

3. SITE SELECTION AND REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU¹ of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU² (the EIA Directive) requires that the Environmental Impact Assessment Report (EIAR) prepared by the developer contains “a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.”

Article 5(1)(f) of the EIA Directive requires that the EIAR contains “any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.”

Annex IV of the EIA Directive states that the information provided in an EIAR should include a “description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) 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.”

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the following references are used: the ‘Proposed Project’, the ‘Proposed Wind Farm’, the ‘Proposed Wind Farm site’, ‘proposed turbines’, the ‘Proposed Grid Connection’, and the ‘Site’. A detailed description of the Proposed Project is provided in Chapter 4: Description of the Proposed Project of this EIAR.

This section of the EIAR contains a description of the reasonable alternatives that were studied by the developer, which are relevant to the Proposed Project and its specific characteristics, in terms of site location and other renewable energy technologies as well as site layout incorporating size and scale of the Proposed Project, connection to the national grid and transport route options to the Proposed Wind Farm site. This section also outlines the design considerations in relation to the Proposed Wind Farm and Proposed Grid Connection. It provides an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. The consideration of alternatives is an effective means of avoiding environmental impacts. As set out in the Environmental Protection Agency (EPA) ‘Guidelines on The Information to be Contained in Environmental Impact Assessment Reports, 2022’ (EPA, 2022), the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

Hierarchy

EIA is concerned with projects. EPA, 2022 states that in some instances neither the Applicant nor the competent authority can be realistically expected to examine options that have already been previously determined by a higher authority, such as a national plan or regional programme for infrastructure.

¹ European Union (2011). Directive 2011/92/EU. European Parliament and European Council.

² European Union (2014). Directive 2014/52/EU. European Parliament and European Council.

Non-environmental Factors

EIA is confined to the environmental effects that influence consideration of alternatives. However, other non-environmental factors may have equal or overriding importance to the developer of a project, for example project economics, land availability, engineering feasibility or planning policy.

Site-specific Issues

EPA, 2022 states that the consideration of alternatives also needs to be set within the parameters of the availability of the land, i.e., the site may be the only suitable land available to the developer, or the need for the project to accommodate demands or opportunities that are site-specific. Such considerations should be on the basis of alternatives within a site, for example design and layout.

3.2 Consideration of Reasonable Alternatives

3.2.1 Methodology

The EU Guidance Document on the preparation of EIAR (EU, 2017) outlines the requirements of the EIA Directive and states that, in order to address the assessment of reasonable alternatives, the Developer needs to provide the following:

- A description of the reasonable alternatives studied; and
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

There is limited European and National guidance on what constitutes a ‘reasonable alternative’ however EU, 2017 states that reasonable alternatives “*must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives*”.

The guidance also acknowledges that “*the selection of alternatives is limited in terms of feasibility. On the one hand, an alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible alternative*”.

EPA, 2022 states that “*It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or ‘mini-EIA’) of each alternative is not required.*”

Consequently, taking consideration of the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- ‘Do Nothing’ Alternative
- Alternative Site Locations
- Alternative Renewable Energy Technologies
- Alternative Project Design Options:
 - Alternative Turbine Numbers and Model
 - Alternative Turbine Layout and Development Design
 - Alternative Roads Layout
 - Alternative Borrow Pit Options
 - Alternative Enhancement Area Proposals
 - Alternative Design of Ancillary Structures
 - Alternative Internal Site Cabling Route
 - Alternative Meteorological Mast Location

- Alternative Temporary Construction Compound Locations
 - Alternative 110kV Substation Location
- Alternative Proposed Grid Connection Design Options
 - Alternative Grid Connection Cabling Route Options
- Alternative Turbine Component Delivery Option and Site Access
 - Alternative Ports of Entry
 - Alternative Component Delivery Route
 - Alternative Site Access Points
- Alternative Mitigation Measures

Each of these headings and how they relate to the Proposed Project, are addressed in the following sections. When considering the Proposed Project, given the intrinsic link between layout and design, these two elements will be considered together in this chapter.

3.2.2 ‘Do Nothing’ Alternative

Annex IV, Part 3 of the EIA Directive states that the description of reasonable alternatives studied by the developer should include “an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.” This is referred to as the “do nothing” alternative. EU, 2017 states that this should involve the assessment of “an outline of what is likely to happen to the environment should the project not be implemented – the so-called ‘do-nothing’ scenario.”

An alternative land use option to developing a renewable energy project at the Site would be to leave the Site as it is, with no changes made to the current land use practices of commercial forestry, small-scale private forestry and low intensity agriculture within the Proposed Wind Farm; and public road corridor, and discontinuous urban fabric along the Proposed Grid Connection underground cable route (approximately 20.5 km). In doing so, the environmental effects in terms of emissions are likely to be neutral.

However, by implementing this ‘Do-Nothing’ alternative, the opportunity to capture the available renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment, local authority development contributions, rates and investment in the local area would be lost. Furthermore, the opportunity to implement the measures outlined in the Biodiversity Management and Enhancement Plan (BMEP) as outlined in Appendix 6-4 would also be lost.

As such, on the basis of the positive environmental effects arising from the project when compared to the ‘Do-Nothing’ scenario, the Do-Nothing’ scenario was not the chosen option. The existing land uses can and will continue in conjunction with the Proposed Project. A comparison of the potential environmental effects of the ‘Do-Nothing’ Alternative when compared against the chosen option of developing a renewable energy project at this site are presented in Table 3-1 below.

Table 3-1 Comparison of environmental effects when compared against the chosen option of developing a renewable energy project.

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
Population & Human Health	No increase in local employment and no long-term financial contributions towards the local community.	Approximately 100 jobs could be created during the construction, operation, and maintenance phases of the Proposed Project.

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
	<p>No potential for shadow flicker and noise to affect sensitive receptors.</p> <p>No potential for effects on visual amenity due to the construction and operation of turbines.</p> <p>No potential for positive effects on air quality and climate change targets.</p> <p>No potential to supply an estimated 49,056 homes with clean renewable electricity</p>	<p>Based on the assessment detailed in Chapter 5: Population & Human Health and the mitigation measures proposed, there will be no significant effects related to shadow flicker during the operational phase of the Proposed Project.</p> <p>As detailed in Chapter 12, residual effects from Noise and Vibration are not significant for the short-term construction and decommissioning phases of the Proposed Project. For the operational phase, the residual effects are also not significant.</p> <p>As detailed in Chapter 13: Landscape and Visual Impact Assessment (LVIA), the proposed turbine locations adhere to the recommended 500m set back distance in the ‘Wind Energy Development Guidelines for Planning Authorities’ (DoEHLG, 2006) (hereafter referred to as the ‘Guidelines (DoEHLG, 2006) and also the 4 times tip height set-back distance set out in the ‘Draft Wind Energy Development Guidelines’ (December 2019) (hereafter referred to as the ‘Draft Guidelines (DoHPLG, 2019)) for the purpose of protecting residential amenity. Within the LVIA Study Area, the visual impact on residential receptors ranges from ‘Imperceptible’ to ‘Significant’ (for a small number of residences in very close proximity). Given the adherence to the 4x tip height set -back distance to protect visual amenity, on balance, effects on residential receptors are mitigated and are therefore not significant.</p> <p>As detailed in the assessment in Chapter 10, the Proposed Project will have a Long-term Moderate Positive Impact on air quality.</p>
<p>Biodiversity (including Birds)</p>	<p>No habitat loss.</p> <p>No potential for collision risk for birds and bats</p> <p>No potential biodiversity enhancement measures would be put in place.</p>	<p>As detailed in Chapter 6: Biodiversity, the Proposed Project has been designed to avoid or mitigate impacts on biodiversity, including bats and downstream aquatic receptors.</p> <p>The Proposed Project includes for a BMEP, providing a boost to local biodiversity. Please see Appendix 6-4 for details.</p>

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
		<p>As detailed in the Bat Report in Appendix 6-2 of this EIAR, the Proposed Project is not expected to result in significant effects on bats at any geographic scale.</p> <p>As detailed in Chapter 7 Ornithology, the Collision Risk Assessment (CRA) indicates that the impact of the Proposed Project on birds corresponds to a Low – Very Low effect significance.</p>
Land, Soils & Geology	Neutral. No excavation of large volumes of peat and spoil.	<p>As detailed in the assessment in Chapter 8: Land, Soils & Geology, no significant effects on land, land use, peat, soil and bedrock will occur. Peat, topsoil and subsoil excavation volumes will be managed within the Proposed Wind Farm. Geotechnical investigations followed by careful design will lead to no significant environmental impacts.</p> <p>The peat and spoil management areas outlined in Chapter 4: Description of the Proposed Project set out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.</p>
Hydrology and Hydrogeology	Neutral	As detailed in the assessment in Chapter 9: Hydrology and Hydrogeology, no significant effects on surface water or groundwater quality will occur.
Air Quality	Neutral. Will not provide the opportunity for an overall increase in air quality or reduction of greenhouse gasses.	As detailed in the assessment in Chapter 10: Air & Climate, there will be no significant effects on air quality during the construction, and decommissioning phases. There will be a Long-term Moderate Positive Impact on air quality during the operational phase.
Climate	Neutral. Will not provide the opportunity for a contribution to the reduction of greenhouse gasses. Will not assist in achieving the renewable energy targets set out in the Climate Action Plan 2025.	As detailed in the assessment in Chapter 11: Climate, over the proposed 35-year lifetime of the Proposed Wind Farm site, 44,498 tonnes of carbon dioxide per annum will be displaced from traditional carbon-based electricity generation. Over the proposed 35-year lifetime of the Proposed Wind Farm site therefore, 1,557,430 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
		addition of an estimated 67.2MW clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in the Climate Action Plan 2025 (CAP25).
Noise & Vibration	Neutral. No potential for noise impacts on nearby sensitive receptors.	Based on the assessment detailed in Chapter 12: Noise & Vibration, and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels resulting from the Proposed Project.
Landscape & Visual	Neutral. No potential for landscape and visual impacts on nearby sensitive receptors.	As detailed in the assessment in Chapter 13: LVIA, the Proposed Wind Farm is located within a landscape that can effectively accommodate a wind energy development of this scale, given the large scale and expansive nature of the receiving environment and the mitigation measures in place to ensure no significant impact on key landscape and scenic sensitivities.
Cultural Heritage	Neutral. No potential for impacts on unrecorded, subsurface archaeology.	As detailed in the assessment in Chapter 14: Cultural Heritage, there will be no significant residual effects on the previously unrecorded archaeological, architectural or cultural heritage resource as a result of the Proposed Project.
Material Assets	Neutral	As detailed in Chapter 15, there will be slight to moderate, short-term negative effect on existing road users during the construction phase of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on Site.
Vulnerability of the Project to Major Accidents and Natural Disaster	No potential to be affected by or to cause major accidents or natural disasters	As demonstrated in Chapter 16, the risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low' in accordance with ' <i>A Framework for Major Emergency Management – A Guide to Regional Risk Assessment</i> ' (DoEHLG, 2024) ³ . The Proposed Project will be designed and built in accordance with current best

³ DoHLGH (2024) *A Framework for Major Emergency Management – A Guide to Regional Risk Assessment*. Available at: https://assets.gov.ie/static/documents/Guide_to_Regional_Risk_Assessment_September_2024.pdf

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
		<p>practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. With the implementation of all mitigation and monitoring measures detailed in the EIAR, there will not be significant residual effects associated with the construction, operation and decommissioning of the Proposed Project.</p>

For the reasons set out above, the proposal for a wind energy development at the Site was progressed over a Do-Nothing Scenario despite the potential environmental effects, as it was determined through the iterative design process and site visits carried out by the EIAR team that any potential environmental effects could be eliminated or appropriately mitigated as set out in detail in Chapters 5-16 of this EIAR. By progressing the Proposed Project, there is an opportunity to enhance the employment and investment in the local area and to capture the available renewable energy resource within County Cork, thus contributing to meeting national and international climate targets. Please refer to Chapter 5 through to Chapter 16 of this EIAR for further details on the likely significant effects associated with the progression of the Proposed Project.

3.2.3 Alternative Site Locations

To ensure that the levelised costs of building each megawatt of electricity-generating capacity on a wind farm is controlled efficiently, it is incumbent on the design team to ensure that the most suitable site for development of a wind farm development is chosen. The process of identifying a suitable location for a development such as the Proposed Project is influenced by a number of factors. While wind speeds, the extent of suitable or available land, proximity to the grid connection point, and planning policy are all very important, a wind farm project must be commercially viable/competitive, as otherwise it will not attract the necessary project finance required to see it built.

The Site has been identified as having potential for a wind energy development as a result of a nationwide search of suitable lands. The site selection process has been constraints and facilitators led. Facilitators are factors that give an advantage to a proposed project, while constraints are restrictions that inform the location and design of a project by highlighting sensitivities. A constraints analysis was undertaken and included avoidance of environmental designations (Natura 2000 sites), review of national, regional and local policies and objectives, suitable wind speeds, adequate setbacks from sensitive receptors, proximity to national grid nodes, avoidance of direct impacts on known cultural heritage assets, access, and constructability.

3.2.3.1 Strategic Site Selection

As the cost of building each megawatt of electricity generating capacity in a wind farm is in the region of €1.5 million, it is critical that the most suitable site for the Proposed Project is chosen.

As set out in Section 1.3 of Chapter 1 of this EIAR, the Applicant company, Maughanaclea Ltd., is an associated company of Enerco Energy Ltd., which is an Irish-owned, Cork-based company with extensive experience in the design, construction and operation of wind energy developments throughout Ireland, with projects currently operating or in construction in Counties Cork, Kerry, Limerick, Clare, Galway, Mayo and Donegal. By the end of 2025, Enerco associated companies had over 975 Megawatts (MW) of wind generating capacity in commercial operation and under construction, with a further c.400MW of projects at various stages in its portfolio to assist in meeting

Ireland's renewable energy targets. Enerco Energy Ltd. invests a significant amount of time and resources identifying and investigating sites for renewable energy proposals throughout Ireland.

Site selection for the development of a wind farm must be suitable for consideration under a number of criteria, such as:

- **Planning Policy:** alignment with the wind energy strategy (i.e., in an area deemed 'open to consideration') of the relevant local authority
- **Environmental Sensitivities:** located outside areas designated for protection of ecological species and habitats;
- **Grid Connection:** access to the national electricity grid possible within a viable distance;
- **Sensitive Receptors:** capable of complying with required setbacks from sensitive receptors.
- **Site Scale:** sufficient area of unconstrained land that could potentially accommodate a wind farm development and turbine spacing requirements;

The criteria above will be explained further below in so far as they influenced the site selection exercise undertaken.

3.2.3.1.1 **Planning Policy**

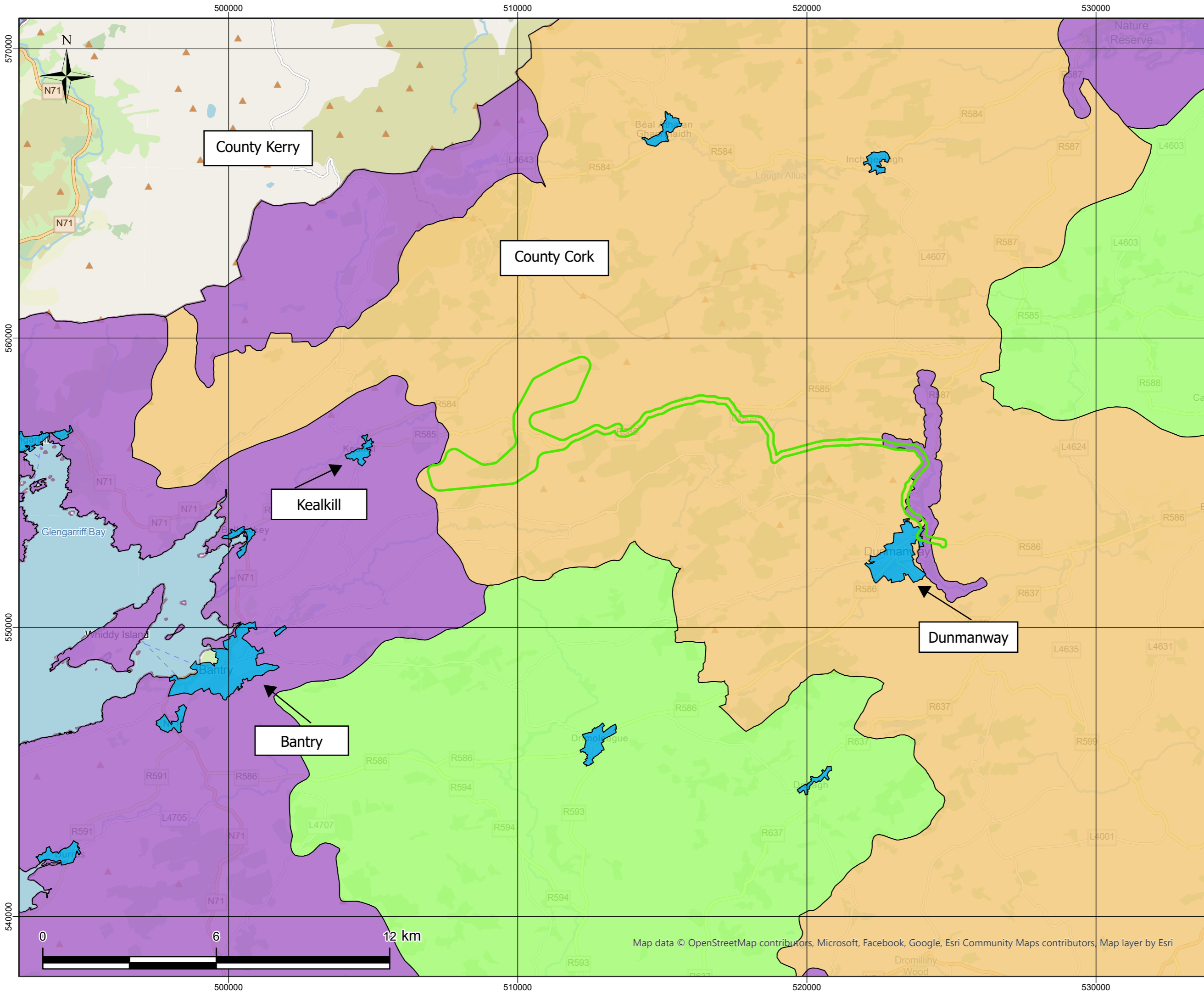
Section 2.5.4 of Chapter 2 of this EIAR sets out in detail the planning policies of Cork County Council with regards to wind energy development. The Proposed Wind Farm is situated within the administrative area of Cork County Council and is therefore subject to the planning policies and objectives set out in the Cork County Development Plan 2022-2028 (CCDP). Cork County Council's *Wind Energy Strategy* is set out in Volume 1⁴ of the CCDP and identifies areas within the county according to a hierarchy from the most optimal down to areas that are not generally considered suitable in relation to wind energy. There are three categories within the Wind Energy Strategy:

- Acceptable in Principle
- Open to Consideration
- Normally Discouraged

The Proposed Wind Farm site is located in an area deemed 'Open to Consideration' (OTC) under the CCDP's Wind Energy Strategy, as illustrated in Figure 3-1 below. Areas that are OTC are "*locations that may have potential for wind farm developments but there are also some environmental issues to be considered*". Wind turbines located in OTC areas are therefore open to development, subject to conformance with the Wind Energy Strategy and the proper planning and sustainable development of the area. The Site was therefore deemed to have favourable potential to support a wind energy development from a planning policy perspective.

