total, followed by transport at 19.1%. For 2022 total national emissions (excluding LULUCF) were estimated to be 60,764 kt CO_2e as shown in Table 4 (EPA, 2023b).

Table 4. Total National GHG Emissions in 2022 (EPA, 2023b)

Category	2022 Kilotonnes CO_2eq	% of Total GHG emissions
Agriculture	23,337	34%
Transport	11,634	17%
Energy Industries	10,076	15%
Residential	6,105	9%
Manufacturing Combustion	4,288	6%
Industrial Processes	2,289	3%
F-Gases	741	1%
Commercial Services	767	1%
Public Services	659	1%
Waste Note 2	867	1%
LULUFC	7,305	11%
National Total excluding LULUFC	60,764	89%
National Total including LULUFC	68,069	100%

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022b) and IEMA Guidance (IEMA, 2022) the future baseline is a trajectory towards net zero

by 2050, "*whether it* [the project] *contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

The future baseline will be determined by Ireland meeting its targets set out in the CAP23, and future CAPs, alongside binding 2030 EU targets. In order to meet the commitments under the Paris Agreement, the European Union (EU) enacted 'Regulation (EU) 2018/842 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013' (hereafter referred to as the Regulation) (European Union 2018). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The Regulation was amended in April 2023 and Ireland must now limit its greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture.

2.2.2 Climate Change Risk (CCRA) Receiving Environment

The region of the proposed development has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Belmullet is the nearest weather and climate monitoring station to the proposed development with meteorological data recorded for the 30-year period from 1991 to 2020. The data indicates that the wettest months at Belmullet were October - January, and the driest month on average was May. July was the warmest month with a mean temperature of 14.9° Celsius. The highest mean wind speeds occurred in January (7.6 m/s) and the lowest speeds occurred in July (5.5 m/s).

Recent weather patterns and records of extreme weather events recorded by Met Éireann have been reviewed. A noticeable feature of the recent weather has been an increase in the frequency and severity of storms with notable events including Storm Darwin in February 2014, Storm Emma in March 2018 and Storm Ophelia in October 2018. The maximum wind gust for Dublin Airport occurred during Storm Ophelia, peaked at 104 km/hr with a 10-minute speed of 70 km/hr.

Impacts as a result of climate change involve increases in global temperatures, increases in the number of rainfall days and storms per year and changes in wind speeds. Therefore, it is expected that the baseline climate will evolve over time and consideration is needed with respect to this within the detailed design of the proposed development, as per the European Commission *Technical guidance on the climate proofing of infrastructure in the period 2021-2027* (European Commission, 2021a), should the proposed development proceed.

Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east including in the region (EPA, 2021b). The EPA have compiled a list of potential adverse impacts (EPA, 2021a) as a result of climate change including the following which may be of relevance to the proposed development:

- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species.

The EPA sponsored research project 'Ensemble of regional climate model projections for Ireland (Report No. 159)' (EPA, 2015) has projected significant decreases in mean annual, spring and summer precipitation amounts with extended dry periods. The decreases are largest for summer, with reductions ranging from 0% to 13% and from 3% to 20% for the medium-to-low and high emission scenarios, respectively. Conversely increases of heavy precipitation of up to 20% are projected to occur during the winter and autumn months. The number of extended dry periods is projected to increase substantially by mid-century during autumn and summer.

In relation to storms, the report indicates that the overall number of North Atlantic cyclones is projected to decrease by 10% coinciding with a decrease in average mean sea-level pressure of 1.5 hectopascals (hPa) for all seasons by mid-century. Wind energy is also predicted to decrease for spring, summer and autumn with a projected increase in winter. A projected increase in extreme storm activity is expected to adversely affect the future wind energy supply.

The EPA's Critical Infrastructure Vulnerability to Climate Change report (EPA, 2021c) assesses the future performance of Ireland's critical infrastructure when climate is considered. With respect to wind farm infrastructure, changes in wind speed variability are considered the main risk. Extreme wind events are projected to increase in future, while the frequency of extreme low wind speeds is also projected to increase in future. Both types of event are likely to reduce the overall wind energy resource.

Future climate predictions developed by Met Éireann have been published in 'Ireland's Climate: the road ahead' (Met Éireann, 2013) based on four scenarios (RCP2.6, RCP4.5, RCP6.0 and RCP8.5), with focus on RCP4.5 (medium-low) and RCP8.5 (high) scenarios. These are named with reference to a range of radiative forcing values for the year 2100 i.e. 2.6, 4.5, 6.0 and 8.5W/m^2 (watts per square metre) respectively. In terms of mean temperatures, it is predicted that increases of between 1°C to 3°C will occur under RCP4.5 rising to 2°C to 4°C under RCP8.5. Warm extremes are expected to rise by 2°C to 3°C (RCP4.5) but by up to 5°C under RCP8.5.

The EPA's State of the Irish Environment Report (Chapter 2: Climate Change) (EPA, 2020b) notes that projections show that full implementation of additional policies and measures, outlined in the 2019 Climate Action Plan (DECC, 2019), will result in a reduction in Ireland's total GHG emissions by up to 25 per cent by 2030 compared with 2020 levels. Climate change is not only a future issue in Ireland, as a warming of approximately 0.8°C since 1900 has already occurred. The report (EPA, 2020b) underlines that the next decade needs to be one of major developments and advances in relation to Ireland's response to climate change in order to achieve these targets and that Ireland must accelerate the rate at which it implements GHG emission reductions.

Future climate predictions undertaken by the EPA have been published in 'Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach (EPA, 2020c). The future climate was simulated under both Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. This study indicates that by the middle of this century (2041–2060) mid-century mean annual temperatures are projected to increase by 1 – 1.2°C and 1.3 to 1.6°C for the RCP4.5 and RCP8.5 scenarios, respectively, with the largest increases in the east. Warming will be enhanced at the extremes (i.e. hot days and cold nights), with summer daytime and winter night-time temperatures projected to increase by 1 to 2.4°C. There will be a substantial decrease of approximately 50% in the number of frost and ice days. Summer heatwave events are expected to occur more frequently, with the largest increases in the south. In addition, precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events. Climate change also has the potential to impact future

energy supply which will rely on renewables such as wind and hydroelectric. Wind turbines need a specific range of wind speeds to operate within and droughts or low ground water levels may impact hydroelectric energy generating sites. More frequent storms have the potential to damage the communication networks requiring additional investment to create resilience within the network.

The study also projects mean annual percentage change in 10-m wind speed for the RCP4.5 and RCP8.5 scenarios, which will consequently affect swell generation for the Irish wave climate. The projections show a slight reduction in the 10-m wind speed of 1–2.7% for the RCP4.5 scenario and 1.6–3.3% for the RCP8.5 scenario. All seasons show a projected decrease in mean 10-m wind speed. The decreases are largest for summer under the RCP8.5 scenario, ranging from 2% to 5.4%.

3.0 DESCRIPTION OF POTENTIAL IMPACTS

3.1 Air Quality

3.1.1 Construction Phase

The potential impacts due to construction phase dust assessment will be undertaken in accordance with the IAQM Guidance (2023) to assess potential impacts with respect to construction phase dust. Impacts will potentially be caused by activities such as excavation, soil movement, soil storage and backfilling, and would be exacerbated by winds and dry weather. Dust tends to be deposited within 350m of the generation site, and therefore sensitive receptors which fall within this distance of construction activities would be most at risk.

The assessment will take account of sensitive receptors relevant to the proposed development. Sensitive receptors include locations where people spend significant periods of time, such as domestic properties. Ecological receptors are habitats that might be sensitive to dust. Examples of sensitive receptors include:

- Residential dwellings;
- Industrial or commercial uses sensitive to dust;
- Recreational areas and sports grounds;
- Schools and other educational establishments;
- Buildings of religious sensitivity;
- Designated ecological area of conservation (either Irish or European designation);
- Hospitals and nursing homes; and
- Offices or Shops.

The main steps in the assessment are:

- For each category of construction (demolition, earthworks, construction and trackout), first:
  - Determine the potential dust emission magnitude;
  - Determine the sensitivity of the area; and
  - Establish the risk of dust impacts.
- Detail any required site-specific mitigation; and
- Confirm any potential residual effects.

The potential impacts due to construction stage traffic will be reviewed in line with the TII assessment criteria in Section 4.3.3 of PE-ENV-01106 (TII, 2022a) to determine whether a detailed air quality assessment of traffic emissions is required:

- Road alignment will change by 5 meters (m) or more; or

- Annual average daily traffic (AADT) flows will change by 1,000 or more; or
- Heavy duty vehicle (HDV) (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more; or
- Daily average speed change by 10 kph or more; or
- Peak hour speed will change by 20 kph or more.

Within the Environmental Impact Assessment Report ('EIAR') for the proposed development, the construction traffic will be considered with respect to the above screening criteria to determine if a detailed air quality assessment of construction stage traffic emissions is required. As construction data is not currently available this assessment must be considered at EIAR stage.

3.1.2 Operational Phase

The greatest potential impact on air quality associated with the operational and maintenance phase is likely to be associated with traffic emissions. There are no significant emissions to air from the wind turbines and associated infrastructure that will have a potential impact on air quality.

In addition to GHG emissions savings associated with the proposed development, which once in operation will produce electrical power up to 1GW, there will be beneficial impacts on regional air quality. This will be due to the reduced reliance of fossil fuels to generate electricity within Ireland. This will likely be a beneficial impact.

With regard to potential operational phase impacts from traffic, the thresholds outlined below, as per Section 4.3.3 of PE-ENV-01106 (TII, 2022a) will be considered:

- Road alignment will change by 5 meters (m) or more; or
- Annual average daily traffic (AADT) flows will change by 1,000 or more; or
- Heavy duty vehicle (HDV) (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more; or
- Daily average speed change by 10 kph or more.

Within the EIAR, the operational traffic will be considered with respect to the above screening criteria to determine if a detailed air quality assessment of operational stage traffic emissions is required. The traffic generated during this phase will be minimal, with a small number of trips to the substation for inspection, monitoring and maintenance purposes. However, as traffic numbers are not yet available, the operational traffic will be considered with respect to the above screening criteria to determine if a detailed air quality assessment of operational stage traffic emissions is required.

3.2 Climate

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- Climate Change Risk Assessment (CCRA) – Identifies the impact of climate change on a project and receiving environment. The assessment considers a project's vulnerability to climate change and identifies adaptation measures to increase project resilience.

3.2.1 Construction Phase

GHG emissions from construction traffic and embodied energy from construction materials will increase Ireland's GHG emissions potentially causing climate change. The impact of this will be assessed in the EIAR. The embodied energy of the construction material is expected to be the dominant source of GHG emissions as a result of the development. Emissions with the potential to cause climate change will arise from embodied carbon dioxide in site materials, removal of existing material and backfill as well as kilometres travelled by vehicles delivering/removing this material to and from the construction site. These emissions will be quantified using the TII Online Carbon Tool (TII, 2022c) and compared to Irelands greenhouse gas emission budgets.

The proposed development has the potential to cause a loss of forestry and removal of peat during the construction phase, this may have a negative impact on the sequestration of GHG emissions, this will be reviewed as part of the EIAR.

The potential construction traffic emissions will be reviewed in accordance with the TII guidance PE-ENV-01104 (TII, 2022b).

3.2.2 Operational Phase

The potential operational traffic emissions will be reviewed in accordance with the TII guidance PE-ENV-01104 (TII, 2022b).

The benefit in terms of offset greenhouse gas emissions will be calculated from the average fossil fuel electricity mix which will be offset by use of wind energy. This helps to fulfil Roscommon County Council's Climate Change Adaptation Strategy's (Roscommon County Council, 2019) commitment to more renewable energy sources.

The TII guidance document PE-ENV-01104 (TII, 2022b) outlines a recommended approach for determining the significance of both the construction and operational phases of a development. The approach is based on comparing the 'Do Something' scenario and the net project GHG emissions (i.e. Do Something – Do Minimum) to the relevant carbon budgets (Government of Ireland, 2022).

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022b) is based on IEMA guidance (IEMA, 2022) which is consistent with the terminology contained within the EPA's (2022) *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'*. Significance is determined using the criteria in Table 6.7 of PE-ENV-01104 (TII, 2022b) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

An assessment of the potential vulnerability of the proposed development to climate change involves an analysis of the sensitivity and exposure of the development to climate hazards, which together provide a measure of vulnerability.

Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (European Commission, 2021a) outlines an approach for undertaking a climate change risk assessment where there is a potentially significant impact on the proposed development due to climate change. The risk assessment assesses the likelihood and consequence of the impact occurring, leading to the evaluation of the significance of the impact. The role of the climate consultant in assessing the likelihood and impact is to facilitate the climate change risk

assessment process with input from the design team or specific specialists such as hydrology.

3.3 Proposed Methodology and Assessment

3.3.1 Air Quality

It is proposed that an assessment of air quality will be carried out in accordance with the following guidance and established best practice, it will be tailored accordingly based on professional judgement and local circumstance:

- Best Practice Guidelines for the Irish Wind Energy Industry (2012);
- TII guidance PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects.
  IAQM Guidance on the Assessment of Dust from Demolition and Construction (hereafter referred to as the IAQM Guidance) (IAQM, 2023).

The air quality assessment methodology will include the following:

- Details the EIA scoping and consultation process undertaken and sets out the scope of the impact assessment for air quality;
- Identifies the key legislation, policy and guidance relevant to air quality, with reference to the latest updates in guidance and approaches;
- Confirms the study area for the assessment and presents the impact assessment methodology for air quality;
- Describes and characterises the baseline environment for air quality, established from desk studies, project survey data and consultation;
- Defines the project design parameters for the impact assessment and describes any embedded mitigation measures relevant to the air quality assessment;
- Presents the assessment of potential impacts or benefits on air quality and identifies any assumptions and limitations encountered in compiling the impact assessment; and
- Details any additional mitigation and/or monitoring necessary to prevent, minimise, reduce or offset potentially significant effects identified in the impact assessment.

3.3.2 Climate

3.3.2.1 GHGA

The assessment set out in PE-ENV-01104 (TII, 2022b) aims to quantify the difference in GHG emissions between the proposed development and the baseline scenario (without the proposed development). The assessment process is guided by the following documents:

- Publicly Available Specification (PAS) 2080:2016 on Carbon Management in Infrastructure (BSI, 2016): this provides a framework that allows all parties involved in the development of an infrastructure project to work together to quantify the project's overall carbon impact.
- The Institute of Environmental Management and Assessment Assessing Greenhouse Gas Emissions and Evaluating their significance (2nd Edition) (IEMA, 2022): lays out the process of assessing GHG emissions to understand their significance in the context of an EIA.

The IEMA 2022 GHG Guidance does not recommend a particular approach for this due to variations of situations, but instead sets out advice for the key common components necessary for undertaking a GHG emissions assessment.

During the assessment IEMA recommend use of a reasonable worst-case scenario rather

than an absolute worst-case scenario. The IEMA 2022 GHG Guidance states that a GHG emissions assessment should incorporate the following steps into any climate assessment:

- Evaluate early opportunities to reduce GHG emissions;
- Set the scope and boundaries of the GHG assessment;
- Data collection;
- Develop the baseline and Do-Minimum Scenario;
- Calculate/determine the GHG emissions from the proposed development;
- Identify mitigation measures;
- Assess significance; and
- Assess cumulative impacts.

3.3.2.2 CCRA

PE-ENV-01104 (TII, 2022b) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

- Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a); and
- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA, 2022).

The initial stage of an assessment is to establish a scope and boundary for the assessment taking into account the following criteria:

- Spatial boundary: As per PE-ENV-01104 (TII, 2022b), the study area with respect to the GHGA is Ireland's Climate budget. The study area with respect to the CCRA can be considered the project boundary and its assets. The study area will be influenced by current and future baselines, and by the input of other experts within the EIAR team;
- Climate hazards: The outcomes of the climate screening i.e. vulnerability assessment and baseline assessment; and
- Project receptors: TII state that the project receptors are the asset categories considered in the climate screening. In addition, any critical connecting infrastructure and significant parts of the surrounding environment e.g. water bodies that should be considered as a part of the indirect, cumulative and in combination impact assessment should also be considered project receptors.

3.4 Preliminary Mitigation Measures

3.4.1 Air Quality

Throughout the evolution of the proposed development, measures will be adopted as part of the evolution of the project design and approach to construction, to avoid or otherwise reduce adverse impacts on the environment. Mitigation measures with respect to air quality will primarily revolve around the minimisation of construction dust.

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to ensure that no dust nuisance occurs a series of measures on will be implemented, drawing on best practice guidance from Ireland, the UK and the USA based on the following publications:

- Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2023);
- Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings

(The Scottish Office, 1996);
- Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance' (UK Office of Deputy Prime Minister, 2002); and
- Controlling Particles, Vapours & Noise Pollution From Construction Sites (BRE, 2003);
- Fugitive Dust Technical Information Document for the Best Available Control Measures (USEPA, 1997).

Mitigation measures will be finalised once an assessment of site sensitivity to dust nuisance, human health and ecological risk has been established within the EIAR.

3.4.2 Climate

Measures will be adopted as part of the evolution of the project design and approach to construction, to avoid or otherwise reduce adverse impacts on the environment. These mitigation measures are referred to as 'primary mitigation'. They are an inherent part of the Proposed Project and will be effectively 'built in' to the impact assessment.

The IEMA GHG Management Hierarchy (IEMA, 2020b) will be followed for impact minimisation in order to reduce its impact on climate related GHG emissions by implementing low-carbon energy options. The Hierarchy is as follows:

- First Eliminate
  - Influence business decisions/use to prevent GHG emissions across the lifecycle
  - Potential exists when organisations change, expand, rationalise or move business
  - Transition to new business model, alternative operation or new product/service
- Then Reduce
  - Real and relative (per unit) reductions in carbon and energy
  - Efficiency in operations, processes, fleet and energy management
  - Optimise approaches (e.g. technology) and digital as enablers
- If you can't eliminate or reduce, then Substitute
  - Adopt renewables/low-carbon technologies (on site, transport etc)
  - Reduce carbon (GHG) intensity of energy use and of energy purchased
  - Purchase inputs and services with lower embodied/embedded emissions
- The final option is to Compensate
  - Compensate 'unavoidable' residual emissions (removals, offsets etc)
  - Investigate land management, value chain, asset sharing, carbon credits
  - Support climate action and developing markets (beyond carbon neutral).

The hierarchy states where possible the aim is to design out and eliminate potential impacts completely. Where this is not possible impacts should be reduced/substituted to reduce impacts. Finally, if impacts cannot be eliminated by design or reduced/substituted then the IEMA GHG Management Hierarchy final mitigation measure that should be considered is compensation, this includes the use of carbon offsets.

3.5 References

BRE (2003) Controlling Particles, Vapours & Noise Pollution from Construction Sites

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Institute of Environmental Management & Assessment (IEMA) (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance

Institute of Air Quality Management (IAQM) (2020) A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites

Institute of Air Quality Management (IAQM) (2023) Guidance on the Assessment of Dust from Demolition and Construction

Roscommon County Council (2019) Climate Change Adaptation Strategy 2019 - 2024

Transport Infrastructure Ireland (2022a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

Transport Infrastructure Ireland (TII) (2022b) PE-ENV-01104: Climate Guidance for National Rods, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document

Transport Infrastructure Ireland (TII) (2022c) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document

UKHA (2019) Design Manual for Roads and Bridges Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 - Climate

UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance

USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures

ANNEX 5 – LANDSCAPE SCOPING REPORT

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LANDSCAPE & VISUAL SCOPING REPORT

Islandmore Wind Farm.

Co. Roscommon.

Prepared by Macro Works Ltd on behalf of Islandmore Wind Farm Ltd

March 2025 I Rev C



LVIA I TVIA I Landscape Design I Visibility Analysis I Glint and Glare I Verified Photomontages I CGI I Shadow Flicker Analysis

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This LVIA should be read in conjunction with the Viewpoint Selection Report produced by Macro Works Ltd.

Registered Landscape Architect

macroworks APEM Group

1 INTRODUCTION

1.1.1 The purpose of this Scoping Report is to describe the scoping methodology, present outcomes of initial desk study and fieldwork stages, and to establish the scope of work and methods applied in the identification and assessment of landscape and visual impacts of the proposed Islandmore Wind Farm ('proposed development').

1.1.2 It will present key landscape and visual receptors and highlight potential effects that will be assessed. Another key element of the landscape and visual scoping report is the selection of the preliminary set of representative Viewpoints, from which it is intended to prepare photomontage simulations of the development and undertake the visual impact assessment.

1.1.3 The proposed Islandmore Wind Farm will be located in north County Roscommon, c.2km north of Ballaghaderreen, c.13km east of Charlestown (Co. Mayo) and c.6km south west of Gorteen (Co. Sligo).

2 POLICY PLAN AND CONTEXT

2.1.1 The European Landscape Convention promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues. The Convention was adopted on the 20th October 2000 and came into force on the 1st March 2004. The Convention was ratified by Ireland in 2002.

2.1.2 As one of the obligations under the convention, a draft National Landscape Strategy was issued for public consultation by the *Department of Arts*, *Heritage*, Regional, Rural and *Gaeltacht* Affairs, (formally the Department of Art, Heritage and the Gaeltacht in July 2014. Following consideration of submissions, The 'National Landscape Strategy for Ireland 2015-2025' was published in mid-2015 by the Department of Arts, Heritage and the Gaeltacht.

2.1.3 One of the key objectives of the National Landscape Strategy, and a requirement of the European Landscape Convention, is to prepare a National Landscape Character Assessment (LCA). However, this is not likely to be prepared prior to the submission of the planning application.

2.1.4 On this basis, county level Landscape Character Assessments for County Roscommon, County Sligo, and County Mayo (contained within the respective County Development Plans) will be a key consideration. In all cases, these Landscape Character Assessments have also been integral to the development of wind energy strategies / policy contained within the CDPs.

2.1.5 Wind Energy Development within the Republic of Ireland is undertaken in accordance with the Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines for Planning Authorities (2006/2019 revision). Recommendations on the siting and design of wind energy developments are provided in Chapter 6 of the current / draft revised Guidelines based on six potential landscape character types. The proposed development is considered to be most associated with the 'Transitional Marginal Land' landscape character type, albeit the wider study area contains elements of the 'Hilly and flat farmland' landscape character type. This guidance will be a key consideration of the landscape and visual assessment.

2.1.6 The Landscape and Visual Assessment of Islandmore Wind Farm will be undertaken in strict accordance with the Landscape Institute and the Institute of Environmental Management and Assessment publication entitled 'Guidelines for Landscape and Visual Impact Assessment' – Third Edition (2013), commonly referred to as GLVIA3. This is recognised as the principal best practice guidance for landscape and visual assessment of all forms of development in Ireland and the UK.

2.1.7 Regard will also be given to the overarching Environmental Impact Assessments guidelines and advice notes set out by the EPA:

- Environmental Protection Agency (EPA) Guidelines on the Information to be contained in the Environmental Impact Assessment Reports (EPA, 2022)

2.1.8 Other relevant LVIA and wind energy-specific guidance that will be considered includes;

- Scottish Natural Heritage (SNH) Siting and Designing Wind Farms in the Landscape (version 3a – 2017)
- Scottish Natural Heritage (SNH) Assessing the Cumulative Impact of Onshore Wind Energy Developments (2012).
- Scottish Natural Heritage (SNH) Visual representation of wind farms: Best Practice Guidelines (version 2.2 - 2017).

2.1.9 The most relevant landscape and visual policies with regard to the proposed wind farm development are contained in the County Development Plan for County Roscommon, County Sligo, and County Mayo.

Roscommon County Development Plan 2022-2028

2.1.10 A Landscape Character Assessment for County Roscommon is incorporated in the County Development Plan and divides the county into seven Landscape Character Types (LCTs). The proposed development site falls within the 'Hills and Uplands' LCT. The county is further subdivided into Landscape Character Areas (LCAs) that broadly align with the LCT areas. The proposed development site is located within LCA 23 'Ballaghaderreen and Bockagh Hill Uplands'.

2.1.11 The Landscape Character Assessment also identifies landscape values in relation to each of the LCAs. LCA23, together with other LCAs within the wider study area, are identified as being of 'Moderate value'. Of LCA23 it states:

"This landscape is of Moderate value. The elevated Scenic Route from Bockagh Hill affords views of the Roscommon and Mayo landscape and provides spatial relief from the predominantly low lying landscape of much of the rest of the county. The intimate landscapes of small fields and stone walls to the northwest of the character area signal the transition from the midlands to the west of Ireland."

2.1.12 Visual impacts with regard areas of 'Moderate Value' require consideration with reference to Policy Objective NH 10.25 of the CDP.

2.1.13 With regard to wind energy developments, the Renewable Energy Strategy incorporated within the CDP identifies the site as falling within an area designated as "Most Favoured", which is where (as described):

"Wind farm development will be considered favourably, subject to compliance with all necessary siting and design standards."

2.1.14 Scenic Routes and Views are considered with relevance to Policy Objective NH 10.26 of the CDP.

Sligo County Development Plan 2024-30

2.1.15 The Sligo County Development Plan (CDP), does not contain a Landscape Character Assessment of the traditional form that objectively identifies geographically distinct landscape character units. Instead, it includes a landscape characterisation and appraisal study that classifies the County according to its visual sensitivity and capacity to absorb new development without compromising the scenic character of certain areas. It identifies 'Normal Rural landscapes', 'Sensitive Rural landscapes', 'Visually

Vulnerable Areas', and 'Scenic Routes'. The designation of Scenic Routes provides a basis for protective views and prospects.

