

# Appendix 1-3 Scoping Report

## EIAR - Volume 3

### Knockanarragh Wind Farm

SLR Project No.: 501.V00727.00008

25/01/2024

# PRELIMINARY EIA SCOPING REPORT - KNOCKANARRAGH WIND FARM

**Counties Meath and Westmeath**

Prepared for: Knockanarragh Wind Farm Limited

Client Ref: 501.00727.00008

SLR Ref: 501.00727.00008  
Version No: Final  
November 2022



## BASIS OF REPORT

This document has been prepared by SLR Consulting Ireland with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Knockanarragh Wind Farm Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

## CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>5</b>
1.1	The Applicant.....	6
1.1.1	The Agent.....	6
1.2	Purpose of this report .....	6
<b>2.0</b>	<b>ENVIRONMENTAL IMPACT ASSESSMENT (EIA).....</b>	<b>7</b>
2.1	EIA Screening.....	7
2.2	Environmental Impact Assessment Report (EIAR).....	7
2.3	Content of the EIAR.....	7
<b>3.0</b>	<b>SITE LOCATION &amp; PROPOSED DEVELOPMENT.....</b>	<b>9</b>
3.1	Site Location .....	9
3.2	The Proposed Development.....	11
3.2.1	Planning Application Documents.....	11
3.3	Design Change as part of the EIA Process.....	14
<b>4.0</b>	<b>SCOPE OF THE EIAR .....</b>	<b>16</b>
4.1	Project Alternatives .....	16
4.2	Population & Human Health .....	16
4.2.1	Introduction.....	16
4.2.2	Baseline.....	17
4.2.3	Scope of the Assessment.....	19
4.2.4	Assessment Methodology .....	19
4.2.5	Likely Significant Effects.....	20
4.3	Biodiversity .....	21
4.3.1	Baseline.....	21
4.3.2	Scope of Assessment .....	40
4.3.3	Assessment Methodology .....	40
4.3.4	Likely Significant Effects.....	40
4.4	Land & Soil .....	42
4.4.1	Soils.....	42
4.4.2	Peat.....	45
4.4.3	Subsoil.....	47
4.4.4	Bedrock.....	47
4.4.5	Scope of Assessment .....	47

4.4.6	Assessment Methodology .....	47
4.4.7	Likely Significant Effects.....	47
4.5	Water .....	48
4.5.1	Introduction .....	48
4.5.2	Baseline.....	48
4.5.3	Scope of Assessment .....	48
4.5.4	Assessment Methodology .....	54
4.5.5	Likely Significant Effects.....	54
4.6	Air & Climate.....	57
4.6.1	Baseline.....	57
4.6.2	Scope of assessment.....	57
4.6.3	Assessment Methodology .....	58
4.6.4	Likely Significant Effects.....	58
4.7	Landscape .....	59
4.7.1	Introduction .....	59
4.7.2	Baseline.....	59
4.7.3	County Development Plans .....	60
4.7.4	Study area .....	61
4.7.5	Sensitive Receptors.....	61
4.7.6	Consultation.....	61
4.7.7	Methodology .....	61
4.7.1	Impact Assessment .....	62
4.7.2	Assessment Criteria for Landscape Impacts.....	63
4.7.3	Assessment Criteria for Visual Impacts .....	65
4.7.4	Potential Impacts .....	67
4.7.5	Zone of Theoretical Visibility (ZTV) Map.....	67
4.7.6	LVIA Assessment tools / Techniques .....	68
4.7.7	Cumulative Effects .....	69
4.8	Cultural Heritage .....	69
4.8.1	Assessment Methodology .....	71
4.8.2	Magnitude of Impact .....	73
4.8.3	Receiving Environment.....	76
4.8.4	Potential Impacts .....	76
4.8.5	Matters Scoped Out.....	76
4.8.6	Questions for consultees:.....	77
4.9	Noise & Vibration .....	77
4.9.1	Baseline.....	77
4.9.2	Scope of Assessment .....	77
4.9.3	Assessment Methodology .....	78

4.9.4	Likely Significant Effects.....	78
4.10	Shadow Flicker .....	78
4.10.1	Introduction.....	78
4.10.2	Baseline.....	79
4.10.3	Scope of Assessment .....	79
4.10.4	Assessment Methodology .....	79
4.10.5	Likely Significant Effects.....	80
4.11	Material Assets.....	80
4.11.1	Introduction .....	80
4.11.2	Baseline.....	80
4.11.3	Scope of the Assessment.....	82
4.11.4	Assessment Methodology .....	82
4.11.5	Likely Significant Effects.....	82
4.12	Transport & Access .....	82
4.12.1	Baseline.....	82
4.12.2	Scope of Assessment .....	82
4.12.3	Assessment Methodology .....	83
4.12.4	Likely Significant Effects.....	86
4.13	Telecommunications and Aviation .....	87
4.13.1	Introduction .....	87
4.13.2	Baseline.....	87
4.13.3	Assessment Methodology .....	88
4.13.4	Likely Significant Effects.....	88
<b>5.0</b>	<b>CONSULTATION.....</b>	<b>90</b>
5.1	Statutory Consultation .....	90
5.2	Public Consultation.....	90

## DOCUMENT REFERENCES

### TABLES

Table 4-1	Population, Human Health Scope of Assessment .....	19
Table 4-2	SACs and SPAs within 20 km.....	26
Table 4-3	NHAs and pNHAs within 20 km .....	31
Table 4-4	Landscape Value and Sensitivity.....	63

---

Table 4-5 Magnitude of Landscape Impacts .....	64
Table 4-6 Landscape/Visual Impact Significance Matrix .....	65
Table 4-7 Magnitude of Visual Impact .....	66
Table 4-8 Levels of Significance regarding Designated Heritage Assets .....	72
Table 4-9 Magnitudes of Impacts upon Designated Heritage Assets .....	73
Table 4-10 Significance of Effects.....	74
Table 4-11 Matrix of Heritage Significance .....	74
Table 4-12 Existing Material Assets.....	81
Table 4-13 Traffic and Transportation Receptor Sensitivity.....	85
Table 4-14 Traffic and Transportation Magnitude Criteria .....	86

## FIGURES

Figure 1-1 Site Layout Plan – Submitted to An Bord Pleanála (August 2022) .....	5
Figure 3-1 Site Location .....	10
Figure 3-2 Site Layout.....	12
Figure 3-3 Proposed Turbine Delivery Route .....	13
Figure 3-4 Evolution of the Design .....	15
Figure 4-1 Receiving Environment: Residential Receptors in Proximity to the Proposed Development .....	18
Figure 4-2 Receiving Environment: Designated European Sites .....	24
Figure 4-3 Receiving Environment: Habitats & Species .....	39
Figure 4-4 Soil Map.....	44
Figure 4-5 Peat Survey Locations .....	46
Figure 4-6 Receiving Environment: Catchments .....	50
Figure 4-7 Receiving Environment: Groundwater Vulnerability.....	51
Figure 4-8 Receiving Environment: River Sub-Basins.....	52
Figure 4-9 Receiving Environment: Indicative Fluvial Flood Extent .....	53
Figure 4-10 LVIA Assessment Methodology (Derived from GLVIA 2013) .....	63
Figure 4-11 Zone of Theoretical Visibility Map .....	68
Figure 4-12 Receiving Environment: Cultural Heritage .....	70

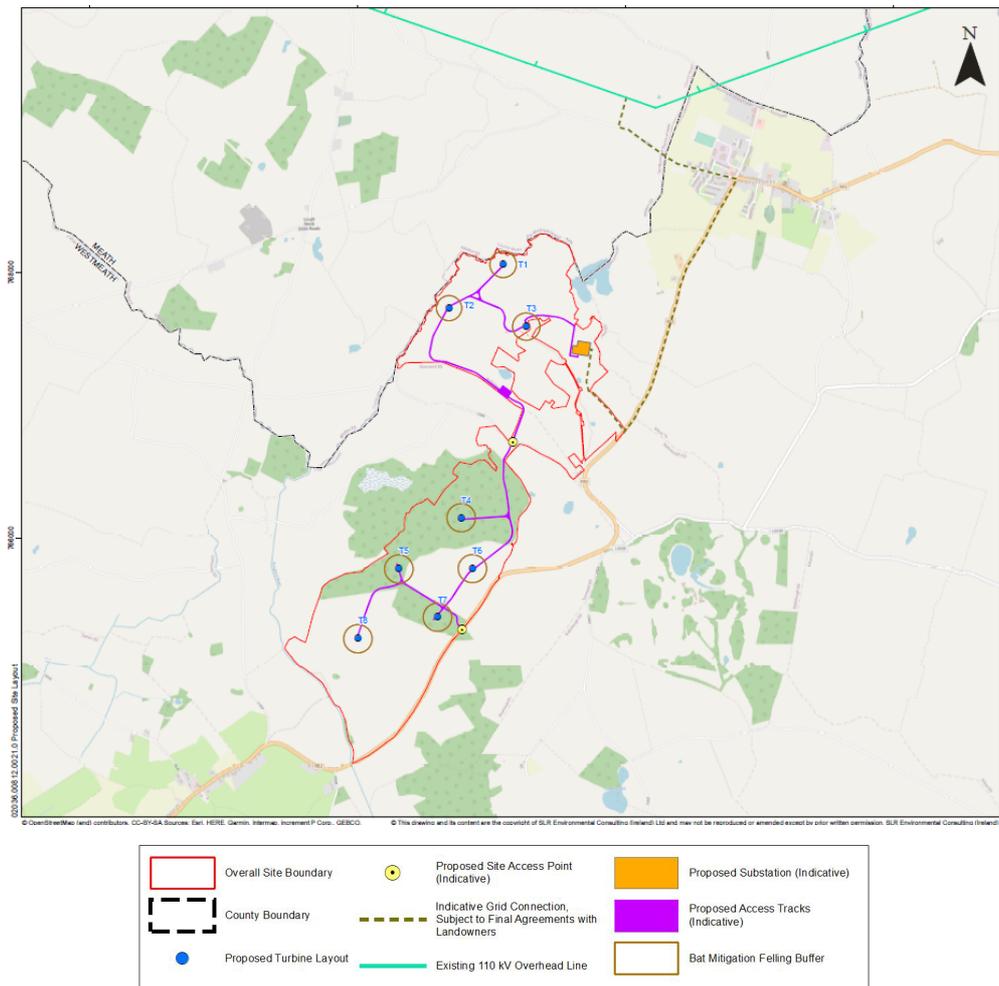
## 1.0 Introduction

This is the Preliminary EIA Scoping Report for the proposed Knockanarragh Wind Farm. The Applicant, Knockanarragh Wind Farm Ltd. is intending to apply for permission to develop a Wind Farm consisting of 8 no. turbines with a tip height of 170m and a rotor diameter of 155m, capable of generating 52.8 MW of power and all associated site infrastructure including a 110 kV electricity substation, switch room and equipment compound, turbine foundations; c. 15 kilometres of site access tracks; underground electricity and communications cabling; site drainage works; 2 no. site entrances. The project represents an excellent opportunity to develop a medium-scale wind farm in an upland area of Counties Westmeath and Meath.

The Planning Application is at pre planning stage and a request for pre-application consultation under Section 37B (and section 182e) of the Planning and Development act 2000 (as amended) was submitted to An Bord Pleanála in August 2022.

The application site of the proposed Knockanarragh Wind Farm is elongated in shape (approximately 4.5km roughly north – south), with two distinct and separate turbine areas. The site is located approximately 1km southwest of the village of Clonmellon and 1.6km northeast from the village of Delvin. The area in which the optioned lands exist has approximately 80 ha of private plantation and native woodland, necessitating early surveying works of woodland areas and identification of suitable replant lands. The chosen location has the potential for good energy yields resulting from the high wind levels experienced in this part of Ireland.

**Figure 1-1**  
**Site Layout Plan – Submitted to An Bord Pleanála (August 2022)**



## 1.1 The Applicant

The applicant for this project will be Knockanarragh Wind Farm Limited, a limited company set up by Statkraft Ireland.

Statkraft Ireland is Europe's largest renewable energy producer and a global company in energy market operations. With 4,500 employees in 17 countries, the group produces hydropower, wind, solar, gas-fired power and supplies district heating. Further investments in Irish renewables fit well into Statkraft's growth strategy. The company's global ambition is to increase its portfolio of wind power assets to 6,000 MW and solar power assets to 2,000 MW by 2025. This includes an ambitious pipeline of projects around the world as well as in Ireland.

### 1.1.1 The Agent

SLR Consulting Ireland (SLR) have been commissioned by the applicant to prepare a Planning Application and Environmental Impact Assessment Report (EIAR) for the proposed development and is the agent for this application.

SLR has proven experience and expertise of wind energy and an established track-record of successfully delivering both onshore and offshore wind energy projects around the world. SLR provides a wide range of technical and professional services, including full life cycle support for projects from initial inception and feasibility through planning and on to construction. SLR is a registered Environmental Impact Assessor Member of the Institute of Environmental Management and Assessment (IEMA) and was also one of first consultancies to achieve the IEMA EIA Quality Mark.

## 1.2 Purpose of this report

This Preliminary EIA Scoping Report has been prepared to provide a high-level overview of the proposed development, to allow consultees inform themselves of the scope of the project and provide comments on information which should be included in the EIAR. The report also sets out to provide an overview of the EIAR scoping process undertaken by the applicant to date.

## 2.0 Environmental Impact Assessment (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).

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 and operational phases, prior to being granted planning permission.

### 2.1 EIA Screening

In accordance with the provisions of the Planning & Development Act 2000 (as amended), EIA is mandatory when certain classes of projects exceed specific sizes and thresholds. Planning applications for such projects must be accompanied by an Environmental Impact Assessment Report (EIAR).

In terms of the requirement for EIA, the proposed development falls under Part 2 of Schedule 5 of the Planning and Development Regulations 2001, which requires EIA for more than 5 turbines or having a total output greater than 5 megawatts.

### 2.2 Environmental Impact Assessment Report (EIAR)

An EIAR is a written statement of the likely significant effects, if any, which the proposed development, if carried out, will have on the environment. The EIAR consists of a systematic analysis of the proposed development in relation to the existing environment. It is an iterative process carried out throughout the full lifecycle of the project design and consenting process to allow for preventative and ameliorative action to 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 consenting authorities can use, amongst other considerations, in independently undertaking EIA and informing a decision-making process.

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 proposed development 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 and Development Regulations 2001, 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 16th April 2014, amending Directive 2011/92/EU 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 1st of September 2018 via the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

### 2.3 Content of the EIAR

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
- 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 several 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. The structure of this EIAR is set out below:

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

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

- Introduction.
- Description of the Existing Environment
- Description of Likely Effects
- Mitigation & Monitoring Measures
- Residual Effects
- Conclusion

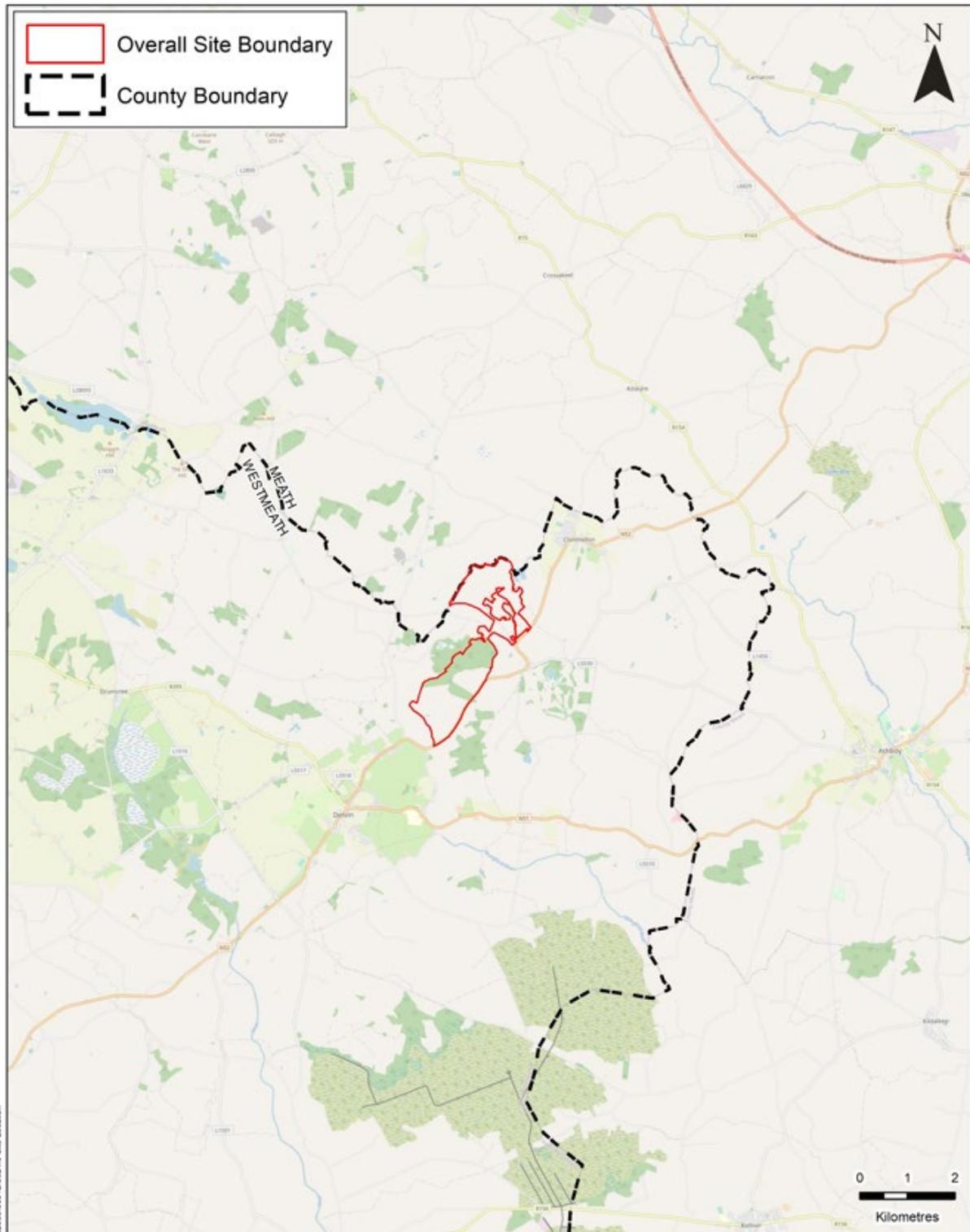
## 3.0 Site Location & Proposed Development

### 3.1 Site Location

The application site of the proposed development is elongated in shape (approximately 4km roughly north – south), with two separate turbine areas. The site is located approximately 1km southwest of the village of Clonmellon and 1.6km northeast from the village of Delvin. The application site is immediately bound to the east by the N52, a national primary road. The western boundary of the site is immediately bound by the Meath County administrative boundary. The site location is found in 3-1 overleaf.

The area in which the optioned lands exist has approximately 80 ha of private plantation and native woodland while the rest of the optioned lands are agricultural lands. There is also a quarry present on these lands. The River Stonyford and its tributary D'arcy Crossroad Streams form part of the western boundary of the site. A protected structure, Rosmead House (RPS, 009-048) is present on the site within the southern portion of the site. In addition, Newtown Lough is located to the northeast of the site.

**Figure 3-1**  
**Site Location**



© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
© OpenStreetMap (and) contributors, CC-BY-SA

## 3.2 The Proposed Development

The proposed development will consist of a wind farm development with 8 no. turbines and all associated and ancillary site development works on land within the townlands of Cavestown and Rosmead, Kilrush Lower, Newtown, Carnybrogan, Ballinlig, Kilrush Upper, Galboystown and Clonmellon. The site is circa 330ha in size, however the proposed development will encompass only a fraction of this area. The development will consist of:

- 8 no. turbines, each with a height of 170m and rotor diameter of 155m
- 110 kV electricity substation and switch room which may have the potential to be a Loop In Loop Out (LILO) substation
- Construction compound
- Turbine foundations
- Hardstand areas
- 33kV collector cable circuit connecting the two clusters and the substation
- Grid connection between the proposed on-site substation to an overhead 110kV electricity line
- 2 no. temporary construction compounds
- Access tracks
- Underground electricity and communications cabling
- Site drainage works
- 3 no. site entrances

The site layout is shown in 3-2. The proposed Turbine Delivery Route is shown in Figure 3-3.

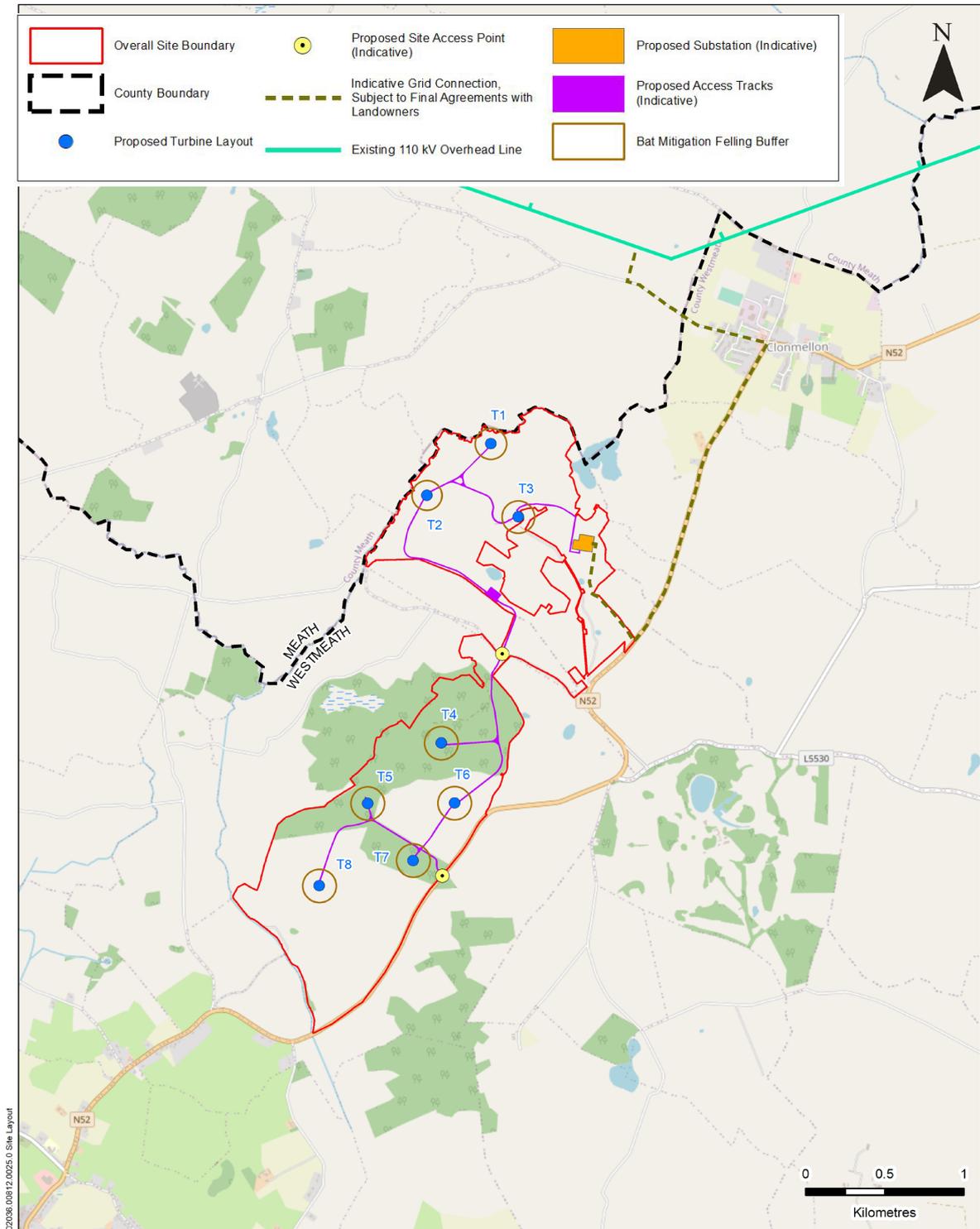
The development description will be subject of revisions arising from feedback from the EIA assessment process and consultation with respective landowners and other statutory and non-statutory consultees.

### 3.2.1 Planning Application Documents

This planning application will be accompanied by an Environmental Impact Assessment Report (EIAR) which will include an assessment of the likely significant effects of the proposed development as a whole and in combination with the relevant off-site or secondary developments which will occur as a direct result of the proposed development, including connection to the national electricity grid.

The planning application will also be accompanied by a Natura Impact Statement (NIS).