Further elaboration on the policies that identify the Proposed Wind Farm site as being suitable for wind energy development are detailed in Section 2.5 of Chapter 2.

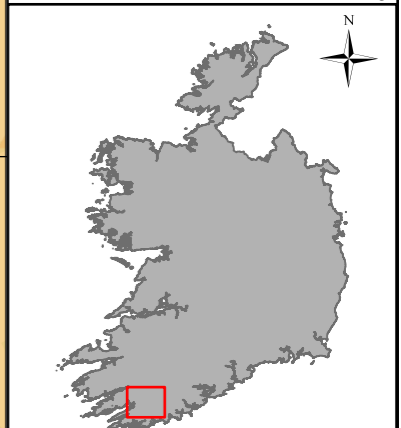
⁴ *Cork County Development Plan 2022, Volume One Chapter 13: Energy and Communications (2022).*
<https://www.corkcoco.ie/sites/default/files/2022-06/volume-1-main-policy-material.pdf>



Map Legend

- EIA Site Boundary
- Cork Wind Energy Strategy Areas**
- Acceptable in Principle
- Normally Discouraged
- Open to Consideration
- Urban Area

Spatial Reference
 Name: TM75 Irish Grid
 Datum: TM75
 Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title
**Cork County Development Plan-
 Wind Energy Strategy 2022-2028**

Project Title
**Maughanaclea Renewable
 Energy Development**

Project No. 240225	Drawing No. 3-1	Scale 1:120,000
Drawn By CF	Checked By RK	Date 02/02/2026

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Map data © OpenStreetMap contributors, Microsoft, Facebook, Google, Esri Community Maps contributors, Map layer by Esri

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3.2.3.1.2 Environmental Sensitivities

The Proposed Wind Farm site is not located within any Nationally Designated or Natura 2000 site.

The nearest Natura 2000 site, i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA) to the Proposed Wind Farm site is the Derryclogher (Knockboy) Bog SAC which is approximately 6.9km northwest of the Proposed Wind Farm site and is of conservation interest for its blanket bog habitat. The nearest nationally designated site, i.e. Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA) to the Proposed Wind Farm site is the Conigar Bog NHA, of conservation significance due to the presence of upland blanket bog, and located approximately 5km northwest of the Proposed Wind Farm site.

It was also noted during comprehensive multi-season ecological site surveys that while the majority of the Proposed Wind Farm site infrastructure is proposed within habitats of low ecological value, some sections of the Proposed Wind Farm are located within areas of Wet Heath (HH3), Dry Siliceous Heath (HH1), and Upland Blanket Bog (PB2) habitat, which are likely to conform to the following Annex I habitat types; Wet heath [4010], Dry heath [4030], and Blanket bog (active)* [7130]. All high-quality, intact heath and bog habitats within the Site have been deliberately avoided where possible in the design of the Proposed Project. A Biodiversity Management and Enhancement Plan (BMEP) is included in Appendix 6-4, which sets out the measures to manage and enhance the biodiversity in the locality of the Proposed Project. Specifically, proposed peatland restoration will result in enhancement of peatland and wet heath habitat within the Proposed Wind Farm site, while also offsetting the losses of degraded wet heath to facilitate the Proposed Project. The establishment of native woodland will enhance the woodland habitat within the Proposed Wind Farm site. Finally, establishment of both peatland/wet heath and native woodland within the Proposed Wind Farm site, along with enhancement measures within certain bat felling buffers, will result in habitats of higher suitability for Kerry slug within the Proposed Wind Farm site.

The nearest Natura 2000 site to the Proposed Grid Connection is the Bandon River SAC. A section of the Proposed Grid Connection overlaps with the Bandon River SAC. However, no instream works are proposed along the entirety of the Proposed Grid Connection underground cabling route. Therefore, as detailed in the Natura Impact Statement, no adverse impacts on the SAC are anticipated.

3.2.3.1.3 Grid Connection

The Proposed Project intends to connect to the national grid via a 110kV underground electrical cabling route that predominantly follows the local and regional road network, apart from a short section (approximately 940 metres) that is located within the Proposed Wind Farm site. It will originate at the proposed 110kV onsite substation and connect into the existing Dunmanway 110kV substation, in the townland of Ballyhalwick, Co. Cork. Details regarding potential alternative grid connection cabling route options are considered and presented in Section 3.2.5.8 below.

3.2.3.1.4 Sensitive Receptors

The Applicant sought to identify an area with a relatively low population density. Having reviewed the settlement patterns in the vicinity, the study area has emerged as suitable to accommodate the Proposed Project. The population density of the Population Study Area, as described in the Population and Human Health section of this EIAR, is 12.9 persons per square kilometre. This is considerably lower than the average national population density of 73.3 persons per square kilometre, and lower than the population density of County Cork, recorded as 18.7 persons per square kilometre. The proposed turbine positions achieve the recommended setbacks in both the Guidelines (DoEHLG, 2006) and the Draft Guidelines (DoHPLG, 2019).

The nearest settlement to the proposed turbines is the village of Kealkill, which is located approximately 2.8 km west of the nearest proposed turbine (T14) and is classified as a Village in the settlement hierarchy of the Cork County Development Plan⁵.

3.2.3.1.5 Site Scale

The Site, which covers a total of 1,175 hectares (ha) and comprises a mix of commercial forestry, pastoral agriculture, blanket bog, as well as portions of moors and heathland, has an elevation range of 428 AOD (Above Ordnance Datum) to 116m AOD. Land use is predominantly the same on adjacent lands. The Proposed Wind Farm benefits from some existing forestry and agricultural roads (approximately 2.1km). The Proposed Wind Farm will be easily accessible off the R585 and L8777, via a new site entrance and access road to the northern turbine cluster, and an existing entrance and road to the southern turbine cluster. As discussed above, the Site comprises habitats of varying ecological value, with the majority of the Site infrastructure proposed within habitats of low ecological value, and appropriate setback distances from sensitive ecological receptors has been a key consideration during the iterative design process.

As such, with its proximity to grid, accessibility, and achievable setbacks from sensitive receptors, the Site affords a large-scale area that is sufficiently unconstrained to accommodate a 14-turbine wind farm development. The constraints and facilitators mapping process is outlined in Section 3.2.5.2.1.

3.2.3.1.6 Summary

Based on the criteria set out above, the Site was identified as being a suitable location for the provision of a renewable energy development of the scale proposed. A portion of the southern turbine cluster of the Proposed Wind Farm is located on commercial forestry land which allows the Site to take advantage of the existing access roads (which will be upgraded) and highlights the suitability of the Proposed Wind Farm site as it can make sustainable use of these established items of infrastructure. All required setbacks from sensitive receptors, as set out above, are achievable.

The Proposed Wind Farm site is designated as ‘Open to Consideration’ under the Cork County Development Plan 2022 Wind Energy Strategy, and as such has *“potential for wind farm developments but there are also some environmental issues to be considered”*.

The Proposed Wind Farm site is not located within or adjacent to EU or National protected areas. The Site does however contain habitats that are designated as Annex I Habitats within the EU Habitats Directive (Council Directive 92/43/EEC). While the majority of the Site infrastructure is proposed within habitats of low ecological value, some sections of the Proposed Wind Farm are located within areas of Wet Heath (HH3), Dry Siliceous Heath (HH1), and Upland Blanket Bog (PB2) habitat. All high-quality, intact heath and bog habitats within the Site have been deliberately avoided where possible in the design of the Proposed Project. A Biodiversity Management and Enhancement Plan (BMEP) is included in Appendix 6-4, which sets out the measures to manage and enhance the biodiversity in the locality of the Proposed Project, while also offsetting the losses of degraded wet heath to facilitate the Proposed Project.

Required setbacks as set out above are achievable and wind speeds in the area are considered commercially viable for wind energy development.

The Proposed Grid Connection was identified as being suitable to connect the Proposed Wind Farm to the national grid. The 110kV underground electrical cabling route is located primarily within the public road corridor. The underground cabling route runs adjacent to and crosses the Bandon River SAC and Bandon Valley South of Dunmanway pNHA. However, there are no instream works proposed as part

⁵ Cork County Development Plan Volume 5 – West Cork (2022) <<https://www.corkcoco.ie/sites/default/files/2022-06/volume-5-west-cork.pdf>>

of the construction of the Proposed Grid Connection at any location, with works contained within the road corridor, and no likely significant effects have been identified. Please refer to Section 4.9.2.6 of Chapter 4: Description of the Proposed Project for further details on watercourse crossings and the associated construction methodologies along the Proposed Grid Connection.

Factoring all required environmental constraints into the project design, a site of considerable scale, with an estimated installed capacity of 67.2MW, and potential to power over 51,000 Irish households with renewable energy and displace 44,498 tonnes of carbon dioxide per annum (1,557,430 tonnes over the 35-year operational life) was established. The Site is considered appropriate for wind energy development and represents a positive contribution to National and EU climate action targets.

It can be demonstrated by the above information, and the assessment undertaken within the chapters of this EIAR, that the Site is suitable for wind energy and in accordance with current planning policy of County Cork.

Once the current Proposed Wind Farm emerged as a suitable location for the provision of the Proposed Project, the Applicant approached the relevant landowners in order to assemble the land necessary for the Proposed Wind Farm. Arising from the site assembly discussions, the current Proposed Wind Farm was identified and brought forward as being capable of accommodating a cohesive viable area of sufficient size to cater for the Proposed Project. While the outcome of the site selection process has identified the Site as a suitable location for a renewable energy development of the nature proposed, it does not preclude other sites within the vicinity being brought forward for consideration in the future.

Throughout the design process, the layout of the Proposed Project has been revised and refined to take account of the findings of all desk-based assessments, site surveys/investigations and baseline assessments which have brought the design from its first initial layout to the current proposed layout; please see Section 3.2.5 below for further details.

3.2.4 Alternative Renewable Energy Technologies

The Proposed Project will be located in a site where low intensity agriculture and commercial forestry will continue to be carried out around the footprint of the Proposed Wind Farm.

Both onshore and offshore wind energy development will be required to ensure Ireland reaches the target set in the Climate Action Plan 2025 (CAP25) to source 80% of our electricity from renewable energy by 2030. It is not a case of 'either' 'or'. CAP25 has set out the following targets for electricity generation:

- Share of electricity demand generated from renewable sources to up to 80% where achievable and cost effective, without compromising security of electricity supply;
- Onshore Wind Capacity: up to 9GW
- Offshore Wind Capacity: 5GW (minimum)
- Solar PV Capacity: 8GW

When considering other renewable energy technologies in the area, the Applicant considered offshore wind and commercial solar energy production as an alternative to the Proposed Wind Farm.

3.2.4.1 Offshore Wind

Although the screening exercise was based on identifying lands for onshore wind development; another alternative source of renewable electricity generation is offshore wind energy.

Enenco Energy Ltd has a keen interest in offshore wind farms and has explored potential offshore sites. However, it is considered that due to delays with the regulatory process for offshore development, a

combination of both onshore and offshore wind farm development will continue to be required to deliver on the ambitious renewable energy targets set out under CAP25 which include focusing on onshore wind energy developments to reach the 2025/2030 renewable energy targets. As such, Enerco's primary focus remains to be onshore wind farms, and they will continue to explore potential development offshore in tandem with delivering suitable sites onshore such as the Proposed Project.

In 2022, six offshore wind projects were designated as 'Phase One' projects in Ireland. Of these six offshore wind projects, four were supported by the Offshore Renewable Electricity Support Scheme 1 (ORESS1), and two secured an alternative route to market. In October 2024, 'Phase 2' progressed with the announcement of the South Coast Designated Maritime Area Plan (SC-DMAP). The SC-DMAP identified four proposed maritime areas off the south coast within which offshore wind farms may be located. The auction for the first of these sites, known as 'Tonn Nua', took place in December 2025 (after a significant delay from its original planned date in late 2024). The next auction will be for the Lí Bán site, however no firm auction date for this site has been published at the time of writing. With all Phase One projects with An Coimisiún Pleanála at the time of writing, and only one Phase 2 project currently at an early stage of development, under the current plan-led system, it is imperative that Ireland continues to develop onshore wind to meet national and European renewable energy and climate targets, including the onshore wind target of 9GW by 2030 under CAP25. As of December 2025, Ireland's installed capacity for wind generation in December 2025 was over 5GW, according to Wind Energy Ireland reporting⁶. As such, the Applicant's primary focus continues to be onshore wind farms, and the Applicant will continue to explore potential development offshore in tandem with delivering suitable onshore sites, such as the Proposed Project.

The Applicant is committed to playing a key role in helping the State achieve its CAP25 objectives while building upon its proven record of generating clean renewable energy to the national grid. As such, the option of an offshore project is not considered to be a reasonable alternative at this time.

3.2.4.2 Solar Energy

The Proposed Project will be located on a site where agriculture and commercial forestry will continue to be carried out around the footprint of the Proposed Wind Farm. Commercial solar energy production is the harnessing and conversion of sunlight into electricity using photovoltaic (PV) arrays (panels). To achieve the same maximum estimated electricity output from solar energy as is expected from the Proposed Wind Farm (c. 67.2MW), a larger development footprint would be required. As detailed in Section 1.1.1 in Chapter 1, the EIAR Site Boundary encompasses an area of approximately 1,175ha and the permanent footprint of the Proposed Project measures approximately 14.67 hectares, which represents approximately 1.25% of the Site.

The amount of electrical energy output from renewable generation is generally described in terms of capacity factor. The capacity factor relates to the amount of energy that may be achieved from a renewable technology over the period of one calendar year. Generally solar PV has a lower capacity factor than wind generation. One factor in the energy yield difference is that solar PV does not produce electrical energy at night, but the wind can blow at any time of the day or night. The Proposed Wind Farm site is located within the F wind region for Ireland, as outlined in the EirGrid report '*Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology*'⁷. The capacity factor for wind in this region is 37% (0.37). If solar PV was to be deployed on the Proposed Wind Farm site, it would be located within the Solar South region of Ireland as outlined in the same EirGrid report. The capacity factor for solar in this region is 13.3% (0.133).

⁶ Wind Energy Ireland (February 2026) Wind Energy Report Annual & December 2025

<<https://windenergyireland.com/blog/irish-wind-farms-provided-a-third-of-our-power-in-2025>>

⁷ EirGrid (2024) Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology

<<https://cms.eirgrid.ie/sites/default/files/publications/ECP-2.3-Solar-and-Wind-Constraints-Report-Assumptions-and-Methodology-v1.1.pdf>>

A solar PV array of the scale necessary to provide the same electricity output as the Proposed Wind Farm site would require a footprint of approx. 107.5 hectares⁸ or 9.15% of the overall Site. In addition, a solar development of this scale, would have a higher potential environmental effect on Traffic and Transport (construction phase), Air Quality (construction phase) and Biodiversity and Ornithology (habitat loss), a greater potential for direct impacts on unknown subsurface archaeology (construction phase) and glint and glare at the Site (operational phase). Furthermore, the implementation of a solar development would require the removal of the existing forestry, resulting in additional environmental and landscape impacts. In contrast, a wind energy development allows for the continued co-existence of the forestry, thereby minimising land use change and preserving existing habitats.

Taking into account the factors outlined above, and considering the farming practices in the area, it has been determined that wind energy is the most suitable renewable energy technology for the Site with the lesser potential for significant, adverse environmental effects.

A comparison of the potential environmental effects of the development of a solar PV array when compared against the chosen option of developing the Proposed Project at this Site are presented in Table 3-2 below.

Table 3-2 Comparison of environmental effects when compared against the chosen option (wind turbines)

Environmental Consideration	Solar PV Array (with up to 67.2MW Output)	Chosen Option
Population & Human Health (incl. Shadow Flicker)	<p>Relatively lower long-term financial contributions towards the local community (i.e., community benefit fund) on a per MWh basis.</p> <p>Lower potential for noise and vibration effects. Lower potential for visual obstructions in the skyline due to solar farms being low lying structures.</p> <p>No potential for shadow flicker to affect sensitive receptors.</p> <p>Potential for glint and glare impacts on local receptors.</p> <p>Based on the renewable energy outputs associated with solar PV, using solar PV at the Site would have a positive effect on human health due to the production of clean renewable energy and the offsetting of emissions (e.g., nitrogen, sulphur dioxide) which are produced from fossil fuel powered sources of electricity.</p>	<p>Higher long-term financial contributions towards the local community (i.e., community benefit fund) on a per MWh basis.</p> <p>Based on the assessment detailed in Chapter 5 and the mitigation measures proposed, there will be no significant effects related to shadow flicker from the Proposed Project.</p> <p>No potential for glint and glare impacts on local receptors.</p> <p>Greater potential for noise and vibration during construction operational and decommissioning phases.</p> <p>Greater potential for visual effects during operational phase. No material difference between the two options during construction and decommissioning.</p> <p>Based on the assessment included in Chapter 10 and Chapter 11, the</p>

⁸ Approximately 1.6 - 2 ha are required for each MW of solar panels installed based on approximately 4000 panels per MW (taken from the Sustainable Energy Authority Solar Energy FAQ publication which can be accessed here: https://www.seai.ie/publications/FAQs_on_Solar_PV.pdf). For the purposes of comparison, a minimum value of 1.6 ha has been assumed.