2.1.16 Landscape Character Polices are included in Chapter 23 of the CDP, with policies in Chapter 24 (Natural heritage), and Chapter 25 (Built heritage) being of relevance.

Mayo County Development Plan 2022-2028

2.1.17 A Landscape Appraisal for County Mayo is incorporated in the current Mayo CDP. The county is divided into six Policy Areas relating to landscape protection and capacity to absorb development. The Landscape Appraisal also includes a Landscape Sensitivity Matrix that provides a general indication of the likelihood of success of planning applications for each development type, in each policy area.

2.1.18 That part of County Mayo that falls within the study area is within Policy Area 4 '*Drumlins and Inland lowland*'. The landscape sensitivity matrix states that Policy area 4 has a High to Medium potential to create adverse impacts on the existing landscape character as a result of wind energy development. The other three Policy Areas are of High sensitivity.

2.1.19 There are no 'Scenic Routes' or 'Scenic Routes with Designated Views' that fall within the study area or ZTV pattern. Landscape Policies NEP14, NEO 25 to 29 are considered relevant.

2.2 County Development Plan Scenic Designations

2.2.1 Scenic views and routes designations from the Roscommon County Development Plan will be considered as well as those from other Planning Authority jurisdictions (Sligo and Mayo) within the study area. Those considered relevant in terms of viewing direction and potential visibility of the proposed development will be included as a representative viewpoint for the purposes of the visual impact assessment. A list of those designated scenic views that have been scoped out and the reasoning why will be included within the accompanying Viewpoint Selection Report.

3 STUDY AREA

3.1.1 The Wind Energy Development Guidelines for Planning Authorities (2006/2019 draft revised) specify different radii for examining the Zone of Theoretical Visibility of proposed wind farm projects ('ZTV'). The extent of this study area is influenced by turbine height as follows;

- 15km radius for blade tips up to 100m;
- 20km radius for blade tips greater than 100m; and
- 25km in order to incorporate features of national or international renown.

3.1.2 In the case of this proposed development, the blade tips will be over 100m high and, thus, the minimum ZTV radius required is 20km from the outermost turbines of the proposed development.

3.1.3 Part of the landscape to the north and northwest of the 20km study area and beyond relates to part of County Sligo that has been included in Ireland's Tentative List of World Heritage Properties. The proposals therefore have the potential to affect the cultural significance of a landscape of recognised international cultural heritage importance (subject to future ratification by UNESCO).

3.1.4 Whilst the impact of the proposal on this landscape and the sites it contains is primarily a Cultural Heritage consideration, acceptance onto the Tentative List highlights the acknowledged importance of the Neolithic passage tombs of Sligo as a coherent group which is understood in a wider landscape context, and the sensitivity of this landscape and its wider landscape setting is recognised.

3.1.5 In terms of defining a study area, notable features in this landscape, including Muckelty Hill and Knocknashee, fall within 20km from the site. Given the proximity of these sites, a radius of 20km is considered to remain appropriate and proportional to a consideration of landscape and visual effects.

3.2 Consultation

3.2.1 It is recommended that consultation on the landscape and visual impact assessment will be undertaken with Roscommon County Council, along with local residents.

4 SCOPING METHODOLOGY

4.1.1 Scoping for this LVIA will consist of a combination of 'Desk Study' and fieldwork in order to understand the nature of the receptors within the study area and the nature of likely impacts that are likely to occur as a result of the proposed development. The Desk Study element precedes fieldwork as the latter is used to scope-in or scope-out potentially affected receptors that are identified as part of the desk study.

4.1.2 Establishing the landscape baseline includes consideration of the geographic location and landscape context of the proposed wind farm site as well as the essential landscape character and salient features of the wider Study Area and is discussed with respect to; landform and drainage and; vegetation and land use. The visual baseline is more population based, but still overlaps with elements of the landscape baseline. The visual baseline is discussed in relation to; centres of population and houses; transport routes and; public amenities and facilities.

4.2 Desk Study

4.2.1 The desktop study will comprise of the following:

- Review of the Zone of Theoretical Visibility (ZTV) map provided (refer to Figure 1), which indicates areas from which the proposed development is potentially visible in relation to terrain within the Study Area;
- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Online review of tourism, recreational and heritage features within the study area that may be potential visual receptors.
- Selection of potential representative assessment Viewpoints, that reflect views that may be obtained by key visual receptors, to be investigated during fieldwork for actual visibility and sensitivity.

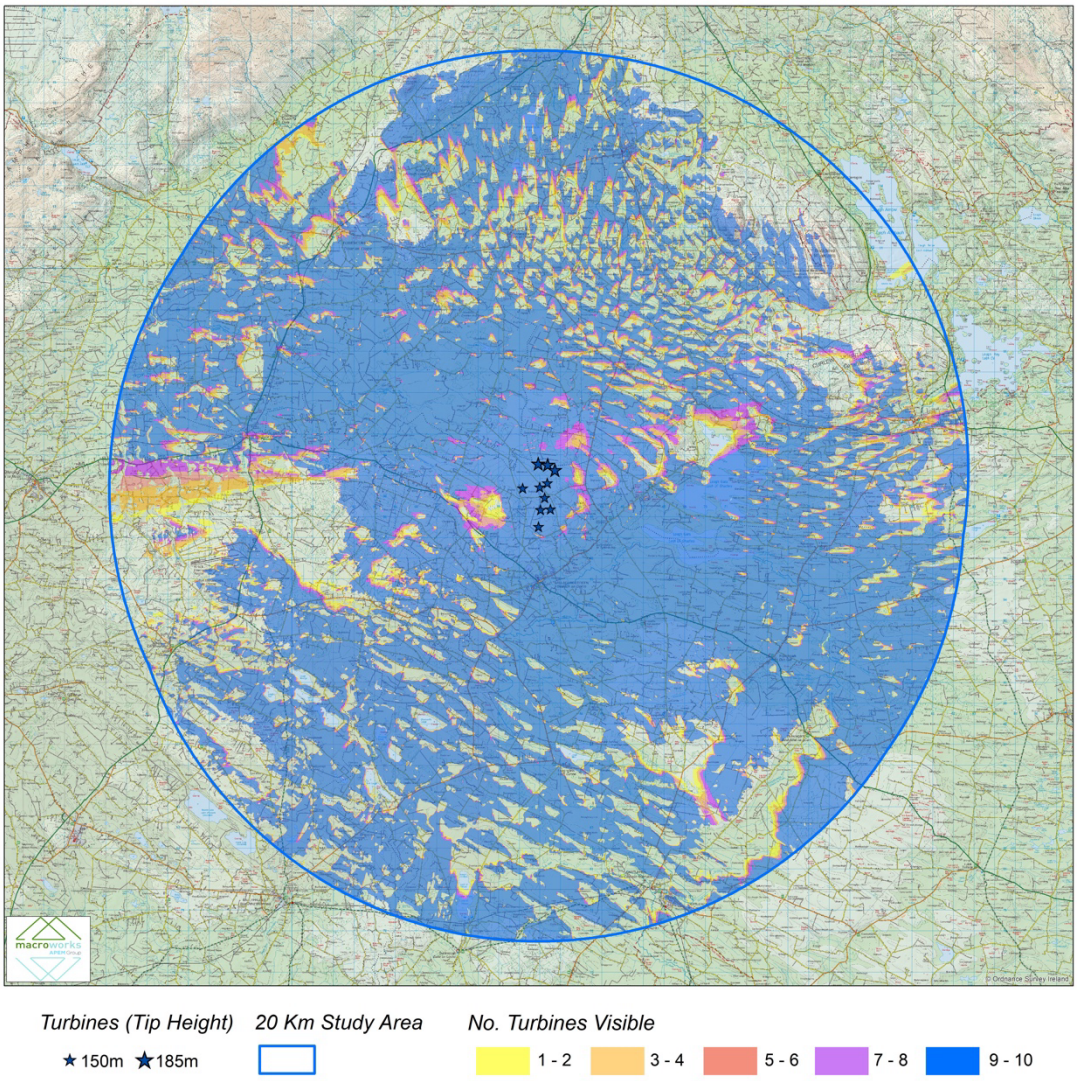
4.3 Fieldwork

4.3.1 Fieldwork was undertaken during Summer/Autumn 2023, with subsequent visits to the locality undertaken throughout 2024. Fieldwork comprised of the following:

- Examination of the salient landscape character of the site and its immediate surrounds as well as the wider study area.
- Investigation of potential viewpoint locations identified at the desk study stage and selection/rejection of each.
- Selection of other relevant viewpoints that may not have been apparent from the desk study (local monuments, walkways etc.)
- Examine the route of the proposed grid connection options.

- Preparation of a viewpoint selection report and associated map for consultation purposes (Planning Authorities) indicating the intended viewpoint selection set to be used for the preparation of photomontages to support the visual impact assessment.

Figure 1: Zone of Theoretical Visibility Map



5 POTENTIAL IMPACTS

5.1.1 As described in Section 4, analysis of ZTV maps provides the basis for initial desk-based VP selection, as these maps identify from where in the study area the development is potentially visible in a bare-ground scenario. Importantly, they also indicate areas where there is no potential for visibility, which can then be confidently scoped out of further investigation/assessment.

5.1.2 Overall, there is potential for short-range (0-5km), mid-range (5-15km) and long-range (15km+) views of the development, but with the highest potential for significant landscape and visual impacts to occur for short-range views, where these might coincide with highly sensitive receptors. Views of the proposed development from beyond 20km, though feasible, could only occur from elevated vantage points and in very clear viewing conditions. At such distances, any visual impacts from the proposed development are not considered to have the potential for significant effects, even at highly sensitive receptor locations.

5.1.3 Potential landscape and visual impacts could also occur with respect to ancillary development such as access roads, hard stands, and grid connections.

5.2 Analysis of ZTV map

5.2.1 The ZTV map illustrates the influence of topography within the study area. Comprehensive theoretical visibility is afforded in a northwest to south east band throughout the study area, with theoretical visibility in the northeastern and southwestern extents being hindered by areas of upland, such as around the Bricklieve Mountains in the northeastern extent of the study area, and the Ox Mountains in the northwest of the study area, as well as elevated areas around West of Ireland Airport near Lurga to the west, and elevated area around Fairymount to the south east. Undulations in the landscape comprising of drumlin-type landforms, and local high points such as Bockagh Hill lying to the southwest of the site, illustrate the localised influence of landform features in the areas beyond the northwest to southeast band of visibility.

5.2.2 The wider landscape is dissected east to west by the N5, with the N17 running north to south within the western part of the study area. These roads connect into a dense network of local roads that traverse the wider landscape.

5.2.3 Within the ZTV pattern, theoretical visibility would be afforded to key centres of population including Ballaghaderreen, Tobercurry, Charlestown, Gorteen, Boyle, Frenchpark, and Castlerea, as well as to many smaller clusters and linear belts of residential properties that lie across the wider landscape.

5.2.4 The wider landscape plays host to numerous local walking routes and trails, as it is typically associated with areas of settlement. A key recreational route of note within the study area is the Lung Lough Gara Way, a long-distance walking route that runs north to south through the study area, passing through the centre of the site.

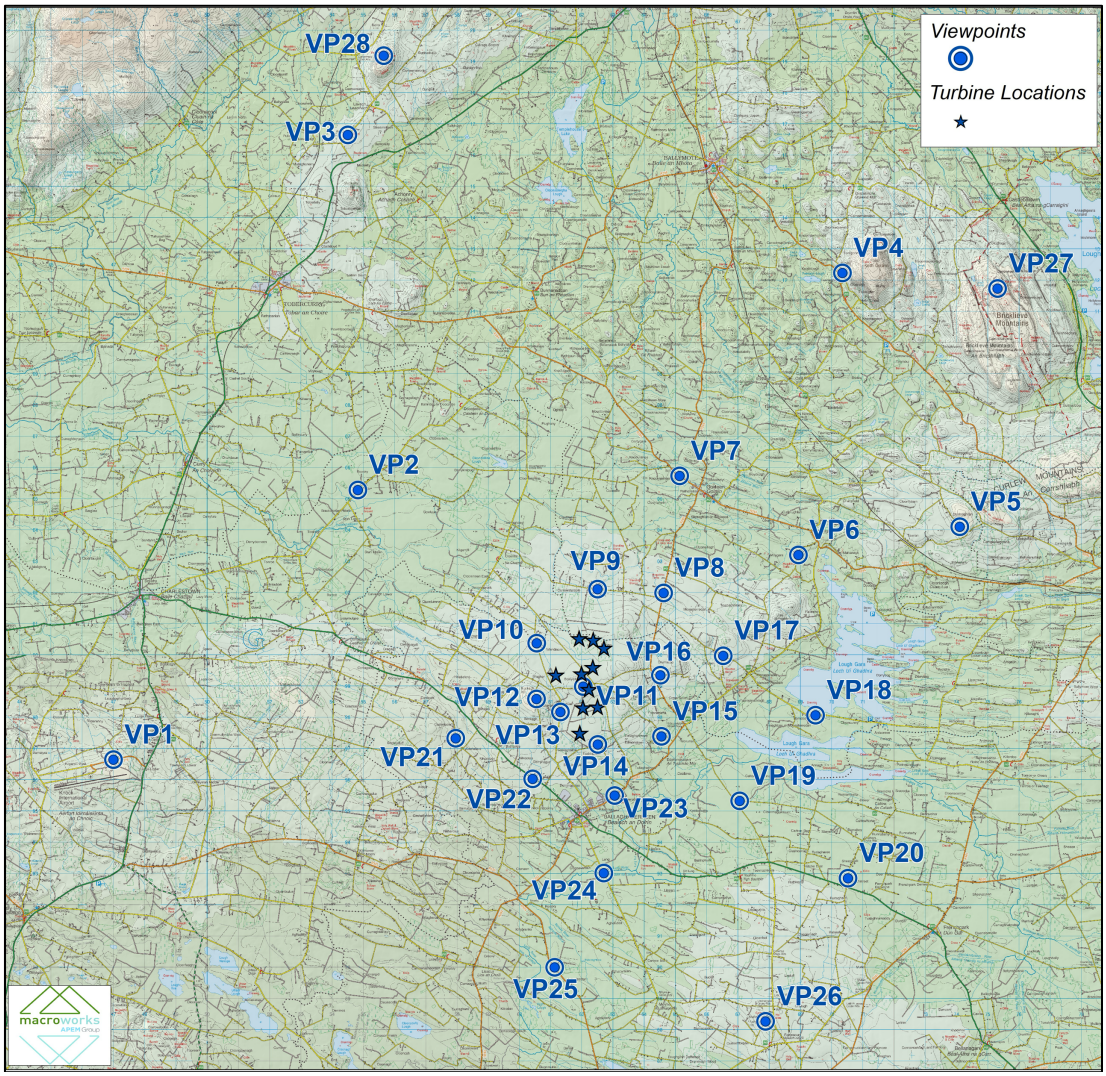
5.2.5 Visual receptors will include residential receptors, road users, and recreational receptors associated with waymarked trails.

5.3 Viewpoint Selection Report

5.3.1 Based on the ZTV map analysis and a baseline study of the site's wider landscape and visual context, a preliminary viewpoint selection was generated. With the intention of identifying a set of viewpoints with which to structure the assessment of visual effects in the LVIA, these were investigated in the field, and appraised as part of the 'Viewpoint Selection Report' that accompanies this scoping report.

5.3.2 Figure 2 illustrates the location of those viewpoints that have been selected and proposed for assessment in the LVIA. Full details of these viewpoints are presented in the accompanying document.

Figure 2: Selected Viewpoint Map



5.4 Potential Cumulative Impacts

5.4.1 The nearest existing wind energy development to the proposed development is the Largan Hill Wind Farm (9 no. turbines) located within approximately 500m of the northernmost proposed turbines.

5.4.2 There are also operational wind turbines at Roosky Wind Farm (2 no. turbines) 5.4km to the south of the proposed development as well as a single turbine at Brackloonagh, Charlestown, 11km to the north west of the proposed development.

5.4.3 It is not known if there are any other approved schemes in planning.

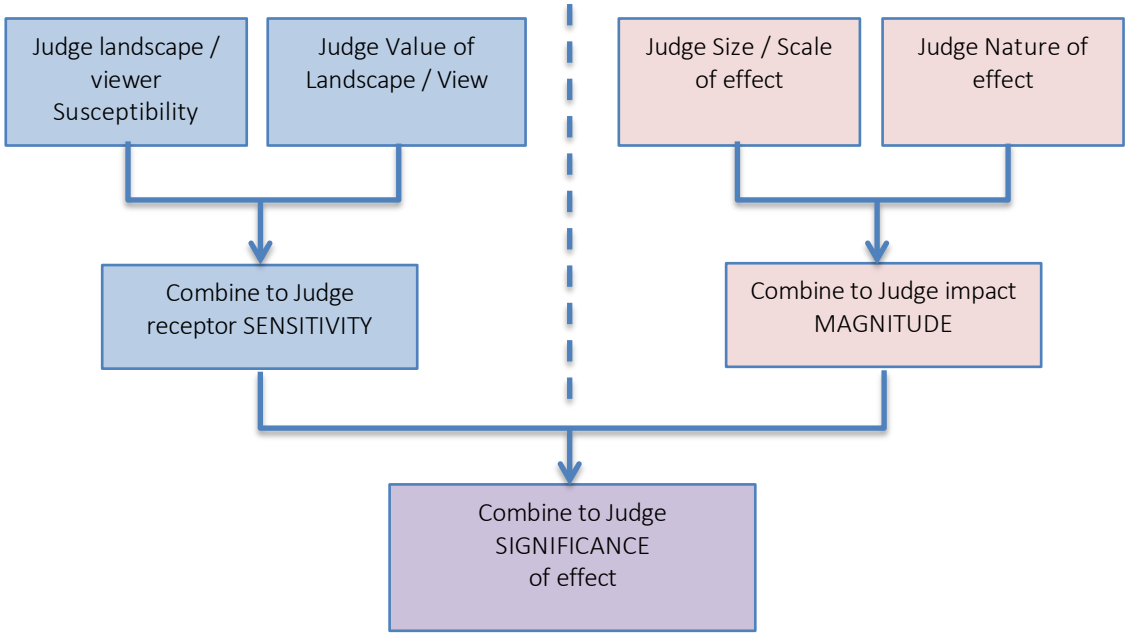
6 EIAR ASSESSMENT METHODOLOGY

6.1.1 Production of the Landscape and Visual Impact Assessment (Landscape EIAR chapter) will involve desktop studies and fieldwork comprising professional evaluation by qualified and experienced Landscape Architects.

6.2 Assessment

6.2.1 In accordance with the Guidelines for Landscape and Visual Impact Assessment (2013), the method for estimating the significance of landscape impacts and visual impacts is very similar. This is summarised in the diagram below;

Figure 2: Method for assessing Significance (based on GLVIA – 2013)



6.3 Landscape Impact Assessment

6.3.1 This part of the LVIA provides an assessment of how the introduction of the proposed development will affect the physical features and fabric of the landscape, and then how the proposals influence landscape character with reference to published descriptions of character and an understanding of the contemporary character of the landscape as informed through desktop and site studies.

6.3.2 When assessing the potential landscape effects of the development, the value and sensitivity of the landscape receptor are weighed against the magnitude of impact to determine the significance of the landscape effect. Criteria outlined below are used to guide these judgements.

Landscape Sensitivity

6.3.3 The sensitivity of the landscape to change is the degree to which a particular setting can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. The judgement reflects such factors as its quality, value, contribution to landscape character and the degree to which the particular element or characteristic can be replaced or substituted. Landscape Sensitivity is classified using the following criteria set out in **Error! Reference source not found.**.

Table 1 - Landscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at an international or national level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.
High	Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national or regional level (Area of Outstanding Natural Beauty), where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the landscape character exhibits some capacity and scope for development. Examples of which are landscapes, which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
Low	Areas where the landscape character exhibits a higher capacity for change from development. Typically, this would include lower value, non-designated landscapes that may also have some elements or features of recognisable quality, where landscape management objectives include, enhancement, repair and restoration.
Negligible	Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

Magnitude of change - Landscape

6.3.4 The magnitude of change is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the immediate setting that may have an effect on the landscape character. **Error! Reference source not found.** outlines criteria used to inform this judgement.

Table 2 - Magnitude of Change - Landscape

Criteria	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an extensive change of the landscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to a considerable change of the landscape in terms of character, value and quality.
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to noticeable changes in landscape character, and quality.
Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements that would lead to discernible changes in landscape character, and quality.
Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable leading to no material change to landscape character, and quality.

6.4 Visual Impact Assessment

6.4.1 This part of the LVIA provides an assessment of how the introduction of the proposed development will affect views within the landscape. It therefore needs to consider:

- Direct impacts of the proposed development upon views through intrusion or obstruction;
- The reaction of viewers who may be affected, e.g. residents, walkers, road users; and
- The overall impact on visual amenity.

6.4.2 It has been deemed appropriate to structure the assessment around a series of representative viewpoint locations. All viewpoints are located within the public domain and are representative of views available from main thoroughfares and pedestrian areas within the vicinity of the proposed development. The selected viewpoints are considered to be comprehensive in communicating the variable nature of the visual effects.

6.4.3 When assessing the potential visual effects of the development, the sensitivity of the visual receptor is weighed against the magnitude of the visual impact to determine the significance of the visual effect. Criteria outlined below are used to guide these judgements.

Sensitivity of Visual Receptors

6.4.4 As with landscape sensitivity, the sensitivity of a visual receptor is categorised as Very High, High, Medium, Low, and Negligible. Unlike landscape sensitivity however, the sensitivity of visual receptors has an anthropocentric (human) basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity the viewer is engaged in and whether this heightens their awareness of the surrounding environment.

6.4.5 A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below to establish visual receptor sensitivity at each viewpoint location.

Susceptibility of Visual Receptors to change

6.4.6 In accordance with GLVIA3, visual receptors most susceptible to changes in views and visual amenity are:

- "Residents at home;
- People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;
- Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;
- Communities where views contribute to the landscape setting enjoyed by residents in the area;
- Travellers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened".
- Visual receptors that are less susceptible to changes in views and visual amenity include;
- "People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape;
- People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life".

Value attached to Views

6.4.7 The value attached to a view is determined by considering the following:

- Recognised scenic value of the view (Development Plan designations, guidebooks, touring maps, postcards etc). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;
- Views from within highly sensitive landscape areas. These are likely to be in the form of Architectural Conservation Areas, which are incorporated within the Development Plan and therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;
- Primary views from residential receptors. Even within a dynamic city context, views from residential properties are an important consideration in respect of residential amenity;
- Intensity of use, popularity. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at a national or regional scale;
- Viewer connection with the landscape. This considers whether or not receptors are likely to be highly attuned to views of the landscape i.e. commuters hurriedly driving on busy roads versus tourists focussed on the character and detail of the landscape;
- Provision of vast, elevated panoramic views. This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas;
- Sense of remoteness and/or tranquillity. Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of a busy street scene, for example;
- Degree of perceived naturalness. Where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by distinctly manmade features;
- Presence of striking or noteworthy features. A view might be strongly valued because it contains a distinctive and memorable landscape / townscape feature such as a cathedral or castle;
- Historical, cultural and / or spiritual significance. Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;
- Rarity or uniqueness of the view. This might include the noteworthy representativeness of a certain landscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;
- Integrity of the landscape character. This looks at the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;
- Sense of place. This considers whether there is special sense of wholeness and harmony at the viewing location;
- Sense of awe. This considers whether the view inspires an overwhelming sense of scale or the power of nature.

6.4.8 Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity, and no relative importance is inferred by the order of listing.

6.4.9 It is recognised that a viewer's interpretation and experience of the landscape can have preferential and subjective components. Where relevant, judgements are made on those elements of the landscape that are considered to contribute more prominently and positively to the visual landscape resource as well as those elements that contribute negatively. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

Magnitude of Change - Visual

6.4.10 The magnitude of change is again a product of the scale, extent, or degree of change that is likely to be experienced as a result of the proposed development. This is directly influenced by its 'visual presence / prominence', as experienced by visual receptors in the landscape. These terms are somewhat quantitative in nature, and essentially relate to how noticeable or 'dominant' the proposal is within a particular view. Aside from the obvious influence of scale and distance, a development's visual presence is influenced by the extent and complexity of the view, contextual movement in the landscape, the nature of its backdrop, and its relationship with other focal points or prominent features within the view. It is often, though not always, expressed using one of the following terms: Minimal; Sub-dominant; Co-dominant; Dominant; Highly dominant.

6.4.11 For wind energy developments, a strong visual presence is not necessarily synonymous with adverse impact and this is reflected in Wind Energy Development Guidelines for Planning Authorities (2006/2019 revision) wherein, it is advocated that a clear and comprehensive view of a wind farm might be preferable in many instances to a partial or cluttered view of turbine components that are not so prominent within a view. On the basis of these reasons, the visual amenity aspect of assessing impact magnitude is qualitative and considers such factors as the spatial arrangement of turbines both within the scheme and in relation to surrounding terrain and land cover. It also examines whether the development contributes positively to the existing qualities of the vista or results in distracting visual effects and disharmony.

6.4.12 It should be noted that as a result of this two-sided analysis, a high order visual presence can be moderated by a low level of effect on visual amenity and vice versa. Given that wind turbines do not represent significant bulk, visual impacts result almost entirely from visual 'intrusion' rather than visual 'obstruction' (the blocking of a view). Criteria used to inform judgements are provided in Table 3.