**Figure 3-2  
 Site Layout**



02036\_00812\_0025.0 Site Layout

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
 © OpenStreetMap (and) contributors, CC-BY-SA



### 3.3 Design Change as part of the EIA Process

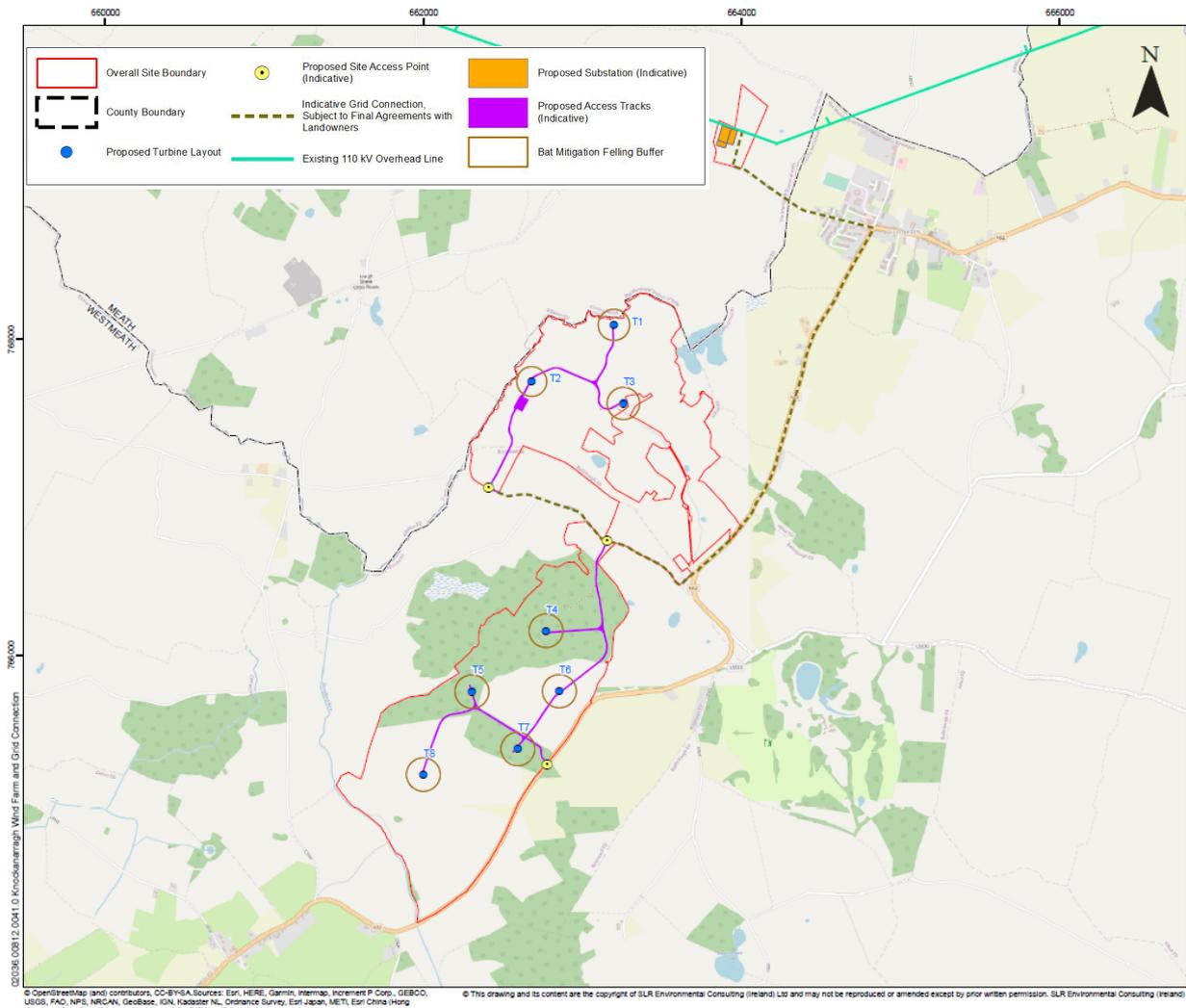
It is expected that as part of the EIA process, the proposed development will be subject of revisions arising from feedback from the impact assessment process and consultation with the local community and other statutory and non-statutory consultees. The EIA process is ongoing and as it progresses, feedback from the assessment is being incorporated into the project design.

With a total power output of c. 52.8 MW, this project is above the threshold for Strategic Infrastructure Development and a request for a pre-application consultation under section 37B (and section 182e) of the Planning and Development Act 2000 (as amended) has been submitted to An Bord Pleanála (August 2022). The proposed development as submitted to An Bord Pleanála is therefore undergoing a robust and iterative environmental assessment process taking into account environmental sensitivities across the site. This has resulted in some changes to the layout. To date they include:

1. A revised substation location, relocated from the northern cluster to a location to the east of the village of Clonmellon
2. A revised access arrangement and construction compound location for the northern cluster, with access and grid route now provided via the L5542
3. A revised grid route, now combined with road access arrangements, which will be accommodated along the N52 and L5542
4. Further micro siting of T1 and its associated access

These changes are being highlighted to prescribed bodies and other interested parties as part of this Preliminary EIA Scoping Report. Together with the initial design, they will be the subject of ongoing consideration which will also be informed by any submissions made as a result of this consultation. The purpose of this consultation is to invite submissions with respect to the original layout (see Figure 3-2) together with proposed design changes listed above and as shown in Figure 3-4 overleaf.

**Figure 3-4**  
**Evolution of the Design**



## 4.0 Scope of the EIAR

The EIAR will provide an assessment of significant environmental effects during the construction, operation and decommissioning of the proposed development for each the environmental factors described in this section.

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

### 4.1 Project Alternatives

It is a requirement of the EIA Regulations to include

“A description of the reasonable alternatives studied by the developer, which are relevant to the proposed project and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”

This chapter of the EIAR will include an assessment of the site alternatives studied together with an assessment of the main reasons for selecting the chosen option. The principal alternatives studied with respect to the proposed development will be outlined under the following headings:

- Location – this section will discuss the overall site selection process for the proposed development on a national, regional and local scale. It will discuss the criteria used to determine site suitability for wind energy developments including:
  - Wind resource
  - Proximity to residential dwellings
  - Land zoning in County development plans
  - Established in future land use
  - Ecological conservation designations
  - Landscape designations
  - Ease of access
- Access – details of the criteria used to select the network of access tracks that provide access from the public road network to the site and to each turbine within the sites in addition to those that provide internal connections as an alternative to using public roads between turbines will be discussed in this section. This will include information on the availability of existing track and suitable ground conditions, to rain, local road infrastructure and other considerations,
- Connection to the National Grid – details of the criteria used to select the proposed grid connection routes will be provided. It will also include a high-level assessment of alternative grid connection route options, and
- Turbine Location – further adjustments to turbine location according to the sites environmental sensitivity.

## 4.2 Population & Human Health

### 4.2.1 Introduction

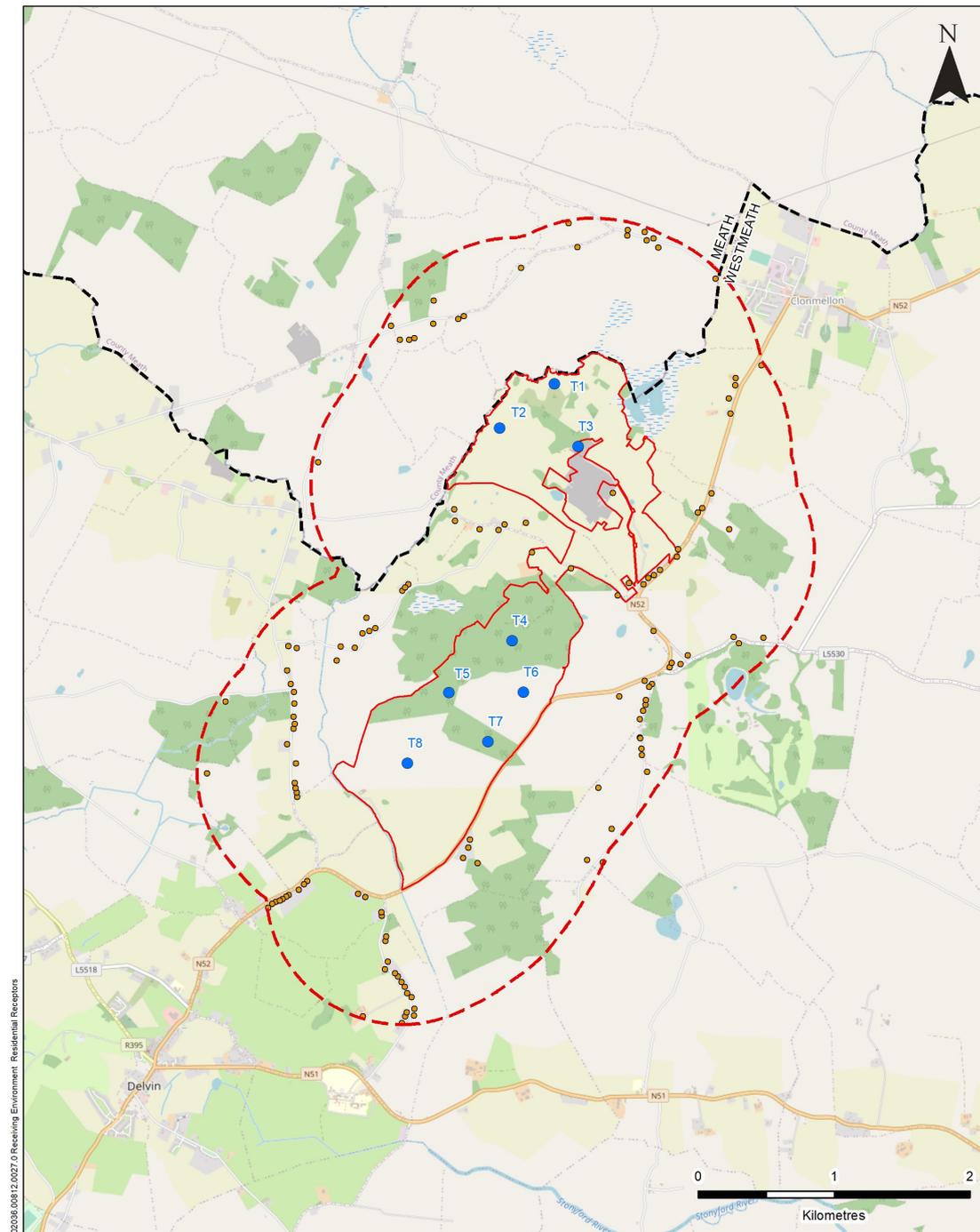
This chapter will consider population, human health in the receiving environment and the potential significant impacts associated with all stages of the proposed development. This includes consideration of impacts on land-use, population, socio-economic activity and employment, tourism, amenities and recreation, health and safety and human health.

#### 4.2.2 Baseline

The application site of the proposed development is located approximately 1km southwest of the village of Clonmellon and 1.6km northeast from the village of Delvin. The application site is immediately bound to the east by the N52, a national primary road. The western boundary of the site including parts of the proposed grid connection and potentially the substation will bound or enter into the Meath County administrative boundary.

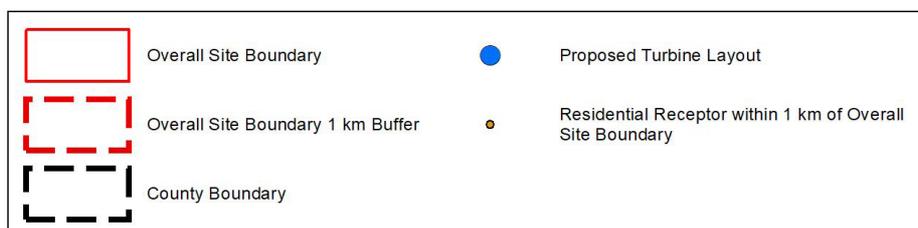
Upon initial examination, it is observed that there are 343 residential receptors within 1km of the wind farm site. These are shown in Figure 4-1 overleaf. In addition to this, there are 282 residential receptors within 500m of the proposed grid route, 10 receptors within 500m of the substation and 149 receptors within 10x the rotor diameter of the candidate turbine.

**Figure 4-1**  
**Receiving Environment: Residential Receptors in Proximity to the Proposed Development**



020206.00012.0007.0 Receiving Environment: Residential Receptors

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
 © OpenStreetMap (and) contributors, CC-BY-SA



### 4.2.3 Scope of the Assessment

The Population and Human Health of the EIAR will assess the likely significant effects of the proposed development on Population, Human Health and Material Assets with a particular reference to the topics of population, human health, socio-economic activity, land-use, recreation, amenity and tourism and material assets. These are set out in Table 4-1.

**Table 4-1**  
**Population, Human Health Scope of Assessment**

Topics of Assessment	Scope
<b>Population</b>	The potential impacts of the proposed development on population trends and statistics on population (density, age) will be addressed in this chapter.
<b>Human Health</b>	The potential impacts on human health from the proposed development will be assessed.
<b>Health and Safety</b>	Details relating to health and safety arising from the proposed construction, operation and decommissioning of the proposed development will be assessed.
<b>Socio-economic Activity</b>	The potential impacts of the proposed development on employment and the main economic activities of the area will be addressed in this chapter.
<b>Land Use</b>	The assessment will address the potential impacts of the proposed development on land use.
<b>Recreation, amenity and tourism</b>	The assessment will address the potential impacts of the proposed development on residential amenity, recreational facilities and tourism of the area.

### 4.2.4 Assessment Methodology

#### Population

With the purpose of analysing population trends and statistics on the proposed area, population data from the Central Statistics Office will be obtained for the study area defined by electoral division. The statistics at this level will be compared against county and state trends.

#### Human health

The assessment will contain a desk study review of the impacts of the operation of renewable energy developments on human health using published and verified sources of information.

#### Health and Safety

The assessment will contain a desk study review of the impacts of the operation of renewable energy developments on health and safety using published and verified sources of information.

#### Socio-economic activity

Data from the Central Statistics Office will be used to define the socio-economic baseline. The potential positive and negative impacts of the proposed development on population, employment and economic activity both directly and indirectly, will be assessed.

## Land-use

The land uses in the area, which could potentially be affected by the proposed development, will be described using Corine 2018 land cover data and if necessary, this data will be verified by subsequent walkovers and drive-by surveys.

## Recreation, Amenity and Tourism

All areas of scenic beauty in addition to heritage, culture and leisure facilities in the areas will be identified. A review of the main recreational activities in the area likely to be affected will be conducted. Residential amenities and recreational facilities, such as forestry in public ownership, walking paths and sports facilities will be recorded and potential impacts assessed.

An assessment will then be conducted for each element of the proposed development to ascertain any potential impacts that may arise which could directly or indirectly affect recreational activity or an amenity. This assessment will be prepared giving cognisance to other disciplines such as cultural heritage and archaeology, hydrology and ecology.

A review will be conducted of a number of published studies and surveys which have been conducted both in Ireland by Fáilte Ireland and in the UK on the attitude of tourists to wind farms. A study of the potential impacts that the proposed development may have on the tourism of the region will be carried out by reviewing Fáilte Ireland surveys, appraising the existing patterns of the tourism within the county and appraising the impacts that wind farms have on tourism in other counties and countries.

### 4.2.5 Likely Significant Effects

#### Population

The potential impacts arising from the proposed development on population during construction are likely to be slightly positive, given the opportunities for enhanced employment opportunities associated with the proposed development. During the operational phase, these impacts would likely be reduced to imperceptible. The assessment will consider the potential impacts during all phases of the proposed development.

#### Human Health

The potential affects arising from the proposed development can impact human health during construction, operation and decommissioning will be considered in this chapter. The human health section of the EIAR chapter will utilise health-based information from CSO statistics, HSA data, air quality data, relevant guidelines and other relevant data pertaining to human health in order to assess the project.

#### Health and Safety

If not properly designed and constructed, there is the potential for construction and operational activities associated with the proposed development to impact on the health and safety of employees associated with the development as well as the public.

Best practice construction and environmental management measures will be employed to prevent the potential for accidents. The EIAR will be accompanied by a comprehensive Construction and Environmental Management Plan (CEMP) which will include detailed health and safety requirements during the construction, operation and decommissioning of the proposed development. With the implementation of measures outlined in the EIAR and CEMP, it is anticipated that the proposed development is not likely to have a potentially significant impact on human health and safety.

#### Socio-Economics

The proposed development will have significant long- and short-term benefits for the local economy including job creation, landowner payments, local authority commercial rate payments and a Community Benefit Fund. These will be developed in full and considered in the EIAR.

## Land Use

The proposed development will require land take for the access tracks, wind turbine bases and adjacent hard-standings and sub-station footprints. The current land uses will continue other than agriculture within this land take. Full details will be contained in this chapter of the EIAR.

## Recreation, Amenity and Tourism

Potential construction impacts from the grid connection cables include full or partial closure of roads used within the area, while the cables are being installed. There may be disruption to access routes around the site. However, any disruption will be mitigated where possible by maintaining access for people throughout, and where this is not possible, in minimising the impact and clearly communicating the timing and scope of works to the local community.

## 4.3 Biodiversity

An assessment of the potential effects of the Proposed Development on biodiversity and nature conservation will be included within the EIAR.

### 4.3.1 Baseline

#### Methodology

##### Desk study

The following sources of information have been consulted:

- Satellite imagery<sup>1</sup>,
- Environmental Protection Agency (EPA) maps<sup>2</sup>,
- Design drawings and the project description of the Proposed Development,
- National Parks and Wildlife Service (NPWS) and the National Biodiversity Centre (NBDC) online resources<sup>3</sup>,
- NBDC protected flora and fauna,
- Environmental Sensitivity Mapper<sup>4</sup>,
- BirdWatch Ireland website<sup>5</sup> and
- Results from previous surveys carried out in 2019 by Fehily Timoney and Company (one year of bat surveys including static detector, activity and emergence surveys, and roost searches).

##### Field survey

The following surveys have been completed or are currently in process:

- **Birds:** Vantage Point (VP), breeding walkover transect, breeding raptor, breeding woodcock *Scolopax rusticola*, winter walkover transect, and wildfowl distribution and abundance surveys were conducted from May 2019 to September 2021 inclusive (three breeding seasons and two non-breeding seasons).

<sup>1</sup> <https://www.google.ie/maps?msclkid=e320bf09ac4b11ec962eba37559e014d> Accessed 15/08/2022.

<sup>2</sup> <https://gis.epa.ie/EPAMaps/?msclkid=f47d1958ac4b11ec8e8b9eed262285b1> Accessed 15/08/2022.

<sup>3</sup> <https://maps.biodiversityireland.ie/Map?msclkid=0dfc1fd9ac4c11eca42c759f25d724b0> Accessed 15/08/2022. Only records of protected species from the past 10 year are considered as older records are unlikely to still be relevant given their age and the changes in land management likely to have occurred in the intervening period.

<sup>4</sup> <https://airomaps.geohive.ie/ESM/> Accessed 15/08/2022.

<sup>5</sup> <https://birdwatchireland.ie/?msclkid=784fe2d6ac4d11ecb74d5d58624ca087> Accessed 15/08/2022.

Consultation with NPWS was undertaken by MKO in April and December 2019 and April 2020. Survey methodology and study area in accordance with latest NatureScot (formerly SNH, 2017)<sup>6</sup> guidance. This will provide the required two years of bird survey data collected in the last five years and data for one additional breeding season.

- **Bats:** static detector, activity, roost (winter and summer) and emergence surveys are currently being conducted within the Proposed Development boundary and within 200 m plus rotor radius of the turbine locations. Survey methodology and study area in accordance with latest NatureScot (SNH, 2021)<sup>7</sup> and Collins (2016)<sup>8</sup> guidance. Roost surveys will be undertaken along the Grid Connection route and where accommodation works are required along the turbine delivery route. These surveys will be within the last two years in accordance with NatureScot (2021) requirements.
- **Mammals other than bats:** terrestrial walkover and camera trap surveys within the Proposed Development are currently being conducted within the Proposed Development boundary, focusing on areas within 50 m of any proposed infrastructure. Survey methodology is in accordance with Creswell et al. (2012)<sup>9</sup> guidance.
- **Habitats:** Terrestrial habitat surveys have been conducted (i) within the Proposed Development site, (ii) within 500 m of the future Grid Connection route, and (iii) where accommodation works are required along the turbine delivery route in July and September 2022. Aquatic habitat surveys have been undertaken in the same areas, although these have focused on the area 150 m either side of where any proposed infrastructure or works crosses a water course, as well as some sites downstream but within the wider catchment<sup>10</sup>. Habitats were mapped according to Fossitt (2000)<sup>11</sup> and following best-practice guidance outlined in Smith et al. (2011)<sup>12</sup>. Habitats thought to share links with those listed under Annex I of the EU Habitats Directives were assessed against the European Commission's 'Interpretation Manual of European Union Habitats' (2013)<sup>13</sup> and using Biodiversity Ireland's ERICA tool<sup>14</sup>, with survey methodology following the approaches outlined in the relevant NPWS manuals (where available). The same approach was undertaken for Possible Ancient Woodland (PAW) habitats, whose condition was assessed against the criteria listed in the relevant NPWS manuals.
- **Botanical:** Protected (listed on flora Protection Order) and invasive (including those listed as Third Schedule species under Regulations 49 and 50 of the Birds and Natural Habitats Regulations 2011; and any non-native species) species were recorded as part of the terrestrial and aquatic habitat surveys and their locations mapped in July 2022.

<sup>6</sup><https://www.nature.scot/sites/default/files/2018-06/Guidance%20Note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf> Accessed 15/08/2022.

<sup>7</sup><https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation?msclid=33793f88ac5b11eca9a46a091ef728d9> Accessed 15/08/2022.

<sup>8</sup><https://www.bats.org.uk/resources/guidance-for-professionals/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition?msclid=7aa611e8ac5b11ecb7f21bca3e4a0d43> Accessed 15/08/2022.

<sup>9</sup>Cresswell, W.J., Birks, J.D.S., Dean, M., Pacheco, M., Trehella, W.J., Wells, D. and Wray, S. (2012). UK BAP Mammals: Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation. The Mammal Society, Southampton.

<sup>10</sup> In general, a catchment-wide approach has been undertaken for aquatic surveys to ensure that any connectivity between the Proposed Development and in- and ex-situ populations of mobile qualifying interest (QI) species of any nearby Special Areas for Conservation (SACs) or Special Protection Areas (SPAs) is identified.

<sup>11</sup><https://www.npws.ie/sites/default/files/publications/pdf/A%20Guide%20to%20Habitats%20in%20Ireland%20-%20Fossitt.pdf?msclid=c28fe35dac5b11ec9ae3df85ef7e3838> Accessed 15/08/2022.

<sup>12</sup>[https://www.heritagecouncil.ie/content/files/best\\_practice\\_guidance\\_habitat\\_survey\\_mapping\\_onscreen\\_version\\_2011\\_8mb.pdf?msclid=18a5c344ac5c11ecbfaf4ad7c1db452d](https://www.heritagecouncil.ie/content/files/best_practice_guidance_habitat_survey_mapping_onscreen_version_2011_8mb.pdf?msclid=18a5c344ac5c11ecbfaf4ad7c1db452d) Accessed 15/08/2022.

<sup>13</sup>[https://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int\\_Manual\\_EU28.pdf?msclid=34f9469eac5c11ec9d757a8371dc5bd2](https://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf?msclid=34f9469eac5c11ec9d757a8371dc5bd2) Accessed 15/08/2022.

<sup>14</sup><https://biodiversityireland.ie/projects/ivc-classification-explorer/?msclid=e60a1699ac6011ecb2f2989ff162b89b> Accessed 15/08/2022.

- **Invertebrates:** Any rare or threatened species of terrestrial invertebrates were recorded if detected during other surveys. In addition, aquatic macro-invertebrate, white-clawed crayfish *Austropotamobius pallipes* (including eDNA), stage 1 & 2 and eDNA pearl mussel *Margaritifera spp* surveys have been conducted for waterbodies within and downstream of the Proposed Development in July 2022. Surveys for adult marsh fritillary butterfly *Euphydryas aurinia* and an assessment of habitat suitability have been undertaken within the same month and larval web surveys have been undertaken in August 2022.
- **Amphibians:** Environmental DNA (eDNA) sampling of any waterbodies within and downstream of the Proposed Development (including all ponds and Newtown Lough) has been conducted to record amphibian (e.g. smooth newt *Lissotriton vulgaris* or common frog *Rana temporaria*) presence in July 2022. Additionally, amphibian species (including suitable habitat) have been recorded if detected during other surveys.
- **Common lizard:** The habitats have been assessed for their potential to support common lizard. Species-specific surveys were not deemed necessary based on the habitats recorded. However, the species has not been recorded during other ecological surveys.
- **Otter:** otter surveys have been carried out for all watercourses within the Proposed Development site and 150 m up/downstream of any watercourses crossed by the indicative Grid Connection in July 2022; and
- **Fish:** Electrofishing (under a DECC licence) and biological water quality (Q-sampling) surveys has been conducted at 13 sites within and upstream and downstream of the Proposed Development in July 2022; in addition, DNA metabarcoding has also been conducted for all fish species at Newtown Lough in the same month.