Environmental Consideration	Solar PV Array (with up to 67.2MW Output)	Chosen Option
		<p>Proposed Project will have a long term moderate positive effect on human health due to the production of clean renewable energy and the offsetting of emissions (e.g., nitrogen, sulphur dioxide) which are produced from fossil fuel powered sources of electricity.</p>
<p>Biodiversity (including Birds)</p>	<p>Larger development footprint would result in greater potential habitat loss.</p> <p>No potential for collision risk for birds.</p> <p>Potential for glint and glare impacts on birds.</p>	<p>As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors.</p> <p>Smaller development footprint would result in reduced habitat loss.</p> <p>The Proposed Project includes for a BMEP, providing a local boost to biodiversity Please see Appendix 6-4 for details.</p> <p>With the implementation of the mitigation measures described in Chapter 7 Ornithology, the residual effects for collision risk are not significant.</p>
<p>Land, Soils & Geology</p>	<p>Shallower excavations involved in solar PV array developments would result in reduced volume of spoil to be excavated.</p>	<p>As detailed in the assessment in Chapter 8, there is no loss of peat, topsoil or subsoil as a result of the Proposed Project. Topsoil and subsoil will be relocated within the Proposed Wind Farm site. No significant effects on soils and subsoils will occur.</p> <p>The peat and spoil management areas outlined in Chapter 4 set out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.</p>
<p>Water</p>	<p>Shallower excavations involved in solar PV array developments would result in reduced volume of spoil to be excavated, therefore reducing</p>	<p>Neutral - Project design specific drainage design removes the potential for significant environmental effects.</p>

Environmental Consideration	Solar PV Array (with up to 67.2MW Output)	Chosen Option
	<p>the potential for silt-laden runoff to enter receiving waterbodies.</p>	<p>Smaller footprint would result in less potential for silt laden run-off to enter a waterbody.</p> <p>As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.</p>
<p>Air Quality</p>	<p>Increased potential for dust and other noxious emissions due to larger volume of transport movements to and from site and larger volume of plant and ground works on site due to the larger footprint.</p> <p>Reduced capacity factor of solar PV array technology would result in less carbon offset.</p>	<p>Reduced potential for dust and other noxious emissions due to smaller volume of plant and ground works on site due to a smaller footprint.</p> <p>As detailed in the assessment in Chapter 10, no significant effects on air quality will occur.</p>
<p>Climate</p>	<p>Reduced capacity factor of solar PV array technology would result in less carbon offset</p>	<p>As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Wind Farm, 1,577,430 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 67.2MW clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in the Climate Action Plan 2025 (CAP25).</p>
<p>Noise & Vibration</p>	<p>Potential for short term noise impacts on nearby sensitive receptors during the construction phase.</p> <p>Larger traffic movements and increased plant on site due to the larger footprint/ground disturbance could lead to larger noise and vibration output during the construction phase.</p>	<p>Based on the assessment detailed in Chapter 12 and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels from the Proposed Project.</p>
<p>Landscape & Visual</p>	<p>Panelling potentially less visible from surrounding area due to the screening by vegetation and topography</p>	<p>As detailed in the assessment in Chapter 13: LVIA, the Proposed Wind Farm is located within a landscape that can effectively accommodate a wind energy</p>

Environmental Consideration	Solar PV Array (with up to 67.2MW Output)	Chosen Option
		development of this scale, given the large scale and expansive nature of the receiving environment and the mitigation measures in place to ensure no significant impact on key landscape and scenic sensitivities.
Cultural Heritage	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.	<p>As detailed in Chapter 14, and following the application of mitigation measures, there will be no significant residual effects on the previously unrecorded archaeological, architectural or cultural heritage resource as a result of the Proposed Project.</p> <p>Archaeological monitoring under licence of the smaller footprint will be implemented during the construction phase.</p> <p>Smaller development footprint would decrease the potential for impacts on unrecorded, subsurface archaeology.</p>
Material Assets	<p>Potential for greater traffic volumes during construction phase due to the number of solar panels required to achieve the same output.</p> <p>Greater potential for impacts on waste management due to increased plant on site giving rise to increase in hazardous waste materials.</p> <p>No material difference for impacts on gas, water, aviation.</p> <p>No potential for impacts on telecommunications.</p>	<p>As detailed in Chapter 15, there will be slight to moderate, short-term negative effect on existing road users during the construction phase of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on Site.</p> <p>No material difference for impacts on gas, water, aviation. Buffers implemented on telecommunication links.</p> <p>There will be a positive effect on electricity supply with the provision of an estimated 67.2MW to the national grid and powering of 51,800 Irish households with renewable electricity per year.</p>
Vulnerability of the Project to Major	Larger development footprint would result in a higher risk in relation to major accidents and	As detailed in Chapter 16, the risk of a major accident and/or disaster during the construction of the

Environmental Consideration	Solar PV Array (with up to 67.2MW Output)	Chosen Option
Accidents and Natural Disasters	<p>natural disasters due to increased land disturbance.</p> <p>Lower potential risk in relation to bridge/structural collapse due to the lighter project components required.</p>	<p>Proposed Project is considered 'low'. The highest risk scenarios to the Proposed Project are considered to be unlikely to occur at any phase of the Proposed Project.</p> <p>A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Chapter 16 of this EIAR.</p>

While there are positive and negative environmental aspects of both renewable energy development options, neither is likely to have significant adverse effects; however, given the particular suitability of the Site for wind energy development, the lesser area of land required and the greater positive impact of wind energy generation from a climate and air quality perspective, it was considered the more suitable option and the most efficient method of electricity production with the lesser potential for significant environmental effects.

3.2.5 Alternative Project Design Options

3.2.5.1 Alternative Turbine Numbers and Model

Modern wind turbines have a potential power output in the 4 - 7 megawatt (MW) range. It is proposed to install 14 no. turbines at the Proposed Wind Farm which will have an estimated installed capacity of 67.2 MW. Such a wind farm could also be achieved on the Proposed Wind Farm site by using smaller turbines (for example, 2.5 MW machines). However, this would necessitate the installation of 27 turbines to achieve a similar output. A larger number of smaller turbines would result in the wind farm occupying a greater footprint within the Proposed Wind Farm site, with a larger amount of supporting infrastructure being required (i.e., roads, hardstands, etc) and increasing the potential for environmental impacts to occur. An estimated capacity of 67.2MW could also be achieved using larger turbines (for example, 6.7MW machines). In this case, only 10 turbines would be required to achieve a similar output. While a smaller number of turbines would occupy a lower overall footprint, taller turbines could have a greater effect on the overall landscape. The proposed number of turbines takes account of all site constraints and the distances to be maintained between turbines and features such as roads and houses, while maximising the wind energy potential of the Proposed Wind Farm. The 14-turbine layout selected for the Proposed Wind Farm is considered to strike the right balance compared to the other alternatives considered in relation to overall development footprint, reducing the potential for environmental effects, while still achieving the optimum output at a more consistent level than would be achievable using different turbines.

The turbine model to be installed on the Proposed Wind Farm site will have an overall ground to blade tip height of 169m; a rotor diameter 133m; and a hub height of 102.5 metres. The use of alternative smaller turbines at the Proposed Wind Farm would not be appropriate as they would fail to make the most efficient use of the wind resource at the Proposed Wind Farm site, and would likely require a larger development footprint. This alternative would potentially lead to additional environmental effects. As mentioned above, larger turbines were also considered during the design development phase, which could offer even greater efficiency and output due to their increased rotor diameters and hub heights. However, the use of larger turbines would have resulted in taller overall structures, which would increase visual impacts and as such, were not considered appropriate for the landscape.

A comparison of the potential environmental effects of the installation of a larger number of smaller wind turbines when compared against the chosen option of installing a smaller number of larger wind turbines on the Proposed Wind Farm is presented in Table 3-3 below.

Table 3-3 Comparison of environmental effects when compared to the chosen option (14 no. wind turbines, higher MW output)

Environmental Considerations	Option 1 Larger number of smaller turbines	Option 2 Chosen option of a 14-turbine layout
Population & Human Health	<p>Greater potential for shadow flicker and noise impacts on nearby sensitive receptors due to the increased number of turbines. However, these can be curtailed to meet threshold criteria.</p> <p>Smaller turbines would be less visually obstructive in the skyline; however, the larger development footprint would spread further across the landscape potentially occupying a larger portion of a viewpoint.</p>	<p>There is no potential for significant shadow flicker effects from the proposed turbines. Shadow flicker effects can be mitigated to meet threshold criteria.</p> <p>There is no potential for significant noise and vibration effects from the proposed turbines. Furthermore, noise emissions can be curtailed to meet threshold criteria.</p> <p>As detailed in Chapter 13: LVIA, the proposed turbine locations adhere to the recommended 500m set back distance in the Guidelines (DoEHLG, 2006) and also the 4 times tip height set-back distance set out in the Draft Guidelines (DoHPLG, 2019) for the purpose of protecting residential amenity. Within the LVIA Study Area, the visual impact on residential receptors ranges from 'Imperceptible' to 'Significant' (for a small number of residences in very close proximity). Given the adherence to the 4x tip height set-back distance to protect visual amenity, on balance, effects on residential receptors are mitigated and are therefore not significant.</p> <p>Based on the assessment detailed in Chapter 5 Population and Human Health, and the mitigation measures proposed, there will be no significant effects on population and human health from shadow flicker, noise and vibration and visual amenity during the construction, operation and decommissioning phases of the Proposed Project.</p>
Biodiversity (Including Birds)	<p>Larger development footprint would result in greater potential for habitat loss.</p>	<p>As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors.</p>

Environmental Considerations	Option 1 Larger number of smaller turbines	Option 2 Chosen option of a 14-turbine layout
		<p>With the implementation of the mitigation measures described in Chapter 7 Ornithology, the residual effects for collision risk are not significant.</p>
<p>Land, Soils, & Geology</p>	<p>Larger development footprint would result in greater volume of spoil to be generated, excavated and sorted.</p> <p>Neutral-Geotechnical investigations followed by careful design would lead to no significant environmental impacts</p>	<p>As detailed in Chapter 4, the Proposed Wind Farm has been designed to utilise the existing roads to minimise ground disturbance where possible.</p> <p>The peat and spoil management areas outlined in Chapter 4 sets out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.</p> <p>Neutral – Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p> <p>As detailed in the assessment in Chapter 8, no significant effects on peat, topsoil and subsoils will occur.</p>
<p>Hydrology and Hydrogeology</p>	<p>Project design specific drainage design removes the potential for significant environmental effects.</p> <p>Larger development footprint, therefore, increasing the potential for silt-laden runoff to enter receiving waterbodies.</p>	<p>Neutral – Project design specific drainage design removes the potential for significant environmental effects.</p> <p>Smaller footprint would result in less potential for silt laden run-off to enter a waterbody.</p> <p>As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.</p>
<p>Air Quality</p>	<p>Increased potential for vehicle and construction dust emissions due to an increased volume of construction material and turbine component deliveries to the site, giving rise to a reduced air quality locally for the construction phase.</p>	<p>Decreased potential for vehicle emissions and dust emissions due to a decreased volume of construction material and turbine component deliveries to the Site.</p> <p>As detailed in Chapter 10, there will be no significant effects on air quality during the construction, and decommissioning phases. There will be a Long-term Moderate Positive Impact on air quality by during the operational phase.</p>
<p>Climate</p>	<p>There would be an increased potential for vehicle emissions</p>	<p>Decreased potential for vehicle emissions and dust emissions due to a decreased</p>

Environmental Considerations	Option 1 Larger number of smaller turbines	Option 2 Chosen option of a 14-turbine layout
	and dust emissions due to an increased volume of construction material and turbine component deliveries to the Site.	<p>volume of construction material and turbine component deliveries to the Site.</p> <p>As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Wind Farm, 1,557,430 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 67.2MW clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in Climate Action Plan 2025 (CAP25).</p>
Noise & Vibration	Potential for increased noise impacts on nearby sensitive receptors due to reduced separation distance between sensitive receptors and turbine locations and additional turbine generators.	<p>Potential for decreased noise levels at nearby sensitive receptors due to increased separation distance between sensitive receptors and turbine locations.</p> <p>Based on the assessment detailed in Chapter 12, there will be no significant effects on sensitive receptors during the construction, operational and decommissioning phases from the Proposed Project.</p>
Landscape & Visual	Smaller turbines may be less visually intrusive on the landscape. Equally, a larger number of smaller turbines would be spread over a wider area, taking up a greater portion of a viewpoint	As detailed in the assessment in Chapter 13: LVIA, the Proposed Wind Farm is located within a landscape that can effectively accommodate a wind energy development of this scale, given the large scale and expansive nature of the receiving environment and the mitigation measures in place to ensure no significant impact on key landscape and scenic sensitivities.
Cultural Heritage	<p>Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.</p> <p>No material difference between the two options for indirect effects on monuments.</p>	<p>No material difference between the two options for indirect effects on monuments.</p> <p>The selected layout represents a balanced approach in terms of development footprint and archaeological risk. Compared with Option 1, the reduced footprint limits the potential for impacts on unrecorded, subsurface archaeology.</p> <p>As detailed in the assessment in Chapter 14 and following the implementation of mitigation measures, there will be no</p>

3.2.5.2 Alternative Turbine Layout and Development Design

The design of the Proposed Wind Farm has been an informed and collaborative process from the outset, involving the designers, developers, engineers, landowners, environmental, hydrological and geotechnical, landscape, archaeological, and and traffic specialists. All have had the objective of reducing the potential for environmental effects while designing a project that is capable of being constructed and viable.

Throughout the preparation of this EIAR, the layout of the Proposed Wind Farm has been revised and refined to take account of the findings of all site investigations and baseline assessments, which have brought the design from its first initial layout to the current Proposed Wind Farm layout. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory consultees, the local community and local authorities as detailed in Chapter 2 of the EIAR, while still seeking to ensure a viable project which can ultimately be constructed and connected to the national grid.

3.2.5.2.1 Constraints and Facilitators Mapping

The design and layout of the Proposed Project follows the recommendations and guidance set out in the Guidelines (DoEHLG, 2006) and the *'Best Practice Guidelines for the Irish Wind Energy Industry'* (Irish Wind Energy Association, 2012).

The Guidelines (DoEHLG, 2006) were the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments were outlined in the Draft Guidelines (DoHPLG, 2019). The proposed changes presented in the Draft Guidelines (DoHPLG, 2019) give certain focus on the setback distance from residential properties, along with shadow flicker and noise requirements relative to sensitive receptors. The consultation on the Draft Guidelines (DoHPLG, 2019) closed on 19th February 2020, but at time of writing, they have not yet been adopted. CAP25 states that new draft wind energy guidelines are intended to be adopted in Q1 2025, however the Guidelines (DoEHLG, 2006) remain the relevant guidelines for the purposes of Section 28 of the Act. Please see Section 1.2.2 of Chapter 1 for further information on the wind energy development guidelines.

The constraints mapping process involves the placing of buffers around different types of constraints so as to clearly identify the areas within which no development works will take place. The size of the buffer zone for each constraint has been assigned using guidance presented in the Guidelines (DoEHLG, 2006). Should the Draft Guidelines (DoHPLG, 2019) be adopted in advance of a decision being made on this planning application, the Proposed Project will be capable of achieving the requirements of the Draft Guidelines (DoHPLG, 2019) as currently proposed.

The constraints map for the Proposed Wind Farm, as shown in Figure 3-2, was produced following a desk study of all site constraints. Figure 3-2 encompasses the following constraints and associated buffers:

- **Sensitive Receptors:** a minimum 500m setback from all sensitive receptors achieving the Guidelines (DoEHLG, 2006) recommended setback of 500m and a minimum 682-metre setback from third party sensitive receptors achieving the Draft Guidelines (DoHPLG, 2019) recommended setback of 4 x tip height separation distance from third party sensitive receptors.
- **Natura 2000** sites plus minimum 200-metre buffer;
- **Hydrology:** Watercourses plus 50-metre buffer;
- **Archaeological Sites or Monuments;** minimum 30-metre buffer, plus 'Zone of Notification' as required by the National Monuments Service (ROI)
- **Habitats and Biodiversity:** Species specific buffers. Siting of infrastructure so as to minimise loss of habitats of Local Importance (higher value) and higher. Avoidance of all high-quality, intact Article 17 habitat, and Annex I habitat.

➤ **Telecommunications:** Telecommunication links plus operator-specific buffer.

Facilitators at the Site build on the existing advantages and include the following:

- Available lands for development;
- Acceptable wind resource;
- Proximity to national grid node;
- Opportunity to win construction materials on site, minimising the potential for additional traffic (and associated environmental impacts) and cost generation by acquiring all materials offsite;
- Existing access points and general accessibility of all areas of the Site due to existing road infrastructure; and,
- Limited extent of constraints.

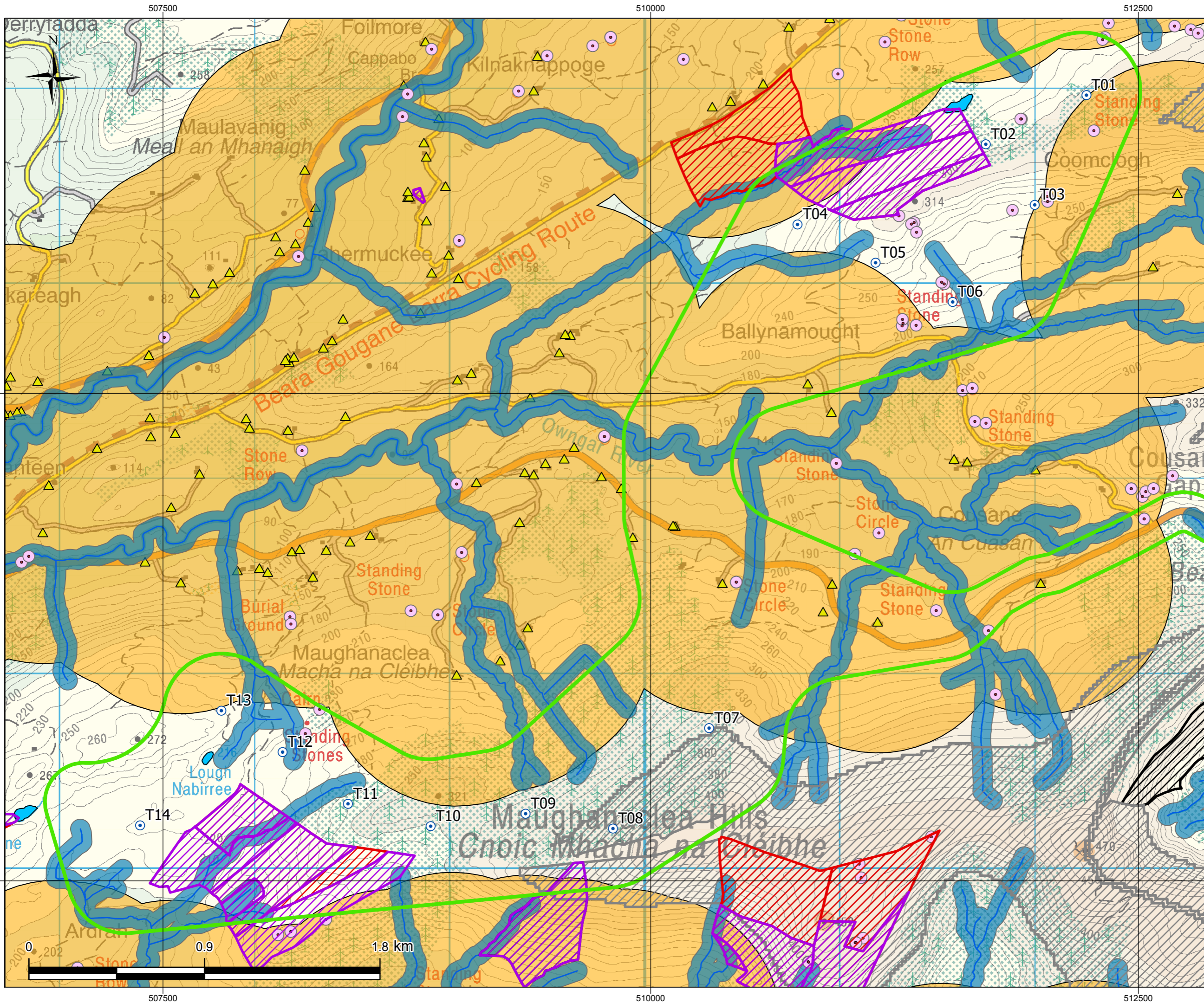
The inclusion of the constraints on a map of the Proposed Wind Farm site allowed for a viable area to be identified. An initial turbine layout was then developed to take account of all the constraints mentioned above and their associated buffer zones and the separation distance required between the turbines. Following the mapping of all known constraints, detailed site investigations were carried out by the project team.

