Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Slievegrine Renewable Energy Development, Co. Waterford

Chapter 3 – Consideration of Reasonable Alternatives



3. CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU[1] 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/EU[2] (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', 'Proposed Turbines', the 'Proposed Grid Connection', 'Proposed 110kV Substation', 'Proposed 220kV Loop-in Substation', 'Proposed 110kV Underground Cabling Route', the 'Site', 'Proposed Wind Farm site' and 'Proposed Grid Connection site'. A detailed description of the Proposed Project is provided in Chapter 4: Description of the Proposed Project of this EIAR.

This chapter of the EIAR contains a description of the reasonable alternatives that were studied by the Applicant, 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. This chapter 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 is 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 Communications Relay Mast
- Alternative 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 and agricultural pasture within the Proposed Wind Farm; and public road corridor and agricultural pasture along the Proposed 110kV Underground Cabling Route (approximately 9km). 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 described above 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 and Human Health	No increase in local employment and no long-term financial contributions towards the local community. No potential for shadow flicker and noise to affect sensitive receptors. No potential for effects on visual amenity due to the construction and operation of turbines. No potential for positive effects on air quality and climate change targets. No potential to supply an estimated 106,000 homes with clean renewable electricity	Approximately 120-150 jobs could be created during the construction, operation, and maintenance phases of the Proposed Project. Based on the assessment detailed in Chapter 5: 'Population andand 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. As detailed in the assessment in Chapter 10, the Proposed Project will have a long-term moderate positive impact on air quality. 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. As detailed in Chapter 13: Landscape and Visual Impact Assessment (LVIA), the Proposed Turbines 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.
Biodiversity (including Birds)	No habitat loss. No potential for collision risk for birds and bats	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.

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
	No potential biodiversity enhancement measures would be put in place.	The Proposed Project includes for a BMEP, providing a boost to local biodiversity. Please see Appendix 6-4 for details. 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. 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 effect significance.
Land, Soils and Geology	Neutral. No excavation of large volumes of spoil.	As detailed in the assessment in Chapter 8: 'Land, Soils and Geology', no significant effects on land, land use, soil and bedrock will occur. Topsoil, rock and subsoil excavation volumes will be managed within the void borrow pits and used as for landscaping within the Site. Geotechnical investigations as well as mitigation by good design will lead to no significant environmental impacts.
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 Quality, there will be no significant effects on air quality during the construction, and decommissioning phases. There will be a Long-term Moderate Positive, Indirect impact on air quality during the operational phase.
Climate	Neutral. Will not provide the opportunity for a contribution to the reduction of greenhouse gases. 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 Project, 79,376 tonnes of carbon dioxide per annum will be displaced from traditional carbon-based electricity generation. Over the proposed 35-year lifetime of the Proposed Project therefore, 2,778,170 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 145.2MW of clean energy to the national grid will be a positive contribution to the States renewable energy targets set

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
		out in the Climate Action Plan 2025 (CAP25).
Noise andand Vibration	Neutral. No potential for noise impacts on nearby sensitive receptors.	Based on the assessment detailed in Chapter 12: 'Noise andand 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 andand 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 recorded or the 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 negligible to slight, temporary to 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 '*A Framework for Major Emergency Management – A Guide to Regional Risk Assessment'* (DoEHLG, 2024)[3]. The Proposed Project will be designed and built in accordance with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will

[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
		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.

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 Waterford, 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, Slievegrine 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*