## Preliminary results

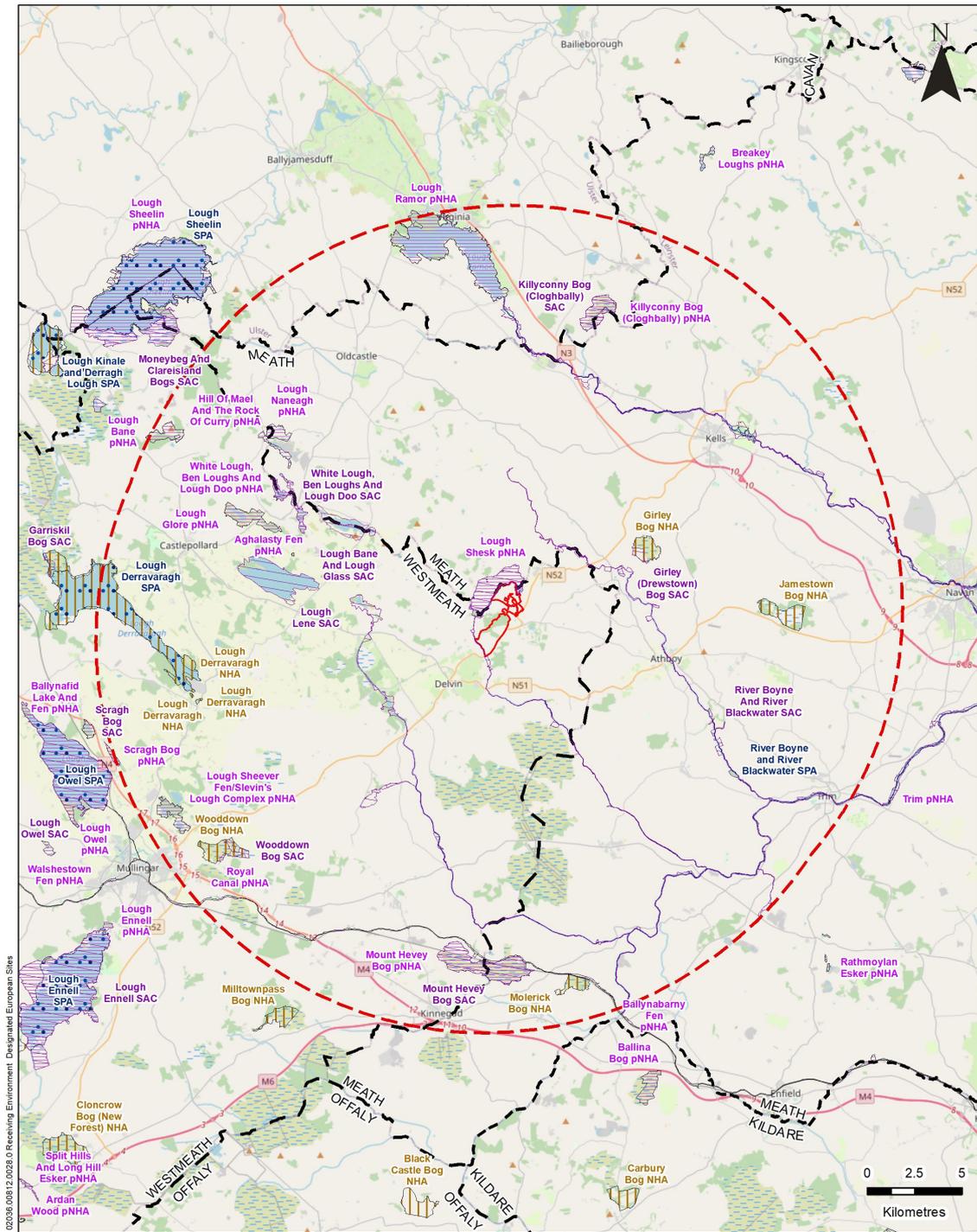
### Designated sites

Internationally and nationally designated sites are discussed for the Proposed Development site and Grid Connection route and shown in Figure 4-2 below<sup>15</sup>.

---

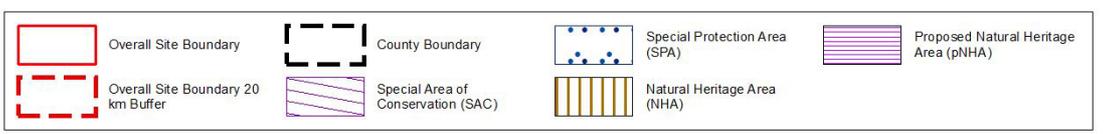
<sup>15</sup> The accommodation works at TDR nodes involve at most light trimming to trees/scrub and none of the nodes are located near any sensitive habitats or watercourses. They are therefore not discussed here in relation to designated sites as there is no pathway between them.

**Figure 4-2**  
**Receiving Environment: Designated European Sites**



02036-00812-0025.0 Receiving Environment: Designated European Sites

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
 © OpenStreetMap (and) contributors. CC-BY-SA  
 Copyright Government of Ireland. This dataset was created by National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. This copyright material is licensed for re-use under the Creative Commons



### *Internationally designated sites (Natura 2000)*

The Proposed Development is not situated within any Natura 2000 site but runs adjacent to the River Boyne and River Blackwater SAC. There are nine SACs and two SPAs within 20 km<sup>16</sup> of the Proposed Development and Grid Connection.

Of these, one SAC (the River Boyne and River Blackwater SAC) and one SPA (the River Boyne and River Blackwater SPA) have combined hydrological, hydrogeological and ecological connectivity to the Proposed Development and Grid Connection.

One SAC (Girley (Drewstown) Bog SAC) has hydrogeological connectivity to the Grid Connection and a remote upstream hydrological connection to both Proposed Development and Grid Connection.

One SPA (Lough Derravaragh SPA) and three SACs (Lough Bane and Lough Glass SAC, Lough Lene SAC and White Lough, Ben Loughs and Lough Doo SAC) have ecological connectivity and remote upstream hydrological connections to the Proposed Development and Grid Connection.

Only Scragh Bog SAC has no downstream hydro- or hydrogeological connectivity or ecological connectivity to the Proposed Development. There is one Ramsar sites within 20 km of the Proposed Development, which is also an SPA (Lough Derravaragh).

The SACs and SPAs are listed in Table 2 below with information presented on their QIs, distance to the Proposed Development and Grid Connection route, and whether there is a potential ecological, hydrological or hydrogeological connection to the same.

---

<sup>16</sup> A 20 km search distance has been used for SPAs as a starting point, as the largest core foraging range (CFR) for any Irish bird species listed in the NatureScot (2016) document 'Assessing Connectivity with Special Protection Areas' is 20 km.

**Table 4-2**  
**SACs and SPAs within 20 km**

Site	Site Code	Qualifying Interest(s)	Direct-line Distance to Proposed Development (km)	Direct-line Distance to Grid Connection (km)	Potential Hydrological / Hydrogeological / Ecological Connection (Y/N)
River Boyne and River Blackwater SAC	002299	Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]	0.0	0.4	Y. Hydrological connection to both Proposed Development and Grid Connection – River Stoneyford 07, which forms part of the SAC, bounds the Proposed Development. The Grid Connection crosses the Kilskeer Stream, which flows downstream (2.8 km instream distance) to the SAC. Y. Hydrogeological connection as SAC within Boyne_SC_050 (Proposed Development) and Boyne_SC_070 (Grid Connection). Y. The following QIs are mobile so there is a potential ecological connection: river lamprey, salmon and otter.
River Boyne and River Blackwater SPA	004232	Kingfisher ( <i>Alcedo atthis</i> ) [A229]	3.0	4.8	Y. Hydrological connection to Proposed Development and Grid Connection – River Stoneyford 07 flows 3.5 km from the Proposed Development to the SPA. The Grid Connection crosses the Kilskeer Stream, which flows 13.5 km downstream to the SPA at Athboy. Y. Hydrogeological connection as SPA within Boyne_SC_050 (Proposed Development) and Boyne_SC_070 (Grid Connection). Y. Kingfishers are riparian birds and tend not to venture far from rivers. They are also highly territorial and maintain ranges covering at least 1 km of a river but may extend up to 5 km <sup>17</sup> . A kingfisher was recorded 600 m west of the Proposed Development during surveys. This bird could be part of a supporting population to those within the SPA, so there is a potential ecological connection to the SPA.

<sup>17</sup> <https://www.rspb.org.uk/birds-and-wildlife/wildlife> Access 15/08/2022.

Girley (Drewstown) Bog SAC	002203	Degraded raised bogs still capable of natural regeneration [7120]	6.3	5.0	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but there is a remote upstream connection to the Proposed Development via the Athboy, Boyne and Stonyford 07 watercourses (c. 40 km instream distance). There is an upstream connection to the Grid Connection via the Kilskeer, Athboy, Creevagh 07 and Drewstown_Great watercourses (c. 8.5 km instream distance).</b></p> <p><b>N and Y. No hydrogeological connection to Proposed Development as within separate sub-catchment, but within same sub-catchment (Boyne_SC_070) as Grid Connection.</b></p> <p>N. QIs are not mobile so no ecological connection.</p>
Lough Bane and Lough Glass SAC	002120	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]	6.7	8.2	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but there is a remote upstream connection to the Proposed Development via the Stonyford 07, Boyne, Deel [Raharny], Lough Lene-Adeel Stream, Ballany and Lurganboy 07 watercourses (c. 56 km instream distance) and Grid Connection via Kilskeer, Athboy, Boyne, Deel [Raharny], Lough Lene-Adeel Stream, Ballany and Lurganboy 07 watercourses (c. 67 km instream).</b></p> <p>N. No hydrogeological connection as SAC in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p><b>Y. White clawed-crayfish are mobile and despite the remote upstream hydrological connection, could potentially travel from the SAC to the Proposed Development.</b></p>
Lough Lene SAC	002121	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]	8.6	10.4	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but there is a remote upstream connection to the Proposed Development via the Stonyford 07, Boyne, Deel [Raharny], Lough Lene-Adeel Stream, Ballany and Lurganboy 07 watercourses (c. 54 km instream distance) and Grid Connection via Kilskeer, Athboy, Boyne, Deel [Raharny] and Lough Lene-Adeel Stream watercourses (c. 65 km instream).</b></p> <p>N. No hydrogeological connection as SAC in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p><b>Y. White clawed-crayfish are mobile and despite the remote upstream hydrological connection, could potentially travel from the SAC to the Proposed Development.</b></p>
White Lough, Ben Loughs and	001810	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]	10.4	11.8	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but there is a remote upstream connection to the Proposed Development via the Stonyford 07, Boyne, Deel [Raharny], Lough Lene-Adeel</b></p>

Lough Doo SAC		<i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]			<p><b>Stream, Ballany and Lurganboy 07 watercourses (c. 55 km instream distance) and Grid Connection via Kilskeer, Athboy, Boyne, Deel [Raharny], Lough Lene-Adeel Stream and Ballany watercourses (c. 66 km instream).</b></p> <p>N. No hydrogeological connection as SAC in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p><b>Y. White clawed-crayfish are mobile and despite the remote upstream hydrological connection, could potentially travel from the SAC to the Proposed Development.</b></p>
Killyconny Bog (Cloghbally) SAC	000006	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]	13.6	12.7	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but there is a remote upstream connection to the Proposed Development via the Stoneyford 07, Boyne, Blackwater [Kells] and Killyconny watercourses (c. 72 km instream distance) and Grid Connection via Kilskeer, Athboy, Boyne, Blackwater [Kells] and Killyconny watercourses (c. 70 km instream).</b></p> <p>N. No hydrogeological connection as SAC in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p>N. QIs are not mobile so no ecological connection.</p>
Lough Derravaragh SPA	004043	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Pochard ( <i>Aythya ferina</i> ) [A059] Tufted Duck ( <i>Aythya fuligula</i> ) [A061] Coot ( <i>Fulica atra</i> ) [A125] Wetland and Waterbirds [A999]	14.6	17.1	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but there is a remote upstream connection to the Proposed Development via the Stoneyford 07, Boyne, Deel [Raharny], Tevrin and Gibson watercourses (c. 56 km instream distance) and Grid Connection via the Kilskeer, Athboy, Boyne, Deel [Raharny], Tevrin and Gibson watercourses (c. 67 km instream distance)</b></p> <p>N. No hydrogeological connection as SPA within different sub-catchment to both Proposed development and Grid Connection.</p> <p><b>Y. Whooper swan and coot have been recorded on or nearby to the Proposed Development. Whooper swans have a core foraging range of 5 km, so it is unlikely that these birds are from the SPA population. As a precaution, it assumed there are potential ecological connections to the SPA for both whooper swans and coot.</b></p>
Mount Hevey Bog SAC	002342	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]	15.1	18.0	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but there is a remote upstream connection to the Proposed Development via the Stoneyford 07, Boyne, Deel [Raharny] and Molerick watercourses (c. 30 km instream distance) and Grid Connection via the Kilskeer,</b></p>

		Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]			<p><b>Athboy, Boyne, Deel [Raharny] and Molerick watercourses (c. 45 km instream distance)</b></p> <p>N. No hydrogeological connection as SAC in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p>N. QIs are not mobile so no ecological connection.</p>
Wooddown Bog SAC	002205	Degraded raised bogs still capable of natural regeneration [7120]	16.1	19.3	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but there is a remote upstream connection to the Proposed Development via the Stoneyford 07, Boyne, Deel [Raharny], Riverstown 07, Riverstown Trib North and Macetown 07 watercourses (c. 47 km instream distance) and Grid Connection via the Kilskeer, Athboy, Boyne, Deel [Raharny], Riverstown 07, Riverstown Trib North and Macetown 07 watercourses (c. 58 km instream distance)</b></p> <p>N. No hydrogeological connection as SAC in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p>N. QIs are not mobile so no ecological connection.</p>
Scragh Bog SAC	000692	Transition mires and quaking bogs [7140] Alkaline fens [7230] <i>Hamatocaulis vernicosus</i> (Slender Green Feather-moss) [6216]	19.8	>20	<p>N. No downstream hydrological connection to either Proposed Development or Grid Connection.</p> <p>N. No hydrogeological connection as SAC in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p>N. QIs are not mobile so no ecological connection.</p>

### *Nationally designated sites*

The Proposed Development is not situated within any nationally designated site but Lough Shesk pNHA runs adjacent to it. There are five NHAs and 13 pNHAs within 20 km of the Proposed Development and Grid Connection. Of these, only Lough Shesk pNHA has combined hydrological, hydrogeological and ecological connectivity to the Proposed Development and Grid Connection.

One NHA (Girley Bog NHA) has hydrogeological connectivity to the Grid Connection and a remote upstream hydrological connection to both Proposed Development and Grid Connection. One NHA (Lough Derravaragh NHA) plus four pNHAs (White Lough, Ben Loughs and Lough Doo pNHA, Royal Canal pNHA, Lough Glore pNHA and Lough Ramor pNHA) have ecological connectivity to the Proposed Development and Grid Connection. Only Aghalasty Fen pNHA, Jamestown Bog NHA, Lough Naneagh pNHA, Hill of Mael and the Rock of Curry pNHA, Ballynabarny Fen pNHA and Scragh Bog pNHA have no downstream hydro- or hydrogeological connectivity or ecological connectivity to the Proposed Development.

The NHAs and pNHAs are listed in Table 3 with information presented on their QIs, distance to the Proposed Development and whether there is a potential ecological, hydrological or hydrogeological connection to the same.

**Table 4-3**  
**NHAs and pNHAs within 20 km**

Site	Site Code	Qualifying Interest(s)	Direct-line Distance to Proposed Development (km)	Direct-line Distance to Grid Connection (km)	Potential Hydrological / Hydrogeological / Ecological Connection (Y/N)
Lough Shesk pNHA	00556	No site synopsis available. Superseded by River Boyne and River Blackwater SAC designation.	0	0.4	<p><b>Y. Hydrological connection to both Proposed Development and Grid Connection – River Stoneyford 07, which forms part of the pNHA, bounds the Proposed Development. The Grid Connection crosses the Kilskeer Stream, which flows downstream (2.8 km instream distance) to the pNHA.</b></p> <p><b>Y. Hydrogeological connection as pNHA within Boyne_SC_050 (Proposed Development) and Boyne_SC_070 (Grid Connection).</b></p> <p><b>Y. The following QIs are mobile so there is a potential ecological connection: river lamprey, salmon and otter.</b></p>
Girley Bog NHA	001580	Peatlands [4]	6.3	5.0	<p><b>Y. As for SAC of same name.</b></p> <p><b>N and Y. No hydrogeological connection to Proposed Development as within separate sub-catchment, but within same sub-catchment (Boyne_SC_070) as Grid Connection.</b></p> <p>N. QIs are not mobile so no ecological connection.</p>
Aghalasty Fen pNHA	000672	Transitional fen/bog plant communities	9.9	12.0	<p>N. No downstream hydrological connection to either Proposed Development or Grid Connection.</p> <p>N. No hydrogeological connection as pNHA in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p>N. QIs are not mobile so no ecological connection.</p>
White Lough, Ben Loughs and Lough Doo pNHA	001810	No site synopsis available. Superseded by White Lough, Ben Loughs and Lough Doo SAC designation.	10.4	11.8	<p><b>Y. As for SAC.</b></p> <p>N. No hydrogeological connection as pNHA in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p><b>Y. As for SAC.</b></p>

Site	Site Code	Qualifying Interest(s)	Direct-line Distance to Proposed Development (km)	Direct-line Distance to Grid Connection (km)	Potential Hydrological / Hydrogeological / Ecological Connection (Y/N)
Lough Glore pNHA	000686	Aquatic vegetation, insects, birds (northern pochard, great-crested grebe, tufted duck, ringed plover, grey heron, Eurasian coot, water rail, Eurasian teal, common snipe, northern lapwing, Eurasian curlew, reed bunting and kestrel) and otter.	11.6	12.9	<p>N. No downstream hydrological connection to either Proposed Development or Grid Connection.</p> <p>N. No hydrogeological connection as pNHA in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p><b>Y. QI birds recorded at or near the Proposed Development could be from the pNHA population (Eurasian coot, common snipe, northern lapwing, Eurasian curlew and kestrel). Core foraging distances are not available for all of these birds, so as a precaution it is assumed their core foraging distances are 20 km and so they could be from the pNHA.</b></p>
Jamestown Bog NHA	001324	Peatlands [4]	12.3	11.6	<p>N. No downstream hydrological connection to either Proposed Development or Grid Connection.</p> <p>N. No hydrogeological connection as NHA in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p>N. QIs are not mobile so no ecological connection.</p>
Lough Naneagh pNHA	001814	Transitional fen, lake, species-rich grassland and woodland habitats.	12.4	13.5	<p>N. No downstream hydrological connection to either Proposed Development or Grid Connection.</p> <p>N. No hydrogeological connection as pNHA in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p>N. QIs are not mobile so no ecological connection.</p>
Killyconny Bog (Cloghbally) pNHA	000006	No site synopsis available. Superseded by Killyconny Bog (Cloghbally) SAC designation.	13.6	12.7	<p><b>Y. As for SAC.</b></p> <p>N. No hydrogeological connection as pNHA in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p>N. QIs are not mobile so no ecological connection.</p>

Site	Site Code	Qualifying Interest(s)	Direct-line Distance to Proposed Development (km)	Direct-line Distance to Grid Connection (km)	Potential Hydrological / Hydrogeological / Ecological Connection (Y/N)
Lough Ramor pNHA	000008	Plant communities along lake margins and wintering birds (great cormorant, whooper swan, Eurasian teal, mallard and northern lapwing).	14.4	14.0	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but remote upstream hydrological connection to Proposed Development via Stoneyford 07, Boyne and Blackwater [Kells] watercourses (c. 75 km) and Grid Connection via Kilskeer, Athboy, Boyne and Blackwater [Kells] watercourses (c.71 km).</b></p> <p>N. No hydrogeological connection as NHA in separate sub-catchment to both Proposed Development and Grid Connection.</p> <p><b>Y. Some of the QI the birds for this pNHA have been recorded at or near the Proposed Development (whooper swan, northern lapwing, great cormorant, Eurasian teal and mallard). Core foraging distances are not available for all of these birds, so as a precaution it is assumed their core foraging distances are 20 km and so they could be from the pNHA.</b></p>
Lough Derravaragh NHA	000684	Peatlands [4] Birds [12]	14.6	17.1	<p><b>Y. As for SPA of same name.</b></p> <p>N. No hydrogeological connection as SPA within different sub-catchment to both Proposed development and Grid Connection.</p> <p><b>Y. Whooper swan and coot have been recorded at or nearby to the Proposed Development. Whooper swans have a core foraging range of 5 km, so it is unlikely that these birds are from the NHA population. As there is no official core foraging distance for coots, a 20 km distance has been assumed as a precaution. Therefore, there is a potential ecological connection to the NHA for coot.</b></p>
Royal Canal pNHA	002103	Diversity of plant species (including opposite-leaved pondweed <i>Groenlandia densa</i> and <i>Tolypella intricata</i> stonewort) and otter.	14.7	17.6	<p><b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but remote upstream hydrological connection to Proposed Development via Stoneyford 07 and Boyne watercourses (c. 30 km instream distance) and Grid Connection via Kilskeer, Athboy and Boyne watercourses (c.38 km instream distance).</b></p> <p>N. No hydrogeological connection as NHA in separate sub-catchment to both Proposed Development and Grid Connection.</p>

Site	Site Code	Qualifying Interest(s)	Direct-line Distance to Proposed Development (km)	Direct-line Distance to Grid Connection (km)	Potential Hydrological / Hydrogeological / Ecological Connection (Y/N)
					<b>Y. QI otters are not mobile so potential ecological connection.</b>
Mount Hevey Bog pNHA	001584	No site synopsis available. Superseded by Mount Hevey Bog SAC designation.	15.2	18.0	<b>Y. As for SAC of same name.</b> N. No hydrogeological connection as pNHA in separate sub-catchment to both Proposed Development and Grid Connection. N. QIs are not mobile so no ecological connection.
Wooddown Bog NHA	000694	Peatlands [4]	16.2	19.3	<b>Y. As for SAC of same name.</b> N. No hydrogeological connection as NHA in separate sub-catchment to both Proposed Development and Grid Connection. N. QIs are not mobile so no ecological connection.
Molerick Bog NHA	001582	Peatlands [4]	17.4	19.5	<b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but remote upstream hydrological connection to Proposed Development via Stoneyford 07, Boyne and Royal Canal watercourses (c. 33 km instream distance) and Grid Connection via Kilskeer, Athboy, Boyne and Royal Canal watercourses (c.41 km instream distance).</b> N. No hydrogeological connection as NHA in separate sub-catchment to both Proposed Development and Grid Connection. N. QIs are not mobile so no ecological connection.
Lough Sheever Fen/Slevin's Lough Complex pNHA	000690	Rare Myxomycete fungi, round-leaved wintergreen <i>Pyrola rotundifolia</i> subsp. <i>Rotundifolia</i> , woodland and lake habitats, badgers and red squirrels.	17.8	>20	<b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but remote upstream hydrological connection to Proposed Development via Stoneyford 07, Boyne, Royal Canal, Brosna and Sheever Lough Stream watercourses (c. 62 km instream distance) and Grid Connection via Kilskeer, Athboy, Boyne, Royal Canal, Brosna and Sheever Lough Stream watercourses (c.69 km instream distance).</b> N. No hydrogeological connection as NHA in separate sub-catchment to both Proposed Development and Grid Connection.

Site	Site Code	Qualifying Interest(s)	Direct-line Distance to Proposed Development (km)	Direct-line Distance to Grid Connection (km)	Potential Hydrological / Hydrogeological / Ecological Connection (Y/N)
					N. QIs are unlikely to travel the intervening distance between the pNHA and Proposed Development/Grid Connection, crossing multiple rivers, so no ecological connection.
Hill of Mael and the Rock of Curry pNHA	000681	Calcareous habitats.	18.2	19.4	N. No downstream hydrological connection to either Proposed Development or Grid Connection. N. No hydrogeological connection as NHA in separate sub-catchment to both Proposed Development and Grid Connection. N. QIs are not mobile so no ecological connection.
Ballynabarny Fen pNHA	001573	Fen community and presence of variegated horsetail <i>Equisetum variegatum</i> .	18.7	>20	<b>Y. No downstream hydrological connection to either Proposed Development or Grid Connection but remote upstream hydrological connection to Proposed Development via Stoneyford 07, Boyne and Royal Canal watercourses (c. 31 km instream distance) and Grid Connection via Kilskeer, Athboy, Boyne and royal Canal watercourses (c. 39 km instream distance).</b> N. No hydrogeological connection as NHA in separate sub-catchment to both Proposed Development and Grid Connection. N. QIs are not mobile so no ecological connection.
Scragh Bog pNHA	000692	No site synopsis available. Superseded by Scragh Bog SAC designation.	19.8	>20	N. No downstream hydrological connection to either Proposed Development or Grid Connection. N. No hydrogeological connection as pNHA in separate sub-catchment to both Proposed Development and Grid Connection. N. QIs are not mobile so no ecological connection.

## Habitats

The following terrestrial habitats have been mapped by surveys to date at the Proposed Development: conifer plantation (WD4), improved agricultural grassland (GA1), (mixed) broadleaved woodland (WD1), oak-ash-hazel woodland (WN2), bog woodland (WN7), scrub (WS1), treelines (WL2), hedgerows (WL1), dry calcareous and neutral grassland (GS1) and immature woodland (WS2).

Terrestrial annex 1 habitats have been mapped in the north of the Proposed Development. These include transition mire and quaking bog (PF3; corresponding to 'transition mires and quaking bogs (7140)' annex 1 habitat) and rich fen and flush (PF1; corresponding to both 'alkaline fens (7230)' annex 1 habitat and the priority 'calcareous fens with *Cladium mariscus* and species of the Caricion davallinae (7210)' annex 1 habitat).

Three areas of PAW have been mapped at the Proposed Development site (of semi-natural broadleaved type). Relevés have been undertaken to assess the condition of these areas. The PAW corresponds to oak-ash-hazel woodland (WN2) and (mixed) broadleaved woodland (WD1) types.

Aquatic habitats within the Proposed Development comprise of drainage ditches (FW4), eutrophic ponds (FL5), and depositing/lowland rivers (FW2). The River Stoneyford 07 is an SAC river. The results from the aquatic surveys are pending and will confirm if any annex 1 floating river vegetation habitat is present and whether any of the seasonally flooded depressions contained within some of the improved agricultural grassland are turloughs (FL6).

The indicative Grid Connection route will be located almost entirely within the existing road network with only a small area traversing improved agricultural grassland and hedgerows. It will cross one watercourse (the Kilskeer Stream; EPA code 07K26).

## Species

### Plants

No rare or protected plant species were recorded by surveys to date or are contained within the NPWS database for locations within 10 km from the Proposed Development (round-leaved wintergreen *Pyrola rotundifolia* subsp. *rotundifolia* has been recorded at Newtown Lough in 1973; the results of dedicated wetland habitat surveys will confirm if the Near Threatened species is present at the Proposed Development).

### Invertebrates

Marsh fritillary *Euphydryas aurinia* butterfly was recorded during ecological surveys in the northwest of the Proposed Development in 2022. A habitat assessment and survey for adult butterflies was carried out on 23<sup>rd</sup> June 2022. Although no butterfly was observed during this survey, it was outside the optimal period for observing the species on the wing. Areas of high-quality habitat for the species was recorded in the north of the Proposed Development during the survey. A larval web survey was carried out in this area on 30<sup>th</sup> August 2022. Sixty one larval webs were recorded during this survey, confirming their presence.