Table 3 - Magnitude of Change - Visual

Criteria	Description
Very High	The proposal intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. A high degree of visual disorder or disharmony is also generated, strongly reducing the visual amenity of the scene
High	The proposal intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual disorder or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene
Medium	The proposal represents a moderate intrusion into the available vista, is a readily noticeable element and/or it may generate a degree of visual disorder or disharmony, thereby reducing the visual amenity of the scene. Alternatively, it may represent a balance of higher and lower order estimates in relation to visual presence and visual amenity
Low	The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene
Negligible	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene

6.5 Significance of Effects

6.5.1 The significance of a landscape or visual effect is based on a balance between the sensitivity of the receptor and the magnitude of change, and is categorised as Profound, Substantial, Moderate, Slight, or Imperceptible. Intermediate judgements are also provided to enable an effect to be more accurately described where relevant. 'No Effect' may also be recorded as appropriate where the effect is so negligible it is not noteworthy.

6.5.2 The significance category judgement is arrived at using the Significance Matrix at **Error! Reference source not found.** as a guide. This applies the principle of significance being a function of magnitude weighed against sensitivity, but employs slightly different terminology that avoids the potentially confusing use of the term 'significant' (GLVIA3 Statement of Clarification 1/13 (Landscape institute, 10th June 2013)). Indicative criteria descriptions used in relation to the significance of effect category are presented at **Error! Reference source not found.**.

Table 4 - Significance Matrix

	Sensitivity of Receptor				
Magnitude	Very High	High	Medium	Low	Negligible
Very High	Profound	Profound-substantial	Substantial	Moderate	Slight
High	Profound-substantial	Substantial	Substantial-moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

Table 5 - Indicative significance of effect criteria descriptions

	Landscape	Visual
Profound	There are notable changes in landscape characteristics over an extensive area or a very intensive change over a more limited area.	The view is entirely altered, obscured or affected.
Substantial	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the landscape. There are notable changes in landscape characteristics over a substantial area or an intensive change over a more limited area.	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the visual environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. There are minor changes over some of the area or moderate changes in a localised area.	An effect that alters the character of the visual environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.
Slight	An effect which causes noticeable changes in the character of the landscape without affecting its sensitivities. There are minor changes over a small proportion of the area or moderate changes in a localised area or changes that are reparable over time.	An effect which causes noticeable changes in the character of the visual environment without affecting its sensitivities. The affected view forms only a small element in the overall visual composition or changes the view in a marginal manner.
Imperceptible	An effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.	An effect capable of measurement but without noticeable consequences. Although the development may be visible, it would be difficult to discern resulting in minimal change to views.

6.5.3 It is important that the likely effects of the proposals are transparently assessed and understood in order that the determining authority can bring a balanced, well-informed judgement to bear when making a planning decision.

6.5.4 As such, whilst the significance matrix and criteria provide a useful guide, the significance of an effect is ultimately determined by the landscape specialist using professional judgement, and also in the context of occasionally using hybrid judgements to account for nuance.

6.5.5 Effects assessed as 'Substantial' or greater (shaded cells) are considered to be the most notable in landscape and visual terms, and may be regarded as 'Significant' in EIA terms, albeit it is important to note that this is not a reflection on their acceptability in planning terms.

6.6 Quality of Effects

6.6.1 In addition to assessing the significance of landscape and visual effects, the quality of the effects is also determined. Within this LVIA, effects are described as negative/adverse, neutral, or positive/beneficial, and the following criteria has been used to guide these judgements.

- Positive/beneficial - A change which improves the quality of the environment, enhancing the existing view/landscape;
- Neutral - No effects or effects that are imperceptible, within normal bounds of variation e.g. will neither detract from nor enhance the existing view/landscape;
- Negative/adverse - A change which reduces the quality of the environment, detracting from the existing view/landscape.

6.6.2 In the case of new energy / infrastructure developments within rural and semi-rural settings, the landscape and visual change brought about by an increased scale and intensity of built form is seldom considered to be positive / beneficial. Effects in these contexts are generally considered to be adverse in nature, or neutral, where the effect has little influence on the landscape/views.

7 CONCLUSION

7.1.1 The proposed development site is located within a broad area of landscape bordered by upland areas that is defined by a patchwork of raised bogland, wet grassland, agricultural pasture, and forestry, interspersed with river networks and inland bodies of water. It is a landscape that has been assessed as having 'Moderate Value', and defined as 'Most favoured' for wind energy development, with the caveat that it complies with all necessary siting and design standards.

7.1.2 In this regard, the siting and design guidance for 'Transitional Marginal Land' contained in the Wind Energy Development Guidelines (2006/2019 revision) is relevant. This recommends that irregular spacing and linear or staggered linear layout being appropriate, and the proposed development has been laid out as such. As a landscape that falls within an area containing hills and uplands, but which also comprises a mix of landscape types, the layout proposed is considered to align with the guidance:

"Wind energy development with irregular spacing and random layout - is more appropriate given the relative undulation of the setting."

"The likely location of wind energy developments on ridges suggests a linear or staggered linear layout whereas on broader hilltops they could be linear or clustered. Grid layouts are less likely to succeed aesthetically unless there is an open continuity of similar landcover."

7.1.3 Whilst the landscape has open and expansive qualities, the experience of this is variable, owing to the topographical characteristics of the landscape (which in places are complex and undulating), and the successive layers of vegetation in the landscape. Varied levels of visibility towards the site and the proposed development are anticipated, and whilst there are locations that have more open visibility (such as around raised peat bogs), and elevated locations which afford longer range views over the

wider landscape, for the vast majority of locations within the study area views are short to medium distance in nature.

7.1.4 Although there are locations in the study area which are defined for their scenic qualities, sensitive rural qualities, and landscapes that are 'visually vulnerable' due to the presence of distinctive or natural features, many of the scenic designations and sensitive areas are located around the peripheries of the 20km radius study area, particularly to the northeast of the site where views are influenced by the Bricklieve mountains, to which the wider lowland landscape forms part of the landscape setting.

7.1.5 In this regard, the landscape of the central study area is that of a robust rural working landscape setting that encompasses some sensitive elements, and much of the landscape value relates to the subsistence of the rural economy, where views are in all circumstances influenced by longstanding human intervention in the landscape.

7.1.6 Visual impacts relating to receptors outside of the 20km radius study area are scoped-out of further assessment due to the very limited potential for visibility beyond this distance as well as the fact that if the proposed turbines are seen from beyond 20km (in the clearest of viewing conditions) they will present at a very small scale with a low degree of contrast against a backdrop of sky. Thus, there is not considered to be potential for significant visual impacts to occur.

7.1.7 For similar reasons, cumulative impacts in relation to receptors or other wind farm developments beyond the 20km radius study area have also been scoped-out of further assessment. Visual effects at receptors that are not contained within the ZTV pattern will also be scoped-out on the basis that there will be no potential for views of the proposed development in such instances.

7.1.8 As with all development proposals of this type, there is potential for visual effects given the network of roads dissecting the landscape, residential receptors in the wider landscape, and recreational receptors on walking routes (including most notably the long-distance Lung Lough Gara Way which passes through the site). Whilst the site is considered to be set within an area of robust landscape character, with the capacity to accommodate wind turbines, given the scale of the proposed turbines and the presence of visual receptors in the surrounding landscape, there is potential for notable visual effects, particularly in relation to proximate receptors in the surrounding landscape, where the perceived scale of the proposed turbines, and the extent to which they occupy views will naturally be most notable.

7.1.9 It is considered that the approach to the LVIA and to the viewpoint locations outlined is proportionate to the most notable landscape and visual effects, and is appropriate as a base to progress assessment work.

7.1.10 In terms of cumulative impacts, given its proximity, it will be important to consider the influence of the proposed wind farm in conjunction the Largan Hill Wind Farm to ensure they do not present as one large wind energy development or with any notable sense of scale conflict. Beyond this, it is not considered that the proposed development will generate notable cumulative landscape or visual issues in the wider landscape, with wind turbines being limited to single turbine development near Charlestown, and a 2 no. turbine scheme to the south.

7.1.11 Cumulative impacts will be assessed in accordance with the SNH guidance note for 'Assessing the cumulative impact of onshore wind energy developments' (2021) taking account of 'Combined Views' 'Succession Views' and 'Sequential Views'.

macroworks

VIEWPOINT SELECTION REPORT

Islandmore Wind Farm.

Co. Roscommon.

Prepared by Macro Works Ltd on behalf of Islandmore Wind Farm Ltd

March 2025 I Rev C



LVIA I TVIA I Landscape Design I Visibility Analysis I Glint and Glare I Verified Photomontages I CGI I Shadow Flicker Analysis

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This LVIA should be read in conjunction with the LVIA Scoping Report produced by Macro Works Ltd.

Registered Landscape Architect

macroworks APEM Group

1 INTRODUCTION

1.1.1 This report provides a rationale for the selection of Viewpoints for the proposed Islandmore Wind Farm ('proposed development'), which is located in north County Roscommon, c.2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c.6km south-west of Gorteen (Co. Sligo).

1.1.2 The development will comprise 10 no. wind turbines; 7 no. of which will have an overall tip height of 150m and 3 no. with an overall tip height of 185m.

1.1.3 Viewpoint selection is based on computer-generated visibility modelling, a desk survey and subsequent fieldwork to establish actual visibility and relative landscape sensitivity at each proposed location.

2 METHODOLOGY

2.1 Generation of a Zone of Theoretical Visibility (ZTV)

2.1.1 A computer-generated Zone of Theoretical Visibility (ZTV) study was undertaken, the purpose of which is to identify the geographical extent of the landscape from which views of the proposed turbines are theoretically possible, and provide an indication on the degree to which they are theoretically visible.

2.1.2 Based on topographical information only, this ZTV plan does not incorporate screening elements such as hedgerows, forests, or buildings, that may otherwise act to restrict views of the proposed development. It therefore represents a 'worst case' level of visibility that allows a focus to be placed on those parts of the landscape from where views are theoretically possible, and avoiding areas from which views are not possible.

2.1.3 For the purposes of this project a 20km radius study area has been used for the ZTV in accordance with the DOEHLG Wind Energy Development Guidelines for Planning Authorities (2006/2019 review) for turbines in excess of 100m overall height.

2.2 Identification of Viewpoints from which to structure the assessment

2.2.1 Identifying viewpoints from which to communicate the Landscape and Visual Impact effects of the proposed wind farm follows a structured approach which starts with the analysis of the ZTV alongside a comprehensive analysis of the site's landscape and visual baseline context.

2.2.2 Best practice Guidelines GLVIA3 advocates proportionality, and it is not warranted to include each and every single location that provides a view of the development, as this would result in an unwieldy report and make it extremely difficult to draw out the key impacts arising from the project. Instead, the assessor's objective is to identify and select a variety of locations that will provide representative views of the proposed wind farm from different distances, different angles and different contexts.

2.2.3 Informed by the ZTV analysis and baseline research, an initial broad set of potential viewpoint locations is generated through a desk-based study, that reflect locations that are of potential significance because they comprise, for example, centres of population and important communication routes, key views and scenic attributes, or designated landscape or visual sensitivities. Viewpoints are categorised as to which of the following receptor types it represents;

- Key Views - from features of international or national importance;
- Amenity Views from important heritage or amenity locations;
- Designated Scenic Routes and Views;

- Local Community views;
- Centres of Population; and
- Major Routes.

2.2.4 Some Viewpoints may be applicable to several receptor categories, in which case, they will be assessed under the group that best reflects that location's particular sensitivities.

2.2.5 These potential viewpoint locations are then used as the basis of a fieldwork stage, where each is visited in the context of the landscape of the wider study area, in order to systematically identify those that will actually provide a view of the proposed wind farm and those from which potential views would be substantively obscured or screened by features in the intervening landscape.

2.2.6 The site visit also provides an opportunity to experience the character and features of each location and inform initial value judgements in relation to the sensitivity and importance of each location.

2.2.7 Where a viewpoint location is not a specific view, such as designated scenic viewpoints outlined in a County Development Plan, the location seeks to be representative of views experienced by visual receptors in that general locality. The actual location may not be at the centre of a town or village or fall within a particular designation in a County Development Plan but is at a location that represents such areas, locations or routes. The site visit provides an important opportunity to identify an appropriate location in this regard so that the extent of visibility is representative, and not obscured by localised screening relevant to a specific location.

2.2.8 During and following the site visit, the viewpoints are refined, with a number of those originally identified discounted based on views likely being screened from those locations, or substantively screened to the extent that effects are highly unlikely to be significant. Where views at proximate viewpoints are considered representative in terms of general viewing distance, extent, context, orientation, and likely visual impact, the most sensitive may be selected in lieu of the others to represent the visual impact from that general location.

2.3 Designated Views

2.3.1 A key source of baseline analysis comes from the County Development Plans (CDP) covering the study area. These contain policies that relate to landscape character and key views, that are outlined in supporting studies and appendices. Those of relevance to the proposed development are outlined below.

Roscommon County Development Plan 2022-2028

2.3.2 The Roscommon CDP outlines Scenic Routes and Views. No Scenic Routes fall within the 20km study radius, albeit a number of Scenic Views do fall within the Study area, as outlined in Table 1.

Table 1 - Rational for selection of scenic designations within the Roscommon CDP

CDP Reference	Relevance	Rationale	VP ref. no.
Scenic View 7	Not Relevant	View located in edges of ZTV pattern indicating partial views. Successive layers of vegetation at over 16.5km distance will make views highly unlikely.	-
Scenic View 11	Relevant	View oriented in the direction of the proposed development, with views considered possible.	VP 26
Scenic View 14	Not Relevant	Outside of ZTV pattern, and scenic view oriented in the opposite direction to the proposed development.	-
Scenic View 15	Not Relevant	No views anticipated	- (VP ZZ)

Sligo County Development Plan 2017-2023 (Extended to 2024)

2.3.3 The Sligo CDP outlines a number of Scenic Routes as a basis for protecting views and prospects. Those that fall within the 20km study radius are outlined in Table 2.

Table 2 - Rational for selection of scenic designations within the Sligo CDP

CDP Reference	Relevance	Rationale	VP ref. no.
Sligo Scenic Route 3	Not Relevant	Outside of ZTV pattern	-
Sligo Scenic Route 20	Not Relevant	Limited potential visibility – alternative focus	(VP I)
Sligo Scenic Route 21	Relevant	Views possible. Represented by Viewpoint 6.	(VP O)
Sligo Scenic Route 57	Not Relevant	Outside of ZTV pattern	-
Sligo Scenic Route 60	Relevant	Views possible. Represented by Viewpoint 4.	(VP J)
Sligo Scenic Route 64	Not Relevant	Outside of ZTV pattern	-
Sligo Scenic Route 68	Relevant	Views possible	VP 18
Sligo Scenic Route 69	Relevant	Views possible	VP 6
Sligo Scenic Route 70	Relevant	Views possible	VP 5

Mayo County Development Plan 2022-2028

2.3.4 There are no 'Scenic Routes' or 'Scenic Routes with Designated Views' that fall within the study area or ZTV pattern.

2.4 Viewpoint selection and use

2.4.1 The Viewpoints selected at this stage of the project are those from which Macro Works intend to assess the landscape and visual impacts of the proposal. They are considered comprehensive and representative in their selection, and an appropriate basis on which to structure the LVIA and produce visual material.

2.4.2 It is a common occurrence that viewpoint locations are suggested or required by Statutory or non-statutory bodies with stakeholder interest in the site. The most likely source of Viewpoint selection input is from the Local Authority that will assess the planning application, or surrounding Local Authorities that may be impacted by the proposal. Viewpoint locations may also be requested by An Taisce or other tourism, heritage or conservation groups with an interest in the area.

2.4.3 This document should therefore be regarded as a discussion document. Other locations may be added to or removed through the scoping process in consultation with the Planning Authority, following an evaluation of their relevance. Naturally, therefore, an increase/decrease in the total number of viewpoints selected for the LVIA chapter is possible.

3 VIEWPOINT SELECTION PROPOSED

3.1.1 A plan illustrating the general location of the proposed viewpoints is provided in Figure 1, with the grid coordinate location provided in Table 3.

3.1.2 The photographs (included in Appendix 1) provide the view from each of the proposed Viewpoint locations and can be used in conjunction with the grid reference coordinates by the Photographer / Photomontage provider to identify the viewpoint location and capture their own images. For many of

the images, a screenshot from Google Earth is also provided to assist in an understanding of where in the view the proposed development would fall.

Figure 1 - Proposed Viewpoint Location Plan

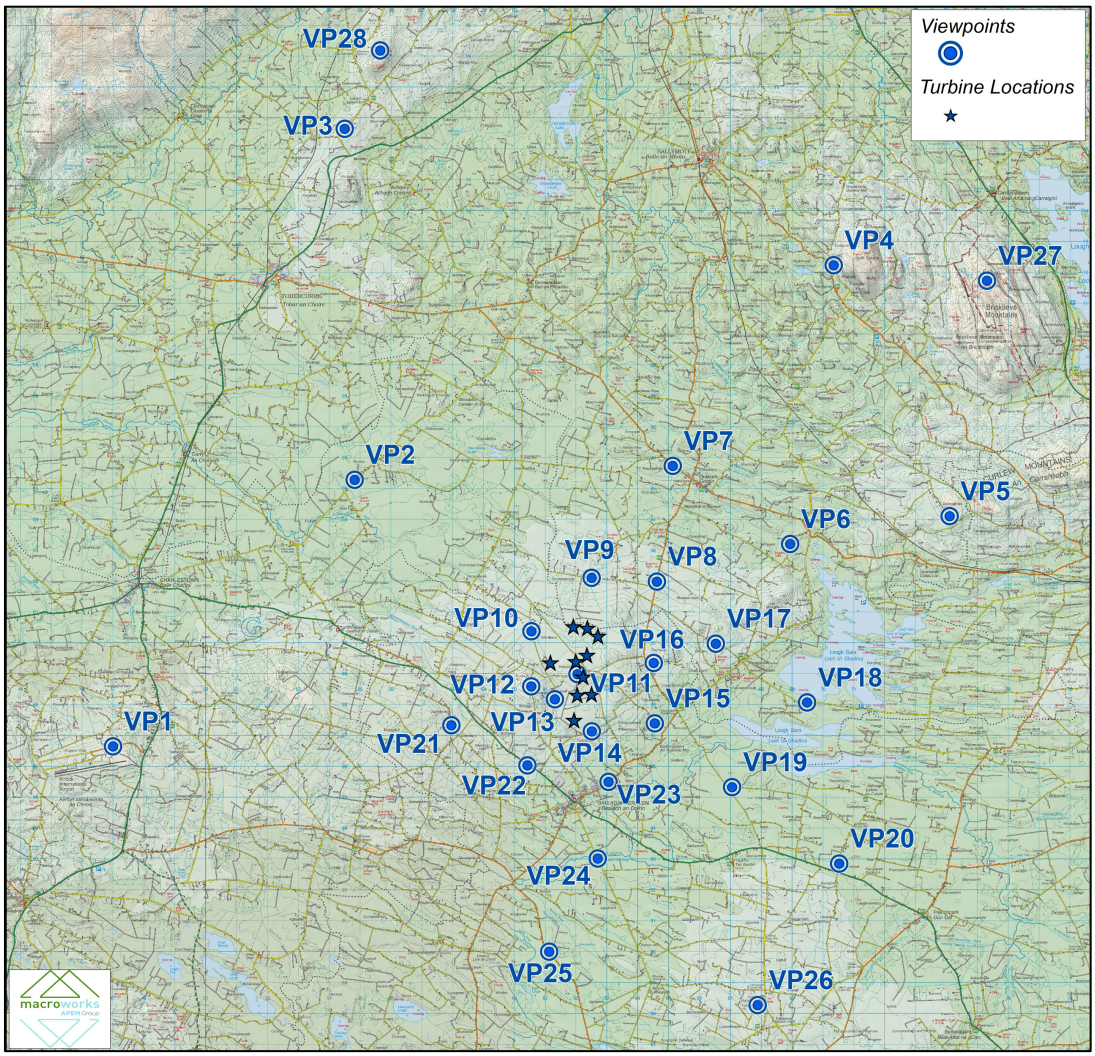


Table 3 - Outline Description of proposed viewpoints

VP	Location	Initial selection Criteria	Grid Coordinates ITM	Direction of view
1	R376 West of Ireland Airport	Regional route and visitor arrival	546965 796654	ENE
2	L1305 at Roosky	Centre of population	554788 805289	SE
3	L8402 Carinara Viewpoint	Interpretive viewpoint	554466 816650	SSE
4	Keshcorran Caves, Keash Hill Walk	Natural heritage feature with expansive views.	570305 812232	SSW
5	L5705 Sligo Scenic Route 70 Derrinoghran Loop (Wynne's View)	Interpretive viewpoint / Scenic Route	574060 804108	WSW
6	L4103 Sligo Scenic Route 69	Scenic route / Community views	568898 803206	WSW
7	R294 Gurteen	Centre of population	565098 805735	SSW
8	R293 south of Gurteen	Local community views	564583 801993	SW

VP	Location	Initial selection Criteria	Grid Coordinates ITM	Direction of view
9	L8019 Carrowntemple Burial Ground	Local community views	562472 802113	S
10	L1203 west of Owengarve River	Local community views	560516 800380	SE
11	L1203 Lung Lough Gara Way	Amenity feature / recreational trail	562006 798995	N & S
12	L5507 east of Bockagh Hill (Bockagh Hill walking loop)	Amenity feature / recreational trail	560510 798601	NE - SE
13	L1203 south of Attiantaggart	Local community views	561272 798182	N - SE
14	L55019 Lung Lough Gara Way	Amenity feature / recreational trail	562478 797139	NNW
15	Local Road, Tallaghan	Local community views	564514 797399	NW
16	Local Road, Derrycashel, west of R293	Local community views	564481 799354	W
17	L8110 north west of Monasteraden, Lung Lough Gara Way	Amenity feature / recreational trail / Local community views	566489 799982	WSW
18	L1703 (Island Road) Cuilbeg, Sligo Scenic Route 68	Scenic route / Community views	569445 798076	WNW
19	Ballinlough Road	Natural heritage feature with expansive views.	567014 795335	NW
20	L1213, north of Churchstreet	Local community views	570482 792862	NW
21	Ballaghaderreen and Brusna Walking loop, Pollboy	Amenity feature / recreational trail / Local community views	557922 797338	ENE
22	L1244 Cox's Line, Doogary	Local community views	560387 796039	NNE
23	R293, Kilcolman Cemetery, Ballaghaderreen	Centre of population	563020 795508	N
24	Crinean Bridge, Lung River, Lung Lough Gara Way.	Amenity feature / recreational trail	562667 793025	N
25	R325 north of Aghadrestan	Local community views	561088 790005	NNE
26	Scenic View V11 (Roscommon) Fairymount Hill	Scenic Viewpoint	567847 788278	NNW
27	Carrowkeel Passage Tomb	Heritage and amenity feature / recreational trail	575270 811732	SW
28	Knocknashee Passage Tomb	Heritage and amenity feature / recreational trail	555621 819186	SE

4 VIEWPOINTS DISCOUNTED

4.1.1 A plan illustrating the general location of the discounted viewpoints is provided in Figure 2, with the grid coordinate location provided in Table 4. Photographs from these locations are also included in Appendix 1 for reference.

Figure 2 - Discounted Viewpoint location plan

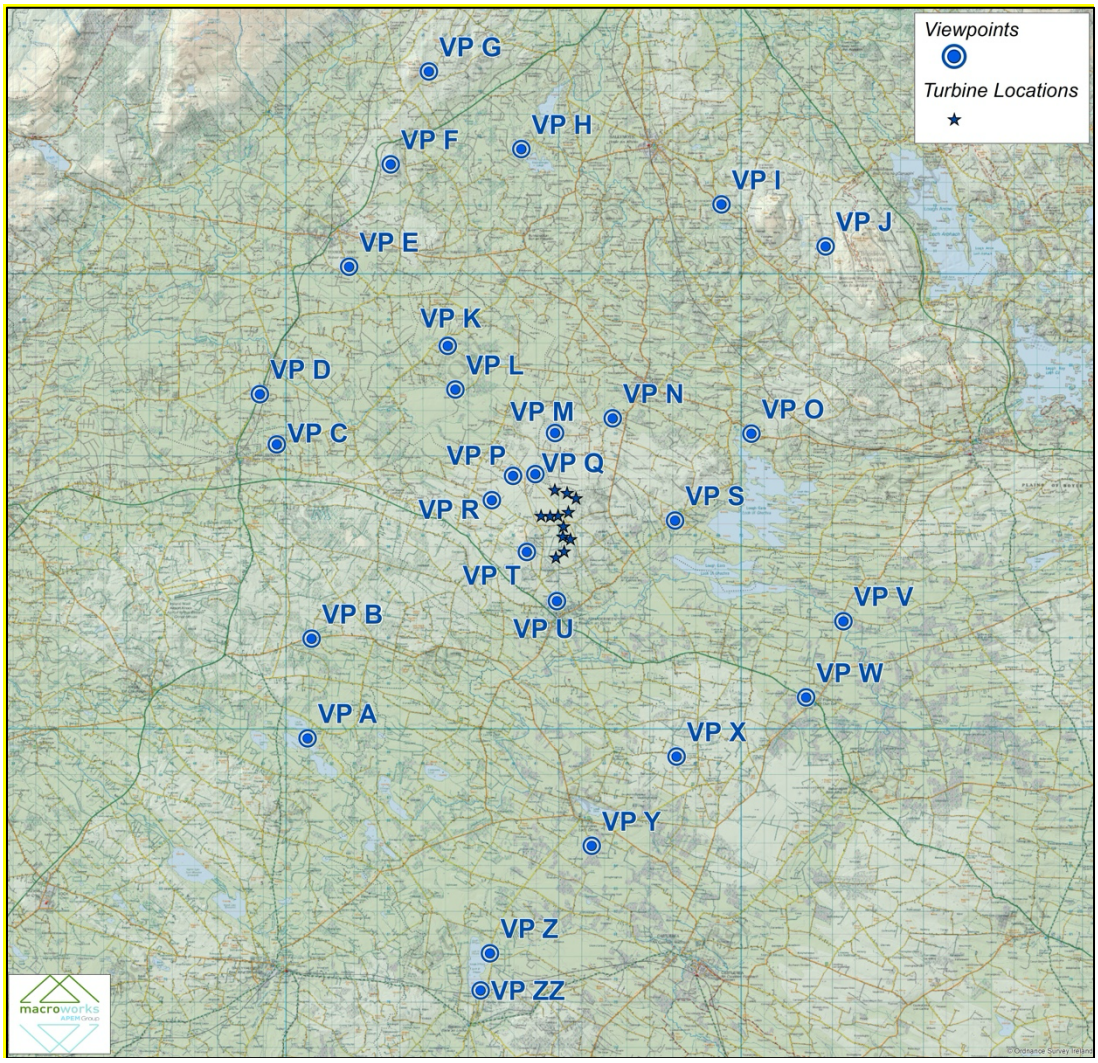


Table 4 - Outline Description of rejected viewpoints

VP	Location	Initial selection Criteria	Grid Coordinates ITM	Rejection rationale
A	Road off L1907 towards Urlaur Abbey	Heritage feature	550917 789605	Clear views unlikely due to the degree of screening.
B	Regional Road R325 west of Kilmovee	Centre of population	551092 793973	Clear views unlikely due to the degree of foreground screening.
C	L1035 east of Charlestown	Centre of population	549568 802507	Potential for partial views from +12km, highly unlikely to generate significant effects.
D	N17 Roosky, south of Curry	Centre of population	548818 804717	Potential for partial views from +13.5km, highly unlikely to generate significant effects.