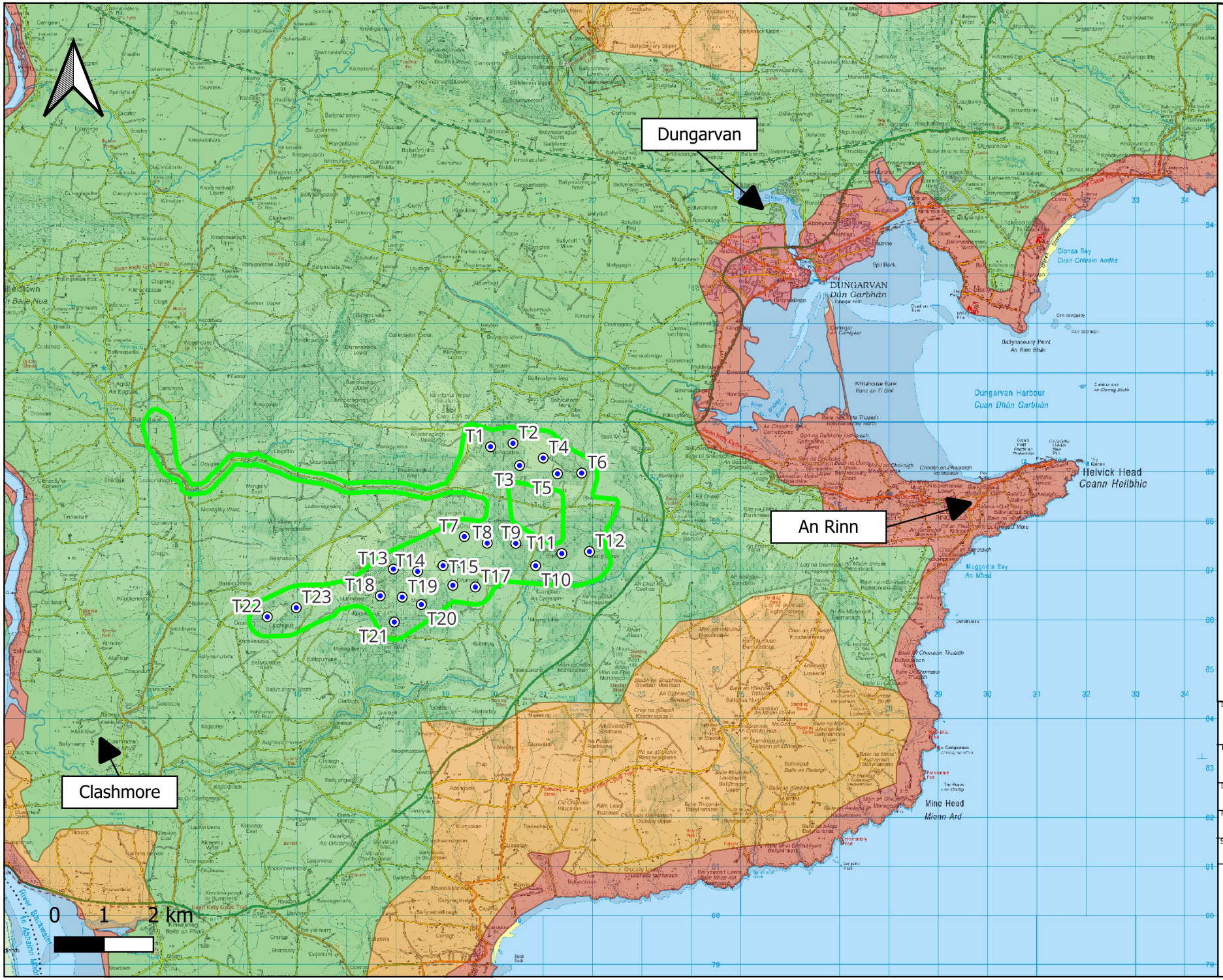
Section 2.5.4 of Chapter 2 of this EIAR sets out in detail the planning policies of Waterford City and County Council with regards to wind energy developments. The Proposed Wind Farm is situated within the administrative area of Waterford City and County Council and is therefore subject to the planning policies and objectives set out in the Waterford City and County Development Plan 2022-2028 (WCCDP). Waterford City and County Council's *Wind Energy Strategy* is set out in Appendix 7 of Volume 3[4] of the WCCDP 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:

- Preferred Areas
- Areas Open to Consideration
- No Go Areas

The Site is located in an area deemed as a 'Preferred Area' (PA) under the WCCDP's Wind Energy Strategy, as illustrated in Figure 3-1 below. While not defined in the WCCDP 2022-2028, 'Preferred areas' were previously defined in WCDP 2011-2017 as *"Areas which are suitable and should generally be considered for permission unless local circumstances dictate otherwise"*. This designation therefore demonstrates the Sites appropriateness for wind energy development, subject to detailed assessment

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

[4] https://waterfordcouncil.ie/documents/development-plan-2022-2028/#volume-3-appendices