The Proposed Development and Grid Connection do not lie within any freshwater pearl mussel catchments. White-clawed crayfish have been recorded within the 10 km grid square which encompasses the Proposed Development.

### Amphibians

Common frogs have not been recorded breeding within the Proposed Development site by recent surveys but there are recent records held by NPWS within the 10 km grid square which encompasses the Proposed Development. There are suitable habitats within the Proposed Development for this species (drainage ditches, ponds and fens). No smooth newts have been recorded during surveys to date or contained within the NPWS database, but the aquatic surveys will confirm presence definitively.

## Reptiles

No common lizard *Zootoca vivipara* has been recorded by surveys to date but there are recent records held by NPWS within the 10 km grid square which encompasses the Proposed Development. The broadleaved woodland and fen habitats in particular offer suitable habitat for common lizard.

## Birds

BirdWatch Ireland sensitivity mapping has not been undertaken for the Proposed Development site.

Vantage point surveys have so far recorded the following target species likely to be susceptible to wind farm impacts: European golden plover *Pluvialis apricaria*, whooper swan *Cygnus cygnus*, hen harrier *Circus cyaneus*, merlin *Falco columbarius*, peregrine falcon *Falco peregrinus*, Eurasian curlew *Numenius arquatus*, northern lapwing *Vanellus vanellus*, common snipe *Gallinago gallinago* and kestrel *Falco tinnunculus*. Of these, most were only recorded a handful of times and generally in low numbers, suggesting that collision risk is likely to be low.

Breeding raptors confirmed or probably maintaining territories within or nearby to the Proposed Development include buzzard *Buteo buteo* and sparrowhawk *Accipiter nisus* (both Birds of Conservation Concern in Ireland or 'BoCCI'<sup>18</sup> green-listed).

Woodcock have been recorded in two confirmed breeding territories within conifer plantation. Northern lapwing has been confirmed breeding at a small pond, as have common snipe. Little grebe *Tachybaptus ruficollis* were also recorded breeding in small pools, as were Eurasian coots.

Wildfowl distribution and abundance surveys recorded no swans or geese within 500 m of the proposed development site; however, Eurasian golden plover, kingfisher, whooper swan, common snipe, black-headed gull *Chroicocephalus ridibundus*, Eurasian wigeon *Mareca penelope*, herring gull *Larus argentatus*, Eurasian teal *Anas crecca*, shelduck *Tadorna tadorna*, lesser black-backed gull *Larus fuscus*, great cormorant *Phalacrocorax carbo*, little grebe, jack snipe *Lymnocyptes minimus*, mute swan *Cygnus olor*, mallard *Anas platyrhynchos*, green sandpiper *Tringa ochropus*, moorhen *Gallinula chloropus* and grey heron *Ardea cinerea* were recorded by surveys in the wider area.

## Bats

Previous static detector survey results from 2019 recorded eight species of bats (common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat, Daubenton's bat, Leisler's bat, Nathusius' pipistrelle and Natterer's bat). The same suite of species was also recorded during activity surveys. The two pipistrelle species were recorded most frequently while Natterer's bat the least. A total of 26 trees were recorded as having moderate roosting suitability for bats. A derelict house and outbuilding in the south of the Proposed Development Site support two minor summer roosts of common and soprano pipistrelle. While the most recent survey results from the 2022 surveys have not yet been analysed, it is likely a similar suite of species will be recorded again.

## Mammals other than bats

Terrestrial surveys to date have recorded badger *Meles meles* setts/latrines, red squirrel *Sciurus vulgaris* signs, and red fox *Vulpes vulpes* sightings. Irish hare *Lepus timidus hibernicus*, pine marten *Martes martes*, hedgehogs *Erinaceus europaeus* and otter *Lutra lutra* have been recorded on the NPWS database for the 10 km grid square which encompasses the Proposed Development. It is likely that some of the woodland habitats within the Proposed Development are used by pine marten and hedgehogs and the results of the aquatic surveys will confirm otter presence.

<sup>18</sup><https://birdwatchireland.ie/app/uploads/2021/04/BOCCI-2020-2026.pdf?msclkid=9b739406ae7311ec8014e98fa6f78114> Download 15/08/2022

### Invasive species

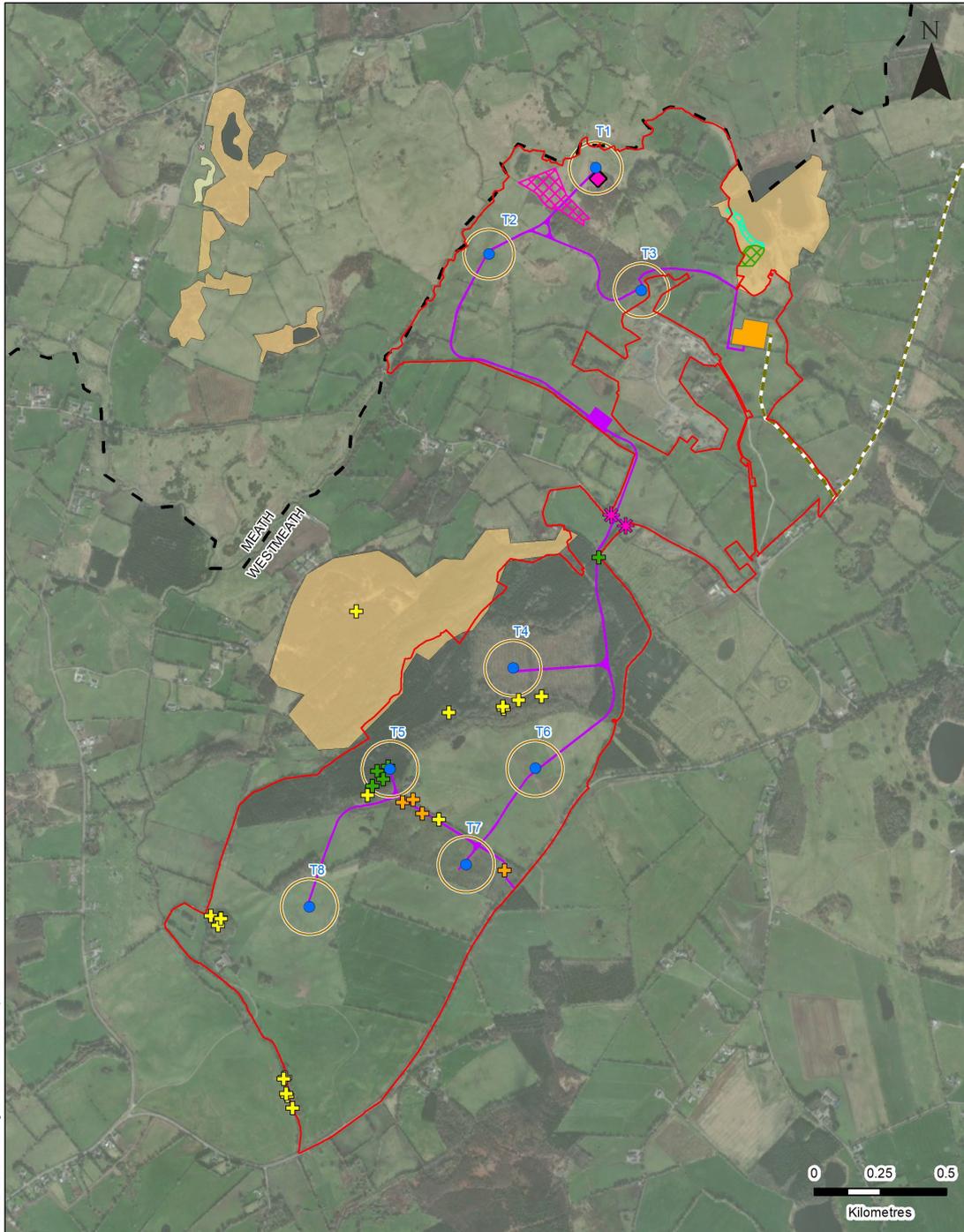
Japanese knotweed *Fallopia japonica*, cherry laurel *Prunus laurocerasus* and snowberry *Symphoricarpos albus* have been recorded within or near to the Proposed Development by current surveys. New Zealand flatworm *Arthurdendyus triangulatus* has been recorded on the NPWS database for the 10 km grid square which encompasses the Proposed Development.

### Fish

Aquatic surveys are completed but the results are pending. It is highly likely that QI species from the River Boyne and Blackwater SAC are found within the River Stoneyford including river lamprey and salmon.

Figure 4-3 provides a snapshot of all habitats and species noted across the site.

**Figure 4-3**  
**Receiving Environment: Habitats & Species**



02036.00817.0035.0 Receiving Environment: Habitats and Species

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
 Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Overall Site Boundary	Proposed Access Tracks (Indicative)	<b>Invasive Species</b>	H7140 Fen Habitat
County Boundary	Bat Mitigation Felling Buffer	Snowberry	WN6 Woodland (H91E0 Potential)
Proposed Turbine Layout	<b>Mammal Species</b>	Ancient and Long-Established Woodland Inventory	<b>Historical Annex 1 Habitats</b>
Indicative Grid Connection, Subject to Final Agreements with Landowners	Badger	<b>Annex 1 Habitat Survey Results (2022)</b>	H6210 Orchid-Rich Calcareous Grassland
Proposed Substation (Indicative)	Fox	Area with H7140 Fen Habitat	H6430 Lowland Hay Meadow
	Red Squirrel	H7120 and H7230 Fen Habitat	H7140 H7210 H7230 Transition Mire; Cladium Fen, Alkaline Fen

## Ecological Networks

Most of the land within the southern turbine cluster outside of the PAW area and away from Newtown Lough in the northern cluster forms part of 1 ecological network (as defined by NPWS, 2016<sup>Error! Bookmark not defined.</sup>). The PAW areas and Newtown Lough area form part of 2 ecological networks.

### **4.3.2 Scope of Assessment**

For the EIAR, an assessment will examine the likely significant effects (both unmitigated and mitigated) of the main wind farm site itself, the Grid Connection and where any accommodation works for the turbine delivery route are required. This will be for all biodiversity receptors (designated sites, habitats and species) connected ecologically or hydrologically with the Proposed Development according to the Source-Pathway-Receptor model.

In addition to the Biodiversity Chapter of the EIAR, an AA Screening and Natura Impact Statement (NIS) will be produced to examine the effects of the Proposed Development on Natura 2000 sites.

### **4.3.3 Assessment Methodology**

The Environmental Impact assessment will be primarily based upon the guidelines for ecological impact assessment produced by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) and Environmental Protection Agency (EPA, 2022), as well as other relevant guidance specific to certain taxonomic groups e.g. NatureScot (2017) for birds and NatureScot (2021) for bats.

Baseline reports detailing the results of bird surveys, bat surveys and aquatic surveys will be used to inform the EIAR and will be included as Appendices. A collision risk model and report will also be included as an Appendix to provide a quantitative estimate of collision risk to bird species.

Mitigation measures will be recommended to reduce the effect of the potential impacts, with an assessment made of the residual impact of the Proposed Development to each biodiversity receptor. In addition, a Habitat and Species Management Plan will be created to restore and/or create natural and semi-natural habitats and thus improve biodiversity at the Proposed Development site.

In addition to the Proposed Development, an overall 'do nothing' scenario will also be assessed.

#### *Appropriate Assessment*

Methodology will follow NPWS (2010) and EC (2021, 2018) guidance on the application of the Habitats Directive. The 2021 EC guidance describes a series of stages and steps which should be completed when carrying out the assessment and these will be followed. The assessment applies only to Natura 2000 sites (Special Protection Areas and Special Areas of Conservation). More specifically, it only applies to the qualifying interest features of such sites i.e. the features which are the reason that the site was designated. Both in-situ and ex-situ effects will be considered, along with in-combination effects from other projects and plans. Mitigation measures will only be considered in the NIS and not in the AA screening.

### **4.3.4 Likely Significant Effects**

Likely significant effects are shown for each stage of the proposed development and biodiversity receptor below:

#### **Construction stage**

##### *Designated Sites*

No direct loss of habitats will occur as the Proposed Development is located outside any designated site.

The most likely potential impacts include the release of suspended solids and pollutants, which may enter watercourses. These then have the potential to be transported downstream, negatively affecting either aquatic QI habitats or species within designated sites themselves, or outside the designated sites where mobile QI species are present. Designated sites most likely affected by such impacts include: the River Boyne and River

Blackwater SAC/Lough Shesk pNHA, the River Boyne and River Blackwater SPA, Girley (Drewstown) Bog SAC and Girley Bog NHA.

Disturbance to mobile aquatic QI species may also occur where there is downstream connectivity to the project. The designated sites most likely to be affected by this include: the River Boyne and River Blackwater SAC/Lough Shesk pNHA.

Other potential impacts include the spread of any invasive species located within the footprint of the Proposed Development, which may be spread via construction activities either directly or indirectly via watercourses to designated sites. These invasive species could undermine the conservation objectives for said designated sites. Of particular risk will be the spread of invasive species along the indicative Grid Connection route within the existing road network, although the only non-native species recorded along this route is snowberry, which is classed as having a low risk of impact.

The River Boyne and River Blackwater SAC/Lough Shesk pNHA is hydro-geologically connected to the Proposed Development and is designated for groundwater dependent fen habitats that are susceptible to groundwater pollution, which could occur in the absence of mitigation.

### *Habitats*

Permanent and temporary loss to habitats will occur during construction (infrastructure felling), although this is likely to be mainly for lower-value habitats such as commercial conifer plantation, ash plantation or improved agricultural grassland. It is likely that approximately 15.7 ha of commercial forestry will be lost during the construction stage (mostly Sitka spruce conifer plantation) and under the 2014 Forestry Act, the planting of alternative land(s) is stipulated, although this is for infrastructure felling (e.g. where trees are felled to make way for infrastructure associated with the Proposed Development such as turbine bases) and turbulence felling (e.g. where trees are felled to improve the operational efficiency of turbines) only. No terrestrial Annex 1 or PAW habitats will be lost.

Where possible, there is opportunity to replace felled conifer plantation with habitats that will have a more positive effect on biodiversity e.g. native broadleaved trees will be planted to increase connectivity between PAW areas, which in turn will have a positive effect on species.

As for designated sites, riparian and other aquatic habitats could be impacted by the release of suspended solids and pollution.

### *Species*

Potential impacts during construction include habitat loss and gain, which could affect flora, bats, non-volant mammals, birds, amphibians, reptiles and invertebrates. This includes habitats used for breeding, foraging and resting. Woodland specialists may lose such habitats, but other species that prefer open habitats may find the Proposed Development site more favourable to them. The net effect on species could be neutral, positive or negative depending on the quality of the open habitats created vs. those woodland habitats lost.

Other impacts could include disturbance or displacement by construction works, especially for any of the previously mentioned taxonomic groups during sensitive stages of their life-cycle e.g. breeding.

As mentioned for designated sites above, pollution and suspended solids could enter watercourses, which could negatively impact aquatic species.

## **Operational stage**

### *Designated Sites*

The most likely operational impact is collision with turbines for mobile QI bird or bat species (as the indicative Grid Connection will be underground no collision risk is possible for this component of the Proposed Development). Other sources of impacts for birds include barrier effects where turbines may cause the birds to

alter their flight paths, thereby expending greater energy. Disturbance and displacement caused by operational turbines is also a potential impact to birds and potentially bats.

Bats may also suffer barotrauma caused by the changes in air pressure surrounding operational turbines. Effects on these two groups could also increase cumulatively due to other wind farms in the general area.

Given the ecological connection between the Proposed Development and some SPAs/NHAs/pNHAs (see Section 4.7.2) designated for birds, some impacts are likely.

#### *Habitats*

Impacts to habitats during operation are unlikely as there will be no land-take (apart from the maintenance of bat buffers surrounding turbines e.g. areas that are kept free of habitat features such as treelines that can attract bats, thereby reducing the risk of collision with operational turbines) and there is a very low risk that any suspended solids or pollutants will enter watercourses, which could reduce effective habitat area or quality.

#### *Species*

The main potential impact during operation is collision with moving turbines for birds and bats (as outlined above). Other taxonomic groups are less likely to be impacted during operation as disturbance is much less likely owing to reduced human presence.

### **Decommissioning stage**

#### *Designated Sites, Habitats and Species*

Impacts from decommissioning are likely to be similar as for the construction stage, except they are likely to be lower in magnitude.

## **4.4 Land & Soil**

Soil is defined as the top layer of the earth's crust and is formed by mineral particles, organic matter, water, air and living organisms. Soil is an extremely complex, variable and living medium and its characteristics are a function of parent subsoil or bedrock materials, climate, relief and the actions of living organisms over time.

Soil formation is an extremely slow process and can take thousands of years to evolve; soil can be considered essentially as a non-renewable resource.

As the interface between the earth, the air and the water, soil performs many vital functions; it supports food and other biomass production (forestry, biofuels etc.) by providing anchorage for vegetation and storing water and nutrients long enough for plants to absorb them. Soil also stores, filters and transforms other substances, including carbon and nitrogen and has a role in supporting habitats that serve as a platform for human activity.

It was noted on a site walkover that there are some moderately developed eskers running through the area. None are designated as geological heritage sites, either by Westmeath County Council or the Geological Survey of Ireland.

### **4.4.1 Soils**

The Irish Soils Information System mapping project, undertaken by Teagasc, provides a modern classification of Irish soils, in line with international standards. Figure 4-4 presents the soil information for the proposed development site.

The dominant soil association in the area is the Elton Soil Association (1000x). It is described by Teagasc as a 'fine loamy drift with limestones'<sup>19</sup>. More specifically, the Elton Association consists primarily of 'luvisols with surface-water gleys, Stagnic Brown Earths and Calcareous Brown Earths, on fine loamy drift with limestones'. The soils

<sup>19</sup> Creamer, R & O'Sullivan, L., eds. 2018. Soils of Ireland.

in this association are considered to have good agricultural potential being friable deep soils with plentiful, well-developed roots and a high base saturation with good nutrient retention<sup>19</sup>.

The Elton Soil Association is extensive throughout the limestone lowlands. Five of the proposed turbine locations are underlain by the association.

There are two occurrences of the Peat Soil Association (1xx) underlying the site. There is one area in the north of the site, described as Fen Peat. Most fen peats in Ireland have been drained for agriculture and it appears that this occurrence has been at least partially drained. Fen peats typically have poor drainage and are suitable for grazing only, as well as being subject to poaching. They can be important habitats from an ecological perspective.

The second occurrence of the Peat Soil Association is in the southern half of the site, in an area described as Cut Peat. Cut Peat is an area of bog or peatland that has previously been harvested for turf. Examination of historic aerial imagery indicates that this area may have been commercially harvested, but it is not clear. The area is now underlain by forestry and agricultural land. Two of the proposed turbine locations are underlain by the association.

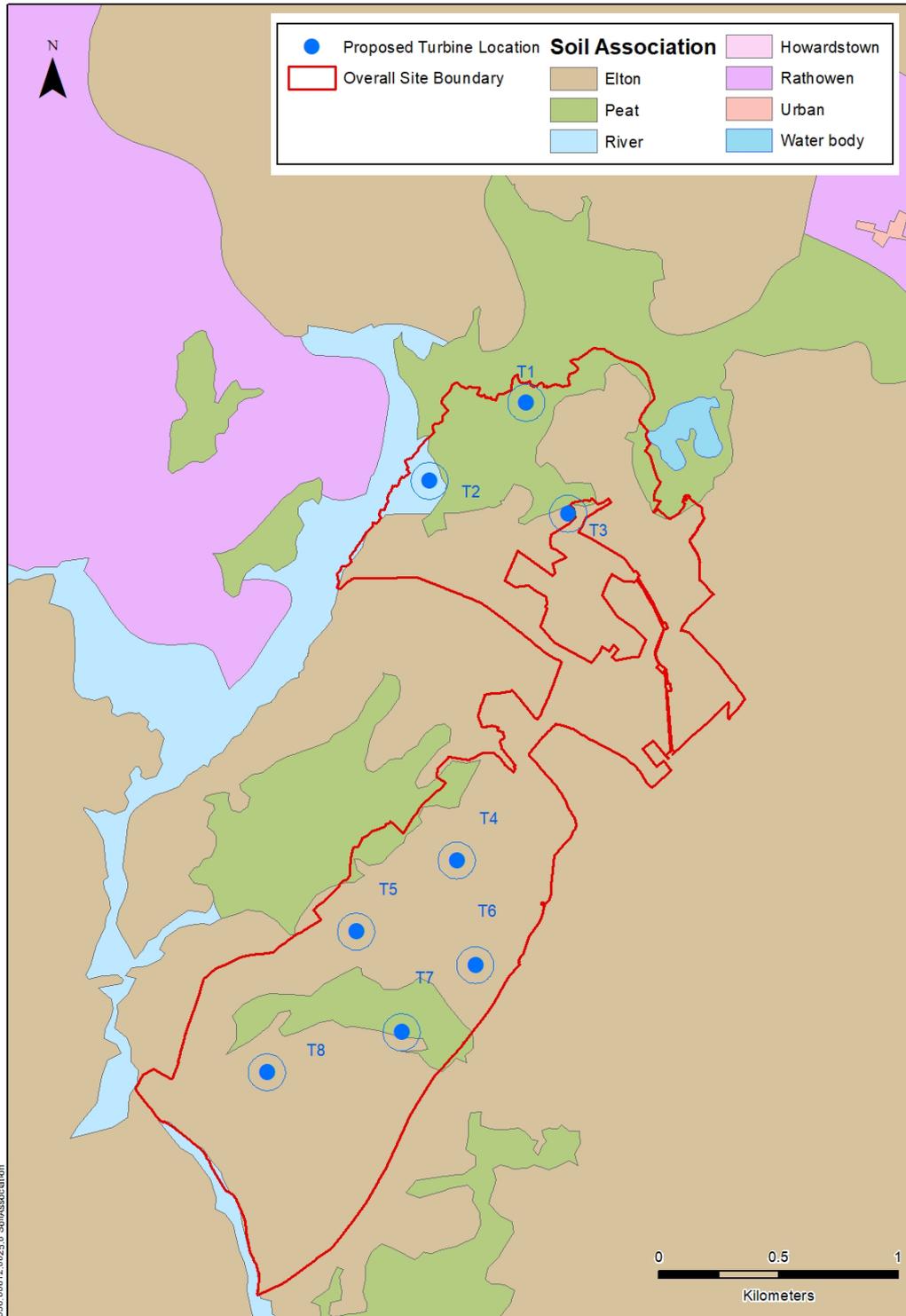
The final soil association at the site is the River Alluvium Association (05RIV), associated with the stream that forms the northwest boundary of the site. River Alluvium has similar features to gleys, with poor drainage and is of limited value from an agricultural perspective.

One other soil association occurs in close proximity to the proposed development: The Rathowen Soil Association (1030b) has occurrences to the north, northwest, west and southwest of the site. The Rathowen Soil Association is described as 'Fine loamy drift with limestones' and is therefore similar to the Elton Soil Association<sup>20</sup>.

---

<sup>20</sup> Creamer, R & O'Sullivan, L., eds. 2018. Soils of Ireland.

**Figure 4-4**  
**Soil Map**



02036\_00812\_0025\_0\_SoilAssociation

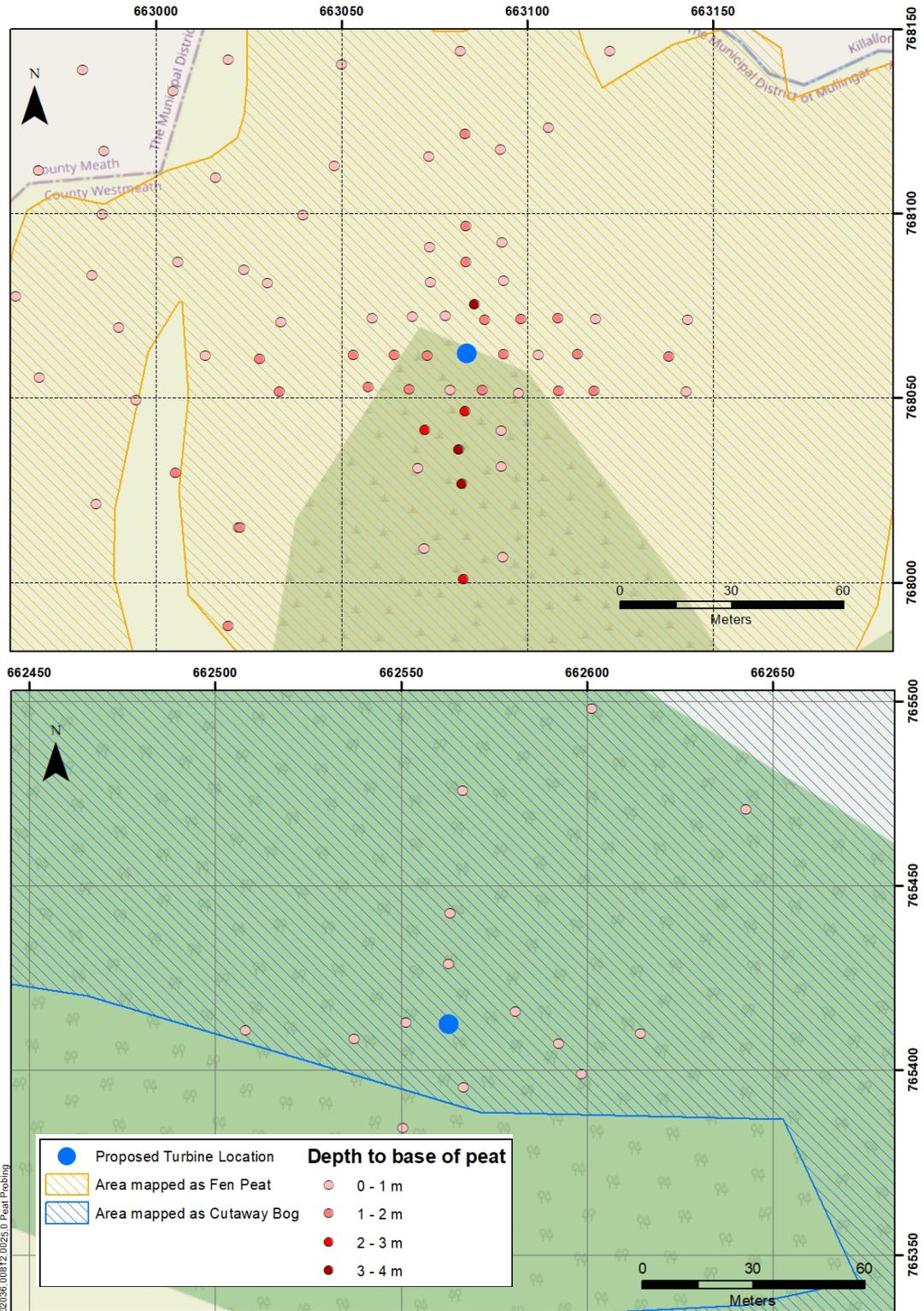
© This drawing and its contents are the property of SLR Environmental Consulting (Ireland) Ltd. and may not be reproduced or amended by other persons without prior written permission.  
 SLR Environmental Consulting (Ireland) Ltd. accepts no liability for amendments made by other persons.  
 © OpenStreetMap (and) contributors, CC-BY-SA

#### 4.4.2 Peat

The preliminary results of a peat survey show that within the northern cluster (around proposed turbine location T01), peat thickness varies from 0 to 4.0m thick, averaging c. 1.0m. The peat is at its thickest immediately southeast of the proposed T1 location, where it ranges from 2.1m to 3.8m thick. The peat thins out to the west and is absent c. 65m to the west of the proposed location. The peat appears to be relatively consistent to the north and east, averaging 1.2m thick. The peat is fibrous in nature and is likely to be quite stable.