VP	Location	Initial selection Criteria	Grid Coordinates ITM	Rejection rationale
E	L4502 south east of Tobercurry	Centre of population	552743 810310	Potential for partial views from +13.5km, highly unlikely to generate significant effects.
F	Mucklety Hill	Visually Vulnerable Area (Sligo)	554567 814808	Represented by VP 3
G	Knockashee Walk (L8606)	Amenity feature	556245 818886	Represented by VP 3
H	L56012 west of Cloonacleigha Lake	Visually Vulnerable Landscape (Sligo)	560302 815480	Likely to be a limited/marginal view. Represented by VP3
I	R295 Sligo Scenic Route 20	Scenic Route	569100 813050	Views focused on Kesh Corran and Bricklieve Mountains. Limited potential visibility, and significant effects unlikely.
J	L1404 Sligo Scenic Route 60	Scenic route	573679 811209	Comparable distance, orientation and elevation to relocated VP4
K	Local Road west of Cloonakillina Lough.	Centre of population	557072 806835	Represented by VP 2
L	Local Road, Gowlaun	Local community views	557409 804917	Represented by VP 2
M	L81061 north of Carrowntemple	Local community views	561784 803008	Represented by VP 9
N	L8106 Kilfree	Local community views	564324 803658	Represented by VP 8 & 9
O	R294 Sligo Scenic Route 21	Scenic route / Community view	570420 802983	Represented by VP 6
P	Local Road Derrynabroc East	Local community views	559938 801126	Represented by VP 10
Q	Road north of L5501	Local community views	560922 801208	Represented by VP 10
R	L1203 Dernacartha Upper	Local community views	559008 800055	Represented by VP 10
S	L41042, St. Aidan's Cemetery, Monasteraden	Centre of population	567060 799168	Clear views unlikely due to the degree of screening. Represented by VP 17.
T	Local Road, Bockagh	Local community views	560550 797789	Represented by VP 13
U	L1203, Ballaghaderreen	Centre of population	561865 795627	Represented by VP 22 and 23

VP	Location	Initial selection Criteria	Grid Coordinates ITM	Rejection rationale
V	R361, Breedogue River crossing	Local community views	574461 794745	Potential for partial views from +12.5km, highly unlikely to generate significant effects.
W	N5, Frenchpark	Centre of population	572817 791395	Clear views unlikely due to the degree of screening.
X	Local Road west of Lisdrumneill Crossroads	Local community views	567126 788801	Represented by VP 26
Y	Track south of Loughglinn, Lung Lough Gara Way.	Amenity feature / recreational trail	563404 784877	Represented by VP 26
Z	Lough O'Flynn – Wild Goose Bog Loop	Amenity feature	558928 780161	Potential for partial views from +17.5km, highly unlikely to generate significant effects.
ZZ	Scenic View V15 (Roscommon) Lough O'Flynn	Scenic View	558513 778531	No view anticipated. Scenic view orientated towards the lough.

macroworks

VIEWPOINT SELECTION REPORT

APPENDIX A

REPRESENTATIVE IMAGES OF
VIEWPOINT LOCATIONS

Islandmore Wind Farm.

Co. Roscommon.

Prepared by Macro Works Ltd on behalf of Statkraft Ireland

March 2025 I Rev C

LVIA I TVIA I Landscape Design I Visibility Analysis I Glint and Glare I Verified Photomontages I CGI I Shadow Flicker Analysis

Viewpoint 1 - R376 West of Ireland Airport

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Regional route and visitor arrival

National Grid Coordinates ITM (Eastings and Northings): 546965 796654

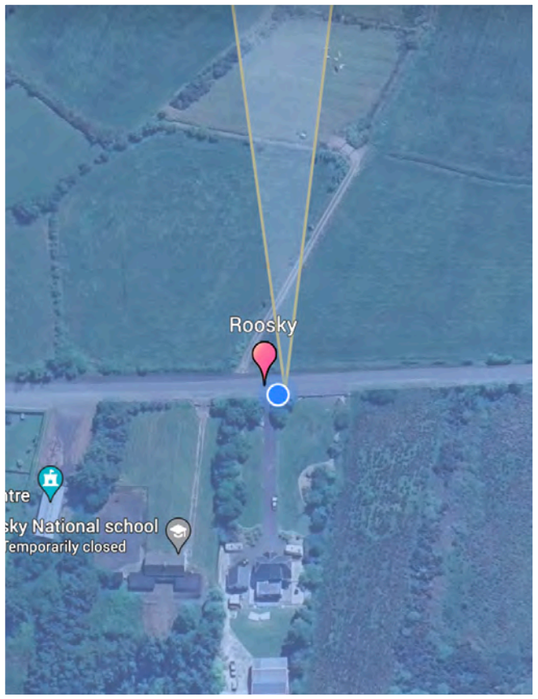
Direction of View: East North East

macroworks APEM Group

Viewpoint 2 - L1305 at Roosky

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Centre of population

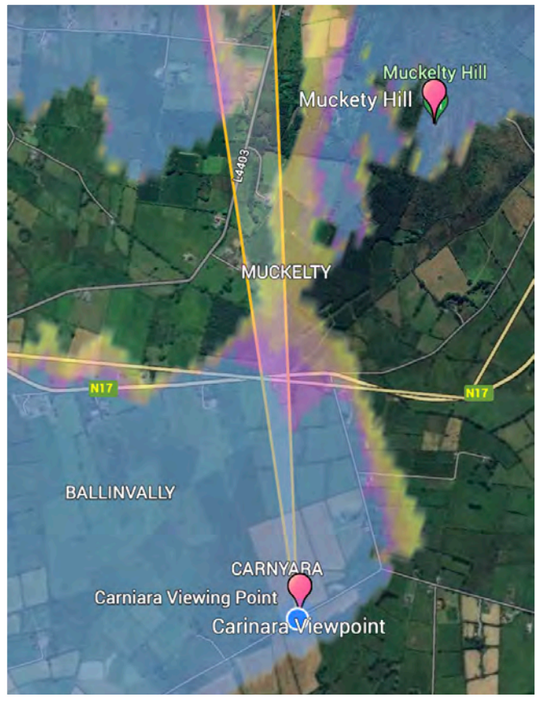
National Grid Coordinates ITM (Eastings and Northings): 554788 805289

Direction of View: South East

macroworks APEM Group

Viewpoint 3 - L8402 Carinara Viewpoint





Registered Landscape Architect

Initial selection criteria: Interpretive viewpoint

National Grid Coordinates ITM (Eastings and Northings): 554466 816650

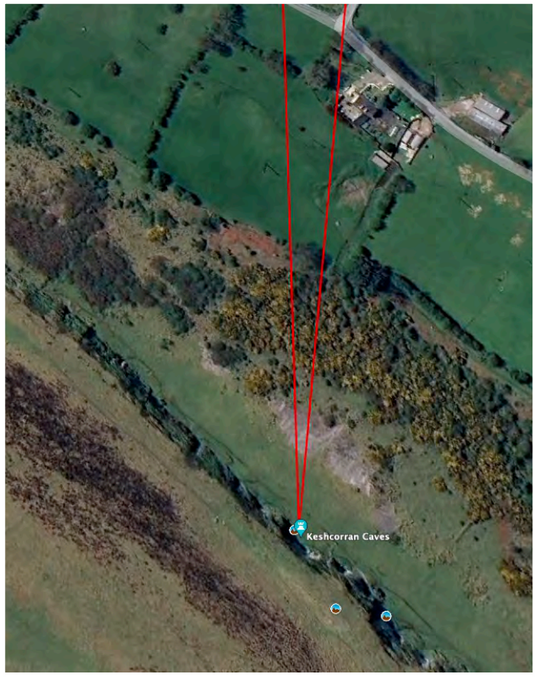
Direction of View: South South East

macroworks APEM Group

Viewpoint 4 - Keshcorran Caves, Keash Hill Walk



Locational accuracy is not crucial, providing it is on the elevated part of the Keash Hill Walk near the caves and views are not precluded in any way.



Registered Landscape Architect

Initial selection criteria: Natural heritage feature with expansive views.

National Grid Coordinates ITM (Eastings and Northings): 570581 812144 (caves approx. location)

Direction of View: South South West

macroworks APEM Group

Viewpoint 5 - L5705 Sligo Scenic Route 70 Derrinoghran Loop (Wynne's View)

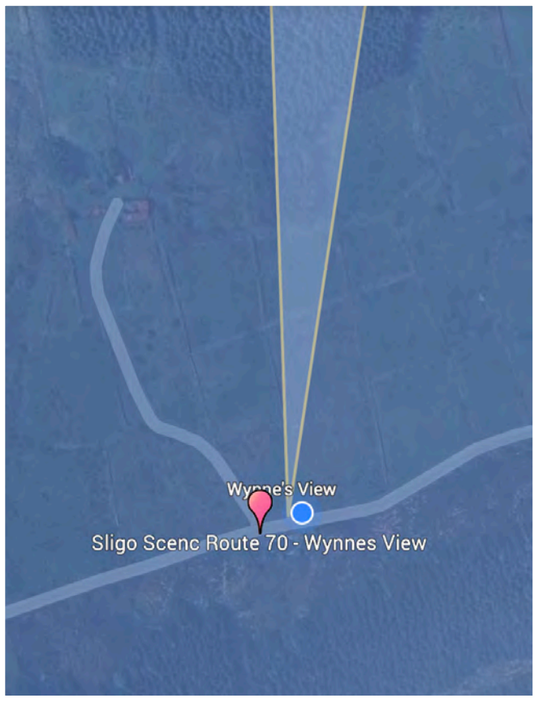
Islandmore Wind Farm - March 2025

Image obtained online



View taken during site visit.





Registered Landscape Architect

Initial selection criteria: Interpretive viewpoint / Scenic Route

National Grid Coordinates ITM (Eastings and Northings): 574060 804108

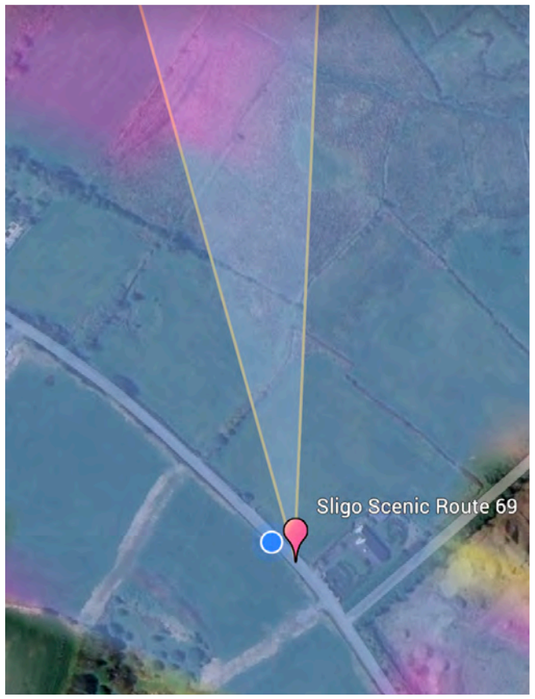
Direction of View: West South West

macroworks APEM Group

Viewpoint 6 - L4103 Sligo Scenic Route 69

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Scenic route / Community views

National Grid Coordinates ITM (Eastings and Northings): 568898 803206

Direction of View: West South West

macroworks APEM Group

Viewpoint 7 - R294 Gurteen

Islandmore Wind Farm - March 2025



Registered Landscape Architect

Initial selection criteria: Centre of population

National Grid Coordinates ITM (Eastings and Northings): 565098 805735

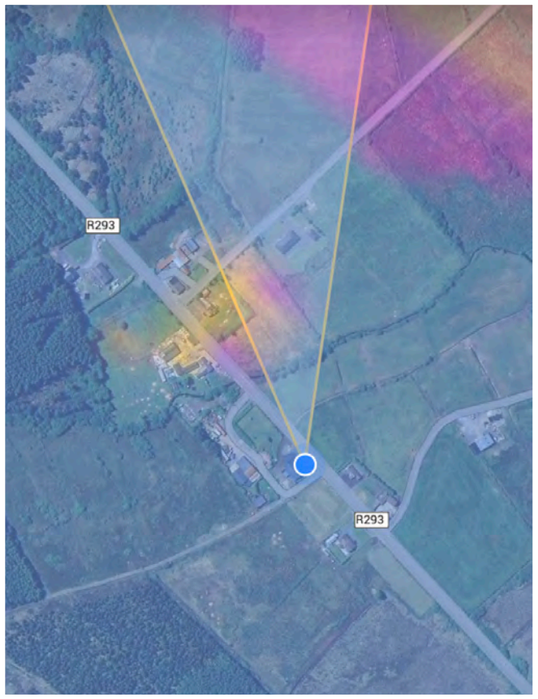
Direction of View: South South West

macroworks APEM Group

Viewpoint 8 - R293 south of Gurteen

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 564583 801993

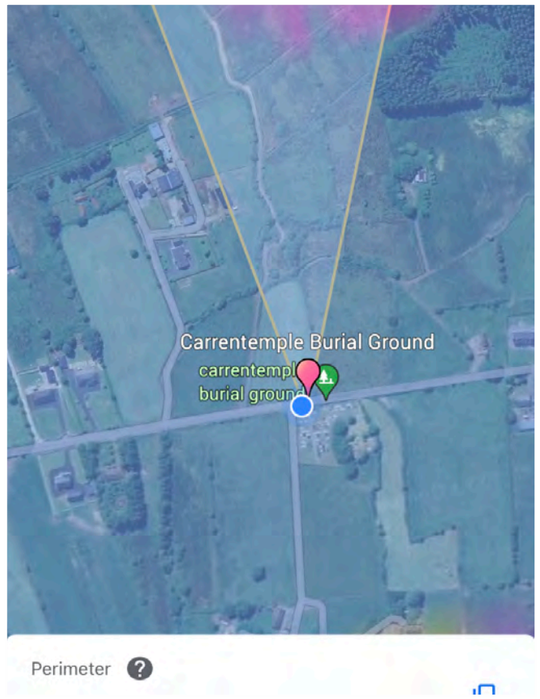
Direction of View: South West

macroworks APEM Group

Viewpoint 9 - L8019 Carrowntemple Burial Ground

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local community views

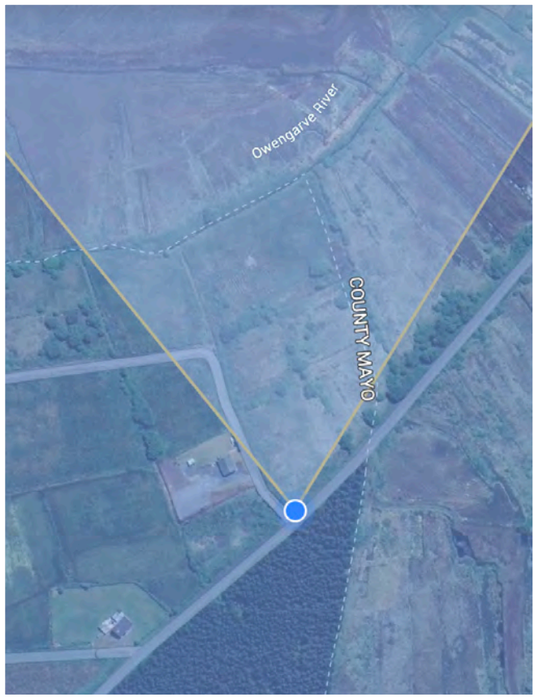
National Grid Coordinates ITM (Eastings and Northings): 562472 802113

Direction of View: South

macroworks APEM Group

Viewpoint 10 - L1203 west of Owengarve River





Registered Landscape Architect

Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 560516 800380

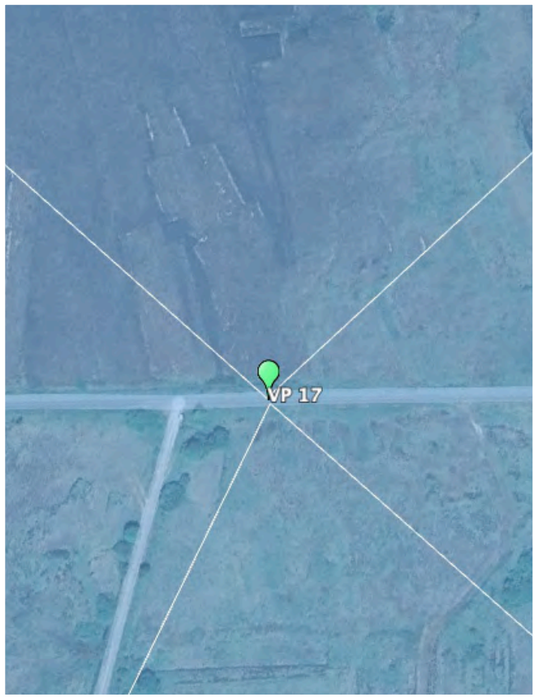
Direction of View: South East

macroworks APEM Group

Viewpoint 11 - L1203 Lung Lough Gara Way

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Amenity feature / recreational trail

National Grid Coordinates ITM (Eastings and Northings): 562006 798995

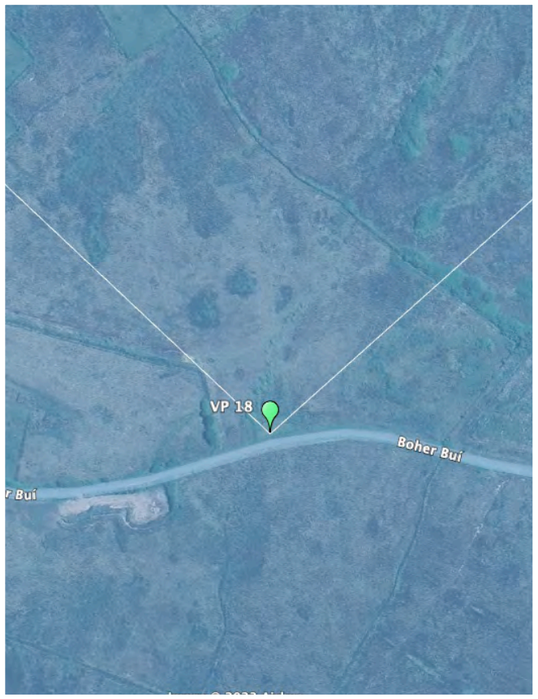
Direction of View: North and South

macroworks APEM Group

Viewpoint 12 - L5507 east of Bockagh Hill (Bockagh Hill walking loop)

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Amenity feature / recreational trail

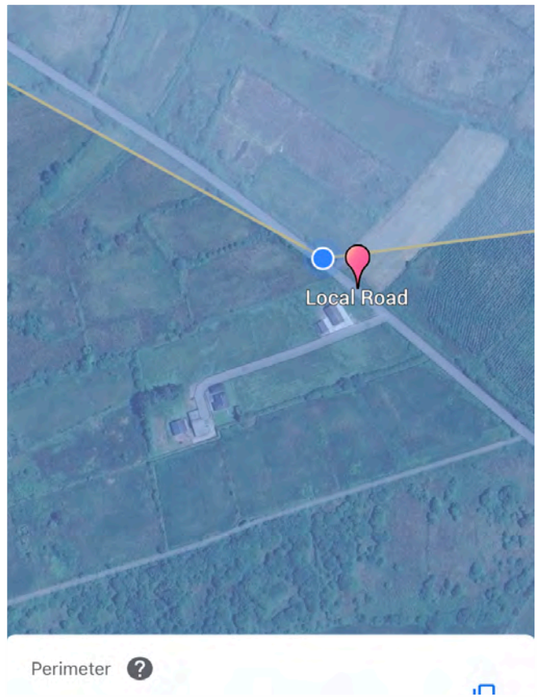
National Grid Coordinates ITM (Eastings and Northings): 560510 798601

Direction of View: North East to South East

macroworks APEM Group

Viewpoint 13 - L1203 south of Attiantaggart





Registered Landscape Architect

Initial selection criteria: Local community views

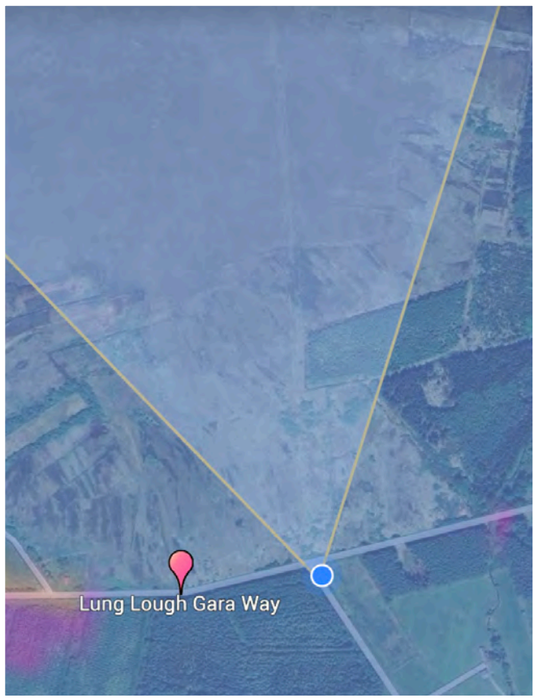
National Grid Coordinates ITM (Eastings and Northings): 561272 798182

Direction of View: North to South East

macroworks APEM Group

Viewpoint 14 - L55019 Lung Lough Gara Way





Registered Landscape Architect

Initial selection criteria: Amenity feature / recreational trail

National Grid Coordinates ITM (Eastings and Northings): 562478 797139

Direction of View: North North West

macroworks APEM Group

Viewpoint 15 - Local Road, Tallaghan





Registered Landscape Architect

Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 564514 797399

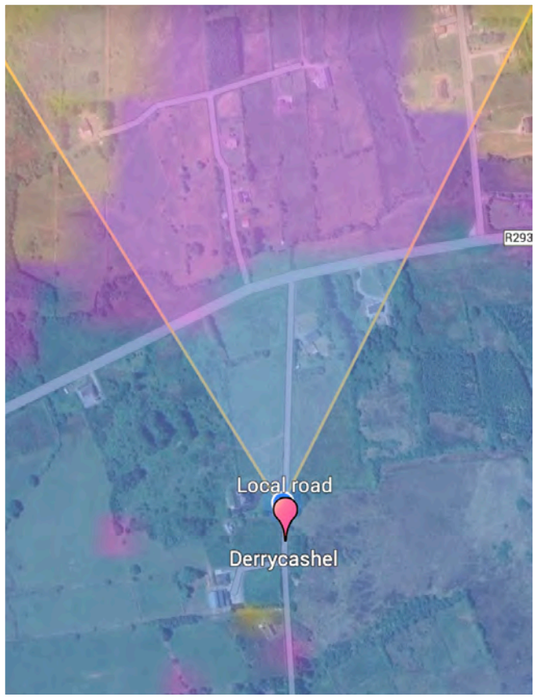
Direction of View: North West

macroworks APEM Group

Viewpoint 16 - Local Road, Derrycashel, west of R293

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local community views

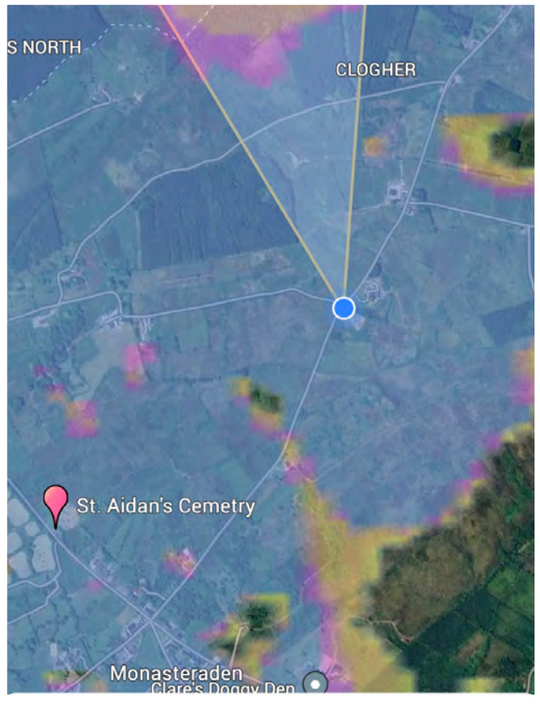
National Grid Coordinates ITM (Eastings and Northings): 564481 799354