Map Legend

- EIAR Site Boundary

Proposed Project

- Proposed Turbine Locations

Waterford Wind Energy Strategy 2022-2028

- Exclusion Area
- Open for Consideration
- Preferred Area

Drawing Title	Waterford Wind Energy Stategy
Project Title	Slievegrine Renewable Energy Development
Drawn By: SOR	Checked By: NS
Project No.: 240740	Drawing No.: 3-1
Scale: 1:100,000	Date: 24.09.2026

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3.2.3.1.2 Environmental Sensitivities

The 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 EIAR Site Boundary is the River Blackwater (Cork/Waterford) SAC, which passes through to the east of the EIAR Site Boundary. The nearest SPA to the EIAR Site Boundary is the Dungarvan harbour SPA which is located approximately 2.4km northeast of the EIAR Site Boundary. The nearest nationally designated site, i.e. Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA), is similarly Dungarvan Harbour pNHA, which is located approximately 2.5km east of the EIAR Site Boundary.

It was also noted during comprehensive multi-season ecological site surveys that the majority of the Proposed Project infrastructure is proposed within habitats of low ecological value. Habitats of higher ecological value, such as Hedgerow (WL1) and Treelines (WL2) have been avoided throughout the constraints and design process of the Proposed Project insofar as possible. Furthermore, 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 hedgerow replanting will result in the enhancement of hedgerow habitat the Site, while also offsetting the losses of hedgerow to facilitate the Proposed Project. Furthermore, the establishment of native woodland will enhance the woodland habitat within the Proposed Wind Farm will provide a more biodiverse alternative to the Conifer Plantation (WD4) located adjacent to the River Licky, whilst also protecting its Freshwater Pearl Mussel resource. Finally, planting of Riparian Woodland (WN5) within the Site will seek to alleviate, insofar as possible, any existing pressures on the Freshwater Pearl Mussel located within the River Licky.

3.2.3.1.3 Grid Connection

The Proposed Project intends to connect to the national grid via a Proposed 110kV Underground Cabling Route that predominantly follows the local and regional road network, apart from two sections of cabling route that are located within existing forestry access tracks within the Site (c.315m) and c.800m section of cabling route located within agricultural lands adjacent to the L-99997 local road. The Proposed 110kV Underground Cabling Route will originate at the Proposed 110kV Substation and connect into the Proposed 220kV Loop-in Substation, in the townland of Ballycullane. 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 of the Site, the study area has emerged as suitable to accommodate the Proposed Project. The population density of the Population Study Area, as described in the Section 5.3.3 of Chapter 5: *'Population and Human Health'* of this EIAR, is 33.17 persons per square kilometre[5]. This is considerably lower than the average national population density of 73.27 persons per square kilometre, and lower than the population density of County Waterford, recorded as 68.55 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 Clashmore, which is located approximately 3.3 km southwest of the nearest proposed turbine (T22) and is classified as a 'Rural Village' in the settlement hierarchy of the Waterford City and County Development Plan[6].

[5] *Census of Population 2022 , Central Statistics Office- https://www.cso.ie/en/statistics/population/censusofpopulation2022/*
[6] *Waterford City and County Development Plan Volume 1 - Chapter 2 – Spatial Vision and Core Strategy (2022) < https://waterfordcouncil.ie/documents/development-plan-2022-2028/volume-1-written-statement/*

3.2.3.1.5 *Site Scale*

The Site, which covers a total of 1,450 hectares (ha) comprises a mix of commercial forestry and pastoral agriculture and has a turbine elevation range of 236 AOD (Above Ordnance Datum) to 137m AOD. Land use is predominantly the same on adjacent lands. The Proposed Wind Farm benefits from existing forestry and agricultural roads (approximately 8.7km). The Proposed Wind Farm will be easily accessible off the L2024, L2023, L6082 and L6085 local roads, via multiple new site entrance as discussed in Section 4.5.1 of Chapter 4: Description of the Proposed Project. 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 23-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. The proposed turbines are located within areas comprised of commercial forestry, as well as agricultural pastures. All required setbacks from sensitive receptors, are achievable.