The survey at the southern site, around proposed turbine location T07, shows that there is no peat present. This indicates that previous extraction has completely removed the peat. See Peat Survey Locations in Figure 4-5.

**Figure 4-5**  
**Peat Survey Locations**



© OpenStreetMap (and) contributors, CC-BY-SA  
 © This drawing and its contents are the property of SLR Environmental Consulting (Ireland) Ltd. and may not be reproduced or amended by other persons without prior written permission.  
 SLR Environmental Consulting (Ireland) Ltd. accepts no liability for amendments made by other persons.

### 4.4.3 Subsoil

There are three types of subsoil at the proposed site:

- River alluvium
- Basic esker sands and gravels
- Cutover peat
- Fen peat
- Limestone gravels
- Lake sediments
- Till derived from limestones.

The river alluvium, cutover peat and fen peat are as described in the soils section, above. The basic esker sands and gravels, limestone gravels and till derived from limestone are typical subsoil types in the limestone lowlands. The lake sediments have minor occurrences and are not associated with present-day lakes. The subsoils at the site have no particular status.

### 4.4.4 Bedrock

The proposed site is entirely underlain by the Lucan Formation, a mixed package of limestones and shales. The Lucan Formation occurs extensively throughout the Dublin basin, an area extending westwards from County Dublin, through the central and northern midlands.

### 4.4.5 Scope of Assessment

The assessment will address soils, subsoils and bedrock underlying the wind farm. Geological Heritage has also been considered. None of the County Geological Sites in the location have the potential to be affected by the proposed development and will therefore not be assessed. No karst occurrences are known in the area.

### 4.4.6 Assessment Methodology

The methodology for the soils and geology assessment will be in accordance with the guidelines published by the Institute of Geologists of Ireland in 2013, 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'.

A Preliminary Site Investigation (Phase 1) has been undertaken, consisting of peat probing around turbine locations and access roads where desktop mapping indicates the presence of peat.

The data gathered will be used to inform the final location of all turbines and associated infrastructure.

An earthworks balance calculation will be prepared for the overall development to assess where excavated material can be beneficially re-used. In addition, an assessment of the volumes of raw material will be made which will in turn be used to determine the number and size of borrow pits required.

### 4.4.7 Likely Significant Effects

The potential impacts of the development of the wind farm on the geology, hydrogeology and slope stability are:

- The excavation and removal of soil and rock and interference with any existing site drainage is a potential direct permanent effect that, without mitigation, could alter the existing hydrogeological balance of the site.

- Areas which are underlain by peat deposits are susceptible to slope stability issues, including peat slides and bursts, when changes are made to topography, hydrogeology and hydrology of the site. The peat survey indicates that the peat is not likely to pose significant stability issues.
- The use of granular fill and other materials for the construction of the access tracks has the potential to have a permanent impact on the source quarries or borrow pits.
- Soil compaction may occur due to movement of construction and maintenance traffic.

## 4.5 Water

### 4.5.1 Introduction

An assessment of the potential effects of the Proposed Development on hydrology and hydrogeology will be included within the EIA within which the water environment will be considered.

### 4.5.2 Baseline

The following key guidelines apply to the hydrology and hydrogeology assessment:

- Institute of Geologists of Ireland. Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements, April 2013
- National Roads Authority, 2008. Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009): Office of Public Works and the Department of the Environment, Heritage and Local Government
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022).

The following sources of information are being consulted for the Water baseline:

- Information from site walkover
- Preliminary floor risk assessment for the area
- GSI Groundwater Data Viewer - bedrock and gravel aquifers, vulnerability, water supplies, groundwater recharge
- GSI Groundwater body description documents
- Environmental Protection Agency water maps
- Irish Soils Information System – Teagasc
- Teagasc/GSI/EPA Subsoil Mapping
- GSI Groundwater Data Viewer - Bedrock Geology
- OSi Discovery Series mapping
- Environmental Protection Agency
- Water Framework Directive
- Met Eireann
- OPW CFRAM.

### 4.5.3 Scope of Assessment

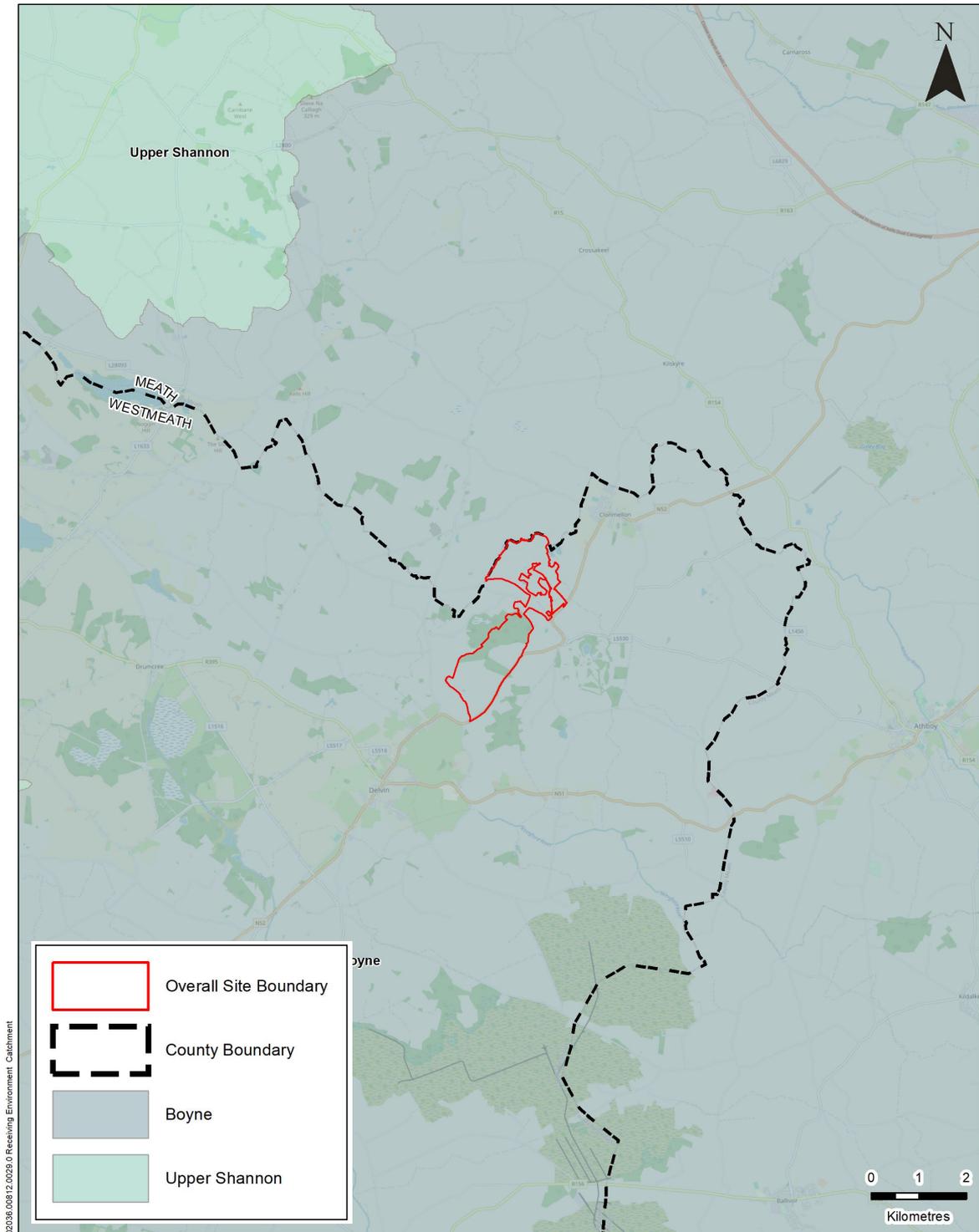
The assessment will address impacts on hydrology and hydrogeology. The aspects of the water environment that could be affected by the activities associated with the proposed development will also be addressed. The scope of the assessment includes:

- An assessment of the existing water (hydrology and hydrogeology) within approximately 2 km of the application area at the wind farm.

- An assessment of the potential impact of construction and operation of the proposed wind farm on surface water and groundwater.
- Where necessary, recommendation(s) of mitigation measures to reduce or eliminate any potential impacts.

For ease of reference: Figure 4-6 shows all catchments within vicinity of the subject site. Figure 4-7 shows groundwater vulnerability within vicinity of the subject site. Figure 4-8 shows the river sub-basins within proximity to the site. Finally, Figure 4-9 shows the indicative fluvial flooding within proximity to the site.

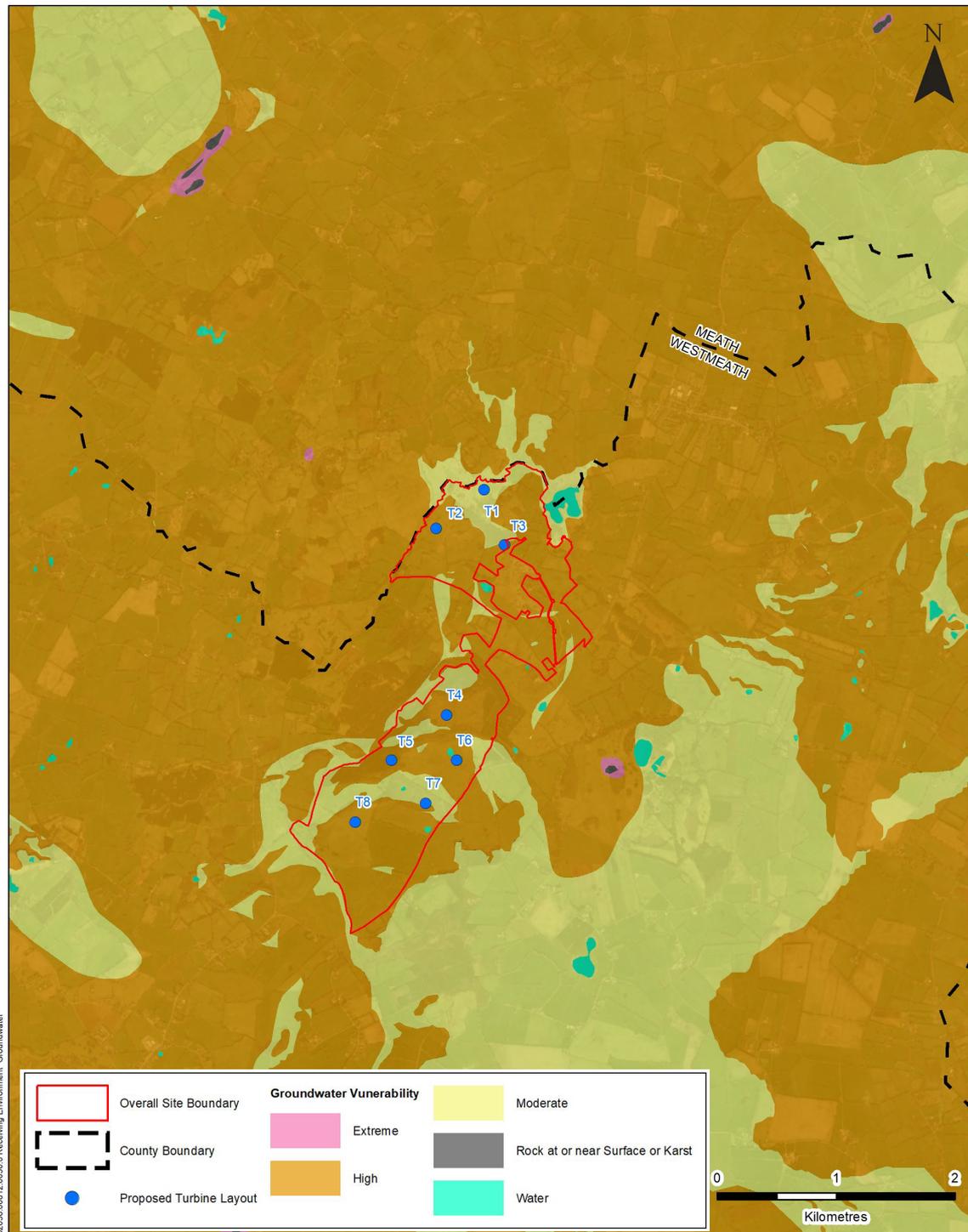
**Figure 4-6**  
**Receiving Environment: Catchments**



02036.00812.0039.0 Receiving Environment Catchment

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
© OpenStreetMap (and) contributors, CC-BY-SA  
Contains Irish Public Sector Data (Geological Survey Ireland) licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence.

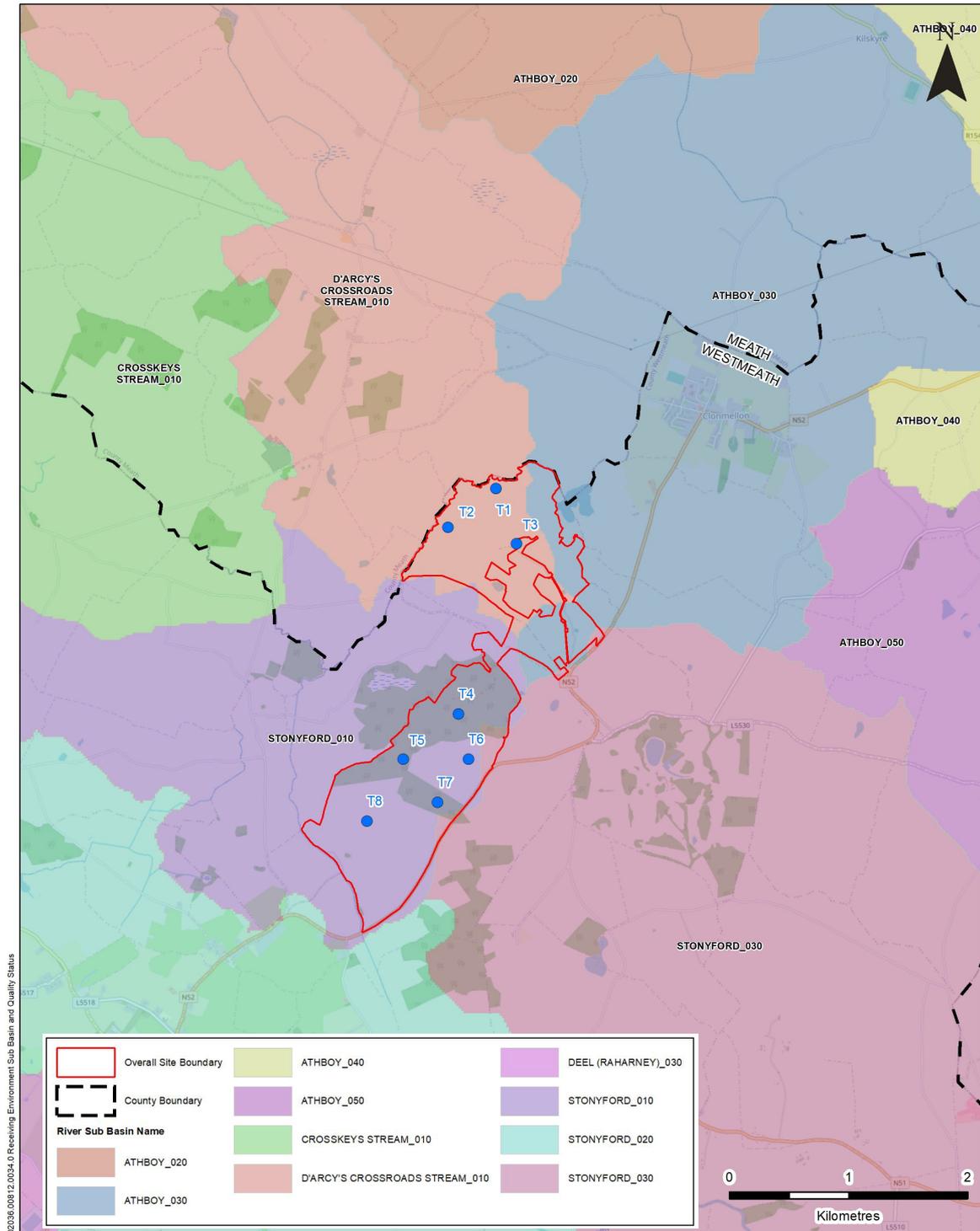
**Figure 4-7**  
**Receiving Environment: Groundwater Vulnerability**



©2022 SLR Consulting Ltd. Receiving Environment: Groundwater

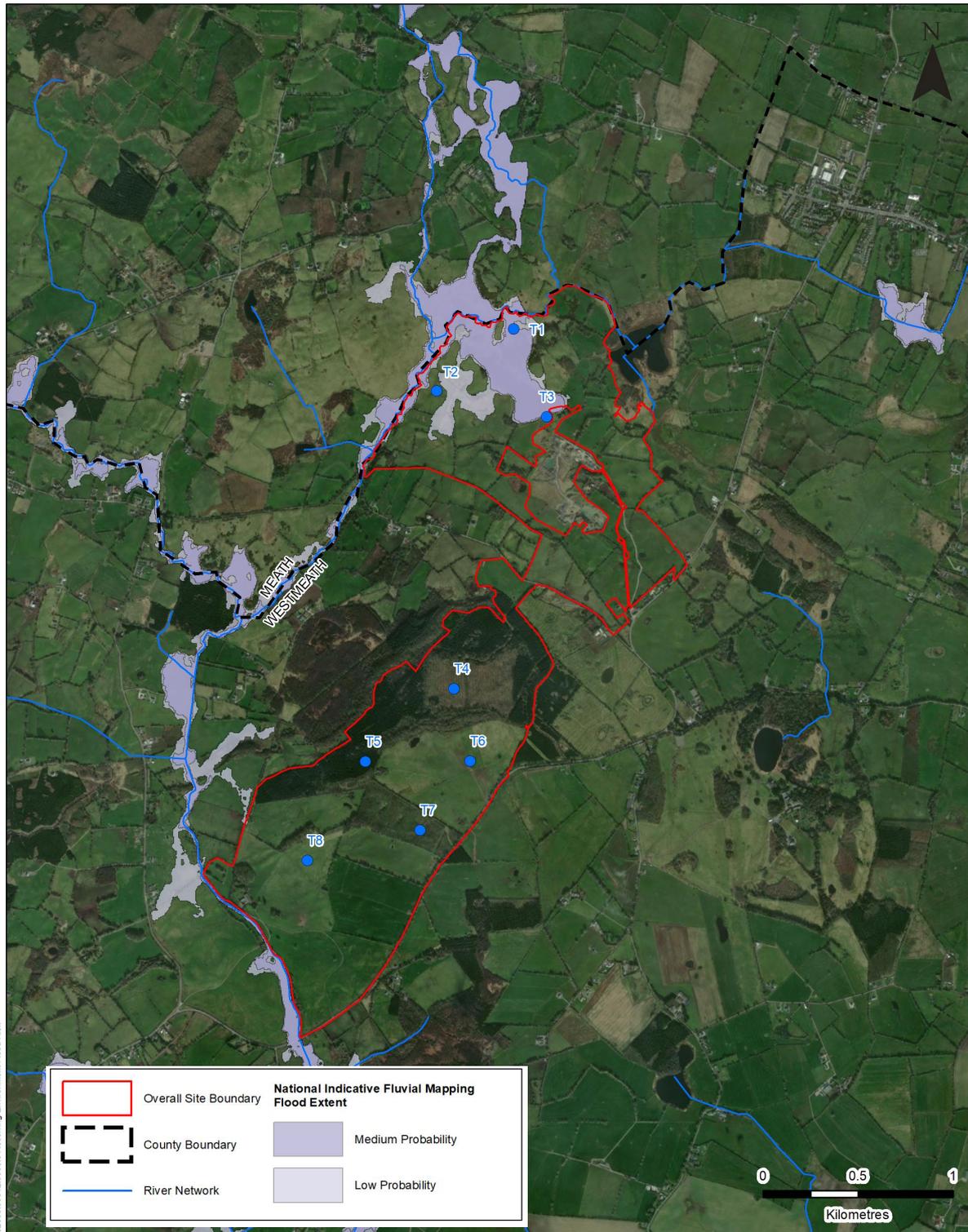
© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
 Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Contains Irish Public Sector Data (Geological Survey Ireland) licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence.

**Figure 4-8**  
**Receiving Environment: River Sub-Basins**



© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
 © OpenStreetMap (and) contributors, CC-BY-SA  
 Contains Irish Public Sector Data (Geological Survey Ireland) licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence.

**Figure 4-9**  
**Receiving Environment: Indicative Fluvial Flood Extent**



02036.008.12.0036.0 Receiving Environment Flood Risk

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
 Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
 Contains Irish Public Sector Data licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence.

#### 4.5.4 Assessment Methodology

A preliminary site visit has been undertaken to establish the constraints relating to the water environment and noting hydrological features. A preliminary flood risk assessment will be undertaken to assess the potential impact of flooding on the proposed development and the impact of the proposed development on downstream flooding. The Flood Risk Assessment for the site will be used to inform the scheme layout and design.

The assessment methodology to identify potential direct and indirect impacts to surface water and groundwater associated with the proposed wind farm will be a qualitative risk assessment methodology in which the nature of the potential impacts will be described in terms of the character, magnitude, duration, probability and consequence of the impact and whether they are direct or indirect impacts.

The description of the potential impact will then be screened against the significance and sensitivity of the receiving environment to establish the overall significance of the potential impact (without mitigation). The classification of the impact significance will be determined using the matrix from the EPA Guidelines (2017).

The potential impacts will initially be assessed with no mitigation or design measures incorporated to reduce the risk and any required mitigation measures will then be outlined.

#### 4.5.5 Likely Significant Effects

The main potential impacts from the construction of the proposed Knockanarragh Wind Farm have been identified as the following:

Generation of turbid runoff during construction that could enter the water environment. Several designed-in measures will be considered to reduce the potential for impact on sensitive receptors. These will evolve over the design process in response to consultation. Measures adopted are likely to include:

- Avoiding sensitive areas of soils and the water environment
- Ensure essential infrastructure is outside Flood Zones A and B at the site
- Minimising the number of watercourse crossing points
- Plan for storage and handling of oils, fuel or any other potentially polluting substance
- Outline drainage plan

Changes to surface water runoff patterns which could affect sensitive habitats such as peat. Limited areas of peat have been identified on site and will be considered in further detail as part of the impact assessment. Assessment will seek to establish the current hydrology of any sensitive habitat and development of the wind farm will seek to maintain the existing hydrological regimes in order to safeguard these ecosystems.

Pollution to local groundwater through foundation development. The baseline assessment will include a review of the underlying geology including groundwater and any local users of this resource or public supply source protection areas will be identified. Appropriate design will seek to safeguard groundwater quality through best practice measure to control any potential pollution vectors.

#### *Site Walkover*

A site walkover was carried out in April 2022 to establish the pattern of existing drainage and to record existing hydrology features of the wind farm site. The site walkover involved an initial review of available information gathered in the desk study. During the site visit, the GPS coordinates, descriptions and photographs of hydrology features were recorded to develop a better understanding of hydrology and drainage process at the site.

#### **Surface Water**

The proposed Knockanarragh wind farm is located within Boyne catchment (ID 07). The main hydrology features within and adjacent to the proposed wind farm lands are the River Stonyford (ID 07\_220) and its tributary D'arcy

Crossroad Streams which forms the western boundary of the site. These features are part of the River Boyne and River Blackwater SAC (ID 002299).