Direction of View: West

macroworks APEM Group

Viewpoint 17 - L8110 north west of Monasteraden, Lung Lough Gara Way





Registered Landscape Architect

Initial selection criteria: Amenity feature / recreational trail / Local community views

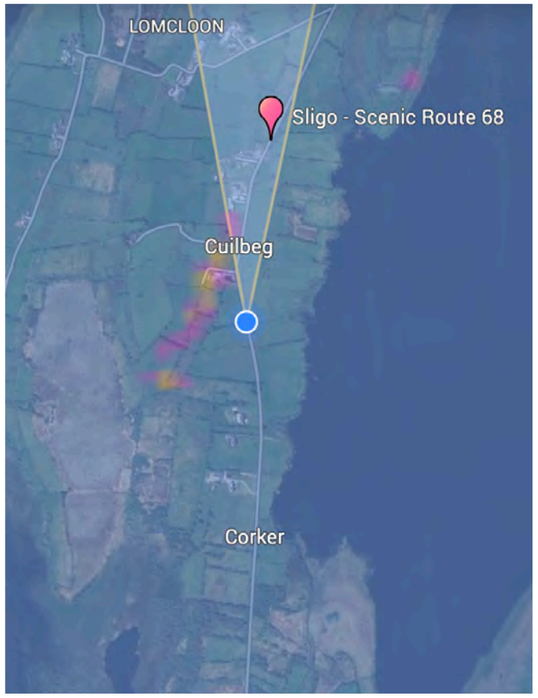
National Grid Coordinates ITM (Eastings and Northings): 566489 799982

Direction of View: West South West

macroworks APEM Group

Viewpoint 18 - L1703 (Island Road) Cuilbeg, Sligo Scenic Route 68





Registered Landscape Architect

Initial selection criteria: Scenic route / Community views

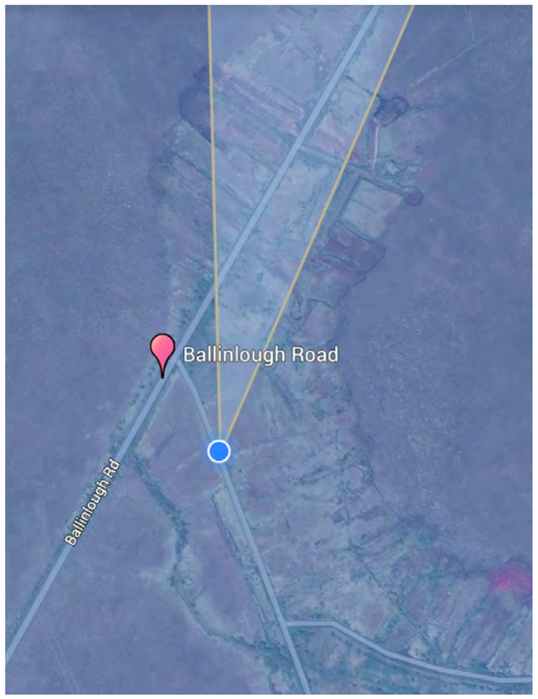
National Grid Coordinates ITM (Eastings and Northings): 569445 798076

Direction of View: West North West

macroworks APEM Group

Viewpoint 19 - Ballinlough Road





Registered Landscape Architect

Initial selection criteria: Natural heritage feature with expansive views.

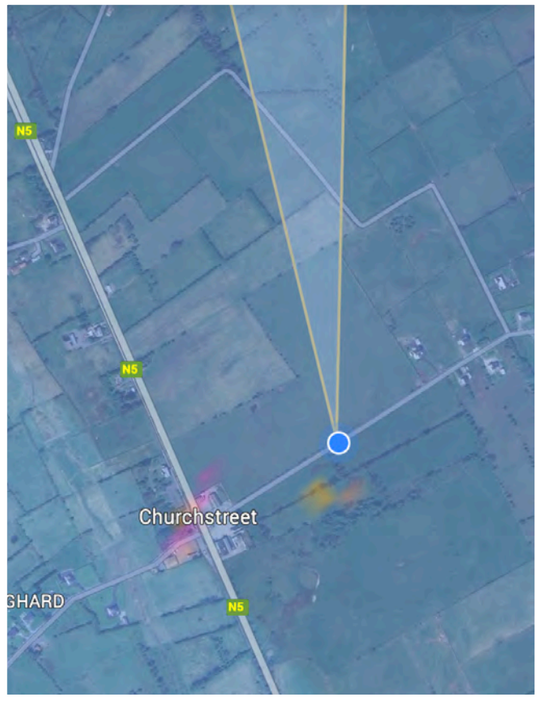
National Grid Coordinates ITM (Eastings and Northings): 567014 795335

Direction of View: North West

macroworks APEM Group

Viewpoint 20 - L1213, north of Churchstreet





Registered Landscape Architect

Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 570482 792862

Direction of View: North West

macroworks APEM Group

Viewpoint 21 - Ballaghaderreen and Brusna Walking loop, Pollboy

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Amenity feature / recreational trail / Local community views

National Grid Coordinates ITM (Eastings and Northings): 557922 797338

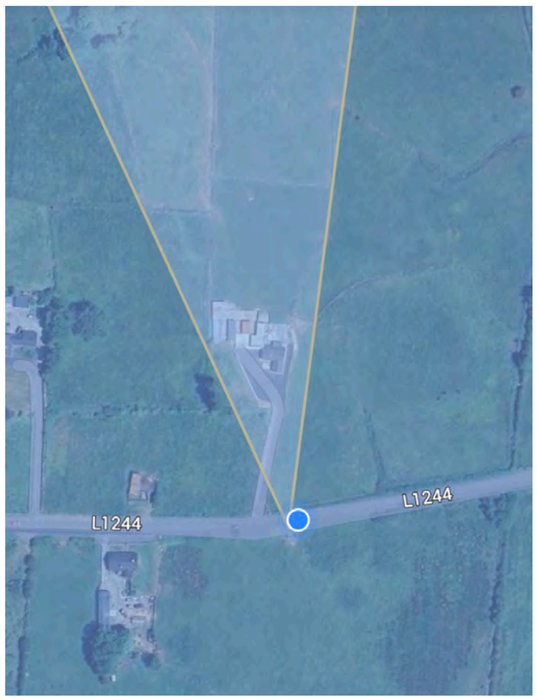
Direction of View: East North East

macroworks APEM Group

Viewpoint 22 - L1244 Cox's Line, Doogary

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 560387 796039

Direction of View: North North East

macroworks APEM Group

Viewpoint 23 - R293, Kilcolman Cemetery, Ballaghaderreen



Registered Landscape Architect

Initial selection criteria: Centre of population

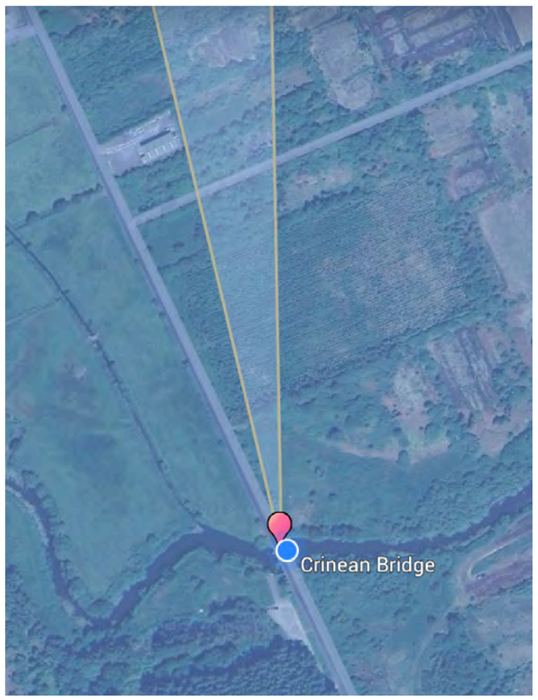
National Grid Coordinates ITM (Eastings and Northings): 563020 795508

Direction of View: North

macroworks APEM Group

Viewpoint 24 - Crinean Bridge, Lung River, Lung Lough Gara Way.





Registered Landscape Architect

Initial selection criteria: Amenity feature / recreational trail

National Grid Coordinates ITM (Eastings and Northings): 562667 793025

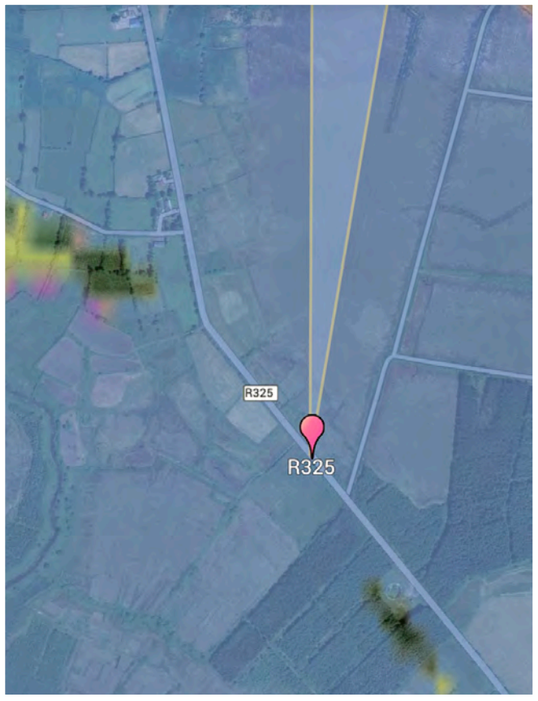
Direction of View: North

macroworks APEM Group

Viewpoint 25 - R325 north of Aghadrestan

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local Community Views

National Grid Coordinates ITM (Eastings and Northings): 561088 790005

Direction of View: North North East

macroworks APEM Group

Viewpoint 26 - Scenic View V11 (Roscommon) Fairymount Hill

Islandmore Wind Farm - March 2025



Location should represent the view presented in the Roscommon Landscape Character Assessment (as per inset image).



Registered Landscape Architect

Initial selection criteria: Scenic Viewpoint

National Grid Coordinates ITM (Eastings and Northings): 567847 788278

Direction of View: North North West

macroworks APEM Group

Viewpoint 27 - Carrowkeel Passage Tomb



To be taken from the surrounds of the passage tomb, NOT from on top of the rocks. Viewpoint to be microsited to ensure it is not obscured by the feature.

Registered Landscape Architect

Initial selection criteria: Heritage and Amenity feature / recreational trail

National Grid Coordinates ITM (Eastings and Northings): 575270 811732

Direction of View: Southwest

macroworks APEM Group

Viewpoint 28 - Knocknashee Passage Tomb



To be taken from the surrounds of the passage tomb, NOT from on top of the rocks.

Registered Landscape Architect

Initial selection criteria: Heritage and Amenity feature / recreational trail

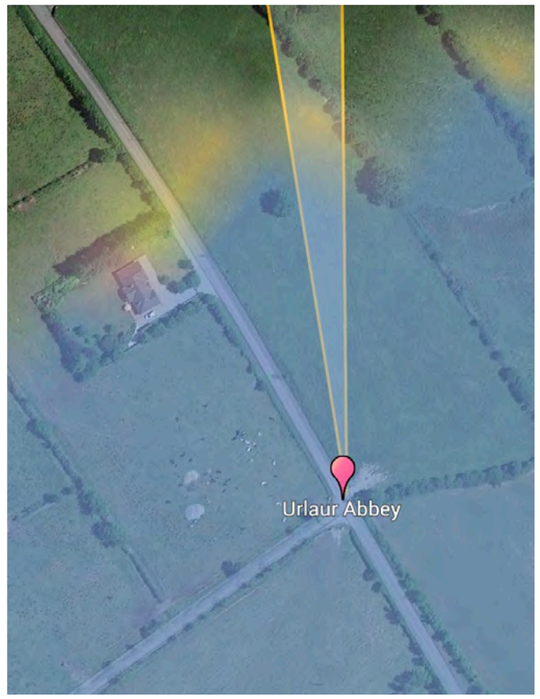
National Grid Coordinates ITM (Eastings and Northings): 658551.795, 777580.542

Direction of View: Southeast

macroworks APEM Group

Rejected Viewpoint A - Road off L1907 towards Urlaur Abbey





Registered Landscape Architect

Initial selection criteria: Heritage Feature

National Grid Coordinates ITM (Eastings and Northings): 550917 789605

macroworks APEM Group

Rejected Viewpoint B - Regional Road R325 west of Kilmovee

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Centre of population

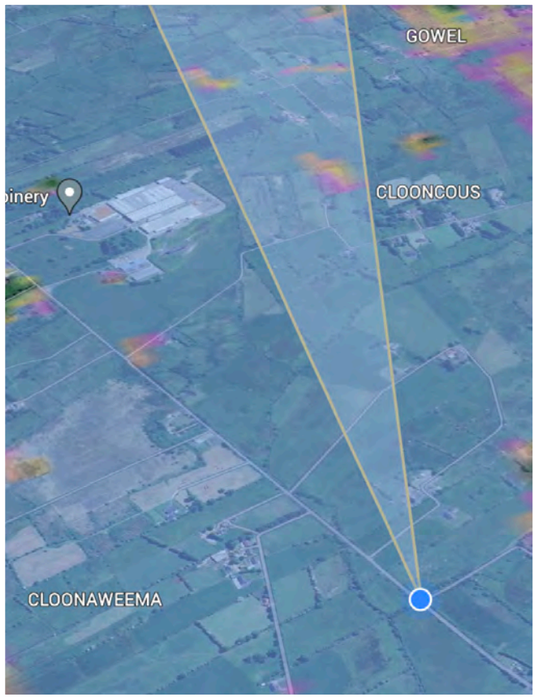
National Grid Coordinates ITM (Eastings and Northings): 551092 793973

macroworks APEM Group

Rejected Viewpoint C - L1035 east of Charlestown

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Centre of population

National Grid Coordinates ITM (Eastings and Northings): 549568 802507

macroworks APEM Group

Rejected Viewpoint D - N17 Roosky, south of Curry

Islandmore Wind Farm - March 2025



Registered Landscape Architect

Initial selection criteria: Centre of population

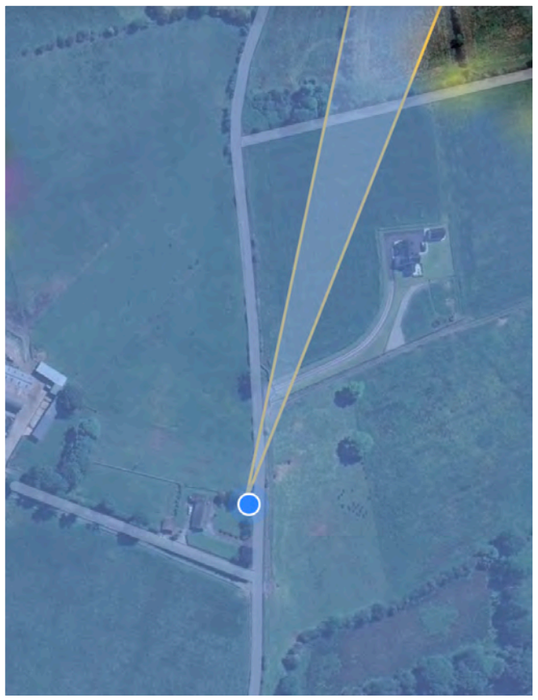
National Grid Coordinates ITM (Eastings and Northings): 548818 804717

macroworks APEM Group

Rejected Viewpoint E - L4502 south east of Tobercurry

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Centre of population

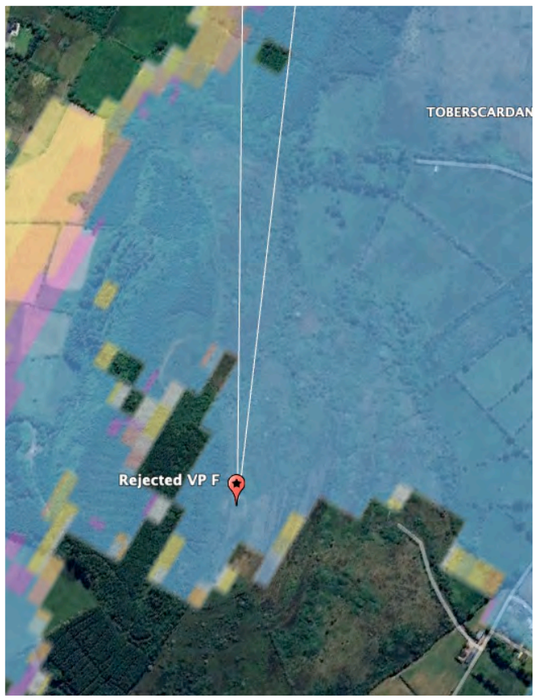
National Grid Coordinates ITM (Eastings and Northings): 552743 810310

macroworks APEM Group

Rejected Viewpoint F - Mucklety Hill

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Visually Vulnerable Area (Sligo)

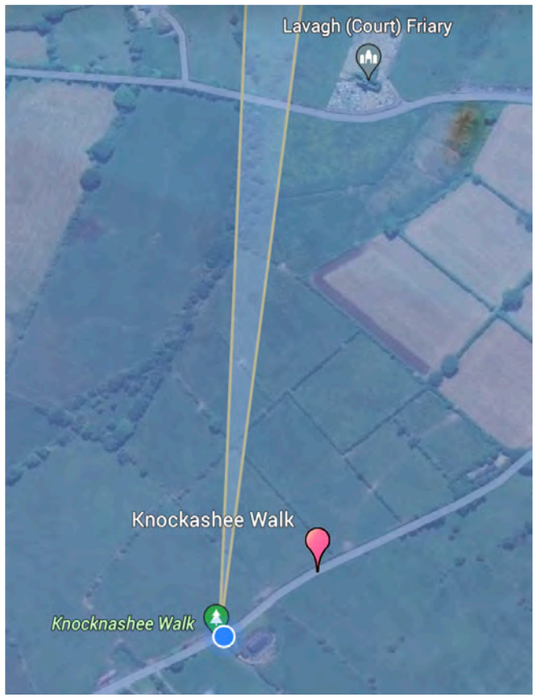
National Grid Coordinates ITM (Eastings and Northings): 554567 814808

macroworks APEM Group

Rejected Viewpoint G - Knockashee Walk (L8606)

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Amenity feature

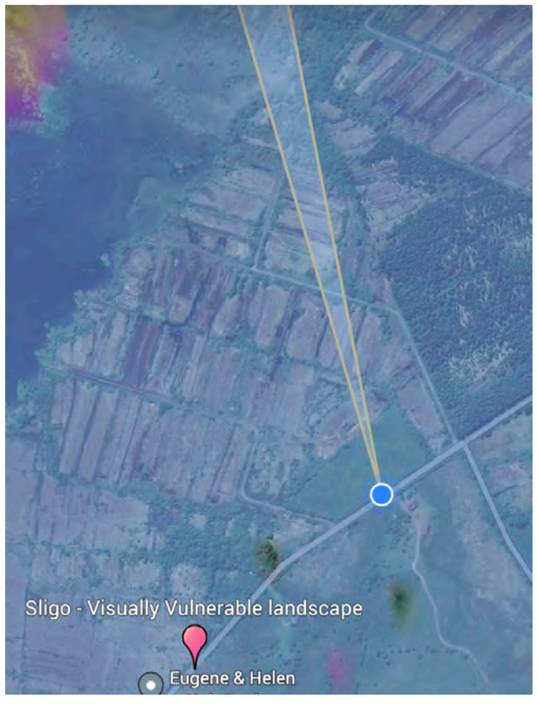
National Grid Coordinates ITM (Eastings and Northings): 556245 818886

macroworks APEM Group

Rejected Viewpoint H - L56012 west of Cloonacleigha Lake

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Visually Vulnerable Landscape (Sligo)

National Grid Coordinates ITM (Eastings and Northings): 560302 815480

macroworks APEM Group

Rejected Viewpoint I - R295 Sligo Scenic Route 20

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Scenic Route

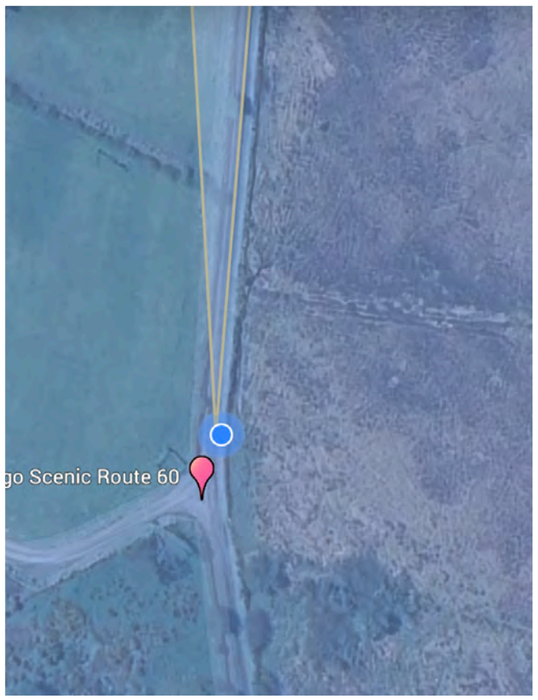
National Grid Coordinates ITM (Eastings and Northings): 569100 813050

macroworks APEM Group

Rejected Viewpoint J - L1404 Sligo Scenic Route 60

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Scenic route

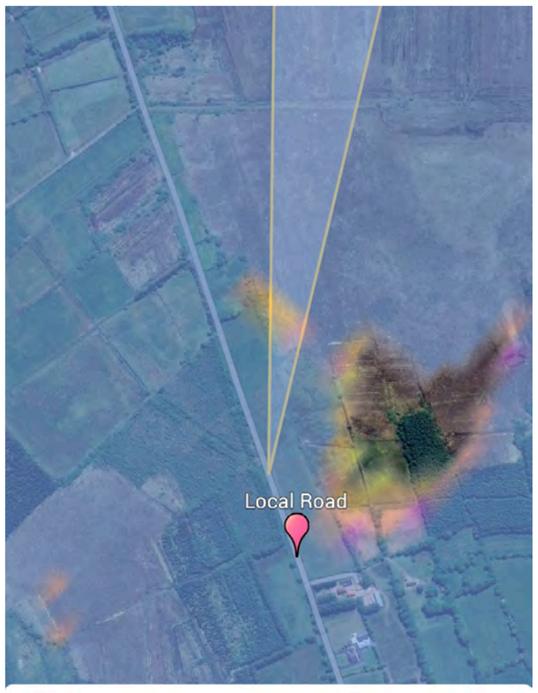
National Grid Coordinates ITM (Eastings and Northings): 573679 811209

macroworks APEM Group

Rejected Viewpoint K - Local Road west of Cloonakillina Lough

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Centre of population

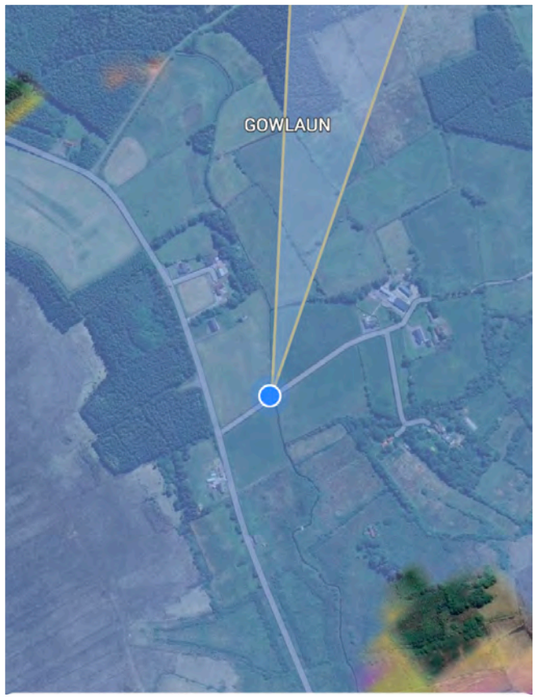
National Grid Coordinates ITM (Eastings and Northings): 557072 806835

macroworks APEM Group

Viewpoint L - Local Road, Gowlaun

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local community views

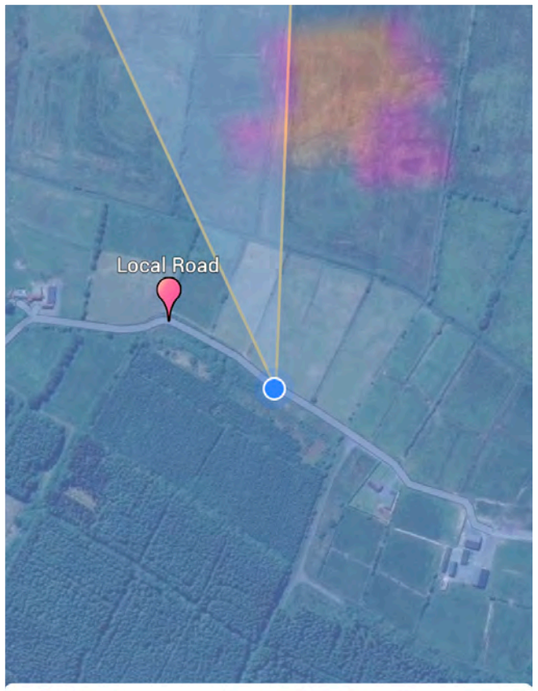
National Grid Coordinates ITM (Eastings and Northings): 557409 804917

macroworks APEM Group

Viewpoint M - L81061 north of Carrowntemple

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local community views

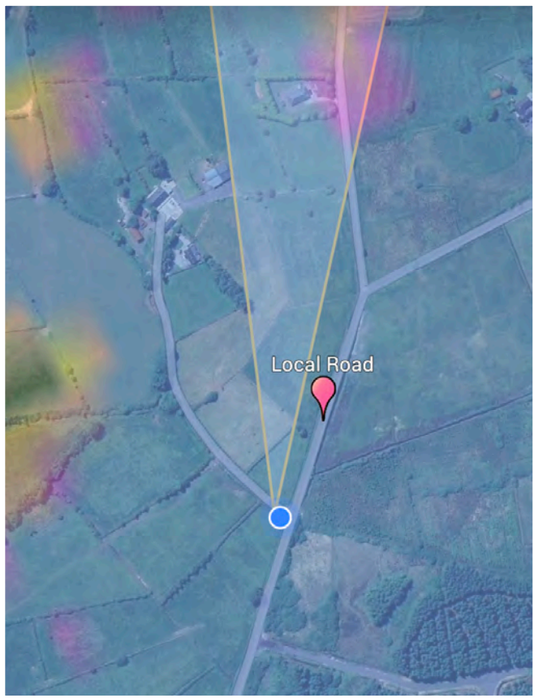
National Grid Coordinates ITM (Eastings and Northings): 557409 804917

macroworks APEM Group

Viewpoint N - L8106 Kilfree

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local Community Views

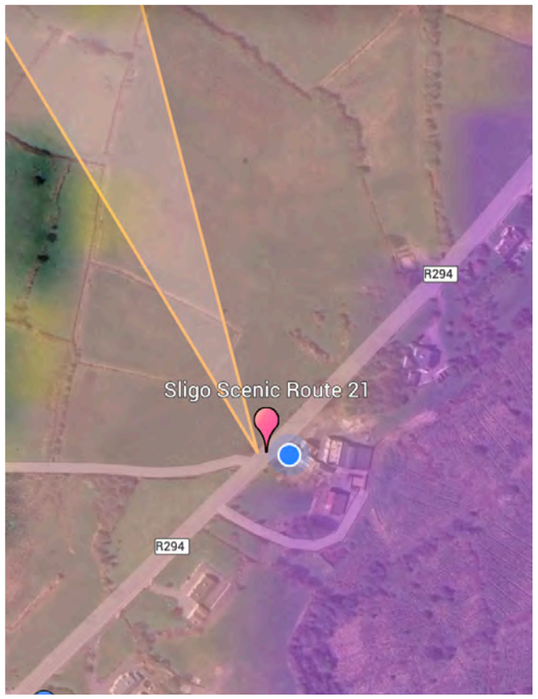
National Grid Coordinates ITM (Eastings and Northings): 564324 803658

macroworks APEM Group

Rejected Viewpoint O - R294 Sligo Scenic Route 21

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Scenic route / Community views