The ecological assessment of the Proposed Wind Farm site encompassed habitat mapping and extensive surveying of birds and other fauna. These assessments, as described in Chapter 6 and 7 of this EIAR on Biodiversity and Ornithology respectively, optimised the decision on the siting of turbines and the carrying out of any development works, such as the construction of roads.

The hydrological assessments of the Proposed Wind Farm site included walkover surveys and hydrological mapping, peat and mineral soil lithology investigation, field hydrochemistry measurements, surface water flow measurement and surface water sampling. As detailed in Chapter 9, this data was used to inform the design of the turbine foundations and other infrastructure on the Proposed Wind Farm site.

Geotechnical investigations were also undertaken on the Proposed Wind Farm site to provide detail and clarity on the nature and extent of subsoils and bedrock as a means of characterising the Proposed Wind Farm site. This allowed for the identification of suitable areas for the turbines, proposed 110kV onsite substation, borrow pits, peat and spoil management areas, and new access roads to be sited in relation to the underlying bedrock. Where specific areas were deemed as being unsuitable for the siting of turbines or roads, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out by constraints.

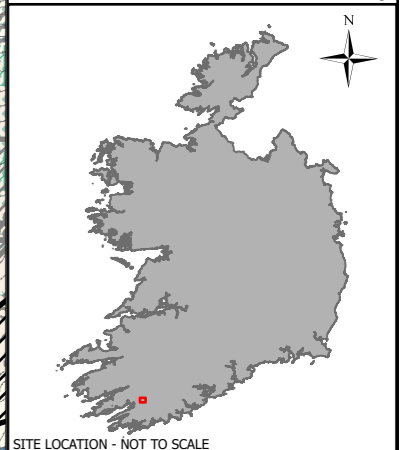
The turbine layout for the Proposed Wind Farm has also been informed by the results of noise assessments, landscape and visual assessments, and the separation distance to be maintained between turbines. Thus, the baseline environmental assessment of the Proposed Wind Farm site and wind farm design was an iterative process, where findings at each stage of the assessment were used to further refine the design, always with the intention of minimising the potential for environmental impacts.



Map Legend

- EIAR Site Boundary**: Green outline
- Proposed Project**:
 - Proposed Turbines: Blue circles with 'T' labels
- Hydrology**:
 - 50m Watercourse Buffer: Blue shaded area
 - Watercourses: Blue lines
 - Lakes: Light blue areas
- National Monuments**:
 - National Monuments Buffer: Pink shaded area
 - National Monuments: Pink dots
- Dwellings**:
 - Dwellings: Yellow triangles
 - Dwellings Buffer: Orange shaded area
- Biodiversity**:
 - Cork Article 17 Habitats:
 - Active Blanket Bog Poly: Black hatched pattern
 - Alpine and Subalpine Heath Poly: Grey hatched pattern
 - Dry Heath Poly: Red hatched pattern
 - Wet Heath Poly: Purple hatched pattern

Spatial Reference
 Name: TM75 Irish Grid
 Datum: TM75
 Projection: Transverse Mercator



Constraints and Facilitators

Project Title		
Maughanaclea Renewable Energy Development		
Project No.	Drawing No.	Scale
240225	3-2	1:18,000
Drawn By	Checked By	Date
CF	RK	05/02/2026

Email: info@mkofireland.ie / Website: www.mkofireland.ie

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3.2.5.2.2 **Alternative Proposed Wind Farm Site Layout Iterations**

The final design of the Proposed Wind Farm site, including the proposed turbine layout, takes account of all site constraints and the distances to be maintained between turbines and from houses, roads, etc. The layout is based on the results of all site investigations that have been carried out during the EIAR process, as well as the EIA scoping process with statutory and non-statutory consultees. As information regarding the Proposed Wind Farm was compiled and assessed, the number of turbines and the proposed layout have been revised and amended to take account of the physical constraints of the Proposed Wind Farm and the requirement for buffer zones and other areas in which no turbines could be located. The selection of the turbine number and layout has also had regard to wind-yield and the separation distance to be maintained between turbines, as well as landscape and visual, noise and shadow flicker impacts. The EIAR and Proposed Wind Farm design process was an iterative process, where findings at each stage of the assessment were used to further refine the design, always with the intention of minimising the potential for environmental impacts.

The development of the final Proposed Wind Farm layout has resulted following feedback from the various studies and assessments carried out as well as ongoing negotiations and discussions with landowners and the local community.

There were several reviews of the specific locations of the various turbines during the optimisation of the Proposed Wind Farm layout. The initial constraints study identified a significant viable area within the overall study area of the original site. The initial turbine layout comprised 19 no. turbines, however the proposed 14-turbine layout was refined following feedback from the environmental project team, landowners, and the need to respect on-site constraints. The Proposed Wind Farm site layout went through several iterations, as shown in Figure 3-3 to Figure 3-6 below, which illustrate the evolution of the layout for the Proposed Wind Farm.

Please note, across the design iterations outlined below, some proposed turbines were renumbered in certain cases following the omission of other turbines from the layout.

Proposed Wind Farm site layout Iteration No. 1

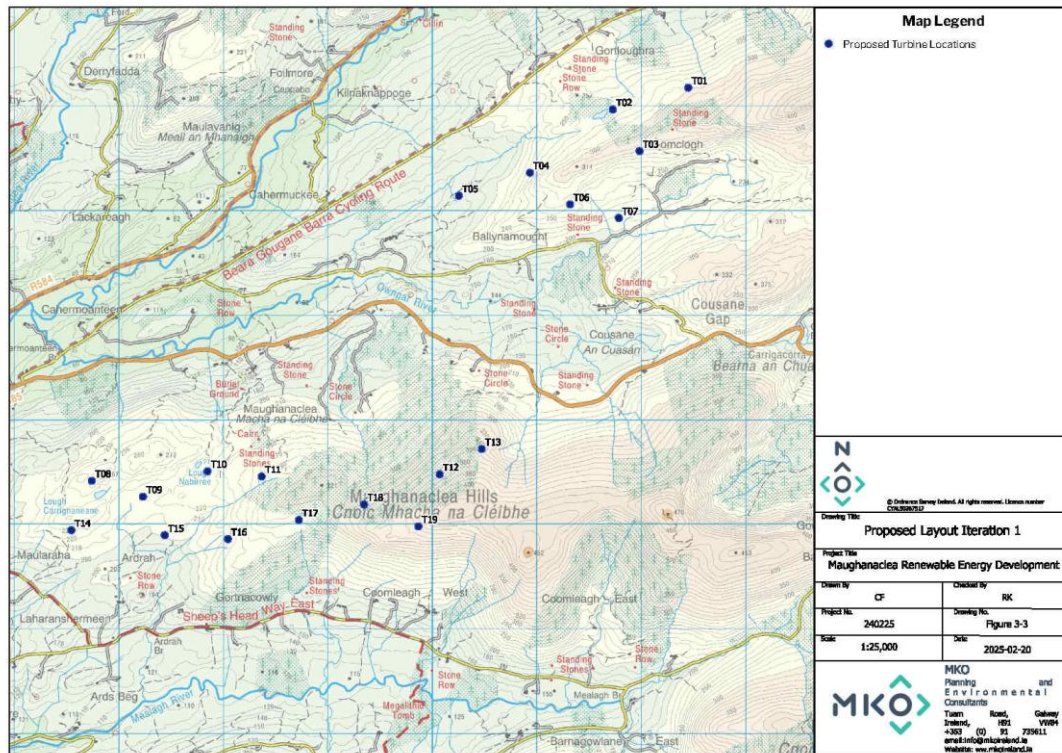


Figure 3-3 Proposed Layout Iteration - Option 1

Iteration No.1, as shown above in Figure 3-3, comprises the original proposed layout for the Proposed Wind Farm. As can be seen in the figure above, this layout comprised of 19 no. turbines, with a maximum overall ground-to-blade tip height of 176.5 metres, rotor diameter of 150 metres, hub height of 101.5 metres, and was determined on the basis of a desk study.

Upon review of desk-based constraints and site surveys, several amendments to the layout were made. These amendments were primarily due to the presence of habitat likely to confirm to Annex I habitat, which was identified near T01 and T02 in the northern turbine cluster and T16, T17 and T19 in the southern turbine cluster, as well as amendments due to wind yield, and included the following:

- T01 – Moved into the forestry block to avoid potential Annex I habitat
- T02 – Moved into the forestry block to avoid potential Annex I habitat
- T04 – Moved due to proximity to potential Annex I habitat
- T05 – Removed from layout due to constraints (watercourse buffer)
- T06 – Moved due to wind-yield
- T07 – Moved slightly to avoid constraints (watercourse buffer)
- T08 – Removed from layout to ensure no direct landscape effects on Co. Cork Landscape Character Type 4 which is designated as a High Value Landscape in local planning policy.
- T09 – Moved slightly due to wind-yield
- T10 – Moved due to wind-yield
- T11 – Moved due to constraints (watercourse buffer)
- T12 – Moved due to wind-yield
- T13 – Moved due to potential landscape and visual effects
- T14 – Removed from layout to ensure no direct landscape effects on Co. Cork Landscape Character Type 4 which is designated as a High Value Landscape in local planning policy.

- T15 – Moved due to wind-yield and limited screening and elevated siting over the Mealagh Valley, turbine would dominate residential receptors on both sides of the ridge
- T16 – Moved due to elevated siting over the Mealagh Valley. Turbine would dominate residential receptors on both sides of the ridge so was strategically sited to reduce visibility and visual prominence.
- T17 – Moved north to avoid potential Annex I habitat
- T18 – Moved slightly due to wind-yield
- T19 – Removed form layout due to potential landscape and visual effects, elevated siting over the Meallagh Valley

Proposed Wind Farm site layout Iteration No. 2

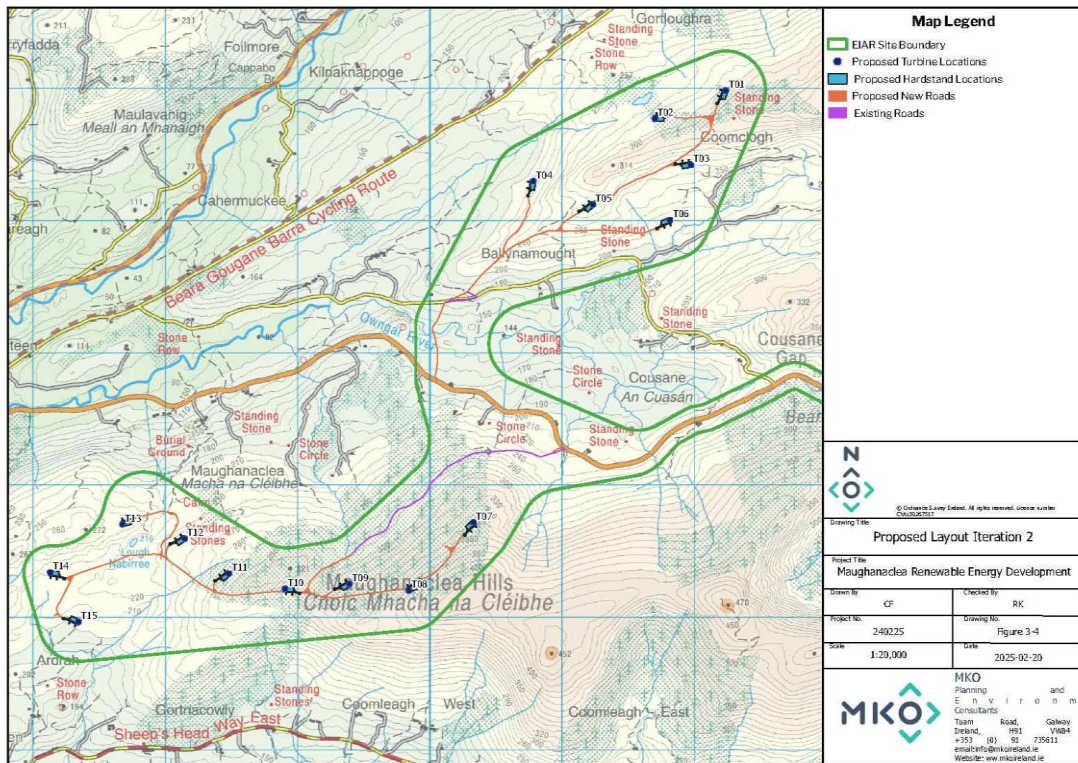


Figure 3-4 Proposed Layout Iteration No. 2

Iteration No. 2. is presented in Figure 3-4 above and comprises 15 no. turbines with a maximum overall ground-to-blade tip height of 169 metres, rotor diameter of 133 metres, hub height of 102.5 metres, hardstands, site access roads, and site entrances. It includes a refined turbine layout that was based on an updated constraints mapping exercise and identification of a viable area for the siting of turbines, following desktop and field-based review by the design team. Constraints that informed this design iteration include relevant setback from dwellings (676m in the case of the Proposed Project), appropriate setback distances from any telecommunication links, setback from National Monuments plus 30m buffer, setback from watercourses plus a 50m buffer, and avoidance of ecologically sensitive and designated habitats. Using the viable area procured from the constraints mapping exercise, the 15 no. turbine layout shown above was identified within the overall study area. As the design process progressed, further technical assessments informed an evolution of the layout. This iterative review identified opportunities to reduce the overall scale of the development. The refinement resulted in a reduced turbine number and a more compact layout, improving environmental sensitivity, reducing landscape and ecological effects, and enhancing alignment with planning and design objectives. It was determined that it would be more environmentally sensitive and efficient to allow for fewer turbines and a smaller turbine model within this area.

Turbine component delivery entrances were also included in Iteration No. 2. A new site entrance was proposed to the northern turbine cluster to facilitate turbine component delivery, as well as construction and operational phase traffic. It was proposed that the existing site entrance to the southern turbine cluster would be upgraded to facilitate turbine component delivery, as well as construction and operational phase traffic. The site entrances were subject to autotrack assessments to identify the turning area required, as described in Section 15.1 of Chapter 15: Material Assets (Traffic and Transport Assessment).

Other amendments included moving T11 outside of a 50m watercourse buffer, as well as other amendments to turbine positions due to wind-yield and maintaining appropriate setback distances from residential receptors.

The layout in Iteration No. 2 was presented to the project team for detailed investigations and assessment. These investigations included habitat mapping, ecological surveying, intrusive site investigation and geotechnical surveys, cut and fill assessments, hydrological investigations, and archaeological surveys of the Proposed Wind Farm.

Proposed Wind Farm site layout Iteration No. 3

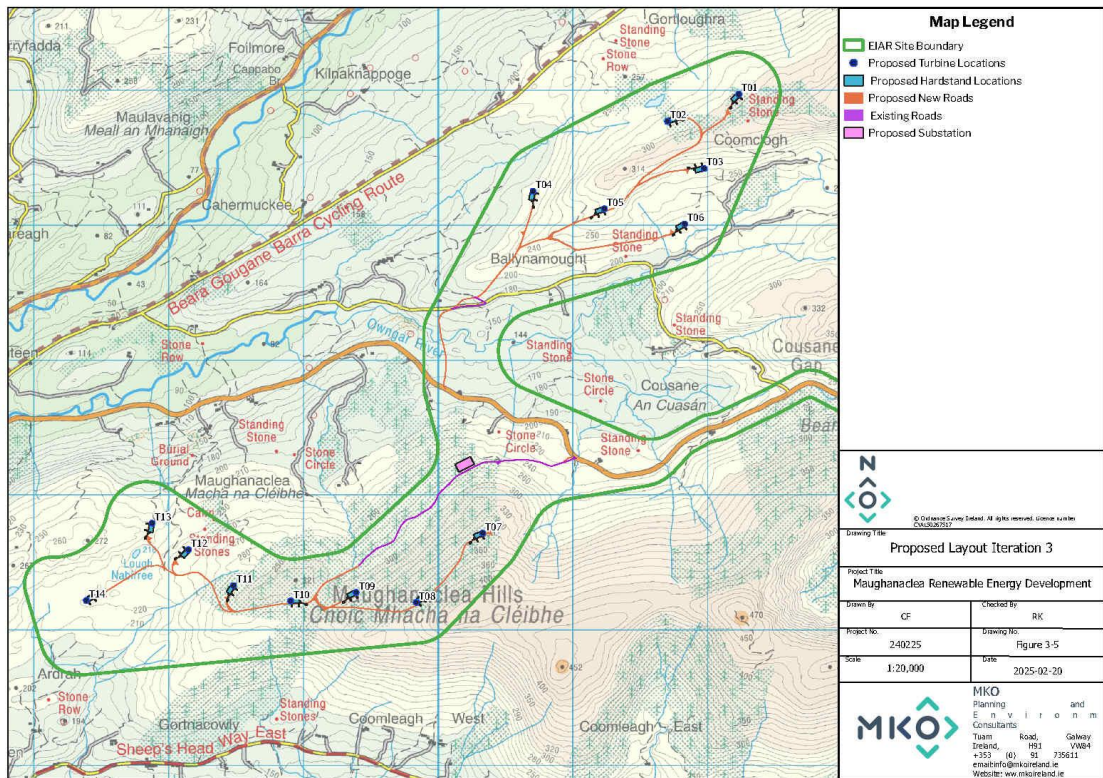


Figure 3-5 Proposed Layout Iteration No. 3

Layout iteration No. 3 of the Proposed Wind Farm, as presented in Figure 3-5 above, comprises 14 no. turbines, hardstands, 110kV onsite substation, site access roads and site entrances.