The EPA database includes name and flow direction of all watercourses within Ireland. Small fields drains and handmade drains are not included in the database. During the site visit additional field drains were identified. These drains are hydrologically linked with the D'arcy Crossroad Streams (called Stonyford River on the EPA website) and its tributary Killacroy Stream.

The EPA website contains information regarding water quality. There are two operational water quality monitoring stations along the River Stonyford. They are owned by Meath County Council. The receiving waters are classified as per Water Framework Directive (WFD). The river waterbodies risk is 'At Risk' and water quality status is 'Moderate'. There are five categories of surface water status: 'High', 'Good', 'Moderate', 'Poor' and 'Bad'. In accordance with the Surface Water Regulations, water classified as 'High' or 'Good' must not be allowed to deteriorate. Water classified as less than good must be restored.

There are a series of small surface water ponds across the study area, which are associated with the esker deposits.

A 50m buffer is applied to all surface water features. Any construction within this buffer will need to be assessed.

### Flooding

The Office of Public Works (OPW) is the government agency with statutory responsibility for flooding in Ireland. The National Indicative Fluvial Mapping (NIFM) is also shown on the OPW website, which shows high level (indicative) national flood mapping.

The NIFM identifies an area of low-lying ground in the northern part of the site which may be liable to flooding, close or at the turbine 1 area. The substation is outside the low-lying groundwater which may be liable to flooding.

The definitions of Annual Exceedance Probability are as follows: The Planning Guidelines use Flood Zone A (<1% AEP 1:100yr), Flood Zone B (<0.1% AEP 1:1,000yr) and Flood Zone C (>0.1% AEP 1:1,000yr). The OPW use High Probability (<2% AEP 1:50yr), Medium Probability (<1% AEP 1:100yr) and Low Probability (<0.1% AEP 1:1,000yr).

According to the NIFM website, the north-western part of the site is in Flood Zone A or Medium Probability of flooding.

According to the OPW database, there are no recorded historical or recurring flood incidents within the site. The closest flood incident is approximately 0.8km northwest of the site at the Cross Keys Stream. This is a tributary of the River Stonyford. The recorded flood incident is a recurring flooding, Sranakill CR 190 Recurring (ID 773) caused by low lying lands.

### Hydrogeology

The aquifer underlying the study area is classified by the GSI as Locally Important Aquifer (LI), which is bedrock which is moderately productive only in local zones. This refers to the Lucan Formation Calp bedrock of dark limestone and shale.

The GSI shows the presence of localised eskers across the study area, these are not classified as aquifers and there is no gravel aquifer in the study area.

The Groundwater Body (GWB) is the management unit under the Water Framework Directive (WFD). The study area is underlain by the Athboy Groundwater Body, which has a poorly productive flow regime and groundwater type.

A groundwater body is also shown associated with the Newtown Lough Fen. The GWDTE-Newtown Lough Fen (SAC002299) groundwater body is shown to the southeast of the lough. The GWB is again defined as a poorly

productive flow regime and groundwater type, suggesting that the flow path between the lough is fracture flow in the bedrock aquifer. There is no gravel aquifer in the area.

All of the proposed turbines are underlain by the Athboy Groundwater Body. Both substation layouts are located on the boundary of the Athboy and Newtown Lough Fen Groundwater Bodies. The substation is not expected to extend into the bedrock aquifer and so there will not be any direct pathway between the substation construction works and Newtown Lough Fen.

The subsoils are detailed in the Land, Soils and Geology section. Briefly, the GSI subsoils map shows Turbines 1 and 7 are underlain by Fen Peat, Turbines 2 and 3 and the Substation are underlain by tills deriving from limestones and Turbines 4-6 and 8 are underlain by gravels derived from limestone.

### **Groundwater Vulnerability**

The area to the north-west (Turbines 1-3) is classified by the GSI as having a groundwater vulnerability of “Moderate” to “High” and the area around the substation is classified as “High”, indicating the presence of between 5-10m of moderate permeability overburden.

The area to the south-west (Turbines 4-8) is classified as “Moderate” to “High”.

### **Groundwater Supply Wells**

The GSI database does not have a record of groundwater supply wells in the area, there are also no group schemes and public supply source protection area in the wider area.

### **Likely Significant Effects**

The main potential impacts from the construction of the Knockanarragh Wind Farm have been identified as the following:

#### *Generation of turbid runoff during construction that could enter the water environment.*

A number of designed-in measures will be considered to reduce the potential for impact on sensitive receptors. These will evolve over the design process in response to consultation. Measures adopted are likely to include:

- Avoiding sensitive areas of soils, eskers and the water environment
- Minimising watercourse crossing points
- Plan for storage and handling of oils, fuels or any other potentially polluting substances, including an emergency spill response plan
- Outline drainage plan

#### *Changes to surface water runoff patterns which could affect sensitive habitats such as peat.*

Some areas of peat are present on the site and this will be considered as part of the water as well as the soils and geology chapter of the EIAR. However this will be confirmed during the assessment of baseline conditions. Assessment will seek to establish the current hydrology of any sensitive habitat and development of the wind farm will seek to maintain the existing hydrological regimes in order to safeguard these ecosystems.

#### *Pollution to local groundwater through foundation development.*

The baseline assessment will include a review of the underlying geology including groundwater and any local users of this resource or public supply source protection areas will be identified. Appropriate design will seek to safeguard groundwater quality through best practice measure to control any potential pollution vectors.

### *Flooding of the site*

An area of low lying ground in the northern part of the site which may be liable to flooding, close or at the Turbine 1 area, was identified. A Stage 3 Flood Risk Assessment will be carried out for the area, including a hydraulic model, to further investigate the potential flood risk in this area.

## 4.6 Air & Climate

An assessment of the potential effects of the Proposed Development on air quality will be included within the EIAR. The assessment will address the potential impacts on air quality arising from traffic and construction equipment during the construction phase. The potential impacts on air quality in the operational phase will also be addressed.

In terms of micro-climate, the proposed development is in a mainly rural area, corresponding to air quality Zone D, Rural Ireland, in the Air Quality Regulations (SI 180 of 2011), as amended. The air quality is expected to be good. The macro-climatic baseline is the future emission of CO<sub>2</sub> and other greenhouse gases, which would be produced by fossil fuel power generation in the country, in the absence of the proposed development. The potential impacts of the proposed development on microclimate and macro climate will be addressed.

### 4.6.1 Baseline

The location of the proposed development is within the air quality zone D within rural Ireland. The air quality is expected to be good. The proposed development site is located within an area of commercial forestry with limited access to traffic. The nearest air quality monitoring station in Zone D is located in Kilkitt, Co. Monaghan, c. 45km northeast of the Proposed Development.

### Dust impacts

The assessment of dust and PM<sub>10</sub> from construction activities will be carried out using a semi-qualitative methodology published by the Institute of Air Quality Management (IAQM). Where required, recommendations for mitigation measures to minimise dust and PM<sub>10</sub> impacts during construction of the facility will be included in the EIAR Chapter.

### 4.6.2 Scope of assessment

The assessment will address the potential impacts on air quality due to the construction equipment and activities and to emissions from traffic associated with the construction process. The potential impacts on air quality in the operational phase will also be addressed.

The climate in the immediate local area of a proposed development is known as the micro-climate whereas the climate of a large geographical area (global) is the macro-climate. The potential impacts of the proposed development on micro-climate and macro-climate will be addressed.

The air quality assessment will include:

The following issues are addressed separately:

- Relevant legislation, standards and guidance.
- Baseline conditions pertaining to measured (or estimated) existing air quality levels around the proposed site footprint.
- Methodology used to assess the potential impacts of planned activities on air quality at receptors.
- Assessment of the impacts.

- Description of mitigation measures that are incorporated into the construction, design and operation of the proposed development to eliminate or reduce the potential for increased air quality impacts (if required).
- Summary of any residual impacts and reinstatement.
- Summary of cumulative impacts.
- Monitoring proposals if required.

#### 4.6.3 Assessment Methodology

Air quality monitoring conducted by the EPA at zone D locations in the vicinity of the site will be reviewed and levels compared with the air quality standards. To assess the impacts of construction dust emissions, the approach and assessment criteria outline in the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA, 2008) will be used.

For the purposes of assessing the impact on air quality of emissions generated by construction traffic, the methodology described in the Design Manual for Roads and Bridges 2007a (UK Highways Agency, May 2007) will be used. Parameters to be assessed will include oxides of nitrogen, particulates PM<sub>10</sub> and PM<sub>2.5</sub>, carbon monoxide and benzene.

The potential micro-climatic impacts of the proposed development will be assessed in relation to the micro-climatic baseline, the scale of the elements of the project and the nature of use of the surrounding environment. For the assessment of macro-climatic effects, the emissions of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases from fossil fuel power generation, which will not be required should the proposed development become operational, will be quantified and assessed in terms of Ireland's commitments under EU and international climate change treaties and protocols.

In terms of carbon losses and savings, the Scottish Windfarm Carbon Assessment Tool will be used to estimate carbon savings and life cycle assessment of the proposed construction and operation of the wind farm.

#### 4.6.4 Likely Significant Effects

The assessment will address the likely potential impacts on air quality due to construction equipment and activities and to emissions from traffic associated with the construction process. The potential impacts on air quality in the operational phase will also be addressed.

The construction phase of the proposed development has the potential to generate dust emissions, which could give rise to nuisance for residents.

To assess the impacts of construction dust emissions, the approach and assessment criteria outlined in the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (National Roads Authority, 2008) will be used.

Construction plant, equipment and the traffic generated by the construction process, have the potential to give rise to emissions of oxides of nitrogen, benzene and particulates, which could impact on local air quality. The operation of the proposed development is not expected to have a negative impact on air quality.

The proposed development is expected to have a positive impact in terms of the net reduction in emissions of CO<sub>2</sub> and other greenhouse gases as a result of the proposed wind farm. For the assessment of macro-climatic effects, the reduction in emissions of CO<sub>2</sub> and other greenhouse gases from fossil fuel power generation when the proposed development is operational, will be quantified and assessed in terms of Ireland's commitments under EU and international climate change treaties and protocols.

## 4.7 Landscape

### 4.7.1 Introduction

The purpose of this Scoping Report is to describe the scoping methodology and present outcomes of initial desk study and fieldwork stages and also establish the scope of work and methods applied in the identification and assessment of landscape and visual impacts associated with the proposed Knockanarragh Wind Farm. It will present key landscape and visual receptors and highlight potential effects that will be assessed.

The proposed Knockanarragh Wind Farm is situated in open, rolling terrain that comprises of a mix of conifer forest plantations, woodland and pastoral farmland. It is situated in the townlands of Rosmead and Cavestown, and Newtown, in County Westmeath just 100m south of the Meath – Westmeath border and lies c. 3km north of the settlement of Devlin and 1.5km south of Clonmellon.

### 4.7.2 Baseline

#### Policy Context

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. 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.

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.

The following County Development Plans are the relevant county level policy context:

- Westmeath 2021 – 2027; All turbines located just within northern boundary of the county and covering the entire south and southwest of study area
- Meath 2021 – 2027; Almost as relevant as Westmeath as the turbines are just beyond the south-western border and it covers all of the northern and eastern study area
- County Cavan 2022 – 2028 (only small northern section of study area)

On this basis, county level Landscape Character Assessments for County Westmeath and County Meath (both contained within the respective County Development Plans) will be a key consideration. With those through the wider study area (Cavan) reviewed for key sensitivities and considerations, principally for Scenic route / view designations, which could be impacted by mid- and long-distance views of turbines. In all cases, these Landscape Character Assessments have also been integral to the development of wind energy strategies / policy contained within the CDPs.

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 (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 'Flat Peatland' and 'Hilly and Flat Farmland' landscape types. This guidance will be a key consideration of the landscape and visual assessment.

## Relevant Guidance

The Landscape and Visual Assessment of Knockanarragh 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). This is recognised as the principal best practice guidance for landscape and visual assessment of all forms of development in Ireland and the UK.

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)
- EPA Advice notes on current practice in the preparation of Environmental Assessment Reports (EPA, Draft 2015)

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)

### 4.7.3 County Development Plans

The most relevant landscape and visual policies with regard to the proposed wind farm development are contained within the County Development Plan for County Westmeath and County Meath, with secondary consideration for those in Cavan.

#### *Westmeath County Development Plan 2021 – 2027*

A landscape character assessment for County Westmeath is included within the current development plan. The landscape character assessment divides the county into 11 landscape character areas (LCAs) with the site situated in 'LCA 3 – River Deel Lowlands. This LCA is *"typified by low-lying pasture punctuated with small lakes which are flanked by scrub and wet woodland. These rivers form part of the River Boyne and Blackwater SAC complex. The area east of Delvin and running south along the Meath Border is characterised by cutover, cutaway bogs and small tracts of intact bog."*

A number of 'Areas of High Amenity' are also designated in county Westmeath, three of which are located within the outer north-western quadrant of the study area and include, Lough Lene, Lough Derravaragh and Lough Owel. These areas are noted for their amenity and recreational value and *"should be protected"*.

#### *Meath County Development Plan 2021 – 2027*

The proposed site is contained within counties Westmeath and Meath County. The nearest and most relevant landscape character area in county Meath is 'LCA 17 – South West Kells Lowlands' from the Meath CDP which is within the 'Lowland Landscapes' character type. This area is of 'Moderate' Value and 'Moderate' sensitivity, which is in the mid-low range for the Meath classification system.

#### *County Development Plan Scenic Designations*

Scenic views and routes designations from both the Westmeath and Meath County Development Plan will be considered as well as those from other Planning Authority jurisdictions (Cavan) 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 assessments.

#### 4.7.4 Study area

The current 2006 (and Draft Revised 2019) Wind Energy Development Guidelines 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:

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

In the case of this project, the blade tips will be over 100 high and thus, the minimum ZTV radius required is 20 km from the outermost turbines of the proposed development. It is not considered that there are any additional features of 'national or international renown' between 20-25km of the site and thus, the study area will remain at a consistent 20km radius from the proposed turbines.

Consideration will also be given to the guidelines set out in the Draft Revised Wind Energy Guidelines (December 2019) with regard to defining the study area in addition to set back distances to nearest residential receptors.

#### 4.7.5 Sensitive Receptors

Sensitive landscape and visual receptors will be identified during baseline studies and fieldwork and will consist of both designated (highly sensitive landscape zoning / scenic views in the CDP) and non-designated receptors.

The receiving landscape is not unduly constrained in terms of sensitive landscape designations and scenic route / view designations in any of the relevant County Development Plans. Notwithstanding the absence of prohibitive landscape and visual designations, the Wind Energy Strategy for County Westmeath is not favourable (however not prohibitive) of development on this site, as the site is zoned 'Low' capacity for wind energy development.

Whilst the proposed development is wholly located in Westmeath, it will be important to consider development plan policies in adjoining counties, as the proposed development may have the potential to influence landscape character, but more likely views, from adjacent counties. The counties which intersect the study area are Meath and Cavan.

Visual receptors will be selected from the following categories;

- Designated scenic routes / views (CDP)
- Local Community views (roads and residences within approximately 5km)
- Centres of Population
- Major Transport Routes
- Amenity, Heritage and Tourism locations

#### 4.7.6 Consultation

It is considered that consultation on the landscape and visual impact assessment will be undertaken with the Local Authorities - Westmeath and Meath County Councils, along with local residents.

#### 4.7.7 Methodology

The 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 proceeds fieldwork as the latter is used to scope-in or scope-out potentially affected receptors that are identified as part of the desk study.

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.

#### *Desk Study*

The desktop study will comprise of the following:

- Review of a Zone of Theoretical Visibility (ZTV) map, which indicates areas from which the 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 Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity
- Production of wireframe images of the development at each potential viewpoint (illustrating the turbines in a bare-ground context) to aid fieldwork / viewpoint selection.

#### *Fieldwork*

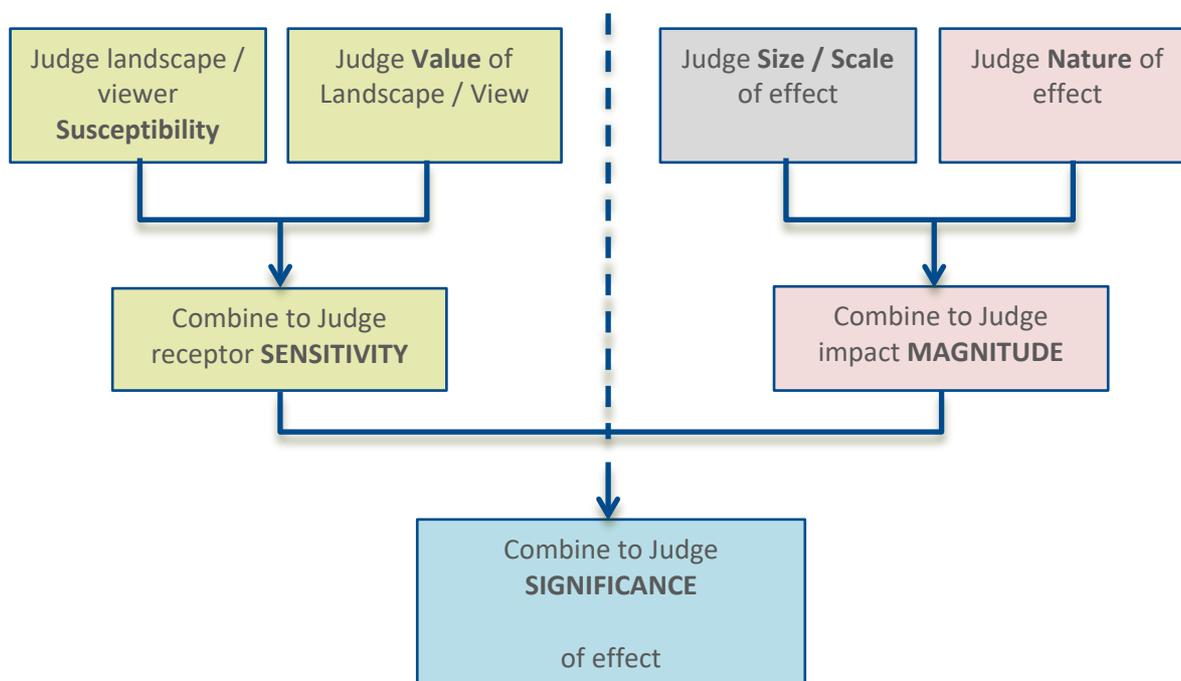
Some fieldwork has been carried out to date with further fieldwork scheduled for Summer/ Autumn of 2022, which will comprise of the following:

- 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.)
- Capture high quality base photography from which to prepare photomontages of the proposal.
- 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 VP selection set to be used for the preparation of photomontages to support the visual impact assessment.

#### **4.7.1 Impact Assessment**

The assessment of landscape effects involves establishing the landscape baseline. This 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 / drainage and vegetation / 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 Amenity / Heritage / Tourism locations. Once the baseline environment is established, an assessment of the potential significant effects associated with the proposed development will be carried out. 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 4-10**  
**LVIA Assessment Methodology (Derived from GLVIA 2013)**



#### 4.7.2 Assessment Criteria for Landscape Impacts

The sensitivity of the landscape to change is the degree to which a particular landscape receptor (Landscape Character Area (LCA) or feature) can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified using the following criteria:

**Table 4-4**  
**Landscape Value and Sensitivity**

Sensitivity	Description
<b>Very High</b>	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.
<b>High</b>	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.
<b>Medium</b>	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.

Sensitivity	Description
<b>Low</b>	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.
<b>Negligible</b>	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.

The magnitude of a predicted landscape impact 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 proposal site boundary that may have an effect on the landscape character of the area.

**Table 4-5**  
**Magnitude of Landscape Impacts**

Magnitude of Impact	Description
<b>Very High</b>	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.
<b>High</b>	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.
<b>Medium</b>	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.
<b>Low</b>	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.
<b>Negligible</b>	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

The significance of a landscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the matrix in Table 6:

**Table 4-6  
 Landscape/Visual Impact Significance Matrix**

Scale/ Magnitude	Sensitivity of Receptor				
	<i>Very High</i>	<i>High</i>	<i>Medium</i>	<i>Low</i>	<i>Negligible</i>
<i>Very High</i>	Profound	Profound-substantial	Substantial	Moderate	Slight
<i>High</i>	Profound-substantial	Substantial	Substantial - moderate	Moderate-slight	Slight-imperceptible
<i>Medium</i>	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
<i>Low</i>	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
<i>Negligible</i>	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

\* Shaded cells are considered to equate with 'significant' impacts in EIA terms.

### 4.7.3 Assessment Criteria for Visual Impacts

As with the landscape impact, the visual impact of the proposed wind farm will be assessed as a function of receptor sensitivity versus magnitude. In this instance, the sensitivity of visual receptors, weighed against the magnitude of visual effects.

#### Visual Sensitivity

Unlike landscape sensitivity, visual sensitivity is population based. Visual sensitivity is a two-sided analysis of receptor susceptibility (people or groups of people) versus the value of the view on offer at a particular location.

#### Susceptibility of Receptors

In accordance with the Guidelines for Landscape and Visual Assessment (2013), 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 of Views*

To assess the amenity value of views, Macro Works use a range of criteria that might typically be related to high amenity value including but not limited to, scenic designations. These are set out below:

- Recognised scenic value of the view
- Views from within highly sensitive landscape areas
- Intensity of use, popularity
- Provision of elevated panoramic views
- Sense of remoteness and/or tranquillity
- Degree of perceived naturalness
- Presence of striking or noteworthy features
- Historical, cultural or spiritual value
- Rarity or uniqueness of the view
- Integrity of the landscape character in view
- Sense of place
- Sense of awe

Those locations where highly susceptible receptors or receptor groups are present and which are deemed to satisfy many of the view value criteria above are likely to be judged to have a high visual sensitivity and vice versa.

#### *Visual Impact Magnitude*

The magnitude of visual effects is determined on the basis of the scale and nature of visual change. 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). The magnitude of visual impacts is classified in Table 4-7:

**Table 4-7**  
**Magnitude of Visual Impact**

Criteria	Description
<b>Very High</b>	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

Criteria	Description
<b>High</b>	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
<b>Medium</b>	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
<b>Low</b>	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
<b>Negligible</b>	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

### *Visual Impact Significance*

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix as for Landscape impacts provided at Table 4 above.

#### **4.7.4 Potential Impacts**

As described in the Scoping Methodology Section above, 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 visible, which can then be confidently scoped-out of further investigation / assessment.

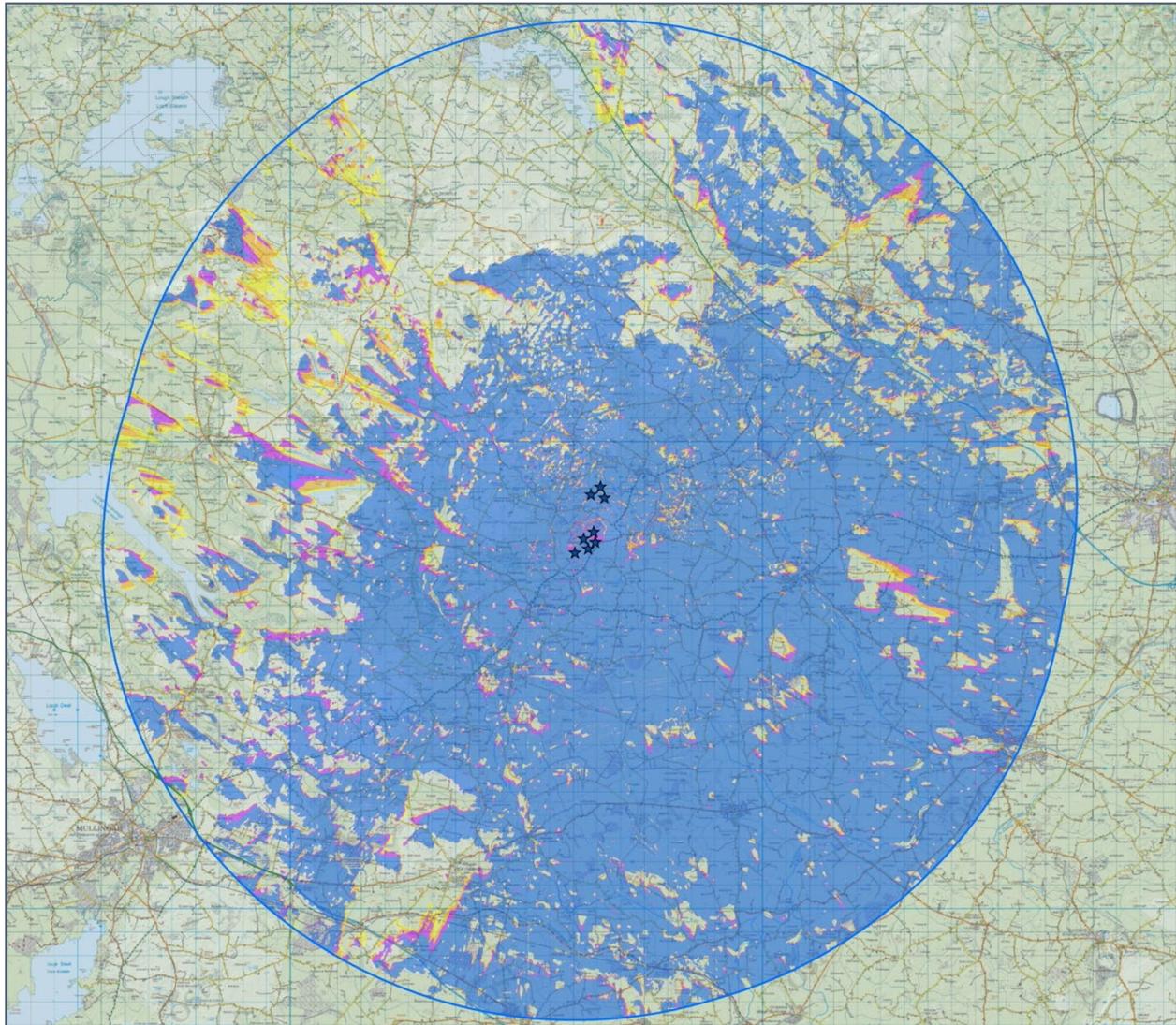
Overall, there is potential for short range (0-5km), mid-range (5-15km) and long range (15km+) views of the development, but with the highest potential for significant landscape and visual impacts to occur for short range views, where these might coincide with highly sensitive receptors. Views of the 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 potential for significant effects even at highly sensitive receptor locations.