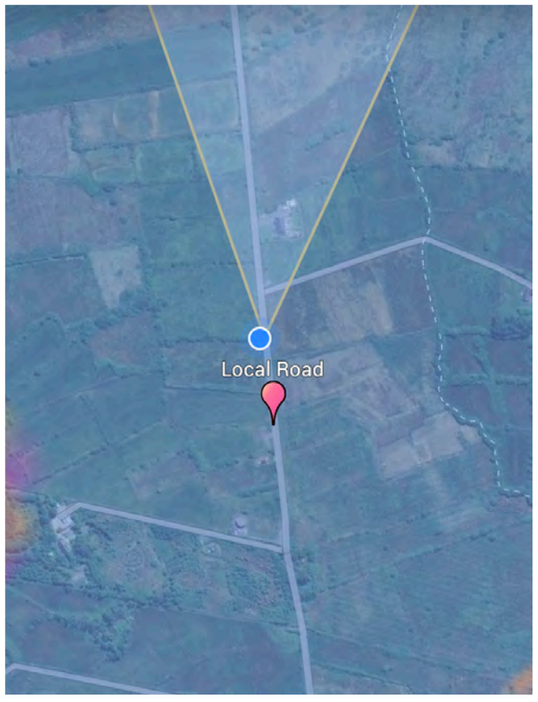
National Grid Coordinates ITM (Eastings and Northings): 570420 802983

macroworks APEM Group

Viewpoint P - Local Road Derrynabroc East

Islandmore Wind Farm - March 2025





Registered Landscape Architect

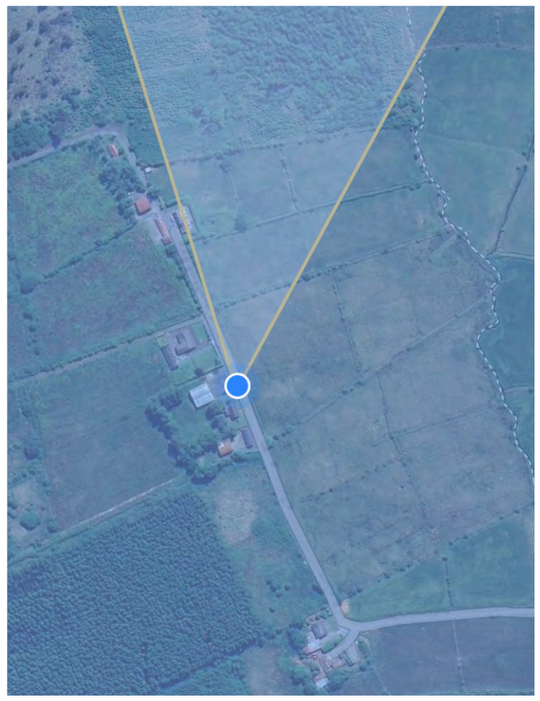
Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 559938 801126

macroworks APEM Group

Rejected Viewpoint Q - Road north of L5501





Registered Landscape Architect

Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 560922 801208

macroworks APEM Group

Rejected Viewpoint R - L1203 Dernacartha Upper

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local community views

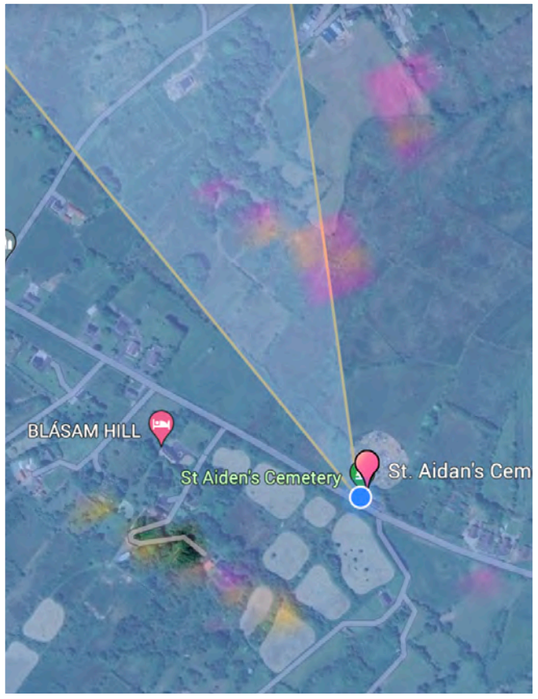
National Grid Coordinates ITM (Eastings and Northings): 559008 800055

macroworks APEM Group

Viewpoint S - L41042, St. Aidan's Cemetry, Monasteraden

Islandmore Wind Farm - March 2025





Registered Landscape Architect

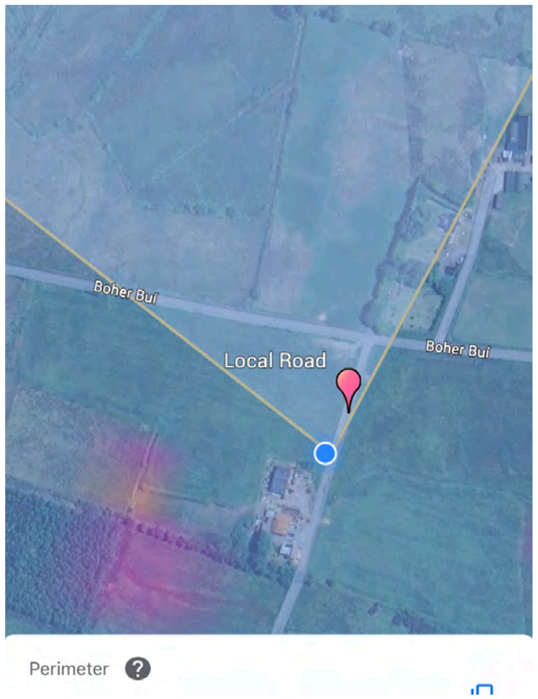
Initial selection criteria: Centre of population

National Grid Coordinates ITM (Eastings and Northings): 567060 799168

macroworks APEM Group

Viewpoint T - Local Road, Bockagh





Registered Landscape Architect

Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 560550 797789

macroworks APEM Group

Rejected Viewpoint U - L1203, Ballaghaderreen

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Centre of population

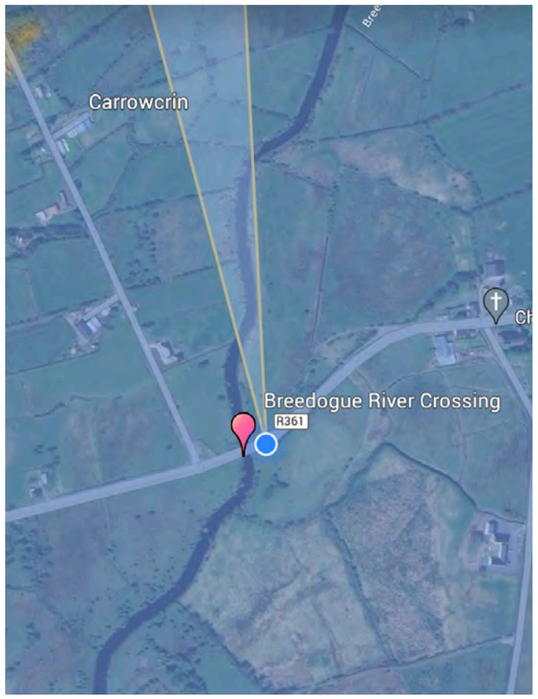
National Grid Coordinates ITM (Eastings and Northings): 561865 795627

macroworks APEM Group

Viewpoint V - R361, Breedogue River crossing

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Local Community Views

National Grid Coordinates ITM (Eastings and Northings): 574461 794745

macroworks APEM Group

Viewpoint W - N5, Frenchpark

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Centre of population

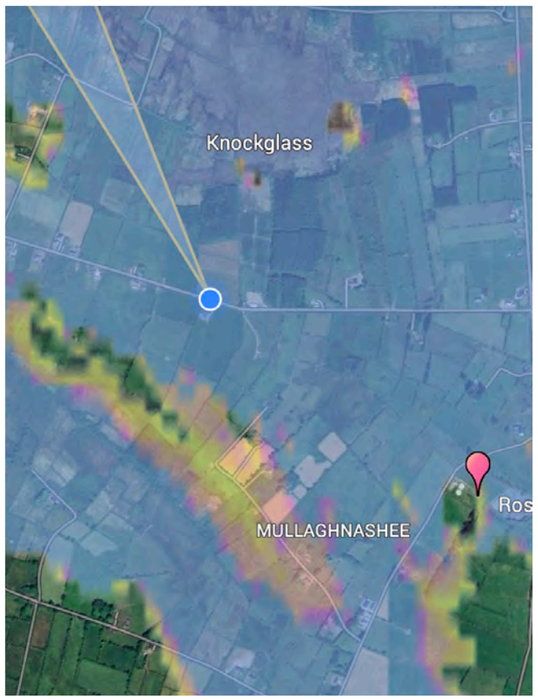
National Grid Coordinates ITM (Eastings and Northings): 572817 791395

macroworks APEM Group

Rejected Viewpoint X - Local Road west of Lisdrumneill Crossroads

Islandmore Wind Farm - March 2025





Registered Landscape Architect

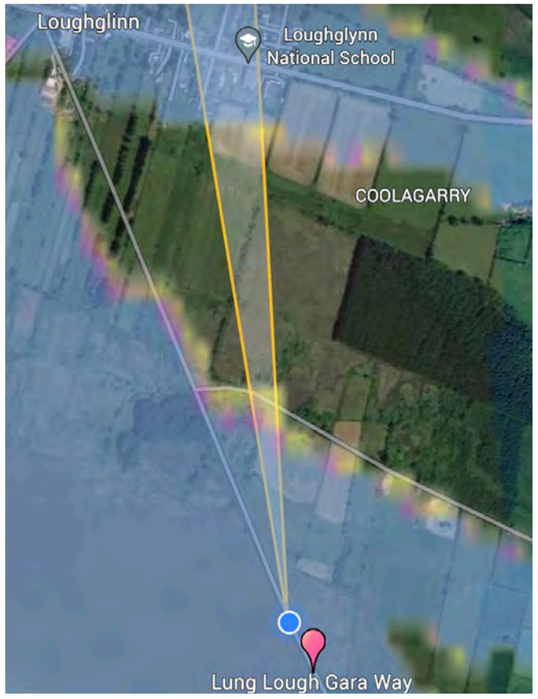
Initial selection criteria: Local community views

National Grid Coordinates ITM (Eastings and Northings): 567126 788801

macroworks APEM Group

Rejected Viewpoint Y -Track south of Loughglinn, Lung Lough Gara Way.





Registered Landscape Architect

Initial selection criteria: Amenity feature / recreational trail

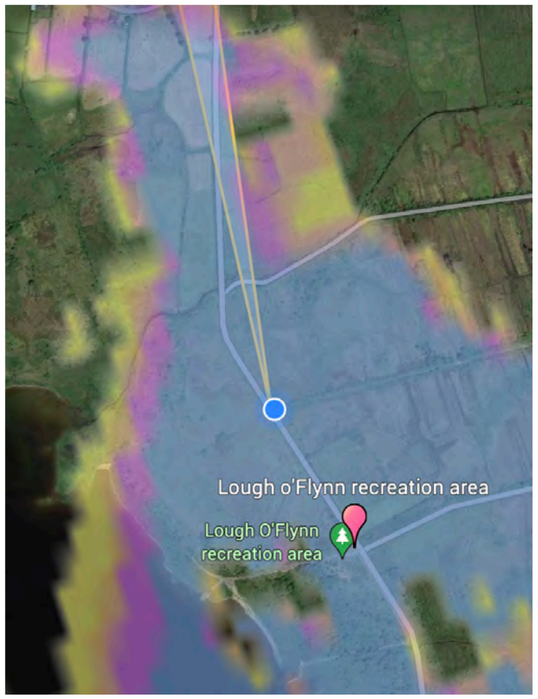
National Grid Coordinates ITM (Eastings and Northings): 563404 784877

macroworks APEM Group

Viewpoint Z - Lough O'Flynn – Wild Goose Bog Loop

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Amenity feature

National Grid Coordinates ITM (Eastings and Northings): 558928 780161

macroworks APEM Group

Viewpoint ZZ - Scenic View V15 (Roscommon) Lough O'Flynn

Islandmore Wind Farm - March 2025





Registered Landscape Architect

Initial selection criteria: Scenic View

National Grid Coordinates ITM (Eastings and Northings): 558513 778531

macroworks APEM Group

ANNEX 6 – CULTURAL HERITAGE SCOPING REPORT

dermot nelis archaeology

ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE SCOPING REPORT

ISLANDMORE WIND FARM,

COUNTY ROSCOMMON

PREPARED BY

DERMOT NELIS ARCHAEOLOGY

FOR

STATKRAFT IRELAND LIMITED

11th OCTOBER 2023

CONTENTS

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Figure 1 Aerial photograph showing location of Turbines 1 – 12

Figure 2 Aerial photograph showing proposed Underground Grid Connection Options 1 - 5

Figure 3 Extract from First Edition 1:10,560 Ordnance Survey map showing location of Turbines 1 – 7

Figure 4 Extract from First Edition 1:10,560 Ordnance Survey map showing location of Turbines 8 – 12

Figure 5 Extract from Third Edition 1:10,560 Ordnance Survey map showing location of Turbines 1 – 7

Figure 6 Extract from Third Edition 1:10,560 Ordnance Survey map showing location of Turbines 8 – 12

1 INTRODUCTION

1.1 General

This desk-based scoping report has been prepared on behalf of Statkraft Ireland Limited by Dermot Nelis Archaeology to assess and define any effects which the construction, operation and decommissioning of the proposed Islandmore Wind Farm ('proposed development') comprising a 12 no. turbine wind farm and associated infrastructure, including 5 no. underground grid connection options, may have on the archaeological, architectural and cultural heritage resource. The scoping report includes an identification of potential impacts or effects which may arise and outlines mitigation measures, based on current information, which may be used to avoid, reduce or offset any potential adverse impacts or effects.

The Islandmore Wind Farm will be located in north County Roscommon, *c*. 2km north of Ballaghaderreen, *c*. 13km east of Charlestown (County Mayo) and *c*. 6km south west of Gorteen (County Sligo).

The development will comprise 12 no. wind turbines; 9 no. of which will have an overall tip height of 150m and 3 no. with an overall tip height of 185m; turbine foundations; turbine hardstanding; internal site access tracks; internal wind farm underground cabling; site entrances; on-site 110kV electricity substation; underground grid connection infrastructure; and all associated site development, access and reinstatement works (Figure 1). 5 no. underground grid connection route options have been assessed as part of this scoping process. Each route option will terminate at the Tonroe 110kV substation located to the north of Ballaghaderreen (Figure 2).

1.2 Objectives of Scoping Report

The key objectives of this scoping report are to assess, as far as is reasonably possible from existing records and current information, any impacts or effects the proposed development may have on the archaeological, architectural and cultural heritage resource. The following key issues are addressed:

- Direct and indirect effects of the construction of the development on the archaeological, architectural and cultural heritage resource;

- Direct and indirect effects of the operation of the development on the archaeological, architectural and cultural heritage resource; and

- Cumulative effects of the construction and operation of the development on the archaeological, architectural and cultural heritage resource with other existing, permitted or proposed developments or projects.

1.3 Project Team

Dermot Nelis BA ArchOxon AIFA MIAI

Dermot Nelis graduated from Queen's University Belfast, and after gaining extensive fieldwork experience undertook postgraduate studies at the University of Oxford in archaeological consultancy and project management.

Dermot has acted as Senior Archaeologist on several road schemes for various County Councils, and Directed large-scale multi-period excavations associated with those developments. He has completed over 180 Licensed fieldwork programmes and over 250 archaeological, architectural and cultural heritage desk-based reports and Environmental Impact Assessments.

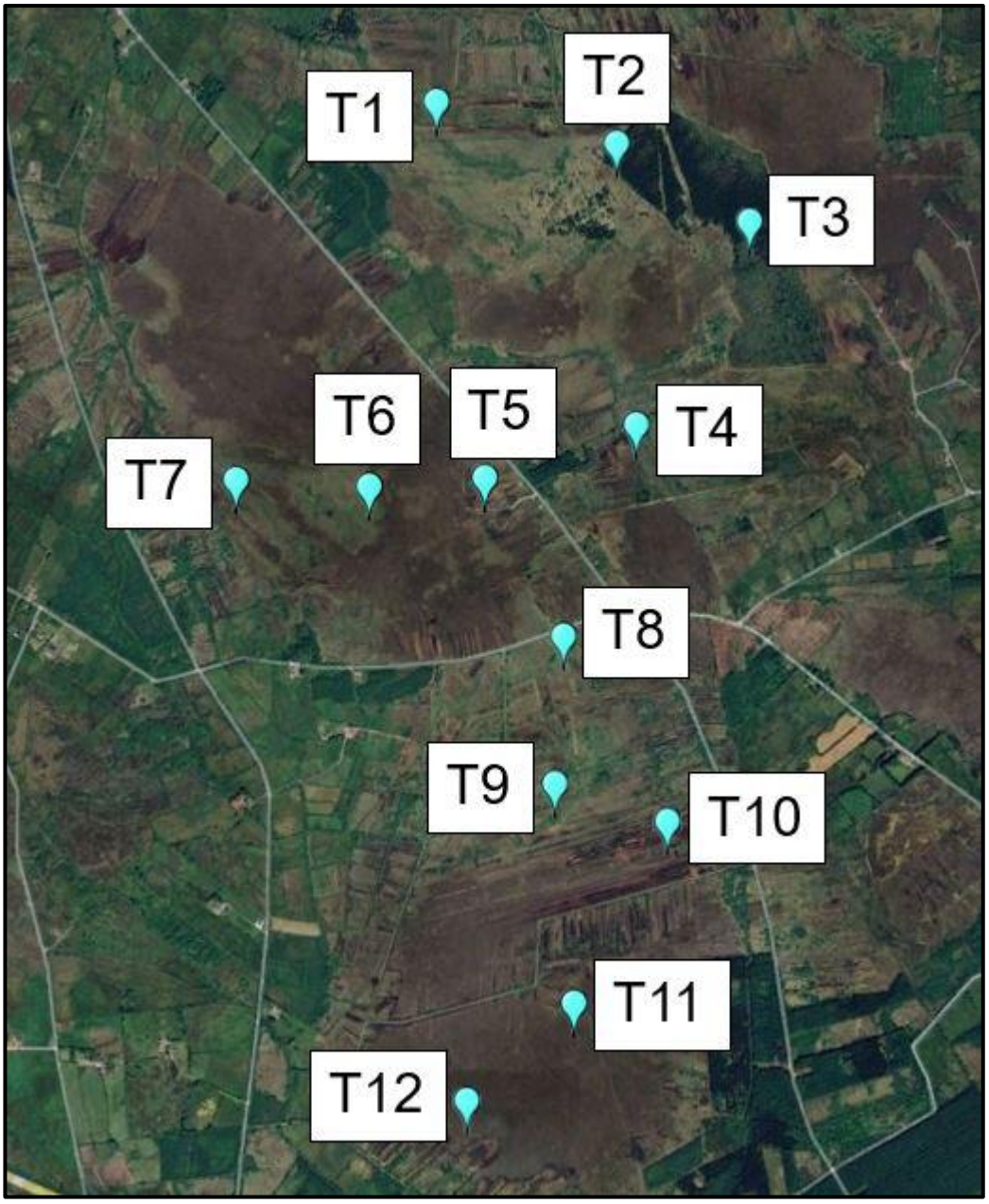


Figure 1: Aerial photograph showing location of Turbines 1 – 12

2 METHODOLOGY

2.1 Study Area

There is no professional standard for defining the extent of a study area when assessing the likelihood of effects on archaeological, architectural or cultural heritage remains. A 1km study area has been applied around the proposed wind farm to assess the presence of statutorily protected archaeological remains (RMP sites). In addition, a 5km study area has been applied around the proposed wind farm to assess the presence of any World Heritage Sites, sites included in the Tentative List as consideration for nomination to the World Heritage List,

National Monuments, sites with Preservation Orders or Temporary Preservation Orders, Protected Structures, Conservation Areas or Proposed Conservation Areas.

A 1km study area has been applied around the proposed wind farm to record the presence of any structures recorded on the National Inventory of Architectural Heritage (NIAH). An assessment has also been made of any historic gardens or designed landscapes as recorded on the NIAH that may exist within the proposed wind farm or the 5 no. proposed grid connection options.

A 100m study area has been applied around each of the 5 no. proposed grid connection options.

2.2 Data Sources

The following sources were examined and a list of sites and areas of archaeological, architectural and cultural heritage potential was compiled:

- Record of Monuments and Places of County Roscommon;
- Cartographic and documentary sources relating to the study area;
- Aerial photographs of Ordnance Survey Ireland and Bing aerial photography;
- Roscommon County Development Plan (2022 – 2028); and
- National Inventory of Archaeological Heritage.

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Service. Back-up files of the Sites and Monuments Record (SMR) provide details of documentary sources and field inspections where these have taken place.

Cartographic sources are important in tracing land-use development within an area of land take, as well as providing important topographical information on sites and areas of archaeological potential. Cartographic analysis of relevant maps has been made to identify any topographical anomalies that may no longer remain within the landscape. **Documentary sources** were consulted to gain background information on the historical and archaeological

landscape of the development area.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its potential to contain previously unidentified archaeological remains.

Roscommon County Development Plan (2022 – 2028) contains Policy Objectives on the preservation and management of archaeological, architectural and cultural heritage features.

National Inventory of Architectural Heritage is a section within the Department of Housing, Local Government and Heritage. The work of NIAH involves identifying, recording and evaluating on a non-statutory basis the architectural heritage of Ireland from 1700 to the present day.