Comprehensive ecological surveys of the site identified the area surrounding turbines T13, T14 and T15 as likely conforming to degraded Annex I habitat. To reduce impacts to this habitat, T15, which featured in the previous design iteration (Iteration No. 2), was removed from the layout and T13 was moved to an area of less sensitive habitat of lower ecological value. The results of the bats assessment identified the lake in proximity to T02 as an important area for bat foraging. A 200m buffer was applied to the lake, and the turbine was moved south out of the buffer.

During the development of this design iteration, it was further established that the proposed 110kV onsite substation location overlapped with an area of recently planted native trees, and also had the potential to result in visual effects on nearby sensitive receptors. As a result, the substation was moved southwest away from the native trees and into an area of conifer plantation. This location is enclosed and visually contained by prominent landforms ensuring it will not be visible from nearby receptors, including residents and the R585 Regional Road, which is a designated scenic route.

Further micro-siting of turbines and roads were undertaken following the results of the cut and full and geotechnical exercises.

As part of this design iteration and following the conclusion of site surveys and investigations, suitable areas for the met mast, borrow pits, peat and spoil management areas, and temporary construction compounds were also identified.

Proposed Layout Iteration No. 4- Final Proposed Wind Farm Site Layout

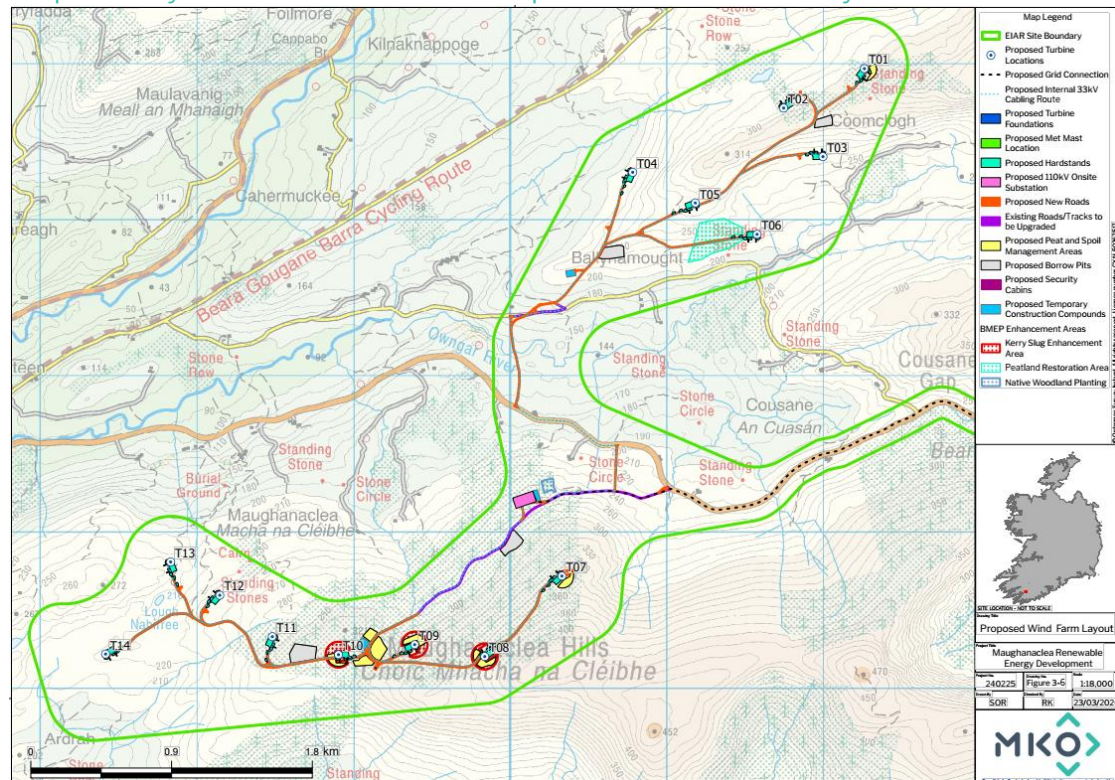


Figure 3-6 Proposed Layout Iteration No. 4 - Final Proposed Wind Farm site Layout

Iteration No.4, as presented in Figure 3-6 above, is comprised of 14 no. turbines with a maximum overall ground-to-blade tip height of 169 metres, rotor diameter of 133 metres, hub height of 102.5 metres, one met mast (30m), 3 no. temporary construction compounds, 4 no. borrow pits, peat and spoil management areas, one onsite 110kV substation, internal wind farm 33kV cabling, biodiversity enhancement areas, and the Proposed Grid Connection underground electrical cabling route which is further detailed in Section 3.2.5.8.

The revisions to the layout were found to have a positive effect on the environmental, ecological and hydrological elements of the Site when compared to the other options considered.

As part of the final design iteration, enhancement and replanting measures were developed in order to manage and enhance the biodiversity in the locality of the Proposed Project and offset the losses of degraded wet heath to facilitate the Proposed Wind Farm. Measures such as the enhancement of peatland habitats, native woodland planting, and enhancement of areas for Kerry Slug are proposed as

part of the Proposed Project, with further details provided in Appendix 6-4: Biodiversity Management and Enhancement Plan.

The peat and spoil management areas and the onsite borrow pits underwent detailed multidisciplinary site-surveys to ensure that the proposed areas were suitable from a geotechnical, hydrological, and ecological perspective. The evolution of the borrow pits are detailed in section 3.2.5.4 below. After all surveys were completed, the proposed peat and spoil management areas and onsite borrow pits were redesigned and scaled appropriately to ensure that they do not encroach on any ecological constraints or hydrological buffers.

The final proposed turbine layout as presented in Figure 3-6 takes account of all site constraints (e.g. ecology, ornithology, hydrology, archaeology, etc) and design constraints (e.g. setback distances from houses and distances between turbines on site etc). The layout also takes account of the results of all site investigations and baseline assessments that have been carried out during the EIAR process.

The final chosen turbine layout is considered the optimal layout given it has the least potential for environmental effects.

A comparison of the potential environmental effects of initial iterations of the turbine layout as compared against the final turbine layout are presented in Table 3-4 below.

Table 3-4 - Comparison of environmental effects of the initial Proposed Wind Farm layout when compared to the chosen option.

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations and all associated Infrastructure	Chosen Option of the Final 14 no. Turbine Layout and all associated infrastructure
Population & Human Health (incl Shadow Flicker)	<p>Likely potential for increased shadow flicker impacts on nearby sensitive receptors due to the increased number of turbines in Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Shadow flicker effects would likely be similar for Proposed Layout Iteration No. 3 (14 turbine layout).</p>	<p>There is no potential for significant shadow flicker effects from the proposed turbines. Shadow flicker effects can be mitigated to meet threshold criteria.</p> <p>There is no potential for significant noise and vibration effects from the proposed turbines. Furthermore, noise emissions can be curtailed to meet threshold criteria.</p> <p>As detailed in Chapter 13: LVIA, the proposed turbine locations adhere to the recommended 500m set back distance in the Guidelines (DoEHLG, 2006) and also the 4 times tip height set-back distance set out in the Draft Guidelines (DoHPLG, 2019) for the purpose of protecting residential amenity. Within the LVIA Study Area, the visual impact on residential receptors ranges from 'Imperceptible' to 'Significant' (for a small number of residences in very close proximity). Given the adherence to the 4x tip height set -</p>

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations and all associated Infrastructure	Chosen Option of the Final 14 no. Turbine Layout and all associated infrastructure
		<p>back distance to protect visual amenity, on balance, effects on residential receptors are mitigated and are therefore not significant.</p> <p>Based on the assessment detailed in Chapter 5, Chapter 12, Chapter 13, and the mitigation measures proposed, there will be no significant effects on population and human health from shadow flicker, noise and vibration and visual amenity during the construction, operation and decommissioning phases of the Proposed Project.</p>
<p>Biodiversity & Ornithology</p>	<p>Larger development footprint would result in greater potential habitat loss in Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Greater potential impact on identified sensitive ecological receptors due to location of infrastructure within Annex I habitat in Proposed Wind Farm site Layout Iteration No. 1, 2, and 3.</p>	<p>As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors.</p> <p>The Proposed Project includes for a BMEP, providing a local boost to biodiversity. Please see Appendix 6-4 for details.</p> <p>As detailed in Chapter 7, the Collision Risk Assessment (CRA) indicated that the impact of the Proposed Wind Farm site on birds corresponds to a Low - Very Low effect significance. With the implementation of the mitigation measures described in Chapter 7 Ornithology, the residual effects for collision risk are not significant.</p>
<p>Land, Soils & Geology</p>	<p>Greater potential impact on peat, topsoil, and subsoil due to location of infrastructure for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Potential impact on identified peat, topsoil and subsoils is neutral for Proposed Wind Farm site Iteration No. 3 (14 turbine layout).</p>	<p>As detailed in the assessment in Chapter 8, peat, topsoil and subsoil excavation volumes will be managed within the Site, and the residual effects on peat, topsoil and subsoil are not significant. Geotechnical investigations followed by careful design will lead to no significant environmental impacts.</p>

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations and all associated Infrastructure	Chosen Option of the Final 14 no. Turbine Layout and all associated infrastructure
	<p>Larger development footprint would result in greater volume of spoil to be generated, excavated and sorted.</p> <p>Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p>	<p>Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p> <p>The peat and spoil management areas outlined in Chapter 4 sets out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.</p>
Water	<p>Larger footprint would result in a greater potential for silt-laden runoff to enter natural watercourses within and around the site for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Potential for runoff is neutral for Proposed Wind Farm site Layout Iteration no. 3 (14 turbine layout).</p> <p>Project design specific drainage design removes the potential for significant environmental effects.</p>	<p>Project design specific drainage design removes the potential for significant environmental effects.</p> <p>As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.</p>
Air Quality	<p>Increased potential for impacts on air quality due to an increased vehicles emissions and dust emissions due to an increased volume of material and turbine component deliveries to the site during the construction phase for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Air quality emission effects are neutral for Proposed Wind Farm site Layout Iteration No. 3 (14 turbine layout).</p>	<p>As detailed in Chapter 10, there will be no significant effects on air quality during the construction, and decommissioning phases.</p> <p>There will be a Long-term Moderate Positive Impact on air quality by during the operational phase.</p>
Climate	<p>An increased number of turbines could result in a greater amount of exhaust emissions from construction vehicles and plant</p>	<p>As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Wind Farm site,</p>

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations and all associated Infrastructure	Chosen Option of the Final 14 no. Turbine Layout and all associated infrastructure
	<p>and the transport of materials and workers to/from the Site for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>An increased number of turbines could result in a higher MW output in the operational phase which would result in a greater amount of carbon savings for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Climate related emission effects (losses and savings) are neutral for Proposed Wind Farm site Layout Iteration no. 3 (14 turbine layout).</p>	<p>1,557,430 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 67.2MW of clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in CAP25.</p>
Noise & Vibration	<p>An increased number of turbines could have a greater noise impact for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>The noise impacts are neutral for Proposed Wind Farm site Layout Iteration no. 3 (14 turbine layout).</p>	<p>Fewer turbines will generate reduced noise levels; fewer turbines sited 4x tip height from sensitive receptors.</p> <p>Based on the assessment in Chapter 12 and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels from the Proposed Wind Farm during the construction, operational and decommissioning phases. Predicted noise levels from the chosen layout indicate that the Proposed Wind Farm noise levels fall within best practise noise criteria as recommended in the Guidelines (DoEHLG, 2006).</p>
Landscape & Visual	<p>An increased number of turbines could have a greater visual impact for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Greater potential impact on visual receptors due to location of</p>	<p>The reduced number of proposed turbines layout ensures a setback in excess of the required setback set out in the Draft Guidelines (DoHPLG, 2019). The final layout adheres to the relevant setback from dwellings (500m from all dwellings, 676m for third-party</p>

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations and all associated Infrastructure	Chosen Option of the Final 14 no. Turbine Layout and all associated infrastructure
	<p>infrastructure within designated set-back buffers for Proposed Wind Farm site Layout Iteration No. 1, 2, and 3.</p>	<p>dwelling in the case of the Proposed Project).</p>
<p>Cultural Heritage</p>	<p>Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Potential views of additional turbines increases the potential for indirect effects on the setting of monuments, as it is more likely that greater numbers of turbines will be seen from monuments for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>The cultural heritage impacts are neutral for Proposed Wind Farm site Layout Iteration No. and 3 (14 turbine layout).</p>	<p>As detailed in the assessment in Chapter 14, there will be no significant direct or indirect effects on known or unknown archaeology and cultural heritage during the construction, operation and decommissioning phases.</p> <p>Archaeological monitoring under licence will be implemented during the construction phase.</p>
<p>Material Assets</p> <p>Material Assets- Utilities, Waste Management, Telecommunications and Aviation</p>	<p>Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials and turbine components for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout).</p> <p>Traffic impacts are neutral for Proposed Wind Farm site Layout Iteration no. 3.</p> <p>No material difference between the Proposed Wind Farm site layout Iteration no. 1, 2 and 3 for gas, water, waste management, telecommunications and aviation.</p>	<p>As detailed in Chapter 15, there will be slight to moderate, short-term negative effect on existing road users during the construction phase of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on Site.</p> <p>No material difference between the Proposed Wind Farm site layout Iteration no. 1, 2 and 3 for gas, water, waste management, telecommunications and aviation.</p>

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations and all associated Infrastructure	Chosen Option of the Final 14 no. Turbine Layout and all associated infrastructure
Vulnerability to Major Accidents Natural Disasters	<p>A larger number of turbines could have a greater potential risk relating to major accidents and natural disasters for Proposed Wind Farm site Layout Iteration No. 1 (19 turbine layout) and Layout Iteration No. 2 (15 turbine layout) due to increased land disturbance and larger excavation footprint..</p> <p>Impacts from major accidents and natural disasters are considered to be neutral for Proposed Wind Farm site Layout Iteration No. 3 (14 turbine layout).</p>	<p>As detailed in Chapter 16 the risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low'. The highest risk scenarios to the Proposed Project are considered to be unlikely to occur at any phase of the Proposed Project.</p> <p>A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Chapter 16 of this EIAR.</p>

3.2.5.3 Alternative Roads Layout

Access roads (or tracks) are required onsite in order to enable transport of infrastructure and construction materials within the Proposed Wind Farm site and to facilitate the Proposed Grid Connection. Such roads must be of a gradient and width sufficient to allow safe movement of equipment and vehicles. Approximately 12.1km of new internal roads are required for the Proposed Project along, while approximately 2.1km of existing roads that are primarily currently used for commercial forestry activities will be upgraded. These roads will require upgrading/widening to facilitate the movement of abnormal loads through the Proposed Wind Farm site. Of the 2.1km of existing roads to be upgraded, an approximate 0.3km section of local road L8777 will require minor upgrade works to facilitate the 33kV internal wind farm cabling.

As the turbine layout was finalised, the most suitable routes between each component of the Proposed Project were identified, taking into account the shortest routes and existing forestry tracks and filtering out the physical and environmental constraints of the Site and the associated buffers, and utilising the most direct route between turbines in order to minimise the footprint. Additionally, turning areas were designed and sited for minimum environmental effect along internal roads.

An alternative option to making maximum use of the existing road network within the Proposed Wind Farm would be to construct a new road network, having no regard to existing roads or tracks. This approach was not favoured, as it would require unnecessary disturbance to the Proposed Wind Farm and create the potential for additional cut and fill material to be used in the construction of new road networks. Please see Table 3-5 for a comparison of environmental effects when compared against the chosen option.

Table 3-5 Comparison of environmental effects when compared against the chosen option (maximising the use of the existing road network)

Environmental Consideration	New Road Network	Use and Upgrade/Resurface of Existing Site Tracks/Local Roads
Population & Human Health	Potential for increased impacts on residential amenity due to increased disturbance during the construction stage.	The road upgrades will have potentially less of an impact on population and human health.

Environmental Consideration	New Road Network	Use and Upgrade/Resurface of Existing Site Tracks/Local Roads
Biodiversity & Ornithology	Larger development footprint would result in greater habitat loss compared to the chosen option.	Smaller development footprint will result in a smaller habitat loss.
Land, Soils & Geology	Larger development footprint would result in greater volumes of spoil to be excavated and stored. Larger volume of stone required for road construction. No material difference between the two options for geotechnical/stability.	Smaller development footprint which leads to a reduction in spoil volumes to be excavated. No material difference between the two options for geotechnical/stability.
Hydrology and Hydrogeology	No material difference between the two options.	No material difference between the two options.
Air Quality	More ground disturbance, potential for greater emissions due to more plant on site and longer construction phase would result in increased dust and other emissions.	Less ground disturbance therefore potential for fewer emissions due to fewer plant on site and shorter construction phase.
Climate	No material difference between the two options.	No material difference between the two options.
Noise & Vibration	Potential for increased noise impacts on nearby sensitive receptors during the construction of the new roads.	Potential for less noise impacts on nearby sensitive receptors during the construction of the road upgrades.
Cultural Heritage	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.	Smaller development footprint would decrease the potential for impacts on unrecorded, subsurface archaeology.
Landscape & Visual	There is potential for increased visual impacts for sensitive receptors due to the presence of additional roads being constructed.	There will be a slight reduction in potential for visual impacts during the construction phase due to the decreased presence of plant on site.
Material Assets	Potential for greater traffic movements on site during construction phase due to larger development footprint. No material difference between the two options in potential for impact on gas, water, telecommunications aviation assets.	Smaller development footprint results in a reduced construction traffic movements on site due to smaller development footprint. No material difference between the two options in potential for impact on gas, water, telecommunications aviation assets.
Vulnerability to Major Accidents Natural Disasters	No material difference between the two options.	No material difference between the two options.

3.2.5.4 Alternative Borrow Pit Options

The use of onsite borrow pits represents an efficient use of existing onsite resources and reduces the need to transport large volumes of construction stone materials along the local public road network to the Site. The use of onsite resources, that would only be developed for the Proposed Wind Farm, reduces the use of off-site existing quarry material assets.

A review of potential construction phase borrow pit locations was carried out by geotechnical experts, Fehily Timoney & Company Ltd. (FT), with on-site investigations carried out by Irish Drilling Ltd. under the supervision of FT. Site surveys were undertaken and existing GIS data and environmental constraints were also considered, namely aerial photography, soil and subsoil cover, biodiversity (habitats), onsite drainage and hydrology, proximity to the existing and proposed internal road network, and proximity to sensitive receptors.