The Site is located in an area designated as a *'Preferred* Area*'* for onshore wind energy production under the Waterford City and County Development Plan 2022-2028 Wind Energy Strategy, and while no definition of a "Preferred Area" is provided within the Waterford City and County Council Renewable Energy Strategy 2016-2030, the Wind Energy Strategy of the Waterford County Development Plan 2011-2017 describes a "preferred area" as;

> *"These areas are suitable for wind farm development and should normally be granted planning permission unless specific local planning circumstances would support a decision to refuse permission in the context of the development plan"*

Whilst the Site overlaps with the River Blackwater (Cork/Water) SAC, the nearest proposed infrastructure is approximately 310m north of the SAC. While the majority of the Site infrastructure is proposed within habitats of low ecological value, some sections of the Proposed Wind Farm require the removal of Hedgerow (WL1). All high-quality hedgerow and treeline 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 hedgerow within the Site.

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 Proposed 110kV Underground Cabling Route is located primarily within the public road corridor. No instream works are proposed as part of the construction of the Proposed Grid Connection. Please refer to Section 4.8.2.9 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 145.2MW, and potential to power approximately 106,000 Irish households with renewable energy and displace 90,950 tonnes of carbon dioxide per annum (3,183,250

tonnes over the 35-year operational life). 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 Waterford.

Once the current Site 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 agricultural practices 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.

Enerco 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 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 reporting[7]. 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. 145.2MW), a considerably 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 1,450ha and the permanent footprint of the Proposed Project measures approximately 31.8 hectares, which represents approximately 2.2% 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 Site is located within the 'K' wind region for Ireland, as outlined in the EirGrid report '*Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology*'[8]. The capacity factor for wind in this region is 35% (0.35). If solar PV was to be deployed on the 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).

A solar PV array of the scale necessary to provide the same electricity output as the Proposed Wind Farm would require a footprint of approx. 230 hectares[9] or 16% 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

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[7] *Wind Energy Ireland (February 2026) Wind Energy Report Annual and December 2025* <https://windenergyireland.com/blog/irish-wind-farms-provided-a-third-of-our-power-in-2025>

[8] *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>

[9] *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.*

would require the permanent removal of larger extents of 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 145.2MW Output)	Chosen Option
Population andand Human Health (incl. Shadow Flicker)	Relatively lower long-term financial contributions towards the local community (i.e., community benefit fund) on a per MWh basis. Lower potential for noise and vibration effects. Lower potential for visual obstructions in the skyline due to solar farms being low lying structures. No potential for shadow flicker to affect sensitive receptors. Potential for glint and glare impacts on local receptors. 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.	Higher long-term financial contributions towards the local community (i.e., community benefit fund) on a per MWh basis. 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. No potential for glint and glare impacts on local receptors. Greater potential for noise and vibration during construction operational and decommissioning phases. Greater potential for visual effects during operational phase. No material difference between the two options during construction and decommissioning. Based on the assessment included in Chapter 10 and Chapter 11, the 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.

Environmental Consideration	Solar PV Array (with up to 145.2MW Output)	Chosen Option
Biodiversity (including Birds)	Larger development footprint would result in greater potential habitat loss. No potential for collision risk for birds. Potential for glint and glare impacts on birds.	As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors. Smaller development footprint would result in reduced habitat loss. The Proposed Project includes for a BMEP, providing a local boost to biodiversity Please see Appendix 6-4 for details. With the implementation of the mitigation measures described in Chapter 7 Ornithology, the residual effects for collision risk are not significant.
Land, Soils andand Geology	Shallower excavations involved in solar PV array developments would result in reduced volume of spoil to be excavated.	As detailed in the assessment in Chapter 8, there is no loss of topsoil or subsoil as a result of the Proposed Project. Topsoil and subsoil will be relocated within the Site. No significant effects on soils and subsoils will occur.
Water	Shallower excavations involved in solar PV array developments would result in reduced volume of spoil to be excavated, therefore reducing the potential for silt-laden runoff to enter receiving waterbodies. Larger permanent footprint would result in increased potential for silt laden run-off to enter a waterbody.	Deeper excavations for turbine foundations would result in an increased volume of spoil to be excavated. Project design specific drainage design removes the potential for significant environmental effects. Smaller permanent footprint would result in reduced potential for silt laden run-off to enter a waterbody. As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.
Air Quality	Increased potential for dust and other noxious emissions due to larger volume of transport movements to and from site and	Reduced potential for dust and other noxious emissions due to smaller volume of plant and