Potential landscape and visual impacts could also occur in respect of ancillary development such as access roads, hard stands and grid connection.

#### **4.7.5 Zone of Theoretical Visibility (ZTV) Map**

An initial ZTV map has been prepared in Figure 4-11 to aid the general understanding of potential visibility within the study area and specifically, the selection of represented viewpoints from sensitive receptors shown to have theoretical visibility of the proposed wind farm i.e. not accounting for vegetation screening.

**Figure 4-11**  
**Zone of Theoretical Visibility Map**



The ZTV map show that comprehensive visibility of all the proposed turbines will be theoretically afforded from the central portions of the study area. This pattern will continue to the south, around to the east and northeast of the wider study area.

There are sections of the northwest of the study area which have limited visibility, with a large section of no visibility around Lough Ramor which dissipates to the south and southwest around the perimeter of the study area.

Within these main areas, there are pockets of varied visibility, which will be assessed in more detail through the main LVIA and will inform the selection of representative viewpoints as described below.

#### **4.7.6 LVIA Assessment tools / Techniques**

The following assessment tools and techniques will be considered for this project and applied as appropriate and beneficial to the assessment.

## Photomontages

Photomontages are photo-realistic depictions of the proposed development superimposed on baseline photography at selected receptor/viewpoint locations. The photomontages will be fully compliant with the most recent SNH guidelines (2014).

In the case of Knockannaragh Wind Farm, it is anticipated that approximately 30 no. viewpoints will be required overall. It is imperative that base photography is captured in the clearest of viewing conditions, especially where existing turbines are contained within the view.

These viewpoints will be selected based on the representation of sensitive receptors/locations combined with the degree of visibility indicated over the ZTV.

## Route Screening Analysis (RSA)

Route Screening Analysis (RSA) utilises Digital Surface Model (DSM) data to determine the degree of wind farm visibility from the local road network within 5km of the site based on screening by a combination of landform and vegetation. It classifies visibility into three categories; 'Open Visibility' (visibility of at least one full blade set); Partial Visibility (a view of one or more partial blade sets) and; 'No Visibility' i.e. fully screened. Subsequently, the 'Open Visibility' category is further refined into the number of turbines that are openly visible.

### 4.7.7 Cumulative Effects

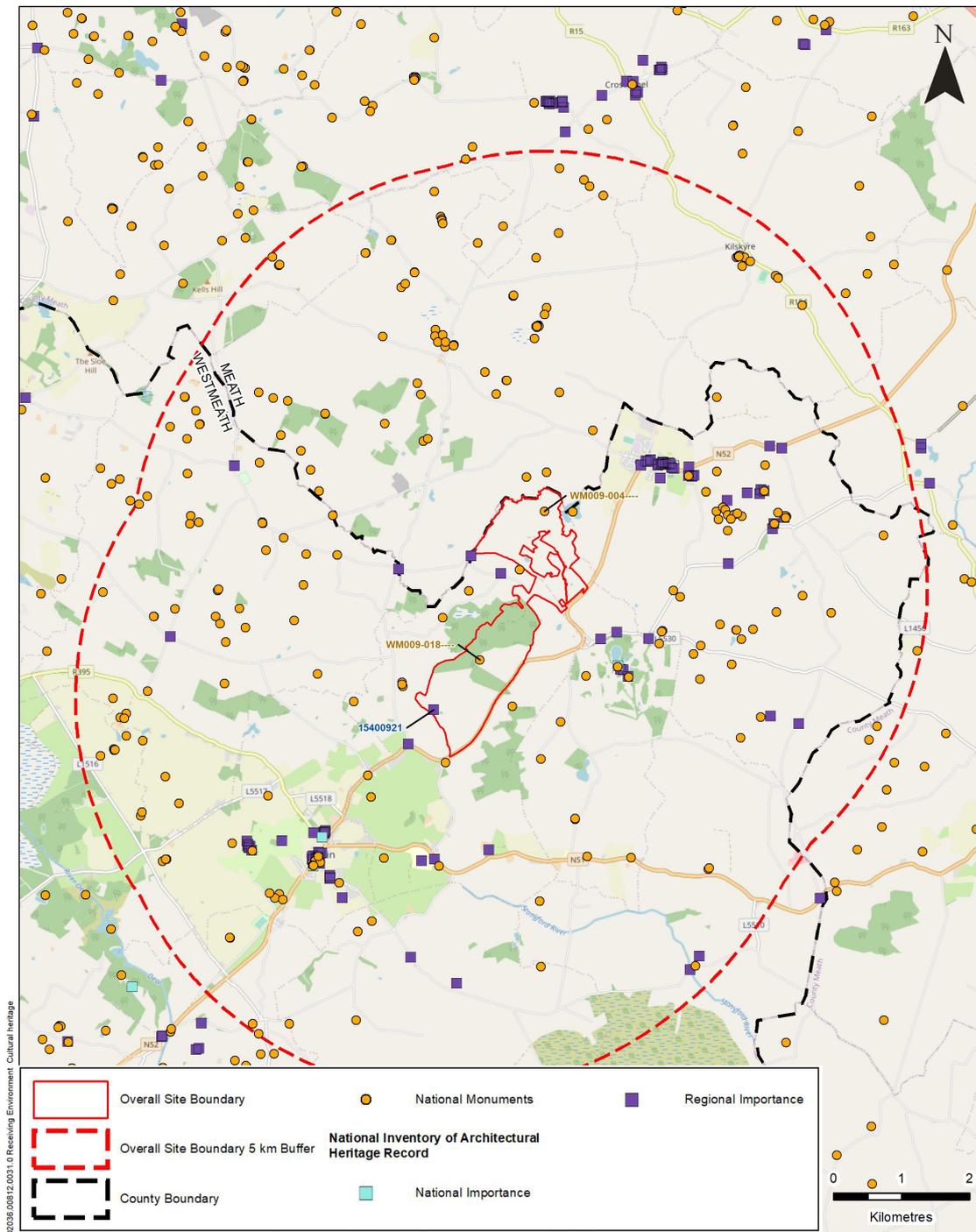
Cumulative impacts will be assessed in accordance with the SNH guidance note for 'Assessing the cumulative impact of onshore wind energy developments' (2012) taking account of 'Combined Views' 'Succession Views' and 'Sequential Views'.

One particular scheme to be addressed in the cumulative impact assessment will be Bracklyn Wind Farm which was recently granted permission. It is located south of Devlin, 6km south of the site – across an area of generally high visibility within the ZTV map.

## 4.8 Cultural Heritage

The assessment will address features and sites of archaeological, architectural and cultural heritage significance. The purpose of the study will be to assess the significance of the receiving cultural heritage environment and to identify and evaluate the magnitude of the impact of the proposed wind farm on the sensitivity of each cultural heritage feature within this environment and on the broader historic character of the landscape. Measures will be proposed to mitigate effects (where possible) so as to allow a fully informed decision to be made by the adjudicating authority. Figure 4-12 shows all cultural heritage assets, including national monuments and NIAH records in proximity to the site.

**Figure 4-12**  
**Receiving Environment: Cultural Heritage**



02038.00812.0031.0 Receiving Environment Cultural heritage

© This drawing and its content are the copyright of SLR Consulting Ltd and may not be reproduced or amended except by prior written permission. SLR Consulting Ltd accepts no liability for any amendments made by other persons.  
 © OpenStreetMap (and) contributors, CC-BY-SA  
 Copyright Government of Ireland. The content of this application is owned and operated by National Monuments Service, Government of Ireland. This copyright material is licensed for re-use under the Creative Commons Attribution 4.0 International

#### 4.8.1 Assessment Methodology

The method of assessment and reporting will assess all potential heritage assets susceptible to harm.

##### Scoping

A review of the following information will be carried out to establish susceptible heritage assets:

- A review and collation of information obtained from public and statutory consultees, for example the Irish Government's Arts, Culture and Heritage Datasets and the National Monuments Service Archive Unit.
- A review of the Protected Structures included within the Westmeath County Development Plan 2014 – 2020. These are protected under the Planning and Development Act 2000.
- A review of the National Inventory of Architectural Heritage (NIAH) building survey sites, NIAH historic gardens and designed landscapes survey sites.
- Constraints mapping generated by GIS to show heritage assets in relation to a Zone of Theoretical Vision (ZTV).
- Observations from a targeted Site inspection to identify recorded assets likely to be impacted, to establish the condition of recorded assets and identify any potential for additional assets not currently identified.
- Aerial photographs to be used in combination with historic mapping to map potential cultural heritage assets.

A review of the direct and indirect impacts upon susceptible heritage assets will be conducted separately. Direct impacts are those which would change the heritage asset's significance through physical alteration, while indirect effects are those which would affect the heritage significance by causing change within its setting.

##### Significance

To allow for a detailed, justifiable and intelligible determination of cultural impact; it is necessary to establish a consistent terminology for discussing the importance of heritage assets. This is referred to variously across the heritage statute, policy and guidance documentation, including 'importance', 'interest', 'significance', 'special interest' and 'character' amongst others. For the purposes of this assessment, the term 'significance' has been used consistently hereafter.

The Framework and Principles for the *Protection of the Archaeological Heritage* (1999), which relates specifically to archaeology, provides the following:-

*"Any material remains which can contribute to understanding past societies may be considered to have an element of archaeological significance... Archaeological significance or interest may also be seen in terms of the potential for sites, monuments or artefacts to enable people to experience directly the evidence for past societies and through this allow them to better understand and appreciate their own past."*

A more detailed approach is provided within *Architectural heritage protection: guidelines for planning authorities* (2011), which conceives of heritage significance as deriving from the following categories of 'special interest': -

- Architectural
- Historical
- Archaeological
- Artistic

- Cultural
- Scientific
- Technical
- Social

This guidance, which derives principally from the terms of the Granada Convention, makes the further point that these categories are not mutually exclusive, such that an asset might derive its significance from one, multiple or all these interests.

In accordance with this guidance, the significance of the heritage assets described will be discussed in terms of these contributing interests, enabling consistent, detailed, justifiable and intelligible determinations of heritage significance to be made.

Table 4-8 shows the potential levels of the heritage significance of an asset related to designation, status and grading, to a scale of Highest to Negligible importance as implied within legislation. This table acts as an aid to consistency in the exercise of professional judgement and provides a degree of transparency for others in evaluating the conclusions reached by this assessment.

**Table 4-8**  
**Levels of Significance regarding Designated Heritage Assets**

Heritage Significance	Explanation
Highest	Sites of international importance, including:- <ul style="list-style-type: none"> <li>• World Heritage Sites;</li> </ul>
High	Site of National importance, including:- <ul style="list-style-type: none"> <li>• National Monuments, including those recorded on the Sites and Monuments Record (SMR)</li> <li>• Nationally Important assets recorded in the National Inventory of Architectural Heritage (NIAH and RPS)</li> </ul>
Medium	Sites of Regional importance, including:- <ul style="list-style-type: none"> <li>• Sites on the Record of Monuments and Places, found within the relevant County Development Plan</li> <li>• Regionally Important assets recorded in the National Inventory of Architectural Heritage (NIAH and RPS)</li> </ul>
Low	Sites of minor importance or with little of the asset remaining to justify higher importance. Locally Important assets recorded in the National Inventory of Architectural Heritage (NIAH)
Negligible	Negligible or no heritage significance
Unknown	Further information is required to assess the significance of these assets.

## 4.8.2 Magnitude of Impact

Determining the magnitude of any likely impacts requires consideration of the nature of activities proposed during the period of continued operation of the wind farm.

The changes could include direct change (e.g., ground disturbance) and indirect change (e.g., visible change, noise, vibration, traffic movements affecting the setting of the asset). Impacts may be beneficial or adverse and may be short term, long term or permanent. The magnitude of impact has been assessed with reference to the criteria set out in Table 4-9. The magnitude of both beneficial and adverse impact is assessed according to the scale of impact, from high to neutral/none.

**Table 4-9**  
**Magnitudes of Impacts upon Designated Heritage Assets**

Magnitude of Impact	Explanatory criteria
High Beneficial	The proposed development would considerably enhance the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Medium Beneficial	The proposed development would enhance to a clearly discernible extent the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Low Beneficial	The proposed development would enhance to a minor extent the heritage significance of the affected asset, or the ability understand, appreciate and experience it.
Very Low Beneficial	The proposed development would enhance to a very minor extent the heritage significance of the affected asset, or the ability understand, appreciate and experience it.
Neutral/None	The proposed development would not affect or would have harmful and enhancing effects of equal magnitude on the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Very Low Adverse	The proposed development would erode to a very minor extent the heritage significance of the affected asset, or the ability understand, appreciate and experience it.
Low Adverse	The proposed development would erode to a minor extent the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Medium Adverse	The proposed development would erode to a clearly discernible extent the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
High Adverse	The proposed development would considerably erode the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.

### Significance of Impact

The significance matrix for assessing the level of impact is presented in Table 4-10. Table 4-11 provides a matrix that relates the heritage significance of the asset to the magnitude of impact on its significance (incorporating contribution from setting where relevant), to establish the likely overall significance of effect. This assessment is

undertaken separately for direct effects and indirect effects, the latter being principally concerned with effects through development within the setting of heritage assets. Those assets which the matrix scores as Profound would be considered as receiving a significant effect.

**Table 4-10**  
**Significance of Effects**

Significance	Description
Profound	The development would destroy all characteristics which are intrinsic to the asset.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Significant	The development would create an effect on a designated asset which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Moderate	An effect which alters the character of the environment in a manner that is consistent with existing or emerging trends
Slight	The development would not have an effect that causes noticeable changes in the character of the environment but without affecting its sensitivities
Not Significant/ Imperceptible	The development would have no effect which causes noticeable changes in the character of the environment but without significant consequences

**Table 4-11**  
**Matrix of Heritage Significance**

Magnitude of Impact	Heritage Significance (excluding negligible and unknown)			
	Highest	High	Medium	Low
High beneficial	Profound	Profound	Very Significant	Significant
Medium beneficial	Profound	Very Significant	Significant	Moderate
Low beneficial	Very Significant	Significant	Moderate	Moderate
Very low beneficial	Significant	Moderate	Slight	Slight
Neutral/None	Not Significant/ Imperceptible	Not Significant/ Imperceptible	Not Significant/ Imperceptible	Not Significant/ Imperceptible
Very low adverse	Significant	Moderate	Slight	Slight
Low adverse	Very Significant	Significant	Moderate	Moderate

Magnitude of Impact	Heritage Significance (excluding negligible and unknown)			
	Highest	High	Medium	Low
Medium adverse	Profound	Very Significant	Significant	Moderate
High adverse	Profound	Profound	Very Significant	Significant

### Zone of Theoretical Visibility (ZTV) Analysis

The assessment of visual impact will be assisted by a ZTV calculation, prepared principally for landscape and visual impact assessment but application to the consideration of visual changes in the setting of heritage assets. The ZTV maps will predict the degree of visibility of the proposed development from points within a study area around the site, as would be seen from an observer's eye. The ZTV model will be able to inform the likely effects on the setting of cultural heritage assets within the study area. The study area is defined as 5km from the proposed development site boundary. However, this would be applied with discretion in respect to particularly sensitive assets located beyond the study area, for example an asset whose significance includes an appreciation of designed views or landscape panoramas.

The ZTV is theoretical because it is based on landform only and does not take into account the screening or filtering effects of vegetation, buildings or other surface features and in that respect is likely to provide an overestimate of the actual visibility.

Assets that fall outside the ZTV will be excluded from further assessment, except where important views are present from third viewpoints which allow visibility of the proposals and the asset.

### Mitigation

The initial approach to mitigation is through embedded measures at the design stage: avoidance of direct impacts on heritage assets will be advised throughout the design process. Screening to avoid impacts on the setting of assets is rarely feasible for wind turbines but will be considered where other effects from other infrastructure may be mitigated in this way. The impacts presented would have been provided with regard to any embedded measures.

Mitigation measures to consider in respect to the identified impacts of development would be measures implemented as a condition to consent. Archaeological fieldwork would mitigate direct impacts to the archaeological resource incurred through ground disturbance.

### Residual Effects

Residual impacts are those that remain even after the implementation of suitable mitigation measures such as conditioned archaeological fieldwork. A statement of the residual effects will be provided, giving consideration to any further site-specific mitigation measures, where these may be identified.

### Cumulative Impacts

A cumulative effect is considered to occur when there is a combination of impacts upon an asset or group of assets due to changes resulting from the proposed development subject to the assessment and another development (consented or proposed) within the surrounding landscape. Consideration of other developments and the identification of common receptors will be limited to other wind farm planning applications either submitted with a decision pending or with permission granted and prior to construction.

### 4.8.3 Receiving Environment

The wider landscape in which the proposed windfarm is proposed has a moderate level of prehistoric and later potential. There are a series of unclassified ringforts located within and around 1km of the Site. There are also burial features, field systems and a potential crannog. However, much more focused activity is located 2.5km to the northeast and west and 1.3km to the east. These areas have larger and more dense clusters of occupational and burial archaeological features.

The landscape within the Site and within 1km has been modified due to intensive agricultural development including cultivation, land improvement, drainage and forestry plantations. The study area contains some structures of architectural heritage interest, namely the Rosmead House (**Register Number: 15400921**), which is considered regionally significant and several regionally significant including the entrance and wall of Ballinlough Castle (**Register Numbers: 15400902, 15400903**), Snipes Bridge (**Register Number: 15400917**) and untitled houses (**Register Numbers: 15406002, 15306003, 15400916**).

### 4.8.4 Potential Impacts

Assets where key consideration will be given to the potential impact through setting change on the significance of the monument are as follows:

- The associated features of Ballinlough Castle (Register Number: 15400906) which provide for and sit within the setting of the approach to Ballinlough Castle approximately 1.2km to the southeast of the Site. The assessment will determine whether the proposed windfarm would affect the castle and its associated features through setting change:
  - Gateway (Register Number: 15400903), Extant 1837, on a symmetrical plan comprising pair of vermiculated-banded drag edged dragged cut-limestone piers on chamfered plinths having "Cavetto" stringcourses below urn finial-topped capping supporting cast-iron double gates. Road fronted at entrance to grounds of Ballinlough Castle.
  - Estate wall (Register Number: 15400902), extant 1837. Road fronted at perimeter of grounds of Ballinlough Castle.
- A series of ringforts/raths as well as a crannog, that may relate to one another in a settlement pattern around the low-lying area of the valley:
  - WM00516- Crannog
  - WM00544- Ringfort - unclassified
  - WM00552- Ringfort - rath
  - WM00525- Ringfort - rath
  - WM00529- Ringfort - unclassified
  - WM00527- Ringfort - unclassified
  - WM00528- Ringfort - rath

### 4.8.5 Matters Scoped Out

On the basis of the work undertaken to date, the professional judgement of the SLR Consulting cultural heritage team, and experience from other similar projects, it is considered that indirect and cumulative impacts of the proposed development on Locally and Regionally important assets recorded beyond the site on the National Heritage Inventory for Architecture can be scoped out.

It is also requested that in respect to nationally significant assets that fall outside the ZTV and where the assets approach does not fall within the ZTV, are scoped out of further assessment.

#### 4.8.6 Questions for consultees:

- Do consultees agree with the methodology set out?
- Do consultees agree with assets listed under key considerations and assets scoped out?
- Are there any assets that key consideration should be given too?
- Do consultees have any specifications on visualisations and their locations?

## 4.9 Noise & Vibration

An assessment of the potential effects arising from operational and construction noise impacts of the Proposed Development will be included in the EIAR.

### 4.9.1 Baseline

The baseline noise environment will be measured at a number of locations around the Proposed Development to inform the assessment. In line with current best practise, noise data measured at one location may be used as a proxy to be representative of other assessment locations.

Noise will be logged every ten minutes and plotted against the corresponding wind speed measured on site during the simultaneous period. Wind speed data at the height of the hub of the proposed turbines will be standardised to a 10 m value using a reference ground roughness length of 0.05m, in accordance with current best practise.

Periods of rain and extraneous noise will be excluded and remaining data will be sorted into quiet daytime and night-time (23:00 to 07:00) periods. Quiet daytime periods are weekdays between 18:00 and 23:00, Saturdays between 13:00 and 23:00 and all day on Sundays (07:00 to 23:00), as defined in ETSU-R-97 "The Assessment and Rating of Noise from Wind Farms".

### 4.9.2 Scope of Assessment

The assessment will address the potential impacts on noise due to the construction and operational phases of the Proposed Development.

The noise assessment will include:

- An assessment of noise generated during onsite construction activity
- An assessment of changes in road traffic noise as a result of construction vehicles
- An assessment of the overall operational noise level from the Proposed Development

The following is proposed to be scoped out of the assessment:

- An assessment of cumulative noise impacts as no large-scale turbines have been identified within at least 10 km of the Proposed Development. At distances beyond this, there would be no likely significant effects.
- Low frequency and infrasound, as is current best practice, no evidence of health effects as a result of these from wind turbines.
- Amplitude modulation, including 'excess amplitude modulation' and 'other amplitude modulation', in line with the Institute of Acoustics Good Practice Guide, is not something that can be adequately assessed at the planning stage.

- Noise associated with traffic during the operation of the proposed development, as this is likely to be low and not significant in the context of the existing road network.
- Vibration effects as a result of construction and operational activities and associated traffic, as is recognised that it is likely to be imperceptible at the typical separation distances.

### 4.9.3 Assessment Methodology

The baseline environment will be assessed by measuring background noise levels as a function of site wind speed at the nearest neighbours, (or at a representative sample of the nearest neighbours).

The ETSU-R-97 recommendations provide a robust basis for assessing the noise implications of an operational windfarm and have become the accepted standard for such developments within the ROI. This methodology will therefore be adopted for the assessment of operational noise impact. In summary, the assessment shall:

- Determine the quiet daytime and night-time criterion curves from the measured background noise levels at the nearest neighbours.
- Specify the type and noise emission characteristics of the wind turbines proposed for the site.
- Calculate noise emission levels due to the operation of the wind turbines as a function of site wind speed at the nearest neighbours.
- Compare the calculated wind farm noise emission levels with the derived criterion curves and assess in the light of relevant planning requirements.

At present the current guidelines against which wind turbine noise should be assessed is the 2006 Wind Energy Development Guidelines. This will form the basis for the determination of appropriate noise limits. Further consideration will be given to the Draft Revised Wind Energy Development Guidelines, 2019.

In assessing the impact of construction noise and vibration, it is usual to accept that the associated works are of a temporary nature. The principal guidance on construction noise is contained in BS5288-1:2009+A1:2014 "Code of Practice for Noise and Vibration Control on Construction and Open Sites". Likely construction noise levels will be calculated in accordance with BS5228-1 and assessed against criteria developed from this standard.

### 4.9.4 Likely Significant Effects

During windfarm construction, noise can arise from both on-site activities such as the construction of access tracks, turbine foundations, substation buildings etc. and from the movement of construction related traffic both on-site and travelling on public roads to and from the site.

During their operation, windfarms have the potential to generate aerodynamic noise and mechanical noise. Aerodynamic noise is caused by the interaction of the turbine blades with the air. Mechanically generated noise is caused by the operation of internal components, such as the gearbox and generator, which are housed within the nacelle of the turbine. However, the level of mechanical noise radiated from current technology wind turbines is generally engineered to a low level.

## 4.10 Shadow Flicker

### 4.10.1 Introduction

Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate the shadow cast flicks on and off, with the resulting effect being known as 'shadow flicker'. In accordance with Irish Wind Energy Guidance, only properties at a distance of less than 10 rotor diameters from a turbine will be assessed for shadow flicker.

Where properties meet these criteria, and there is therefore a potential for a shadow flicker effect, the seasonal duration of the effect will be calculated from the geometry of the turbine, and the latitude of the site and this will be used to assess potential impacts on the amenity of local residents. The potential for shadow flicker effects to occur would be calculated using ReSoft WindFarm software. This software calculates times throughout a year when a turbine rotor viewed from the window of a house is in line with the sun and therefore the potential for shadow flicker exists, by modelling the location of the wind turbines and residential properties relative to the sun's position.

#### 4.10.2 Baseline

The proposed development is located in a semi-rural area and as such there are a number of properties within 10 rotor diameters of the proposed turbine locations. A full shadow flicker model and assessment will therefore be required.

#### 4.10.3 Scope of Assessment

The effect known as "shadow flicker" occurs where the rotating blades of a wind turbine cast a moving shadow which, if it passes over a window in a nearby house or other property, results in a rapid change or flicker in the incoming sunlight. This effect will occur only for a short period during a given day and only under specific concurrent circumstances, namely when:

- The sun is shining relative to the position and distance of the receptor to the turbine and the size of the rotor.
- There is sufficient direct sunlight to cause shadows (cloud, mist, fog or air pollution could limit solar energy levels).
- A turbine is directly between the sun and the affected property and within a distance that the shadow has not diminished below perceptible levels.
- There is enough wind energy to ensure that the turbine blades are moving.

Generally only properties within 130 degrees either side of north, relative to the turbines, can be affected at these latitudes in Ireland - turbines do not cast long shadows on their southern side.