Arising from this process, 16 no. trial pit locations were selected over the Proposed Wind Farm site. Trial pits were undertaken at these locations to determine potential suitable locations for onsite borrow pits. The findings of the geotechnical site investigations concluded in the identification of 4 no. borrow pits within the Proposed Wind Farm site to provide construction stone material for the Proposed Project. The extraction of material from the borrow pits will occur during the construction phase of the Proposed Project only, and will be a temporary operation carried out over a short period of time. Rock breaking and blasting are potential methods of extracting material from the borrow pit. Processing and crushing of stone material will also be required at the borrow pit to achieve the grading requirements for use in construction. The estimated maximum volume to be extracted from the borrow pit for the Proposed Project is up to 170,000m³, based on conservative assumptions. The final volumes to be removed from the borrow pits will be confirmed at the time of construction and following detailed pre-construction site investigation works. Engineer's specified material may be imported onto the Site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure, to be sourced from local, licenced quarries.

Following geophysical and environmental assessments it was concluded that the necessary stone required for the Proposed Wind Farm could be sourced onsite. Following this, 4 no. borrow pit locations were identified to supply the stone requirements while keeping the borrow pits at a reasonable size. In the northern turbine cluster, 2 no. borrow pits were identified: borrow pit no. 1 (BP1), located to the south of proposed turbine T05, and borrow pit no. 2 (BP2), which is located in the south of this cluster near the site entrance. In the southern turbine cluster, a further 2 no. borrow pits were identified: borrow pit no. 3 (BP3), which is located southwest of the proposed 110kV onsite substation, and borrow pit no. 4 (BP4), which is located between T9 and T10. These locations were chosen based on a combination of environmental sensitivities, material suitability, depth to bedrock, and ease of access.

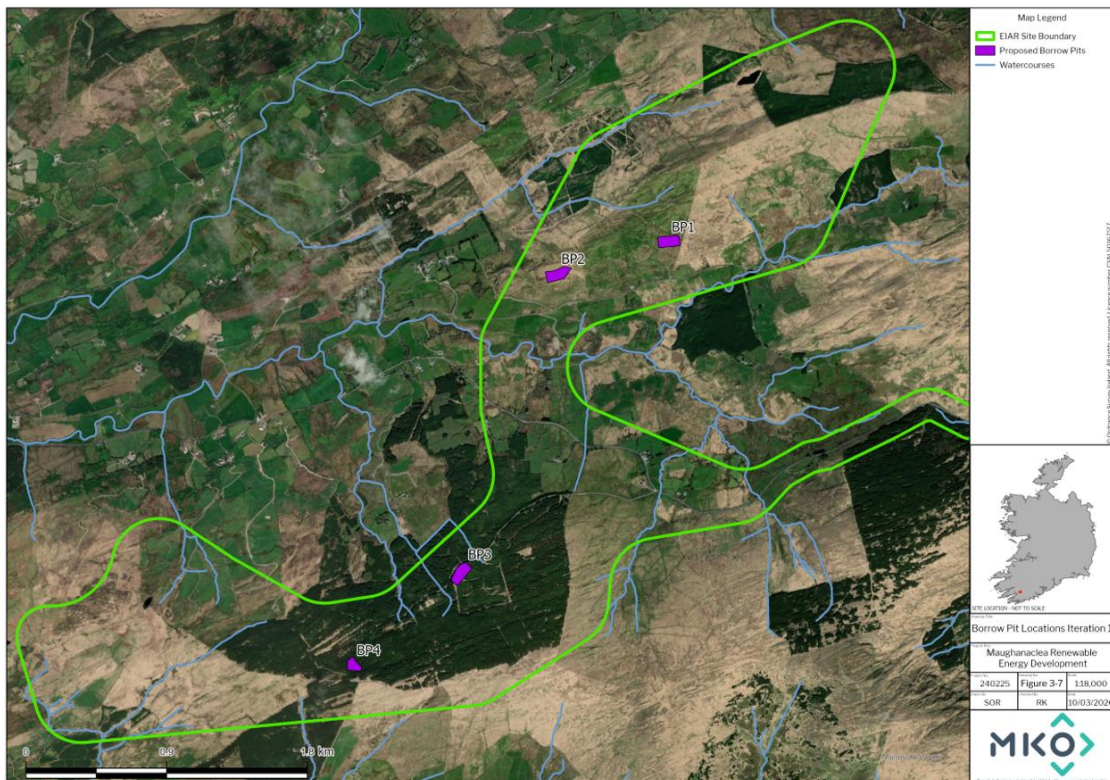


Figure 3-7 Proposed Borrow Pit Locations Iteration No. 1

Following further desk-based studies and site visits, it was determined that in the southern turbine cluster, the position of BP3 was located in close proximity to 2 no. watercourse buffers, which was deemed to be a potential risk from a hydrological perspective. It was also determined that BP4 was located in areas of deeper peat relative to the surrounding areas, and was not of a sufficient size to acquire the necessary stone volume requirements. As a result, BP3 was moved northeast towards the

site entrance to reduce the potential for any potential impacts on watercourses. BP4 was moved to the west, and its footprint was expanded to increase the overall extraction area.

In the northern turbine cluster, the location of BP2 was identified as being more suitable for a temporary construction compound, and this borrow pit was moved to the northeast. Following this adjustment, it was then considered that BP1 was in too close proximity to BP2, and BP2 was subsequently moved to the northeast. It was also determined that the required stone volumes could be sourced from borrow pits with smaller footprints, allowing the sizes of both BP1 and BP2 to be reduced accordingly.

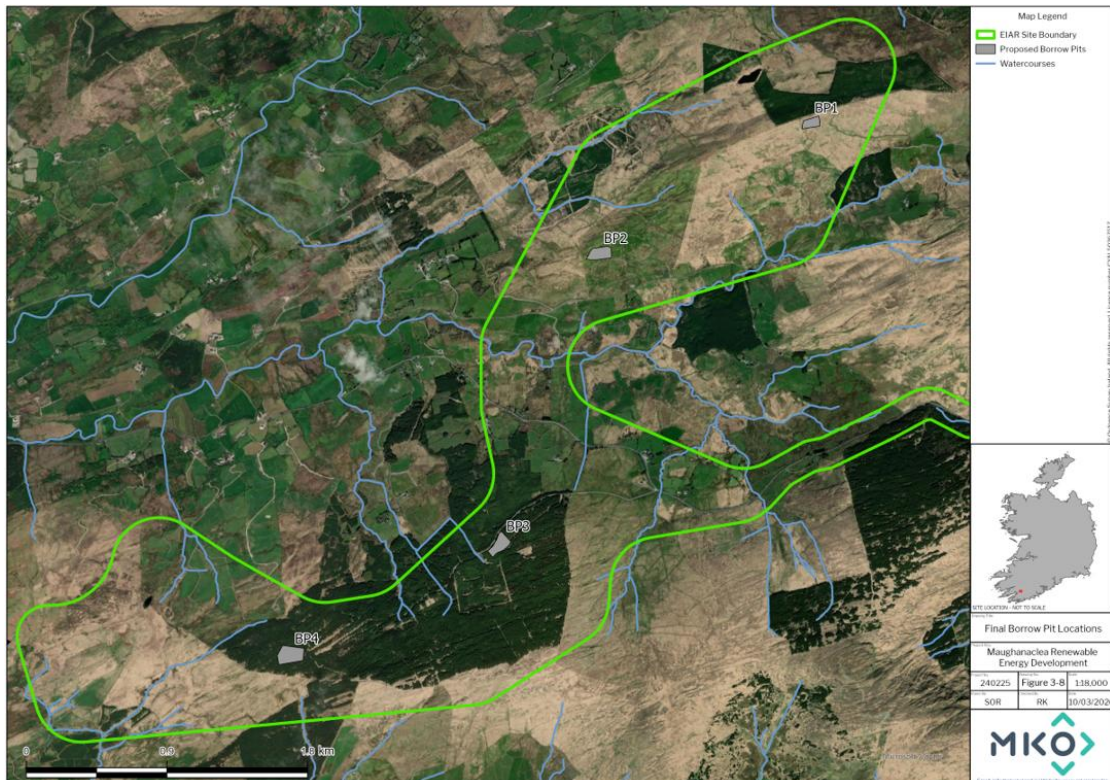


Figure 3-8 Final Proposed Borrow Pit Locations

BP2 will be opened first in the northern turbine cluster, and BP3 will be opened first in the southern turbine cluster, with the stone from these borrow pits being used to build the necessary infrastructure to reach the remaining borrow pits. The 4 no. proposed borrow pit locations for the Proposed Wind Farm were ultimately chosen due to their strategic locations adjacent to existing and proposed access roads and the relatively shallow depth to bedrock at each location. The 4 no. borrow pits offers adequate quantities of suitable rock and benefits from some existing hard surfacing, which will reduce the need for new ground disturbance. Overall, the proposed borrow pits present the best balance of geophysical suitability, environmental responsibility, and operational practicality.

An alternative to using onsite borrow pits was the option of sourcing all stone and materials from a licensed quarry or quarries in the vicinity of the Site. The movement of the volume of material required for the construction of a 14 no. turbine wind farm would result in a significant increase in construction traffic and heavy loads, in combination with a potential for an increase in noise and dust emissions along the haul routes and was therefore considered a less preferable option. The cost of importing the required volume of crushed stone was also a factor in choosing to obtain stone from the onsite borrow pits.

A comparison of the potential environmental effects when comparing the sourcing of all stone from local, off-site quarries against the chosen option (majority from on-site borrow pit) is presented in Table 3-6 below.

Table 3-6 Comparison of environmental effects of sourcing all materials off site when compared against the chosen option – onsite borrow pits

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pits
Population & Human Health	Potential for increased vehicular, noise and dust emissions from increased traffic movements, due to the volume of rock to be transported to the site along the public road network, which could be a nuisance to local residents along the haul route.	Lower dust and noise emissions, and traffic volumes due to reduced requirement for daily HGV presence on site during the construction phase. Temporary dust and noise emissions related to borrow pit extraction however, due to vegetation screening and distance from sensitive receptors, the residual effects are not significant.
Biodiversity & Ornithology	Reduced habitat loss and ground disturbance for flora, fauna and birds.	<p>Increase in habitat loss due to borrow pit footprint however, as assessed in the Biodiversity chapter, this is habitat of low ecological value which comprises the majority of the site and surrounding landscape. Furthermore, the borrow pits will be left to naturally revegetate post construction.</p> <p>Reduction in requirement for peat and spoil management areas.</p> <p>No material difference between the two options in relation to geotechnical and stability concerns. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p>
Land, Soils & Geology	<p>Slight reduction in spoil to be excavated, however, additional spoil placement areas would be required as an on-site borrow pit would not be available for the placement of excavated spoil.</p> <p>No material difference between the two options in relation to geotechnical and stability concerns. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p>	<p>Reduction in requirement for peat and spoil management areas.</p> <p>No material difference between the two options in relation to geotechnical and stability concerns. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p>
Hydrology and Hydrogeology	Smaller development footprint and reduced potential for silt laden runoff to enter receiving watercourses.	Larger development footprint and increased potential for silt laden runoff to enter receiving watercourses.
Air Quality	Potential for increased vehicular and dust emissions from increased traffic	More ground disturbance due to onsite borrow pit which can give rise

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pits
	movements within the site, due to the volume of rock to be imported.	to dust emissions however, lower traffic volumes arriving and departing site per day and reduced onsite traffic volumes therefore reducing dust and noxious emissions overall.
Climate	No material difference between the two options.	No material difference between the two options.
Noise & Vibration	Increased potential for noise and vibration effects on local sensitive receptors due to arrival and departure of heavy goods vehicles during the construction phase and reduced potential for noise and vibration effects on local sensitive receptors due to no breaking or crushing of materials won from onsite borrow pit.	Reduced potential for noise and vibration effects on local sensitive receptors due to arrival and departure of heavy goods vehicles during the construction phase, and increased potential for noise and vibration effects on local sensitive receptors due to breaking or crushing of materials won from onsite borrow pits.
Cultural Heritage	Slightly smaller development footprint would reduce the potential for impacts on unrecorded, subsurface archaeology.	Slightly larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.
Landscape & Visual	Reduced landscape and visual effects temporarily as no open rock face would be visible from certain viewpoints. Increased visual impact due to frequent arrival and departure of HGVs to and from the Site.	Potential for increased landscape and visual effects temporarily due to open rock face which may be visible from certain viewpoints. However, there would be a reduced HGV presence on site and on the local road network as materials will be won onsite. Furthermore, the borrow pit will be reinstated onsite once exhausted.
Material Assets	Significantly higher HGV traffic volumes on the public road network during construction phase due to the volume of crushed stone required to be transported to the site and empty HGVs leaving the site. No material difference between the two options in potential for impact on waste management, telecoms, aviation, electricity, water or gas.	Reduced volume of HGVs traffic volumes on the public road network during construction as a considerable portion of materials will be won on site. Decreased potential for noise, dust and emissions due to the reduced volumes of HGV traffic on the roads. No material difference between the two options in potential for impact on waste management, telecoms, aviation, electricity, water or gas.
Vulnerability to Major Accidents Natural Disasters	No material difference between the two options.	No material difference between the two options.

3.2.5.5 Alternative Enhancement Area Proposals

The selection of the proposed biodiversity management and enhancement areas within the Proposed Wind Farm site was an iterative process. This section looks to identify the development and iterative process of the enhancement and mitigation locations. The final enhancement and mitigation measures are detailed within Appendix 6-4: Biodiversity Management Enhancement Plan (BMEP). The aim of the biodiversity enhancement areas is to facilitate the enhancement of peatland and wet heath habitat within the Proposed Wind Farm site, while also offsetting the losses of degraded wet heath to facilitate the Proposed Project.

Biodiversity Enhancement Areas Iteration No. 1



Figure 3-9 Biodiversity Enhancement Areas Iteration No. 1

Desk-based studies and site surveys identified that habitats within the Proposed Wind Farm site are largely fragmented. Figure 3-9 presents the initial broad areas within which potential habitat enhancement opportunities were assessed following a desktop review. The areas sought to reduce habitat fragmentation and enhance connectivity with existing wet heath and peatland habitats, primarily through the removal of conifer plantation.

The mature conifer plantation in the northern turbine cluster was discounted following site surveys, as no evidence of remnant heath habitats was identified. The southern plantation area was also excluded due to steep slopes and the associated risk of peat instability resulting from felling operations and potential stump removal.

In addition to the wet heath and peatland enhancement proposals, an area of recently planted native woodland was identified within the southern turbine cluster of the Proposed Wind Farm site. An initial enhancement option considered the expansion of this native woodland through the felling of adjacent conifer plantation and replanting with native woodland, with the aim of increasing the extent of the existing native woodland habitat.

Biodiversity Enhancement Areas Iteration No. 2

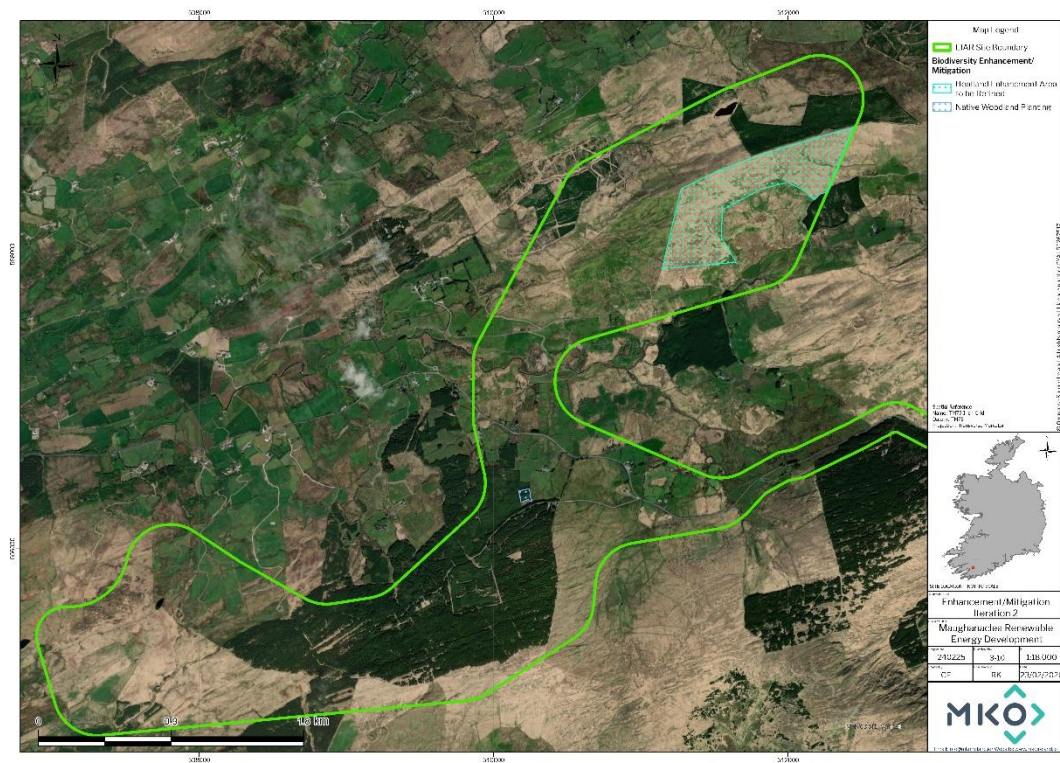


Figure 3-10 Biodiversity Enhancement Areas Iteration No. 2

The second iteration of enhancement areas identified a large area of recently planted conifer forestry in the northern turbine cluster as shown in Figure 3-10 above. This area was identified as a broad area likely to be suitable for enhancement that would be further refined following field surveys.

Iteration No. 2 also re-examined opportunities to expand the previously identified native woodland area. The second iteration retained a corridor of conifer trees to preserve a foraging route for bats and to provide shelter for the proposed native planting.