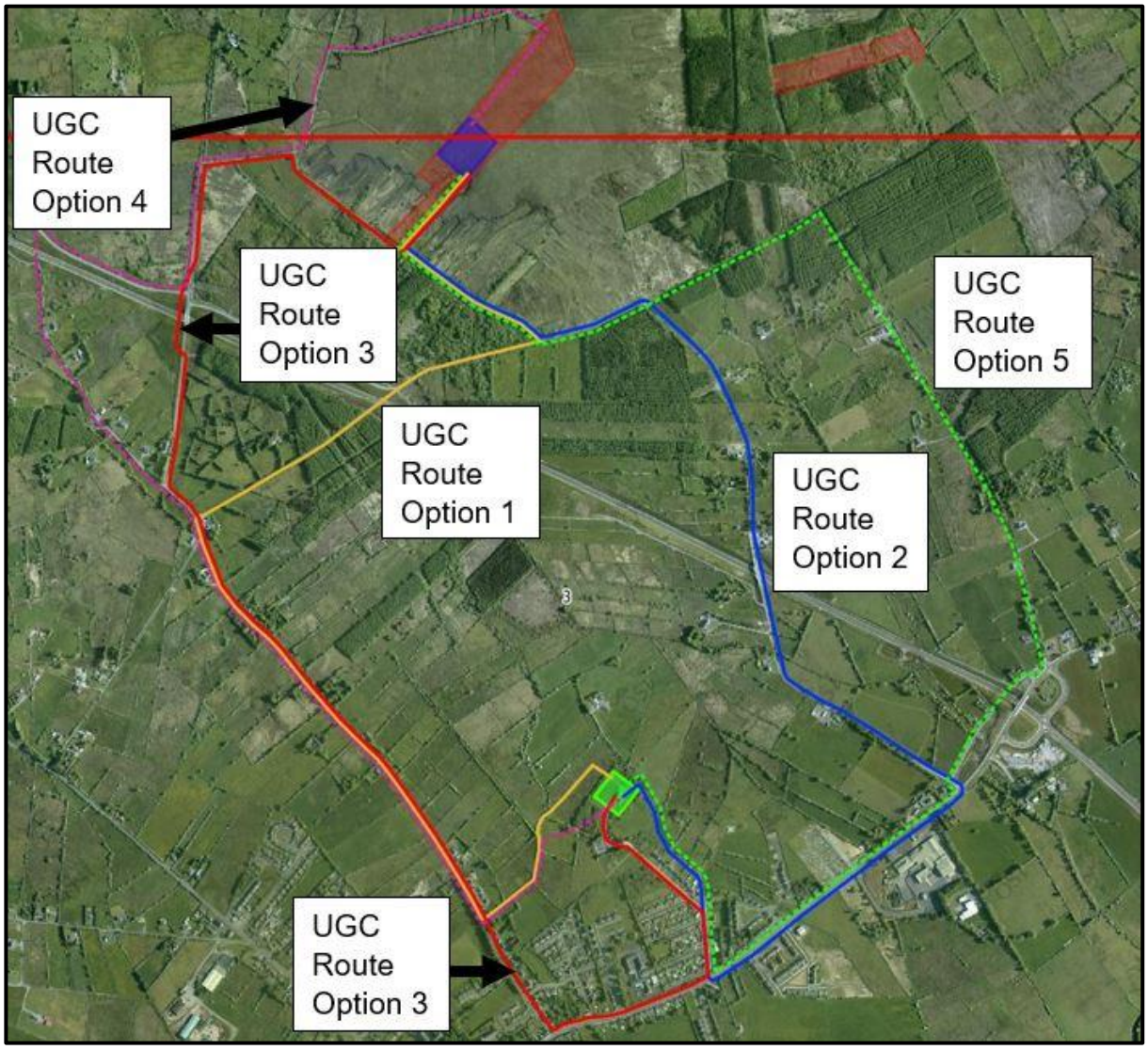


Figure 2: Aerial photograph showing proposed Underground Grid Connection Options 1 – 5

3 BASELINE CONDITIONS

3.1 Site-Specific Archaeological Background

There are no archaeological, architectural or cultural heritage features within any areas of land take required for the proposed development.

There are no Recorded Monuments within the proposed wind farm or within 1km of the proposed wind farm.

There are no Recorded Monuments within proposed UGC Route Option 1 or within 100m of proposed UGC Route Option 1.

There are no Recorded Monuments within proposed UGC Route Option 2. There are 2 no. Recorded Monuments within 100m of proposed UGC Route Option 2:

RMP RO008-022: Earthwork

Marked as a circular feature (diam. *c*. 15m) on the First Edition Ordnance Survey 6-inch map, and situated on a gentle south-facing slope. The site is now occupied by an industrial premises (www.archaeology.ie).

RMP RO008-075: Excavation

Situated on a gentle south-facing slope. Identified in centre-line testing of the N5 Ballaghaderreen bypass as a spread of burnt material with charcoal, filled with a charcoal-rich silty clay. It was subsequently excavated as a single oval pit (dimensions 1.4m x 1.2m x 0.2m) with steep sides cut into the sandy clay subsoil. It contained a sandy clay with heat-shattered stone and charcoal. A fragment of ash produced a C14 date of cal. AD 1048-1218, and it is interpreted as a cooking pit (www.archaeology.ie).

There are no Recorded Monuments within proposed UGC Route Option 3 or within 100m of proposed UGC Route Option 3.

There are no Recorded Monuments within proposed UGC Route Option 4 or within 100m of proposed UGC Route Option 4.

There are no Recorded Monuments within proposed UGC Route Option 5. There are 5 no. Recorded Monuments within 100m of proposed UGC Route Option 5:

RMP RO008-022: Earthwork

Marked as a circular feature (diam. *c*. 15m) on the First Edition Ordnance Survey 6-inch map, and situated on a gentle south-facing slope. The site is now occupied by an industrial premises (www.archaeology.ie).

***RMP RO008-023:* Ringfort**

On a gentle south-facing slope. Circular grass-covered area (diameter 40.3m N-S; 37.6m E-W) defined by an overgrown earthen bank (at E: Wth 2.5m; int. H 0.5m; ext. H 0.8m; at N: Wth 5m; int. H 0.3m; ext. H 0.9m) north east/south south east and south west/north north east which is reduced to a scarp (H 0.9m) south south east/south west and is missing (L 17m) north north east/east north east. There is an outer fosse (Wth of base 1.8m at N to 4.4m at W; D 0.3-0.4m) west south west/north east, but there is no visible entrance. A buffer zone (Wth 20m) was established around the monument in 2009 during the archaeological testing for the N5 Ballaghaderreen bypass and for any subsequent construction. An area outside the buffer-zone was excavated when evidence of Neolithic and Early Bronze Age activity was recorded (RO008-065, below) as well as elements of a field system (RO008-023001, below) associated with the ringfort and an enclosure (RO008-023002, below). Further excavation in 2012 identified a narrow ditch outside the visible fosse of the ringfort and curving in line with the perimeter in the south sector. It produced material that provided a C14 date of AD 666-773 (www.archaeology.ie).

***RMP RO008-023001:* Field system**

Located on a gentle south-facing slope. Archaeological excavation outside the exclusion zone around the ringfort (RO008-023, above) recorded three drains or ditches (Wth 0.6-1.1m; D 0.2-0.25m) with some gaps approaching the ringfort from the west, north and north east (www.archaeology.ie).

***RMP RO008-023002:* Enclosure**

Located on a gentle south-facing slope *c*. 50m north east of ringfort (RO008-023, above). Archaeological excavation as part of the N5 Ballaghaderreen bypass uncovered part of an enclosure in an L-shaped ditch (Wth 2.2m; D 0.75m) running south (L 15m plus) and turning east (L 15m) through a rounded corner to a terminus. Ash from the ditch produced a calibrated

C14 date of AD 1023-1155. An element of a field system (RO008-023001, above) connects the enclosure to the ringfort (www.archaeology.ie).

RMP RO008-065: **Excavation**

Situated on a gentle south-facing slope with a north west/south east stream *c*. 190m to the south west, and just west of ringfort RO008-023 (above). Archaeological testing during 2009 on the route of the N5 Ballaghaderreen bypass identified a number of pits in a concentrated area. An arc (Wth 10-40m) was excavated outside the exclusion zone of the ringfort which revealed a line of four pits or post-holes (diam. 0.5-0.8m; D 0.15-0.5m) aligned north west/south east. One pit produced a C14 date of 2861-2576 cal. BC. There were two hearths *c*. 40m to the south west of the pits, one of which produced a C14 date of 2113-1900 cal. BC. These features were intermixed with elements of the field system (RO008-023001, above) associated with the ringfort (www.archaeology.ie).

Ringforts are generally circular defensive enclosures which were constructed to protect farmsteads. They were enclosed by an earthen bank and exterior ditch, and ranged from approximately 25m to 50m in diameter. The smaller sized and single banked type (univallate) was more than likely home to lower ranks of society, while larger examples with more than one bank (bivallate/trivallate) housed the more powerful kings and lords. They are regarded as defended family homesteads, and the extant dating evidence suggests they were primarily built between the 7th and 9th centuries AD (Stout 1997, 22-31). The most recent detailed study (*ibid*., 53) has suggested that there is an approximate total of 45,119 potential ringforts or enclosure sites throughout Ireland.

Enclosures belong to a classification of monument whose precise nature is unclear. Often, they may represent ringforts, which have either been damaged to a point where they cannot be positively recognised, or are smaller or more irregular in plan than the accepted range for a ringfort. An Early Medieval date is generally likely for this site type, though not a certainty.

The classification of archaeological monuments is often made difficult by their condition, whether it be the result of deliberate destruction, trampling by livestock or natural weathering and erosion. The term "*earthwork*" is used to denote any monument or feature of artificial origin which cannot be further categorised without excavation. The term "*earthwork site*" indicates sites which were levelled before detailed archaeological inspection took place. The majority of such sites may be levelled or destroyed ringforts.

Field systems are regarded as a group or complex of fields which are related and may date to any period from the Neolithic onwards. The practice of enclosing fields in Ireland for agricultural and other purposes dates back to the Neolithic period. The enclosed land could have been used for stock-raising, plant husbandry and crop protection. The fields can vary in size and it is possible that many of them are more extensive than currently thought. A wide range of monuments, such as barrows, ringforts, souterrains, hut sites, ecclesiastical remains *etc*., can be found inside field systems.

3.2 Cartographic Analysis

Ordnance Survey Maps: First Edition 1:10,560 (1838)*; First Edition 1:2,500* (1888 - 1892) and *Third Edition 1:10,560* (1911 - 1913)

The turbines will be located in close proximity to townland, parish, barony and county boundaries as recorded on the First Edition map. Research suggests that:

> "*hoards and single finds of Bronze Age weapons, shields, horns, cauldrons and gold personal objects can all be shown to occur on boundaries*." (Kelly 2006, 28).

The turbines will generally be located on unenclosed rough pasture as recorded on the historic maps.

There are no archaeological or architectural features recorded within the land take of the proposed turbines on historic cartographic sources.

The historic maps all record the presence of vernacular structures, Ordnance Survey bench marks, springs, *etc*. in the general vicinity of the proposed 5 no. underground grid connection route options.

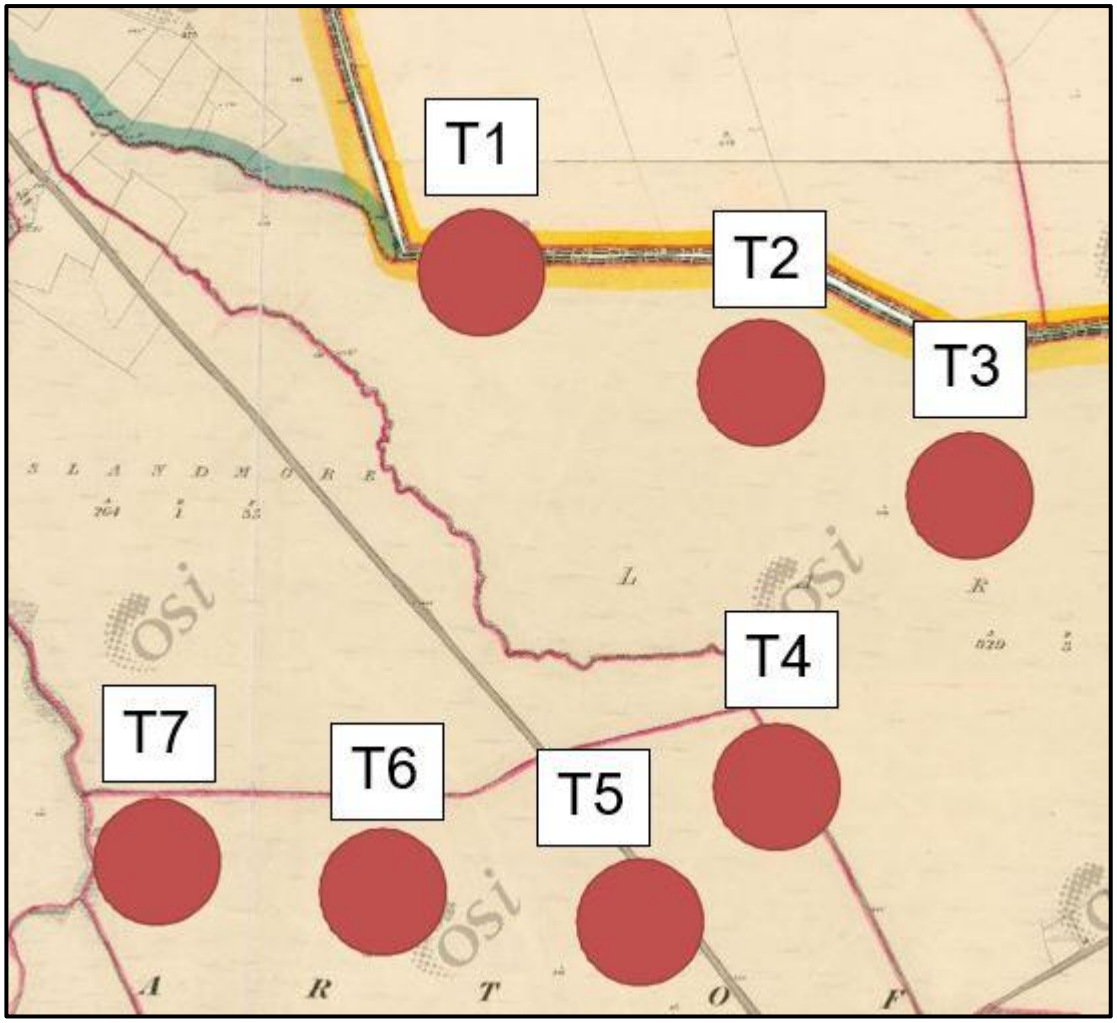


Figure 3: Extract from First Edition 1:10,560 Ordnance Survey map showing location of Turbines 1 – 7

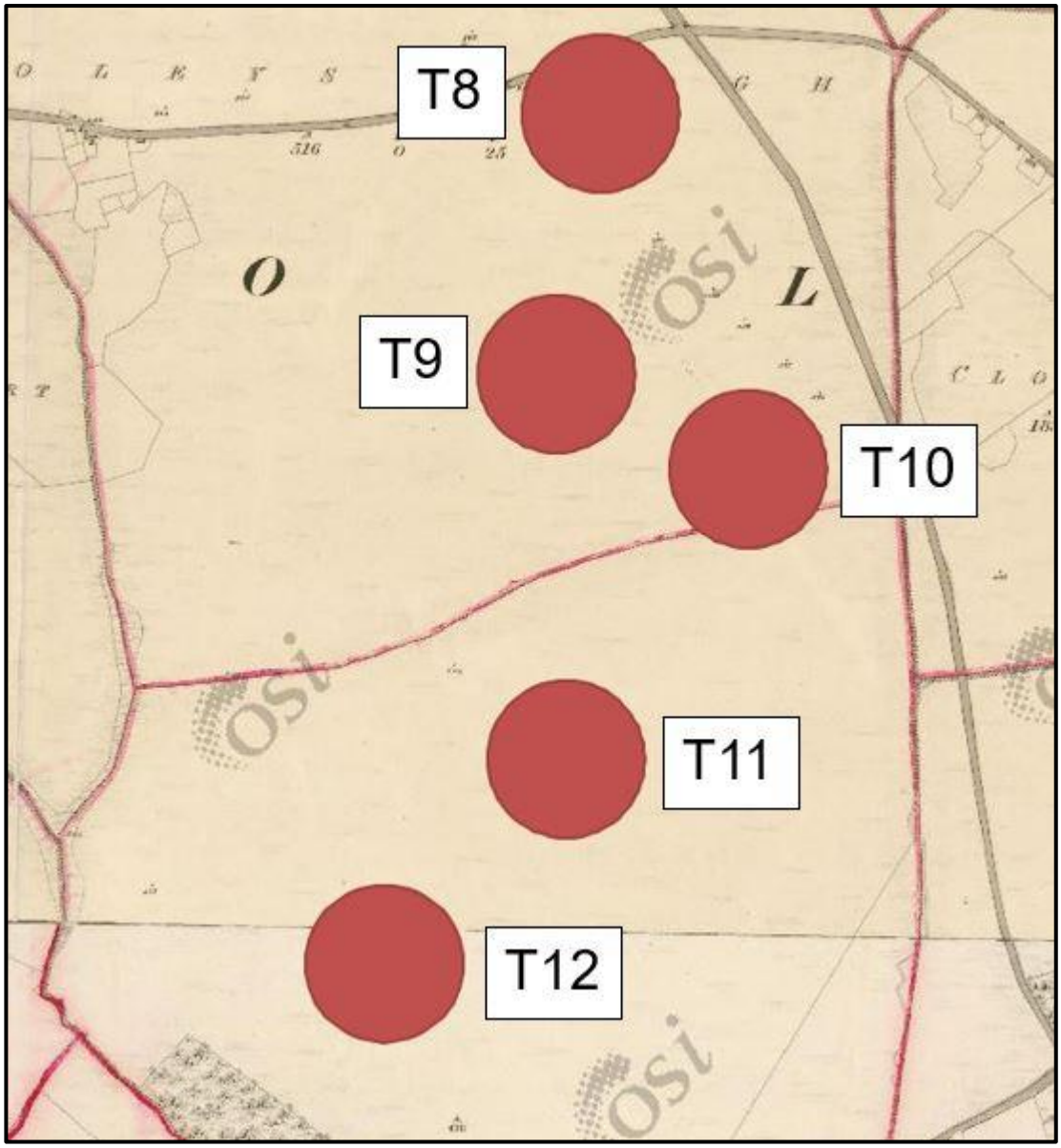


Figure 4: Extract from First Edition 1:10,560 Ordnance Survey map showing location of Turbines 8 – 12

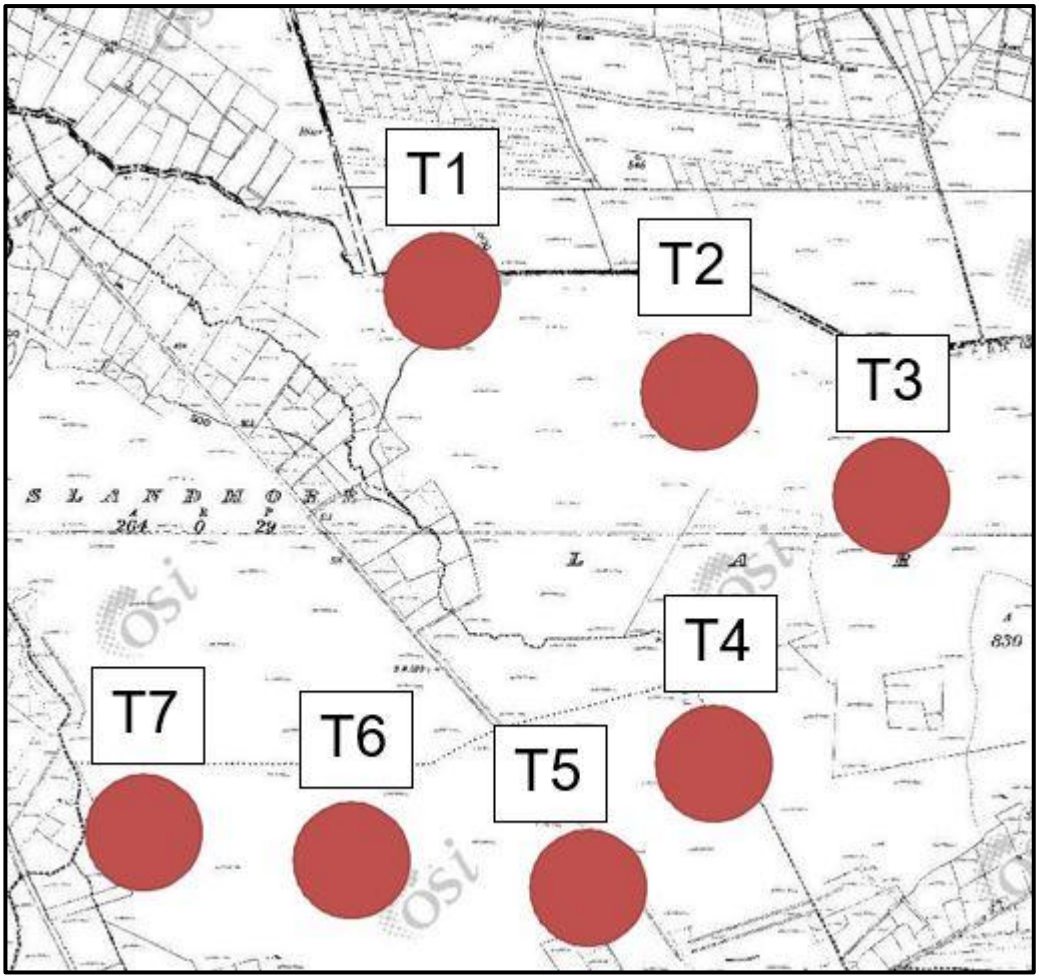


Figure 5: Extract from Third Edition 1:10,560 Ordnance Survey map showing location of Turbines 1 – 7

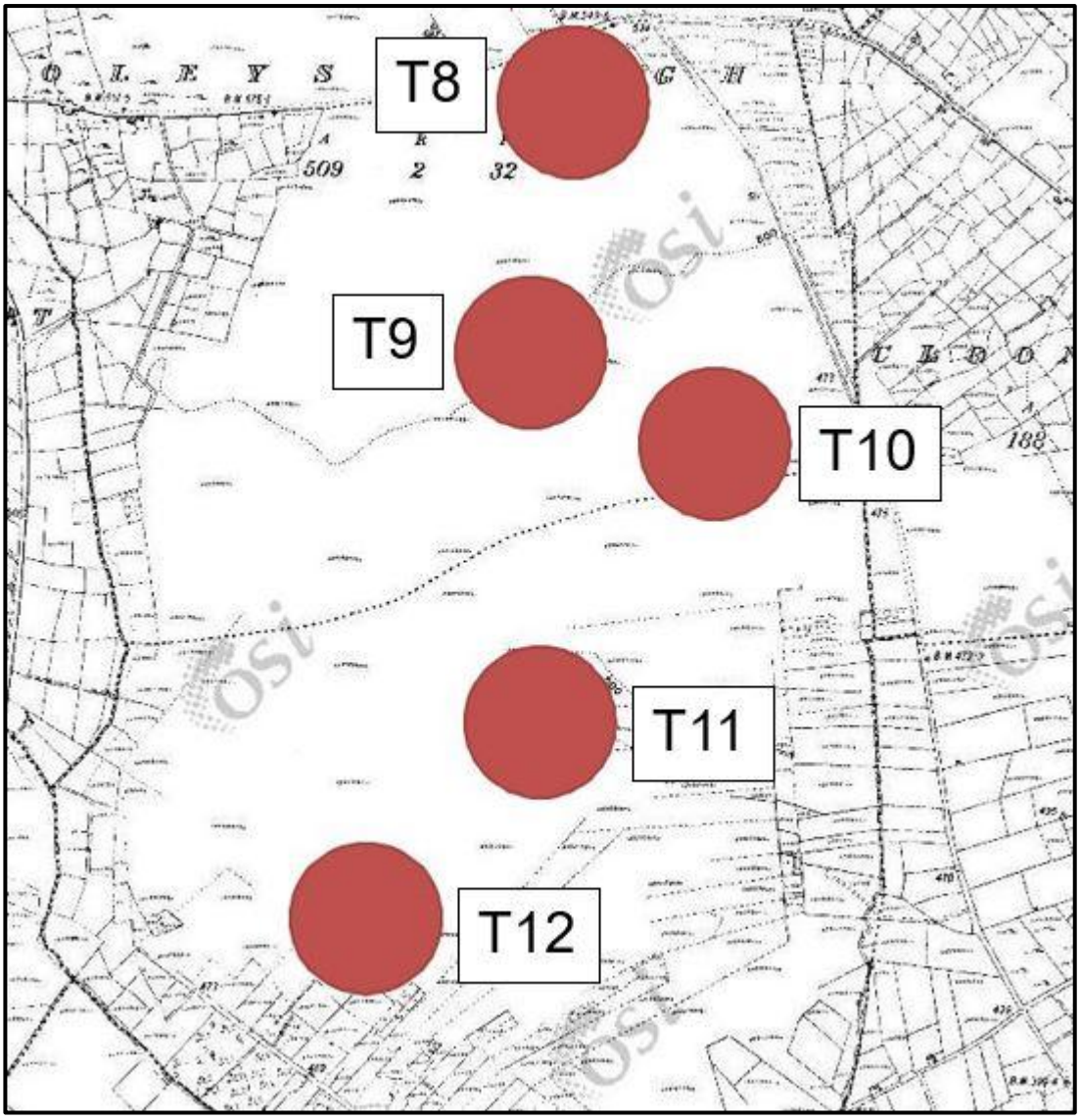


Figure 6: Extract from Third Edition 1:10,560 Ordnance Survey map showing location of Turbines 8 – 12

3.3 Aerial Photographs

Aerial photographs held by Ordnance Survey Ireland (www.map.geohive.ie) and Bing aerial photography (www.bing.com/maps) were consulted to look for the presence of archaeological or architectural remains within the land take of the proposed development.