#### 4.10.4 Assessment Methodology

A shadow flicker assessment will be carried out using ReSoft Windfarm software (version 5.0.1.2) to predict the time and duration of shadow flicker on windows of habitable or permitted houses within 10 rotor diameters from a proposed turbine, as informed by the house and planning surveys.

The methodology used for the shadow flicker assessment will be performed in consideration of the "Wind Energy Development Planning Guidelines" DoEHLG (2006)<sup>21</sup> and the Irish Wind Energy Association (2012) "Best Practice Guidelines for the Irish Wind Energy Industry".

This methodology includes:

- Calculation of sunshine factor based on the historical measurements from the closest Met Éireann meteorology station.
- Calculation of shadow flicker levels for the final turbine layout.

---

<sup>21</sup> It is acknowledged that the 2006 Wind Energy Development Guidelines are currently being revised. A draft version of the replacement Wind Energy Development Guidelines (WEDGs) was published in December 2019. The consultation period has now closed, and the final version is awaiting publication.

- Where exceedances are predicted, detailed mitigation measures, including an outline potential turbine shutdown will be proposed.

Cumulative impacts of the proposed development and other schemes will be assessed. IWEA Best Practice Guidelines (2012, Section 6.3.4) states that “any such wind farm developments within 2 km of the proposed development should be considered in a separate cumulative shadow flicker assessment”. There are no other known proposed, consented or existing wind farms within this distance of the proposed development and so it is proposed that cumulative shadow flicker be scoped out at this stage.

Based on latest draft guidelines, a demonstration of the potential for the development to comply with zero shadow flicker and a curtailment analysis to demonstrate potential downtime will also be provided.

#### 4.10.5 Likely Significant Effects

For shadow flicker to occur, a number of conditions must be reached:

- That there is a sufficient level of sunlight relative to the position and distance of the receptor to the turbine and the size of the rotor.
- That the turbine is directly between the sun and the dwelling.
- That the blades are turning.

This assessment follows the Wind Energy Development Guidelines (2006). The guidelines state that:

‘It is recommended that shadow flicker at neighbouring offices and dwellings within 500 m should not exceed 30 hours per year or 30 minutes per day.’ Knockanarragh Wind Farm Limited will abide by this requirement.

### 4.11 Material Assets

#### 4.11.1 Introduction

Material Assets are defined in the ‘Guidelines on the Information to be contained in Environmental Impact Assessment Reports’ (EPA, 2022) as “*Material assets can now be taken to mean built services and infrastructure.*”

Traffic is generally included in the material assets chapter, however for the purposes of this assessment and given that the Turbine Delivery Route is an intrinsic part of the construction of the proposed development, traffic and transportation will be included in its own standalone chapter. For more information on the impact upon transportation and roads, please see section 4.12 of this scoping report.

For mining and quarrying assets, please see section 4.4.

Telecommunications will be covered in a separate EIA chapter, but for the purposes of this scoping report, the known existing infrastructure is shown in Table 10.

Material Assets will consider the impact of the proposed development on physical infrastructure including renewable and non-renewable resources as well as utility infrastructure.

Table 3.1 in the ‘Guidelines on the Information to be contained in Environmental Impact Assessment Reports’ (EPA, 2022) notes the following headings to be covered in a material assets chapter:

- **Roads and Traffic** – this will be a standalone chapter
- **Built Services** such as electricity, telecommunications, gas, water supply infrastructure and sewerage
- **Waste management**, including Construction and Operational waste.

#### 4.11.2 Baseline

In terms of existing built services and waste management in proximity to the site, a list of material assets is found in Table 4-12:

**Table 4-12**  
**Existing Material Assets**

Heading	Topic	Existing Infrastructure
<b>Traffic and Transport</b>	Construction phase, Operational phase and unplanned events	See section 4.12. To be addressed in Traffic and Transportation chapter
<b>Built Services</b>	<b>Electricity</b> <sup>22 23</sup>	<ul style="list-style-type: none"> <li>• 38kV overhead line which crosses the site, adjacent to the N52 (connecting Delvin to Clonmellon)</li> <li>• Delvin 38KV Substation</li> <li>• Overhead 110kV line at Clonmellon (connecting Navan and Arva)</li> <li>• MV/LV substation 052027Y</li> <li>• MV/LV Substation 052734Z</li> <li>• MV/LV Substation 0524125</li> </ul>
	<b>Telecommunications</b> <sup>24</sup>	Telecommunications masts at <ul style="list-style-type: none"> <li>• Clonmellon (Site IDs WHO18, 4762, Three MT 0194,</li> <li>• Crownstown Little (Site IDs MH013, 2103)</li> <li>• Moyleroe (Site ID 3 WM0117)</li> <li>• Delvin (Site IDs WH011, Three WM0095, 4761)</li> </ul>
	<b>Gas</b> <sup>25</sup>	No infrastructure identified
	<b>Water Supply Infrastructure</b> <sup>26 27</sup>	Ballany Public Drinking Water Supply
	<b>Sewerage</b> <sup>28 29</sup>	No Infrastructure present.
<b>Waste Management</b>	<b>Construction Waste</b>	Allied Recycling, Clonmellon, Co Westmeath Turmec Teoranta, Athboy, Co. Meath
	<b>Operational Waste</b>	Turmec Teoranta, Athboy, Co. Meath Wallace Waste, Mullingar, Co. Westmeath

<sup>22</sup> ESNB Network Capacity Map available at <https://www.esbnetworks.ie/network-capacity-map>

<sup>23</sup> Transmission System Map, Eirgrid available at <https://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Group-Transmission-Map-January-2020.pdf>

<sup>24</sup> ComReg site viewer available at: <https://siteviewer.comreg.ie/#explore>

<sup>25</sup> Gas Networks Ireland Pipeline Map available at: <https://www.gasnetworks.ie/corporate/company/our-network/pipeline-map/>

<sup>26</sup> Irish Water Supply Capacity Registers available at: <https://www.water.ie/connections/developer-services/capacity-registers/water-supply-capacity-register/westmeath/>

<sup>27</sup> Ballaney Public Drinking Water Supply, EPA, available at <https://www.epa.ie/publications/compliance--enforcement/drinking-water/audit-reports/westmeath/ballany-public-drinking-water-supply.php>

<sup>28</sup> Irish Water National Projects available at <https://www.water.ie/projects/national-projects/>

<sup>29</sup> Westmeath County Development Plan 2021-2027 available at <https://www.westmeathcoco.ie/en/media/Volume1WrittenStatement.pdf>

### 4.11.3 Scope of the Assessment

The potential impact of the proposed development on physical infrastructure including renewable and non-renewable resources as well as utility infrastructure will be assessed.

### 4.11.4 Assessment Methodology

Information on the existing material assets within the receiving environment will be obtained and assessed in the context of the proposed development. The Proposed Development will also be considered under the material assets section in its own right as it will be classed as a renewable resource.

### 4.11.5 Likely Significant Effects

Utilities such as overhead power lines or telephone lines or underground services may require diversion or be temporarily disrupted during the construction of the wind farm or cable trench. This has the potential to impact on nearby dwellings and commercial / industrial activities. All potential impacts will be considered in full in this chapter.

## 4.12 Transport & Access

This Section considers the scope of work required to assess the potential significant effects associated with access, traffic and transport during the construction and operational phases of the proposed development.

### 4.12.1 Baseline

The study area for assessment will be the N52 in the vicinity of the Site access location (AP2) and the minor road which extends northwest from the N52 to the Site access locations (AP9). Traffic data will be obtained so that existing traffic flows and vehicle classification for the key roads is identified, informing the baseline situation. Injury accident data for the roads within the study area will be obtained to ensure that road safety issues are identified. Automatic traffic counts (ATCs) will be placed on the N52 between AP2 and the minor road leading to AP9. It is assumed that construction traffic would travel to the site from both directions along the N52.

All abnormal indivisible loads (AILs) would travel along the M4 to the N4 and on to the N52. The proposed route would not be assessed within this section of the EIA Report for AILs as a separate Turbine Delivery Route (TDR) Assessment will be submitted; the findings from the TDR Assessment will be considered within this section of the EIA Report.

### 4.12.2 Scope of Assessment

The port of entry for AILs has been identified as Dublin Port, with a route via the M4 and N4. AILs would exit the N4 Junction 16, to head northeast along the N52 for approximately 22km to the first access point (AP2); access point AP4 is located 1.86km further northeast along the N52, and approximately 64m northwest along the minor road. It is anticipated that this route would also be used for the majority of construction traffic however the N52 northeast of the Site will be included within the assessment for completeness. The study area will be confirmed within the EIA Traffic and Transport Chapter.

The assessment is required to evaluate the effects of the proposed development and to determine the scale of the impacts on the identified sensitive receptors. From a desktop study of the site access and the proposed delivery route, the main receptors, sensitive to increased traffic levels, are anticipated to be located along the N52 where there are a number of small communities which include Delvin to the southwest and Clonmellon to the northeast. These communities include residential properties and non-residential properties such as public houses, businesses (café, shops) and churches. There are also several individually placed dwellings, away from the villages, as well as farms along the delivery route.

The assessment will focus on the delivery of construction materials with a TDR included as a Technical Appendix to the EIA Report.

## Consultation

Consultation will be undertaken with the local community with respect of traffic management proposals. The scope of the study and assessment for the proposed development in relation to access, traffic and transport will seek to identify potential issues which may result from the construction of the development.

The proposed development will continue to be discussed with the following prescribed bodies and key stakeholders/ organisations:

- Westmeath County Council - Consultation to discuss the potential impacts of the proposed development on the local road network and cumulative traffic effects
- Meath County Council - Consultation to discuss the potential impacts of the proposed development on the local road network and cumulative traffic effects
- Transport Infrastructure Ireland (TII)
- Dublin Port.

### 4.12.3 Assessment Methodology

#### Method of Assessment and Reporting

The Access, Traffic and Transport Section of the Environmental Impact Assessment Report (EIA Report) will include a detailed evaluation of the baseline conditions and will focus on assessing the potential impacts to arise during the construction phase. This will include an abridged construction works programme, details of vehicle types and sizes to be used during the construction phase and an estimate of the number of trips anticipated to be generated by HGVs, LGVs and light vehicles. Mitigation measures to alleviate the known local traffic issues arising from the wind farm construction traffic will be identified, with the aim of reducing the effect of the vehicle movements identified.

#### *Desk Study*

The following data collection and analysis will be undertaken:

- A review of available nearby wind farm development application documents
- A review of the TDR
- Analysis of traffic count data and accident data
- Assessment of traffic impacts of previous and committed local wind farm developments to understand identified effects
- Compilation of data on the number of construction vehicles and staff numbers likely to be present on the local road network during the construction phase
- Review anticipated construction programme (once available)
- A comparison between likely traffic flows on potentially affected roads against the baseline situation for a future year scenario with and without the development of Knockanarragh Wind Farm, reported as percentage increases
- A review of height and weight restrictions along the proposed construction transport routes
- Identification of the impacts

### *Field Surveys*

An inspection of the key TDR has been completed from Dublin Port to the site access locations and involved a visual inspection of the route to identify any likely constraints or issues. In addition, each site access location has been considered as part of the site visit.

It would be common practice for traffic surveys to be commissioned in order to provide a baseline situation for traffic flows, movements and speeds. An Automatic Traffic Counter (ATC) on the N52 between the two access locations would be commissioned to collect data for 24 hours a day across a seven-day continuous period. The traffic data collected will provide classified and directional traffic flow data. Speeds would also be recorded in order to determine the 85th percentile speeds and would be used to determine whether the access junction has sufficient visibility splays. Should a traffic count be unable/unacceptable for commissioning, Westmeath County Council and Transport Infrastructure Ireland would be further consulted for existing traffic data along the delivery route. A quick search on the TII Website has confirmed that there is a counter located on the N52 south of Delvin; as the counter is not located close to the site it should only be used to verify the ATC data.

### *Mitigation Measures*

Mitigation measures will be proposed following the completion of the impact assessments, as informed by the baseline. The purpose of these measures is to aim to remove, minimise or compensate any significant effects. These mitigation measures will be agreed with WCC and TII.

### **Assessment**

The Institute of Environmental Management and Assessment (IEMA) guidance (1993) would form the basis for which the effects of traffic during the construction phase would be assessed. Based on the IEMA guidance, the factors identified as being the most discernible potential environmental effects likely to arise from changes in traffic movements have been set out below and would be considered in the assessment as potential effects which may arise from changes in traffic flows from the proposed development.

- Noise and vibration – the potential effect caused by additional traffic on sensitive receptors.
- Driver severance and delay – the potential delays to existing drivers and their potential severance from other areas.
- Community severance and delay – the potential severance to communities and the delays to movements between communities.
- Vulnerable road users and road safety – the potential effect on vulnerable users of the road (i.e. pedestrians and cyclists).
- Hazardous and dangerous loads – the potential effect on road users and local residents caused by the movement of abnormal loads.
- Dust and dirt – the potential effect on dust, dirt and other detritus being brought onto the road and impact on road conditions.

The IEMA guidelines provide two thresholds when considering predicted increase in traffic, whereby a full assessment is required:

- Where the total traffic would increase by 30% or more (10% in sensitive areas).
- Where the HGV traffic would increase by 30% or more (10% in sensitive areas).

The potential sensitivity of the receptors to changes in traffic levels would be determined by considering the study area and presence of receptors in relation to each potential impact. The receptors would be assessed individually to determine its sensitivity and the assessment criteria is set out in Table 13. Magnitude criteria is set out in Table 4-13.

**Table 4-13**  
**Traffic and Transportation Receptor Sensitivity**

Impact	Low Sensitivity	Medium Sensitivity	High Sensitivity
<b>Noise and Vibration</b>	No sensitive receptors	Presence of sensitive receptors near to the road	Presence of sensitive receptors adjacent to the road
<b>Driver Severance and Delay</b>	Road network not affected	Road network not experiencing congestion at peak times	Road network experiencing congestion at peak times
<b>Community Severance and Delay</b>	No presence of existing communities severed by road	Presence of existing communities with a moderate level of existing severance (subjective assessment)	Presence of existing communities with low existing severance (subjective assessment)
<b>Vulnerable Road Users and Road Safety</b>	High sensitive receptor		
<b>Hazardous and Dangerous Loads</b>	No hazardous or dangerous loads on the road network	Some hazardous or dangerous loads on the road network	Abnormal and oversized loads to use road network
<b>Dust and Dirt</b>	Limited presence of sensitive receptors (subjective assessment)	Low to medium presence of sensitive receptors (subjective assessment)	High presence of sensitive receptors (subjective assessment)

**Table 4-14**  
**Traffic and Transportation Magnitude Criteria**

Impact	Negligible	Minor	Moderate	Major
<b>Noise and Vibration</b>	<25% increase in traffic	>25% increase in traffic Quantitative assessment based on predicted increase in traffic against measured baseline		
<b>Driver Severance and Delay</b>	<10% increase in traffic	>10% increase in traffic Quantitative assessment of road capacity based on existing traffic flows and predicted future traffic levels		
<b>Community Severance and Delay</b>	<10% increase in traffic	<30% increase in traffic	<60% increase in traffic	>60% increase in traffic
<b>Vulnerable Road Users</b>	<10% increase in traffic	>10% increase in traffic Quantitative assessment of existing provision and future traffic levels		
<b>Road Safety</b>	<10% increase in traffic	>10% increase in traffic Quantitative assessment of existing accident records and predicted increases in traffic		
<b>Hazardous and Dangerous Loads</b>	0% increase in traffic	<30% increase in traffic	<60% increase in traffic	>60% increase in traffic
<b>Dust and Dirt</b>	<10% increase in traffic	<30% increase in traffic	<60% increase in traffic	>60% increase in traffic

### References and Standard Guidance

The access, traffic and transport assessment will be carried out in accordance with the following policy and guidance documents:

- EU Directive 2014/52/EU.
- Institute of Highways and Transportation (IHT) publication 'Guidelines for Traffic Impact Assessment'.
- 'Guidelines for the Environmental Assessment of Road Traffic' (1993) for the IEMA.
- Transport Infrastructure Ireland and Westmeath County Council Design Standards (as required).
- DfT 'Design Manual for Roads and Bridges' (DMRB).

### 4.12.4 Likely Significant Effects

#### Potential Sources of Impact

The potential sources of impact have been divided into three development phases: construction, operation and decommissioning. In summary, the main potential sources of impact are likely to relate to the impact of construction and decommissioning traffic on the residential areas along the network route.

### *Construction Phase*

The construction phase of Knockanarragh Wind Farm is likely to create the greatest environmental impacts. This is due to the number of Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs) required to transport the materials onsite; as such there would be traffic impacts associated with the communities and roads along the delivery routes.

### *Operational Phase*

Once the Wind Farm is operational, the development would have negligible traffic/transport related impacts caused by intermittent maintenance vehicles travelling to the site.

### *Decommissioning Phase*

Once the proposed development is decommissioned, the development would have similar impacts as those during construction phase.

## **Cumulative Assessment**

The cumulative impacts from the other local permitted wind farm developments will be a key consideration for the assessment, particularly in relation to the control of construction traffic in the local area. The cumulative assessment would focus on the construction phase as this would be the most likely period to create significant effects should construction phases overlap or occur sequentially amongst permitted developments.

The traffic assessment and draft traffic management plans would be reviewed for the other developments identified to be of direct relevance and on a similar construction and decommissioning timeline to Knockanarragh Wind Farm. The proposed construction timescales for these developments would be carefully considered. Operational sites are unlikely to create significant traffic effects and will therefore, not be considered within the cumulative assessment. The assessment would focus on consented developments at application stage within close proximity to the site. Such sites will be identified and discussed with Westmeath County Council (LCC).

## **4.13 Telecommunications and Aviation**

### **4.13.1 Introduction**

The rotating blades of a wind turbine can occasionally cause interference to electro-magnetically propagated signals. Such interference could, in theory, affect all forms of electromagnetic communications including:

- Satellite communications.
- RADAR.
- Cellular radio communications.
- Aircraft instrument landing systems.
- Air traffic control.
- Terrestrial microwave links.
- Television broadcasts.

In addition, it is possible that houses in the immediate vicinity of the turbines could require some remedial measures in relation to television reception. The EIAR will include an assessment of any such potential impacts.

### **4.13.2 Baseline**

In terms of the receiving environment, links will be identified within a suitable buffer distance of the turbines, following consultation with network providers.

### 4.13.3 Assessment Methodology

An evaluation of the possible effects that the proposed development could have on aviation and existing telecommunications networks will be conducted. A study will be undertaken to analyse the impact of the turbines on telecommunications operator's point-to-point microwave radio links.

This evaluation will include the generation of GIS based telecommunications constraints mapping for the areas affected. The purpose of this mapping is to identify potential negative impacts on the telecommunications network and facilitate the selection of optimum sites and turbine locations by avoiding telecommunication links where possible and thereby limiting any potential negative impacts on service providers in the area.

The proposed assessment methodology will include:

- Consultation with Irish Aviation Authority, Commission for the Regulation of Utilities, emergency services.
- Consultation with telecommunications operators to gather the necessary data.
- Preparation of constraint mapping.
- Analyses of the impact of the turbines on telecommunications operators' point-to-point microwave radio links and apply appropriate buffer distances around links and masts where required.
- Discussions with telecommunications operators identifying potential clashes. Operators to provide feedback on initial assessment and to provide information on the importance of the links identified.
- Further specialist investigations will be carried out if the telecommunications operators identify potential impacts.
- 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.
  - Agree any layout alterations following final detailed assessment by telecoms operators or agree suitable mitigation measures if necessary.

Impacts on aviation will be addressed following detailed discussions with the Irish Aviation Authority.

In relation to the grid connection, mapping of telecommunications cables, which could potentially be affected by the installation of the proposed grid connection, will be obtained and potential impacts assessed.

### 4.13.4 Likely Significant Effects

An evaluation of the possible effects that the proposed development could have on aviation and existing telecommunications networks will be conducted. A study will be undertaken to analyse the impact of the turbines on telecommunications operator's point-to-point microwave radio links.

This evaluation will include the generation of GIS based telecommunications constraints mapping for the areas affected. The purpose of this mapping is to identify potential negative impacts on the telecommunications network and facilitate the selection of optimum sites and turbine locations by avoiding telecommunication links where possible and thereby limiting any potential negative impacts on service providers in the area.

The Irish Wind Energy Association 2012 guidelines, "Best Practice Guidelines for the Irish Wind Energy Industry", indicate that wind turbines within "20 km of a radio navigation aid" have the potential to cause electro-magnetic

interference with these signals. It is possible that houses in the immediate vicinity of the turbines could require some remedial measures in relation to television reception. In practice, such measures are not difficult to implement, are relatively inexpensive and if necessary, will be undertaken by the developer in conjunction with RTÉ.

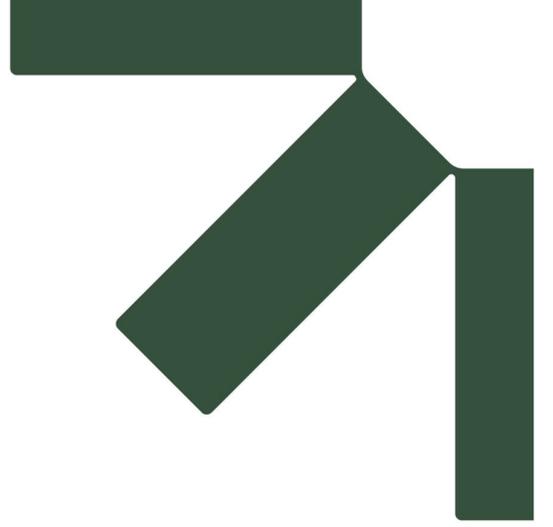
## 5.0 Consultation

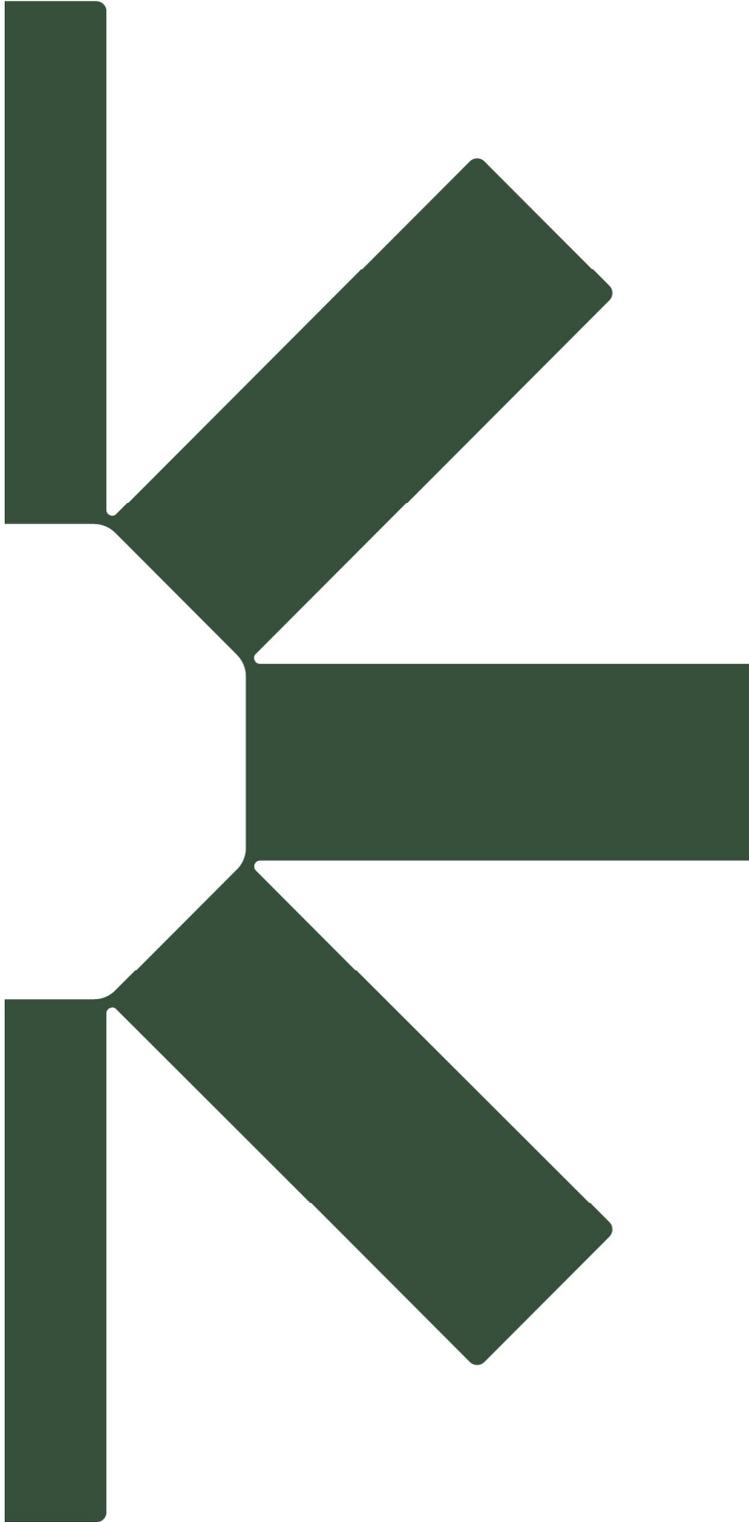
### 5.1 Scoping Consultation

A variety of statutory and non-statutory organisations are being consulted with during the EIA scoping process to gather their views on the likelihood of significant environmental effects arising from the proposed development.

### 5.2 Public Consultation

Public consultation with residents, community groups and other interested stakeholders will be commenced shortly. Public consultation will be continued throughout the preparation of the EIAR as a means of providing information on the proposed development and inviting submissions from the local community and other interested parties.





Making Sustainability Happen