Biodiversity Enhancement Areas - Final Iteration

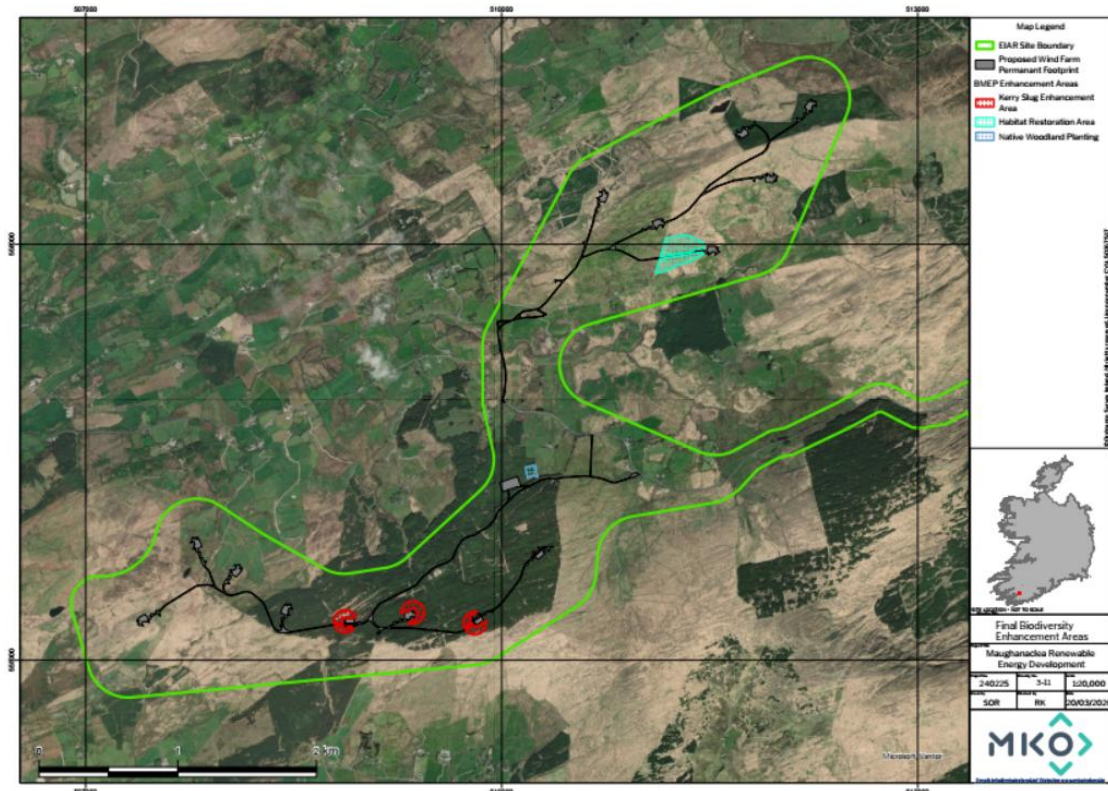


Figure 3-11 Final Biodiversity Enhancement Areas

The final iteration refined the peatland habitat enhancement area to an area of 5.3 hectares. The final peatland enhancement area improves connectivity between existing areas of wet heath and offsets the degraded wet heath habitat being lost to facilitate the Proposed Wind Farm. A total of 0.54h hectares of commercial forestry within the Proposed Project will be felled and planted with native woodland.

Along with the native woodland area identified in iteration 2, further enhancement measures were identified for other relevant species in the Proposed Wind Farm site. Three areas of Kerry slug enhancement areas were identified, making use of the bat felling buffers at proposed turbines T8, T9 and T10. Enhancement will include the felling of existing conifer plantations within the 3 no. felling buffers and leaving the stumps in place and to protrude from the additional peat and spoil deposits, as these provide refuge for this species. These areas combined amount to approximately 3.9 hectares.

3.2.5.6 Alternative Design of Ancillary Structures

The ancillary structures required for the Proposed Project include underground electrical cabling, the onsite meteorological (met) mast, and temporary construction compounds.

3.2.5.6.1 Alternative Internal Site Cabling Route

The internal 33kV site cabling will follow the internal road network throughout the Proposed Wind Farm site, connecting all 14 no. turbines to the proposed 110kV onsite substation. While this means that a longer cable route will be needed, it was considered the more environmentally prudent option. The alternative to this would be to lay the cables 'as the crow flies' between the turbines and the proposed 110kV onsite substation, however this would lead to a greater environmental disturbance and a greater volume of peat and spoil requiring management.

3.2.5.6.2 **Alternative Meteorological Mast Location**

The met mast is located at the northeast of the Proposed Wind Farm. The met mast is located in an area of commercial forestry, which was shown to be an area of low ecological value. The proposed met mast was originally proposed to be located at 507842.47, 555531.45 (ITM). As the design of the Proposed Wind Farm progressed and site surveys were undertaken, ecological surveys identified the Area as likely conforming to Annex I habitat, and therefore the location of the met mast was moved approximately 1.3km to its chosen location at 509109.01, 555194.72 (ITM).

While other locations to situate the proposed met mast within the Proposed Wind Farm site were examined, the above location was deemed to be most suitable due to the low ecological value of the habitat.

3.2.5.6.3 **Alternative Temporary Construction Compounds Location**

The temporary construction compounds will be used for the storage of construction materials, staff facilities and car-parking areas for staff and visitors. The use of 3 no. temporary construction compounds (inclusive of the temporary construction compound at the proposed 110kV onsite substation) was deemed preferable to the alternative of a single large compound. Principally, it will result in shorter distances for traffic movements within the Site and between the two turbine clusters of the Proposed Wind Farm during construction. As the Proposed Project layout became more defined, the temporary construction compounds were sited to facilitate the most efficient flow of construction processes within the Site.

The temporary construction compounds are located strategically within each section of the Proposed Wind Farm site to facilitate the construction of the various infrastructure components and to avoid sensitive habitats and other onsite constraints as identified in Section 3.2.5.2.1 above. As a result, vehicle emissions and the potential for dust arising will be reduced and the proposed 3 no. temporary construction compounds will have no impact on sensitive ecological habitats or other identified onsite constraints.

3.2.5.7 **Alternative 110kV Substation Option**

The identification of a suitable substation location was informed by a range of environmental, technical, and socio-economic considerations. Site selection was undertaken with the objective of minimising potential environmental effects while ensuring technical and operational feasibility. The principal constraints and features assessed as part of this process included:

- **Minimum distance from turbines** – typically at least 2 times the turbine fall distance, to ensure safety and compliance with regulations.
- **Natural screening** – preference for locations that benefit from existing topography or vegetation to reduce visual impact.
- **Grid connection feasibility** – proximity to the national grid, with a focus on achieving the shortest and most efficient cable route to minimise land disturbance and potential environmental effects.
- **Proximity to residential receptors**, ensuring appropriate separation distances from dwellings to limit potential effects related to noise, visual impact, and general amenity.
- **Ecological and Environmental constraints**, avoidance of designated sites, sensitive habitats, protected species, watercourses, flood zones, national monuments etc..
- **Land availability**– suitability of land size, access rights, and landowner agreements.
- **Planning and regulatory constraints** – compliance with local planning policies, zoning, and statutory requirements.

Based on the above two separate options were evaluated for the proposed 110kV onsite substation location.

The first option considered a substation located along the proposed access road to the northern turbine cluster, to the north of the R585 regional road, while the second option looked at a substation located within an area of forestry, adjacent to the existing access track leading to the southern turbine cluster.

3.2.5.7.1 Iteration No. 1 - Substation North of the R585

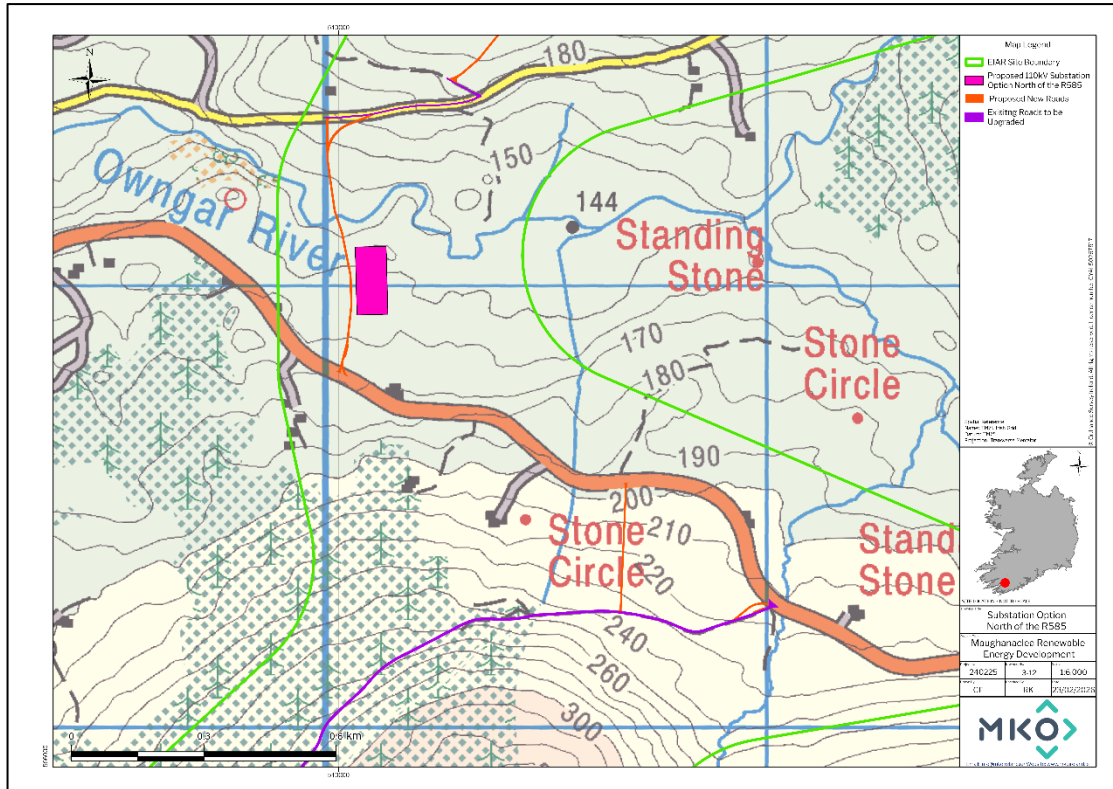


Figure 3-12 Iteration No. 1: Substation option along access road to the northern turbine cluster

The first substation location iteration, as shown in Figure 3-12 above, considered a substation location that would be accessed via the proposed new site entrance road to the northern turbine cluster off the R585. This location was chosen due to its proximity to the road network, which would reduce land disturbance that may be caused by the underground cabling connection to the national grid and also make it easily accessible for maintenance access. This location also falls outside the minimum distance to turbines and avoids any sensitive habitats. This location is within agricultural land consisting of wet grassland and scrub, and coniferous forestry.

The topography here slopes down towards the Owngar River to the north, which may have potential to result in adverse impacts to the watercourse during construction of the substation. It was also considered that this location would be visually prominent from surrounding public roads and sensitive receptors; there are a number of sensitive receptors in close proximity to this location, with the closest being approximately 200 metres away.

3.2.5.7.2 Iteration No. 2A - Substation along access road in southern turbine cluster

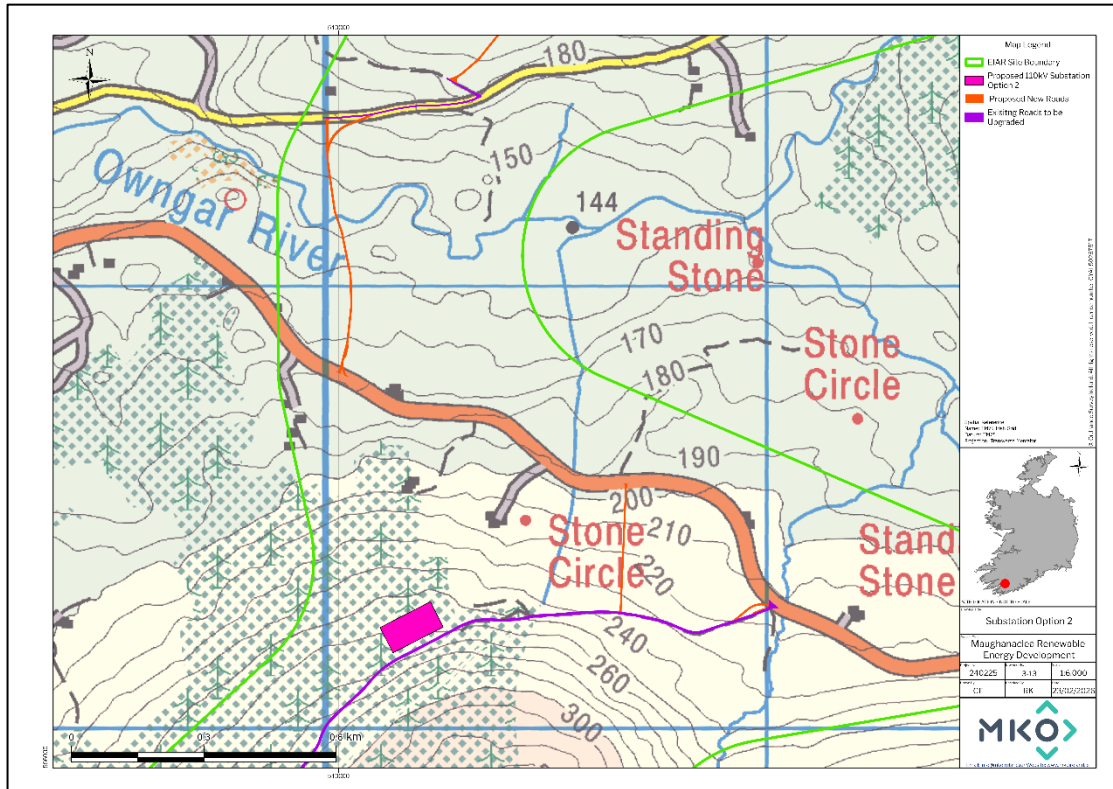


Figure 3-13 Iteration No. 2A: Substation option location along access road to the southern turbine cluster

The second iteration located the substation along the existing forestry road within the southern turbine cluster. This option is strategically positioned within the Proposed Wind Farm site, adjacent to existing site access tracks and close to the public road network within which the Proposed Grid Connection underground cabling route will connect to the existing 110kV Dunmanway substation.

After determining that the southern turbine cluster was the more suitable option for the onsite substation, site surveys and public consultation were undertaken. It was identified that an area of recently planted native woodland overlapped with the substation location shown in Figure 3-13 above. It was also determined that this substation location was in proximity to nearby sensitive receptors. In order to avoid the area of native woodland and ensure appropriate setback from sensitive receptors, the substation was moved west into an area comprised of non-native conifer plantation. The area of native woodland is now being expanded as part of the Proposed Project's biodiversity enhancement measures, as outlined in Section 3.2.5.5 above and in Appendix 6-4 of this EIAR.

3.2.5.7.3 Iteration No. 2B - Substation along access road in southern turbine cluster (chosen option)

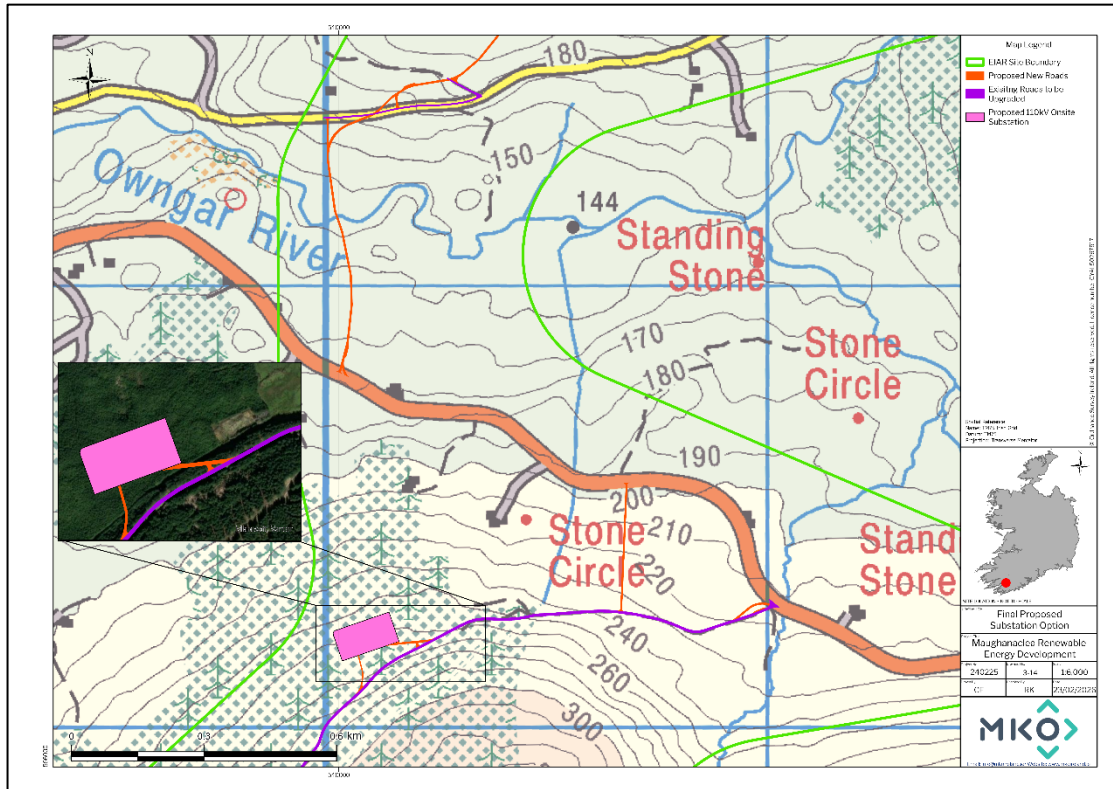


Figure 3-14 Iteration No. 2B: Final substation location along access road to the southern turbine cluster – chosen option

The final substation location is shown in Figure 3-14 above. This area is of low ecological value, situated within an area of commercial conifer plantation, and is screened from sensitive receptors by topography and vegetation. This location also achieves a greater distance to the closest sensitive receptors. The strategic placement of the substation within this tract of forestry, a location enclosed and visually contained by prominent landforms ensures that the substation will not be visible from nearby receptors such as the residents and the R585 Regional Road. Ground investigations were carried out at the location of the proposed 110kV onsite substation to determine whether the ground conditions were suitable for constructing the substation. The results of these surveys showed that the ground conditions are suitable, and therefore, no further micro siting of the substation compound was required.

This chosen location, as shown in Figure 3-14 above, was deemed to be suitable due to the low ecological value of the habitats it is located on, proximity to the local road network for which to facilitate the connection of the Proposed Wind Farm to the national grid, the presence of screening, and the existing ground conditions.

3.2.5.8 Alternative Grid Connection Cabling Route Options

The Proposed Wind Farm will connect to the national grid via underground electrical cabling, located primarily within the public road corridor, with a short section (approximately 940m) passing through the existing on-site access track and area of commercial forestry within the Proposed Wind Farm site. Underground electrical cables will transmit the power output from each wind turbine to the proposed 110kV onsite substation, and from there to the existing Dunmanway 110kV substation, via an underground electrical cabling route, measuring approximately 20.5km in length.

A key consideration in determining the grid connection method for a proposed wind energy development is whether the cabling is underground or run as an overhead line. An alternative to the c.

20.5km underground cabling route would be to construct an approximately 15km long overhead line from the proposed onsite substation to the existing 110kV Dunmanway substation. While overhead lines are less expensive and allow for easier repairs when required, underground cabling will have no visual impact. For this reason, it was considered that underground lines would be a preferable alternative to overhead lines. The Guidelines (DoEHLG, 2006) also indicate that underground cables are the preferred option for connection of a wind energy development to the national grid. The Proposed Grid Connection will follow the route of existing public roads, thereby minimising the amount of ground disturbance required and will have a reduced permanent visual impact due to the placement of the cabling route underground, with no above ground infrastructure visible in the operational phase.