There was no evidence of any archaeological or architectural features recorded on aerial photography within any areas of land take required for the proposed development.

3.4 County Development Plans

Roscommon County Development Plan 2022 - 2028

3.4.1 Archaeological Heritage

It is a policy objective (BH 9.13) of Roscommon County Council (Roscommon County Development Plan 2022-2028, Volume 1) to:

> "*Secure the preservation (i.e. preservation in situ or, as a minimum, preservation by record) of all archaeological monuments included in the Record of Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act, 1994, and of sites, features and objects of archaeological interest generally. In securing such preservation Roscommon County Council will have regard to the advice and recommendations of the National Monuments Section of the Department of Housing, Local Government and Heritage*."

The *Roscommon County Development Plan* (2022 – 2028) does not contain any designated lists or sites of archaeological importance or significance.

3.4.2 Architectural Heritage

It is a policy objective (BH 9.1) of Roscommon County Council (*ibid*.) to:

> "*Ensure the protection of the architectural heritage of County Roscommon through the compilation of a Record of Protected Structures, the designation of Architectural Conservation Areas, the safeguarding of historic gardens, and the recognition of structures and elements that contribute positively to the vernacular and industrial heritage of the county.*"

It is also a policy objective (BH 9.2) of Roscommon County Council (*ibid*.) to:

> "*Protect all structures included on the Record of Protected Structures and their settings, which are of special architectural, historical, archaeological, artistic, cultural, scientific, social, or technical interest*."

The Roscommon County Development Plan (*ibid*.) contains the *Record of Protected Structures* for the county. There are no Protected Structures recorded in the Roscommon County Development Plan within the proposed wind farm or within 1km of the proposed wind farm. There are 27 no. Protected Structures recorded in the Roscommon County Development Plan within 5km of the proposed wind farm, 24 no. of which are located in Ballaghaderreen.

There are no Protected Structures recorded in the Roscommon County Development Plan within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options.

Section 9.3 of the Roscommon County Development Plan (*ibid*.) contains a list of *Architectural Conservation Areas* from within the county. There are no Architectural Conservation Areas recorded in the Roscommon County Development Plan within the proposed wind farm or within 1km of the proposed wind farm. There is 1 no. Architectural Conservation Area recorded in the Roscommon County Development Plan within 5km of the proposed wind farm:

- Ballaghaderreen Architectural Conservation Area. Located approximately 2.5km south, at its nearest point, of the proposed wind farm.

The 5km study area extends into County Mayo and County Sligo. There are no Protected Structures recorded in the Mayo County Development Plan (2022 – 2028) within 5km of the proposed wind farm. There are 4 no. Protected Structures recorded in the Sligo County Development Plan (2017 – 2023) within 5km of the proposed wind farm.

There are no Architectural Conservation Areas recorded in the Mayo County Development Plan (2022 – 2028) within 5km of the proposed wind farm. There are no Architectural Conservation Areas recorded in the Sligo County Development Plan (2017 – 2023) within 5km of the proposed wind farm.

There are no Architectural Conservation Areas within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options.

3.4.3 Cultural Heritage

The *Roscommon County Development Plan* (2022 – 2028) does not contain any designated lists or sites of cultural heritage importance or significance.

3.5 National Monuments

The Department of Housing, Local Government and Heritage maintains a database on a county basis of National Monuments in State Care. The term National Monument is defined in Section 2 of the National Monuments Act (1930) as:

"*a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto.*" (www.archaeology.ie).

There are no National Monuments in State Care within the proposed wind farm or within 1km of the proposed wind farm. There is 1 no. National Monument in State Care within 5km of the proposed wind farm:

- National Monument Number 159. Cashel. Clogher townland. Approximately 3.6km south east in County Sligo.

There are no National Monuments in State Care within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options.

The Department of Housing, Local Government and Heritage also maintains a database on a county basis of National Monuments with Preservation Orders or Temporary Preservation Orders.

There are no National Monuments with Preservation Orders or Temporary Preservation Orders within the proposed wind farm or within 1km of the proposed wind farm. There are 2 no. National Monuments with Preservation Orders within 5km of the proposed wind farm:

- Preservation Order Number 4/1979. Castle. Bawn. Hut sites x 3. Glebe townland. Approximately 3.5km south. These sites represent 5 no. Recorded Monuments with one Preservation Order Number; and

- Preservation Order Number 23/1956. Ring-barrow. Magheraboy townland. Approximately 2.8km south east.

There are no National Monuments with Preservation Orders or Temporary Preservation Orders within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options.

There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed wind farm or within 5km of the proposed wind farm.

There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options.

3.6 National Inventory of Architectural Heritage

Building Survey

The National Inventory of Architectural Heritage (NIAH) maintains a non-statutory register of buildings, structures *etc*. recorded on a county basis.

There are no structures recorded on the National Inventory of Architectural Heritage within the proposed wind farm or within 1km of the proposed wind farm.

There are no structures recorded on the National Inventory of Architectural Heritage within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options.

Garden Survey

There are no historic gardens or designed landscapes recorded on the National Inventory of Architectural Heritage within the proposed wind farm.

There are no historic gardens or designed landscapes recorded on the National Inventory of Architectural Heritage within the proposed 5 no. underground grid connection route options.

3.7 Conclusions

There are no archaeological, architectural or cultural heritage features within any areas of land take required for the proposed development. There are no Recorded Monuments within the proposed wind farm or within 1km of the proposed wind farm. There are no Recorded Monuments within proposed UGC Route Options 1, 3 or 4 or within 100m of proposed UGC Route Options 1, 3 or 4. There are no Recorded Monuments within proposed UGC Route Option 2. There are 2 no. Recorded Monuments within 100m of proposed UGC Route Option 2. There are no Recorded Monuments within proposed UGC Route Option 5. There are 5 no.

Recorded Monuments within 100m of proposed UGC Route Option 5. There are no National Monuments in State Care within the proposed wind farm or within 1km of the proposed wind farm. There is 1 no. National Monument in State Care within 5km of the proposed wind farm. There are no National Monuments in State Care within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options. There are no National Monuments with Preservation Orders or Temporary Preservation Orders within the proposed wind farm or within 1km of the proposed wind farm. There are 2 no. National Monuments with Preservation Orders within 5km of the proposed wind farm. There are no National Monuments with Preservation Orders or Temporary Preservation Orders within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options. There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed wind farm or within 5km of the proposed wind farm. There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options.

There are no Protected Structures within the proposed wind farm or within 1km of the proposed wind farm. There are 31 no. Protected Structures within 5km of the proposed wind farm. There are no Protected Structures within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options. There are no Architectural Conservation Areas within the proposed wind farm or within 1km of the proposed wind farm. There is 1 no. Architectural Conservation Area within 5km of the proposed wind farm. There are no Architectural Conservation Areas within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options. There are no structures recorded on the National Inventory of Architectural Heritage within the proposed wind farm or within 1km of the proposed wind farm. There are no structures recorded on the National Inventory of Architectural Heritage within the proposed 5 no. underground grid connection route options or within 100m either side of the proposed 5 no. underground grid connection route options. There are no historic gardens or designed landscapes recorded on the National Inventory of Architectural Heritage within the proposed wind farm. There are no historic gardens or designed landscapes recorded on the National Inventory of Architectural Heritage within the proposed 5 no. underground grid connection route options.

There are no archaeological or architectural features recorded within the land take of the proposed turbines on historic cartographic sources. The historic maps all record the presence of vernacular structures, Ordnance Survey bench marks, springs, *etc*. in the general vicinity of the proposed 5 no. underground grid connection route options. There was no evidence of any archaeological or architectural features recorded on aerial photography within any areas of land take required for the proposed development.

4 ASSESSMENT OF POTENTIAL CONSTRUCTION IMPACTS

4.1 Potential Construction Impacts

As a result of carrying out this desk-based scoping report, the following potential archaeological, architectural and cultural heritage impacts have been identified and thus require detailed assessment, where relevant:

- There are no Recorded Monuments or any additional statutorily protected archaeological features within any areas of land take required for the proposed development. As a result, there is likely to be no direct construction impact on any recorded protected archaeological remains.

- There are no Recorded Monuments within 1km of the proposed wind farm. There are no Recorded Monuments within proposed UGC Route Options 1, 3 or 4 or within 100m of proposed UGC Route Options 1, 3 or 4. There are no Recorded Monuments within proposed UGC Route Option 2. There are 2 no. Recorded Monuments within 100m of proposed UGC Route Option 2. There are no Recorded Monuments within proposed UGC Route Option 5. There are 5 no. Recorded Monuments within 100m of proposed UGC Route Option 5.

- The proposed development could potentially have a permanent imperceptible direct construction impact on any previously unrecorded archaeological remains that may exist within the development area.

- It is considered at this stage there is unlikely to be a visual or noise construction impact on any archaeological, architectural or cultural heritage remains, however, further assessment is required.

4.2 Potential Cumulative Construction Impacts

- It is considered at this stage there is unlikely to be cumulative construction impacts on any archaeological, architectural or cultural heritage remains.

5 ASSESSMENT OF POTENTIAL OPERATIONAL IMPACTS

5.1 Potential Operational Impacts

- It is considered the proposed wind farm may have an operational visual impact on Recorded Monuments located outside the 1km study area and on 31 no. Protected Structures located within the 5km study area. Further assessment is required.

- It is not known at this stage if there will be an operational visual impact on 1 no. National Monument in State Care within 5km of the proposed wind farm and 2 no. National Monuments with Preservation Orders within 5km of the proposed wind farm. Further assessment is required.

- It is not known at this stage if there will be an operational visual impact on 1 no. Architectural Conservation Area within 5km of the proposed wind farm. Further assessment is required.

- It is considered that the proposed 5 no. underground grid connection route options, due to their underground nature, do not have the potential to result in operational visual impacts on archaeological, architectural or cultural heritage remains.

5.2 Potential Cumulative Operational Impacts

- It is not known at this stage if there will be any cumulative operational impacts on archaeological, architectural or cultural heritage remains between the proposed wind farm and any existing, permitted or proposed developments. Further assessment is required.

- It is considered the proposed 5 no. underground grid connection route options will not have any cumulative operational impacts on archaeological, architectural or cultural heritage remains.

6 PROPOSED ASSESSMENT & MITIGATION MEASURES

- It is recommended that a detailed desktop analysis and appraisal of the existing cultural heritage environment be undertaken as part of the Environmental Impact Assessment

Report (EIAR). This appraisal will allow for an evidence-based assessment of likely significant effects which may arise resulting from the construction, operation and decommissioning of the proposed development.

- A detailed site walkover will be necessary to further assess the presence and nature of heritage features and to ground-truth the findings of the desktop appraisal.

- It is recommended that detailed visual impact assessments be carried out to assess the extent of operational visual impacts the proposed wind farm may have on archaeological and architectural remains.

- It is likely that Licensed archaeological monitoring will be recommended for all excavation works associated with construction of the wind farm.

- It is likely that Licensed archaeological monitoring will be recommended for all excavation works associated with construction of the underground grid connection.

- On the basis of the above scoping assessment, it is assessed that no heritage elements can be "scoped out", and thus a detailed impact assessment of the archaeological, architectural and cultural heritage resource must be provided within the EIAR.

7 MICROSITING

There are no Recorded Monuments or any additional statutorily protected archaeological, architectural or cultural heritage features within any areas of land take required for the proposed wind farm. As such, it is considered that micrositing would not have an impact on the archaeological, architectural or cultural heritage resource.

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ANNEX 7 – NOISE & VIBRATION SCOPING REPORT

Islandmore Wind Farm Ltd

Islandmore Wind Farm

Scoping Report: Noise and Vibration

I

Project Number: 23113

Document Reference: 23113-R1 V0

Document Date: 05/10/2023

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1 Introduction

1.1.1 Bow Acoustics has been appointed by Galetech Energy Services on behalf of Islandmore Wind Farm Ltd to conduct a noise and vibration assessment for the construction, operation and decommissioning of the proposed Islandmore Wind Farm ('proposed development').

1.1.2 This assessment will be carried out by Richard Carter CEng, BEng(Hons), MIOA, a Director at Bow Acoustics Ltd. Richard has worked in the field of acoustics for over 18 years, with over 13 years' experience specialising in the assessment of wind farm noise. Richard has a bachelor of Engineering (BEng (Hons)), a post graduate diploma in acoustics and noise control, is a member of the Institute of Acoustics (MIOA) and a Chartered Engineer (CEng). He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including wind energy, industrial, commercial and residential.

1.1.3 The Noise and Vibration Chapter of the EIAR will assess the likely effects of the proposed development to sensitive receptors in the surrounding environment. Information on the assessment of noise and vibration impacts on the environment during both the construction, operational and decommissioning phases will be assessed. The principal objectives of the noise and vibration assessment will be to specify appropriate limit values and mitigation measures to ensure that the impact on the environment is minimised.

2 Study Area

2.1.1 The study area for the construction and decommissioning noise assessment is limited to the nearest Noise-Sensitive Receptor (NSR) during the construction or decommissioning phase under assessment. Other, more distant NSRs would be exposed to lower levels of noise and do not need to be considered also.

2.1.2 The study area for the operational noise assessment comprises the area where noise levels from the proposed development are predicted to be within 10 dB of those from other relevant wind energy developments, and the predicted cumulative wind farm noise level is greater than 35 dB, $L_{A90,10min}$. The $L_{A90,\ 10min}$ parameter is used to describe wind turbine noise and it represents the level of noise exceeded for 90% of the measurement period, 10 minutes. The proposed development is adjacent to the operational Largan Hill Wind Farm which comprises nine Vestas V47 660kW machines.

2.1.3 An indicative extent of the study area in relation to operational noise, is presented in Appendix A. This area is based on the initial scoping layout for the proposed development and a candidate machine of 9x Nordex N133 with a hub height of 83.5m and 3x Nordex N163 with a hub height of 103.5m. It should be noted, however, that a number of candidate turbines are currently under consideration and alternative turbine types may be selected for assessment in the EIAR. A review of potential NSRs within this area will be undertaken as part of the assessment.

2.1.4 Potential NSRs will include residential dwellings, hostels, health buildings, places of worship, and proposed infrastructure (including houses submitted for planning permission). It is not always appropriate to assess impacts at all nearby NSRs, as a worst-case can be presented with a selection of NSRs. Where multiple NSRs are in the same general direction from the proposed development, it may be appropriate to present results for just one of these which represents the worst-case for all.

3 Description of Existing Environment

3.1.1 The proposed development will be located in north County Roscommon, c. 2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo). The N5 runs to the south of the proposed development and is likely to influence the noise climate for any NSRs situated near to this road. Further north of the proposed development, the

noise climate is likely to be influenced by more natural sounds, such as wind disturbed vegetation.

3.1.2 The existing noise environment will be determined through a baseline noise monitoring survey. Background noise measurement will be undertaken at several NSRs within the study area. All measurements will be conducted in accordance with the UK Institute of Acoustics document "A Good Practice Guide to the Application of ETSU-R-97 for The Assessment and Rating of Wind Turbine Noise" (IOA GPG) and the associated supplementary guidance notes.

3.1.3 The background survey locations will be selected from NSRs that have predicted noise from the proposed development of greater than 35 dB and noise from the existing turbines at Largan Hill Wind Farm is unlikely to influence these measured levels. Noise from the existing turbines is considered unlikely to influence the background survey at a nominal distance of 2km.

4 Description of Likely Effects

4.1 Construction Phase

4.1.1 The construction of the proposed development would introduce temporary noise sources in the form of plant and construction activities, along with the movement of vehicles. Noise would be generated during the construction of access tracks, excavation for turbine foundations, including any borrow pit blasting and as a result of the haulage of materials within the site.

4.2 Operational Phase

4.2.1 Wind turbines generate noise by two means: mechanical noise from the gearbox and generator in the nacelle; and aerodynamic noise caused by the noise of wind passing over the turbine blades. Wind turbines are designed to minimise mechanical noise, for example noise sources in the nacelle are contained within insulated enclosures. Aerodynamic noise is minimised by the design of the turbine blades; however, some aerodynamic noise is unavoidable. Aerodynamic noise increases in proportion with the speed of the turbine blade; therefore, noise levels generally increase with wind speed.

4.3 Decommissioning Phase

4.3.1 Decommissioning of the proposed development is likely to result in lower noise levels than those associated with the construction phase.

4.4 Cumulative Effects

4.4.1 Operational noise associated with the proposed development and Largan Hill Wind Farm turbines has the potential to cumulatively impact NSRs situated close to both developments.

5 Assessment Methodology

5.1.1 The assessment will consider the likely effects of the proposed development due to noise associated with the construction, operational and decommissioning phases, as set out below.

5.2 Construction

5.2.1 The assessment of temporary construction noise effects will include the calculation of noise levels from the anticipated plant and activities at the nearest NSR to the construction activity. Predictions of construction noise levels will be undertaken in accordance with British Standard BS5228-1:2009+A1:2014, Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise, (BS5228-1).

5.2.2 While it is noted that NSRs are generally set back from construction activities, construction activities along the proposed grid connection route will take place in the immediate environs of a number of road-side dwellings and, therefore, a comprehensive assessment will be required. The

likely noise levels at these dwellings, and the nearest dwellings to the proposed wind farm site (and haul route works), will be predicted using BS5228-1 noise prediction methodologies.

5.2.3 The predictions of construction noise levels will be assessed against appropriate threshold values to identify the significance of temporary construction noise effects. Guidance on noise limits during construction activities will be taken from BS5228-1.

5.2.4 Vibration during construction will also be considered regarding the potential impact of residential amenity and structural damage to buildings. It is noted that the current proposed development layout generally provides for substantial separation distances between proposed infrastructure and NSRs; however, the proposed grid connection passes adjacent to a number of road-side dwellings and, therefore, a comprehensive assessment of likely vibration levels will be undertaken.

5.2.5 The assessment of temporary construction vibration effects will include the consideration of vibration levels from cable trenching works at the nearest NSR to the construction activity. Guidance and predictions of construction vibration levels will be undertaken in accordance with British Standard BS5228-2:2009+A1:2014, Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration.

5.3 Operational

5.3.1 The assessment of operational noise impacts will be undertaken in accordance with UK DTI document ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms', whilst also following the recommendations detailed within the IOA GPG and guidance from the 2006 Wind Energy Development Guidelines, published by the then Department of the Environment, Heritage and Local Government.

5.3.2 Draft revised wind energy guidelines were published by the Department of Housing, Planning and Local Government (DoHPLG) in 2019. These guidelines are currently under review and are yet to be adopted, with further revisions to the text, including noise guidance, anticipated. Until such a time as these guidelines are re-published for public consultation, the 2006 Guidelines remain in place. Therefore, the noise assessment section of the draft guidelines are not considered best practice, and would not be applied in this assessment.

5.3.3 Noise levels at all the identified NSRs will be predicted using a proprietary noise modelling software. All predictions will be done in accordance with ISO 9613-2 methodology, using the recommended calculation settings outlined in the IOA GPG.

5.3.4 Noise limits will be determined from the measured background noise data and following ETSU-R-97, the IOA GPG and the 2006 Guidelines. At this stage, it is considered likely that the noise limit for the proposed development will be based on the greater of: a fixed noise limit; and 5 dB above the prevailing measured background noise levels. In the case of any properties that are financially involved with the proposed development, or a neighbouring wind farm, a value of 45 dB L_{A90} will be applied as the fixed portion of the noise limit. In the case of a property that is financially involved with a neighbouring wind farm, but not the proposed development, the increased limit of 45 dB L_{A90} would only apply in the cumulative assessment.

5.3.5 The acceptable limits for wind turbine operational noise are clearly defined in the ETSU-R-97 document and these limits should not be breached. Consequently, the test applied to operational noise is whether or not the calculated wind farm noise immission levels at nearby noise sensitive properties lie below the noise limits derived in accordance with ETSU-R-97. No guidance is available to determine the magnitude of any noise impact; therefore, it is appropriate to classify impacts as not significant if the ETSU-R-97 noise limit is not exceeded and significant if it is.

5.3.6 The above best practice guidance advises that daytime and night-time noise limits will be applicable to all wind turbines operating cumulatively. Therefore, the assessment of cumulative

noise will be a key consideration with respect to the proposed development in the context of the consented noise limits associated with the operation of the existing Largan Hill Wind Farm.

5.3.7 The operational noise assessment will also consider the impact of the proposed development in isolation of other wind energy developments in the area. Noise limits for the proposed development will be derived based on the ETSU-R-97 noise limits less the portion of which already utilised by these other developments.

5.4 Decommissioning

5.4.1 Decommissioning is likely to result in less noise than during construction of the proposed development and would therefore be covered by the construction noise assessment. A separate decommissioning noise and vibration assessment is not necessary.

5.5 Cumulative

5.5.1 The assessment of cumulative operational noise effects is inherent in the assessment methodology described above and in accordance with current best practice set out in the IOA GPG. Therefore, cumulative operational noise will be assessed as part of the main operational noise impact assessment.

6 Matters Scoped Out

6.1 Low Frequency Noise and Infrasound

6.1.1 A study, published in 2006 by acoustic consultants Hayes McKenzie on the behalf of the UK Department of Trade and Industry (DTI), investigated low frequency noise from wind farms (Hayes McKenzie, 2006). This study concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines, but that complaints attributed to low frequency noise were possibly due to a phenomenon known as Amplitude Modulation (AM).

6.1.2 Further, in February 2013, the Environmental Protection Authority of South Australia published the results of a study into infrasound levels near wind farms (Environment Protection Authority, 2013). This study measured infrasound levels at urban locations, rural locations with wind turbines close by, and rural locations with no wind turbines in the vicinity. It found that infrasound levels near wind farms are comparable to levels away from wind farms in both urban and rural locations. Infrasound levels were also measured during organised shut downs of the wind farms; the results showed that there was no noticeable difference in infrasound levels whether the turbines were active or inactive.

6.1.3 In a separate study on the subject, Bowdler et al. (2009) concludes that: "...there is no robust evidence that low frequency noise (including 'infrasound') or ground-borne vibration from wind farms generally has adverse effects on wind farm neighbours."

6.1.4 It is therefore not considered necessary to carry out a specific assessment of infrasound and low-frequency noise.

6.2 Amplitude Modulation

6.2.1 A study was carried out on behalf of the UK Department for Business, Enterprise and Regulatory Reform (BERR) by the University of Salford, which investigated the incidence of noise complaints associated with wind farms and whether these were associated with AM (University of Salford, 2007). This report defined AM as aerodynamic noise from wind turbines with a greater degree of fluctuation than normal at blade passing frequency (occasionally referred to elsewhere as ‘other AM’ (OAM)). Its aims were to ascertain the prevalence of AM on UK wind farm sites, to try to gain a better understanding of the likely causes, and to establish whether further research into AM is required.

6.2.2 The study concluded that AM has occurred at only a small number of wind farms in the UK (4 of 133), and only for between 7% and 15% of the time. It also states that, at the time of writing, the causes of AM were not well understood, and that prediction of the effect was not currently possible.

6.2.3 This research was updated in 2013 by an in-depth study undertaken by RenewableUK, which identified that many of the previously suggested causes of AM have little or no association to the occurrence of AM in practice (RenewableUK, 2013). The generation of AM is based upon the interaction of several factors, the combination and contributions of which are unique to each site. With the current knowledge, it is not possible to predict whether any particular site is more or less likely to give rise to AM, and the incidence of AM occurring at any particular site remains low, as identified in the University of Salford study.

6.2.4 In 2016, the IOA proposed a measurement technique to quantify the level of AM present in any particular sample of wind farm noise (Institute of Acoustics, 2016). This technique is supported by the Department of Business, Energy & Industrial Strategy (BEIS, formerly the Department of Energy & Climate Change) who have published guidance, which follows on from the conclusions of the IOA study in order to define an appropriate assessment method for AM, including a penalty scheme and an outline planning condition (BEIS, 2016).

6.2.5 Section 7.2.1 of the IOA GPG therefore remains current, stating: "The evidence in relation to 'Excess' or 'Other' Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM".

6.2.6 It is therefore not considered necessary to carry out a specific assessment of AM.

6.3 Operational Vibration

6.3.1 Research undertaken by D. J. Snow found that levels of ground-borne vibration 100m from an operational wind turbine were significantly below criteria for 'critical working areas' given by British Standard BS 6472:1992 Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz) and were lower than limits specified for residential premises by an even greater margin (Snow, 1997).

6.3.2 Ground-borne vibration from operational wind turbines can be detected using sophisticated instruments several kilometres (km) from a wind farm site, as reported by Keele University (Keele University, 2005). This report clearly shows that, although detectable using highly sensitive instruments, the magnitude of the operational vibration is orders of magnitude below the human level of perception and does not pose any risk to human health.

6.3.3 It is therefore not considered necessary to carry out a specific assessment of operational vibration.

6.4 Operational Road Traffic Noise

6.4.1 The number of vehicles required to access the site during the operation of a wind farm are very low and infrequent. Therefore, no likely significant effects are anticipated in the context of the existing road network and as such an assessment of road traffic noise impacts during operation is scoped out.

7 Appendix A – Indicative Noise Levels



35 dB LA90 cumulative noise level

Turbines
- Largan Hill Wind Farm
- Islandmore Wind Farm

Rev	Date	Description
0	05/10/2023	Initial Issue for Scoping

Islandmore Wind Farm

Initial Noise Results

Drawing Number
23113/F1

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