Additionally, consideration was given to installation of the grid connection within private lands adjacent to the public road network. However, as the existing Dunmanway 110kV substation is located approximately 15 km southeast of the proposed 110kV onsite substation (as the crow flies), it was considered that this was not a feasible option, due to the need for constructing 9.4 km of new road across private lands to facilitate the construction and operation of the underground cabling.

The Megawatt (MW) output of the Proposed Wind Farm is such that it needs to connect to a 110kV substation. There are 8 no. existing 110kV electricity substation located within 25km of the Proposed Wind Farm, namely:

- > Dunmanway 110kV substation
- > Carrigdangan 110kV substation
- > Ballylickey 110kV substation
- > Clonkeen 110kV substation
- > Coomagearlahy 110kV substation
- > Glanlee 110kV substation
- > Coomataggart 110kV substation
- > Coomagearlahy 110kV substation

Following initial grid connection studies, Dunmanway 110kV substation was identified as the optimum connection node for the Proposed Project. An underground grid connection underground cabling route to Dunmanway 110kV substation was considered and assessed to identify whether it was a viable option. This assessment outlines 2 no. possible routes from the Proposed Wind Farm to Dunamnnaway 110kV substation, which were considered during the iterative design process.

The early iterative design process also explored the potential of connecting to the Proposed Wind Farm to the Carrigdangan 110kV substation, as illustrated in Figure 3-15.

The Proposed Grid Connection underground electrical cabling route has been revised and refined to take account of the findings of the site investigations and baseline assessments, which have brought the design from its initial option as presented in Figure 3-15 to the current layout as presented in Figure 3-17.

3.2.5.8.1 Proposed Grid Connection Underground Cabling Route Iteration No. 1

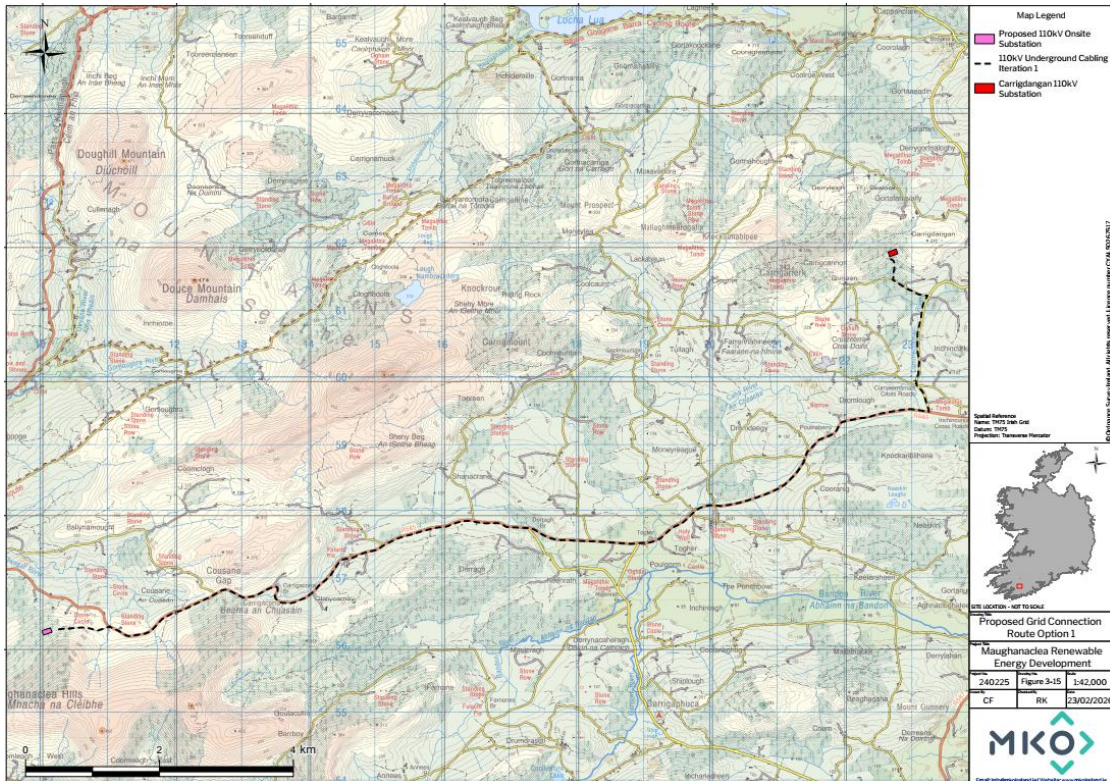


Figure 3-15 Proposed Grid Connection Options - Iteration No. 1

The first iteration examined to connect the Proposed Wind Farm to the Carrigdangan 110kV substation located to the northeast of the Proposed Wind Farm site. This route is approximately 17.5 km long.

The route travels along the R585 for 14.7 km, with a high volume of traffic using this road. With the goal of limiting the disruption to traffic, it was determined that it would be appropriate to seek out a less constrained alternative underground cabling route.

3.2.5.8.2 Proposed Grid Connection Underground Cabling Route Iteration No. 2A

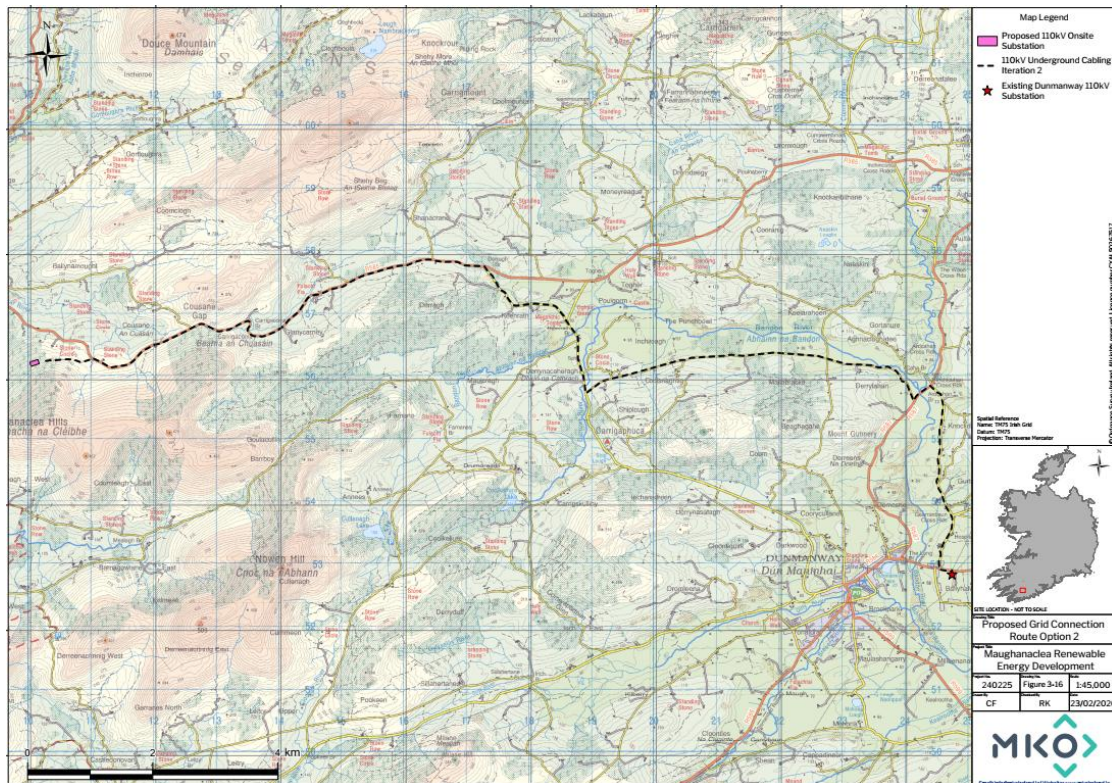


Figure 3-16 Proposed Grid Connection Options – Iteration No. 2A

After turning off the R585, this route takes advantage of local roads for the majority of the route, taking into consideration effects of traffic during the construction phase of the Proposed Project. This underground cabling route option originates at the proposed 110kV onsite substation and is routed east for approximately 940m through the Proposed Wind Farm site towards the R585. The underground cabling route exists the Proposed Wind Farm and continues along the R585 for approximately 7km, before following the L4609, L4909 and L4615 Local Roads for approximately 8.6km. The underground cabling route is then routed north briefly for 380m on the R587, the route then continues south on the L4621 for 3.1km before turning onto the R586 Regional Road for 200m, and finally exiting the R586 to the right and into the existing 110kV Dunmanway Substation in the townland of Ballyhalwick.

Following further assessments, this route was ruled out due to the existing number of cables in the L4621. As a result, Iteration No. 2B below was identified.

3.2.5.8.3 Proposed Grid Connection Underground Cabling Route Iteration No. 2B – Final Proposed Grid Connection Layout

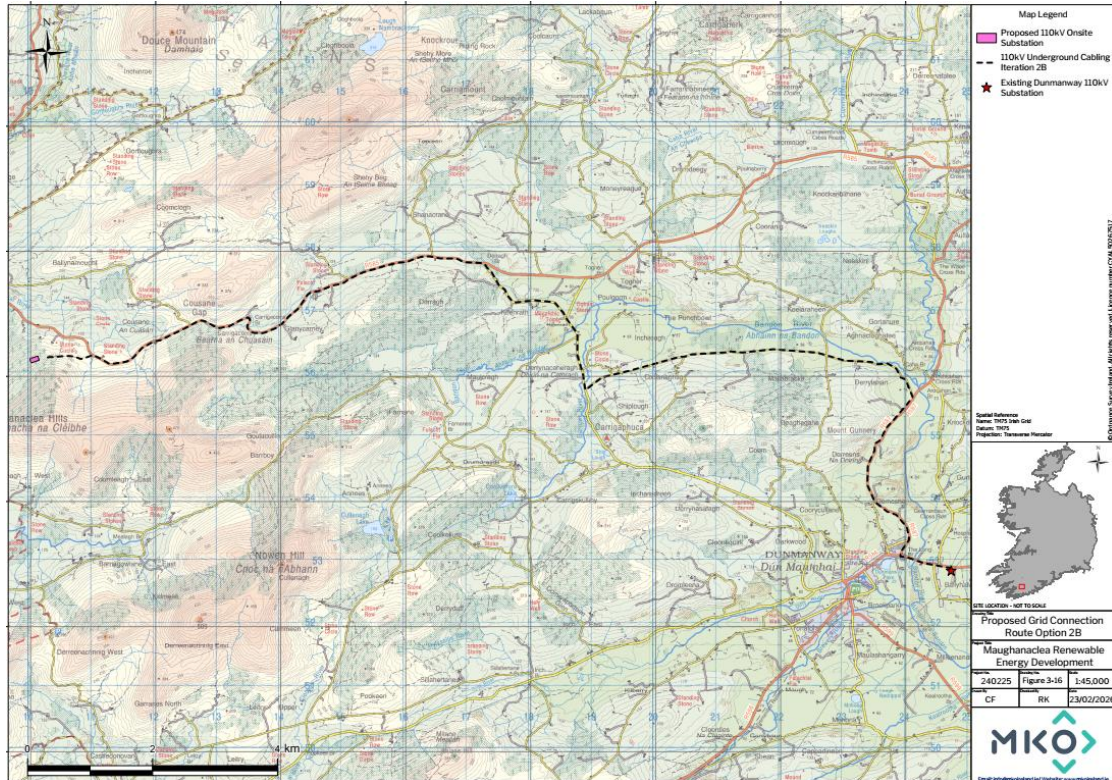


Figure 3-17 Proposed Grid Connection Options – Iteration No. 2B: Final Proposed Grid Connection Route

The chosen and final Proposed Grid Connection option is to connect the Proposed Wind Farm to the existing Dunmanway 110kV substation.

After turning off the R585, this route takes advantage of local roads for the majority of the route, taking into consideration effects of traffic during the construction phase of the Proposed Project. The Proposed Grid Connection underground electrical cabling route will originate at the proposed 110kV onsite substation, and from there will run southeast for approximately 130m through an existing conifer plantation within the Proposed Wind Farm site. The Proposed Grid Connection will then travel east for approximately 810m through an existing access road within the Proposed Wind Farm site, towards the R585. The Proposed Grid Connection then exists the Proposed Wind Farm's southern turbine cluster site entrance to the east, and travels along the R585 for approximately 7km. The Proposed Grid Connection then turns right and follows the L4909 and L4609 for approximately 3km in a generally southeast direction. The Proposed Grid Connection then turns left and is routed along the L4615 in an easterly direction for approximately 5.7km. The underground cabling route then turns right onto the R587 and runs south towards Dunmanway for approximately 3km, before turning left and travelling east on the R586. After 825m the Proposed Grid Connection exits the R586 to the south and enters the existing Dunmanway 110kV substation in the townland of Ballyhalwick.

The route passes through the outskirts of Dunmanway town centre and therefore traffic impacts are anticipated, however as discussed in Chapter 15 (Material Assets), due to the Proposed Grid Connection construction works taking place in 100 metre sections, the works will be short-term and transient in nature and significant adverse traffic impacts are not anticipated. The shorter distance (10.5km) travelled on the regional road network when compared to Option 1 (14.7km) is expected to have a reduced impact on traffic and transport. Iteration No. 1 includes 4.2km of additional cabling in the regional road network.

3.2.5.9 **Alternative Turbine Component Delivery Option and Site Access Points**

Wind turbine components (blades, nacelles and towers) are not manufactured in Ireland and therefore must be imported from overseas and transported overland to the Proposed Wind Farm. With regard to the selection of a transport route to the Proposed Wind Farm, alternatives were considered in relation to turbine components, general construction-related traffic, and site access locations.

3.2.5.9.1 **Alternative Ports of Entry**

The ports considered for the port of entry of wind turbine components into Ireland for the Proposed Wind Farm site include Dublin Port, Shannon-Foynes Port, the Port of Cork, and the Port of Galway. The Port of Cork is the principal deepwater facility on the South Coast and caters for dry bulk, break bulk, liquid and project cargoes. The Port of Cork also offers a roll-on roll-off procedure to facilitate import of wind turbine components. All of the aforementioned ports have been used for the importing of turbine components. As stated, all ports mentioned above have a proven track record in the handling and subsequent transport of large turbine components. The final selection will be driven by commercial, availability and scheduling considerations. There are clear access routes for all four ports utilising the motorway network to the proposed haul route to the Site. For the purpose of this EIAR, the Port of Cork, in Ringaskiddy, Co. Cork was selected as the port of entry for the proposed turbines due to its proximity and ease of access to the Proposed Wind Farm, and has been assessed in detail in Chapter 15 of this EIAR.

3.2.5.9.2 **Alternative Turbine Component Delivery Option**

The Proposed Wind Farm is located approximately 32km southwest of the N22/R585 junction and, as such, delivery of turbine components from this direction were considered as part of the iterative design process for the Proposed Project. The proposed Turbine Delivery Route (TDR) leaves Ringaskiddy on Ringaskiddy Rd (N28), following the N28 right onto Carr's Hill, merging onto the Cork south Ring Rd (N40), continuing on the N22 until turning southwest onto the R585 Regional Road. The TDR continues on the R585 before reaching the Site in the townland of Maughanaclea where it will turn left onto the existing access track to reach the southern turbine cluster, or turn right onto the new proposed site entrance off the R585 to reach the northern turbine cluster.

This route has been proven suitable for the transport of turbine components, and the transport analysis (as presented in Section 15.1 of this EIAR) has determined that only minor accommodation works will be required to accommodate the proposed turbine components. The turbine transport route will utilise the national and regional roads available to ensure the road network holds the capacity to manage large loads.

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. As detailed in Section 15.1 of this EIAR, turbine components will be delivered to site using a blade trailer. When considering turbines transport routes, alternative modes of transport, as well as alternative points of access were also considered. Alternatively, depending on the selected turbine delivery route and the turbine manufacturer, a blade adapter or blade transporter may also be used, if deemed appropriate, for delivery of turbines to the Proposed Wind Farm.

It should be noted that all component deliveries (abnormal loads) will be undertaken as described in the Traffic Management Plan in Appendix 15-2, which will be submitted and agreed with the local authorities and roads authorities upon consent of this application. All component deliveries will be subject to escort by An Garda Síochána. All manoeuvres around junctions and into the Proposed Wind Farm site entrances will be supervised by a qualified team of turbine delivery experts. The abnormal load entrance will be temporary in nature, over a short period of the construction phase only. The abnormal load entrance will be reinstated after all abnormal loads have been delivered to the Site.

However, should replacement components be required, this entrance will be temporarily reopened to facilitate such works. Please see section Chapter 15: Material Assets for further details.

3.2.5.9.3 **General Construction and Operational Entrances**

There are a number of existing access points to the Proposed Wind Farm site. These comprise the existing site access road to the southern turbine cluster, as well as private farm access points and the local road network to both the northern and southern turbine clusters. An initial review of these existing locations was carried out to identify the most suitable locations for wind farm construction and operational site entrances.

In the northern turbine cluster, the existing farm entrances off the L8777 and L87771 local roads were deemed unsuitable for construction traffic and delivery of turbine components due to the lack of adequate sightlines and significant areas of land take that would be required. Use of these local roads were not considered appropriate from a traffic management perspective. Therefore, a new construction site entrance off the R585, which has achieved the necessary sightlines, is proposed for general construction (inclusive of abnormal load delivery) and operational access, and is also considered suitable as an operational entrance for maintenance staff. Only a short section (approximately 150m) of the L8777 will be utilised by maintenance staff when entering the northern turbine cluster.

It was considered the most appropriate and environmentally prudent option to utilise the existing entrance and access road to the southern turbine cluster for general construction (inclusive of abnormal load delivery) and operational access. The upgrading of this site entrance, as described in Chapter 15, will achieve the necessary sightlines that are proposed for general construction (inclusive of abnormal load delivery) and operational access, and is considered suitable as an operational entrance for maintenance staff and ESBN (for substation access). An autotrack assessment confirmed the suitability of the proposed new site access off the R585 to the northern turbine cluster, as well as the existing site entrance off the R585 to the southern turbine cluster, for all HGVs, construction traffic vehicles, and abnormal load entry with minimal land take requirements and minimal environmental impacts.

3.2.6 **Alternative Mitigation Measures**

Mitigation by avoidance has been a key aspect of the Proposed Project's evolution through the selection and design process. Avoidance of the most ecologically sensitive areas and geotechnically unstable areas of the site limits the potential for environmental effects. As noted above, the layout aims to avoid any environmentally sensitive areas. Where loss of habitat occurs at the Site, this has been offset with the proposal of habitat enhancement and improved habitat connectivity with hedgerow planting at the Proposed Wind Farm site.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the Site and any identified environmental receptors. The alternative is to either not propose these measures, or propose measures which are not best practice and effective, and neither of these options are sustainable.