Environmental Consideration	Solar PV Array (with up to 145.2MW Output)	Chosen Option
	larger volume of plant and ground works on site due to the larger footprint. Reduced capacity factor of solar PV array technology would result in less carbon offset.	ground works on site due to a smaller footprint. As detailed in the assessment in Chapter 10, no significant effects on air quality will occur.
Climate	Reduced capacity factor of solar PV array technology would result in less carbon offset	As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Wind Farm, 2,778,170 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 145.2MW 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 and Vibration	Potential for short term noise impacts on nearby sensitive receptors during the construction phase. 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. Lesser potential for noise and vibration impacts on sensitive receptors during operational phase.	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.
Landscape and Visual	Panelling potentially less visible from surrounding area due to the screening by vegetation and topography	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	Larger development footprint would increase the potential for	A smaller development footprint would decrease the potential for

Environmental Consideration	Solar PV Array (with up to 145.2MW Output)	Chosen Option
	impacts on unrecorded, subsurface archaeology.	impacts on unrecorded, subsurface archaeology. 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. Archaeological monitoring under licence of the smaller footprint will be implemented during the construction phase.
Material Assets	Potential for greater traffic volumes during construction phase due to the number of solar panels required to achieve the same output. Greater potential for impacts on waste management due to increased plant on site giving rise to increase in hazardous waste materials. No material difference for impacts on gas, water, aviation. No potential for impacts on telecommunications.	Potential for lesser traffic volumes during construction phase due to a reduced amount of deliveries needed for turbines. As detailed in Chapter 15, there will be negligible to slight, temporary to 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. No material difference for impacts on gas, water, aviation. Buffers implemented on telecommunication links. There will be a positive effect on electricity supply with the provision of an estimated 145.2MW to the national grid and powering of 106,000 Irish households with renewable electricity per year.
Vulnerability of the Project to Major Accidents and Natural Disasters	Larger development footprint would result in a higher risk in relation to major accidents and natural disasters due to increased land disturbance.	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

Environmental Consideration	Solar PV Array (with up to 145.2MW Output)	Chosen Option
	Lower potential risk in relation to bridge/structural collapse due to the lighter project components required.	at any phase of the Proposed Project. A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Chapter 16 of this EIAR.

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 23 no. turbines at the Site which will have an estimated installed capacity of 145.2 MW. Such a wind farm could also be achieved on the Site by using smaller turbines (for example, 2.5 MW machines). However, this would necessitate the installation of 58 turbines to achieve a similar output. A larger number of smaller turbines would result in the wind farm occupying a greater footprint within the Site, with a larger amount of supporting infrastructure being required (i.e., roads, hardstands, etc) and increasing the potential for environmental impacts to occur. 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 23-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.

Multiple turbine models are proposed to be installed on the Proposed Wind Farm and are included in Table 3-3 below:

Table 3-3 Proposed Turbine Dimensions

Turbine ID	Tip Height (m)	Rotor Diameter (m)	Hub Height (m)
T1 - T6, T13 - T21	175	150	100
T7 - T12	185	162	104
T22 and T23	170	150	95

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 Site and would likely require a larger development footprint. This alternative would potentially lead to additional environmental effects.

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 3-4 below.

Table 3-4 Comparison of environmental effects when compared to the chosen option (23 no. wind turbines, higher MW output)

Environmental Considerations	Option 1 Larger number of smaller turbines	Option 2 Chosen option of a 23-turbine layout
Population and Human Health	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. 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.	There is no potential for significant shadow flicker effects from the proposed turbines. Shadow flicker effects can be mitigated to meet threshold criteria. There is no potential for significant noise and vibration effects from the proposed turbines. Furthermore, noise emissions can be curtailed to meet threshold criteria. As detailed in Chapter 13: LVIA, the proposed turbine locations adhere to the recommended 500m 'involved landowner' set back distance in the Guidelines (DoEHLG, 2006) and also the 4 times tip height set-back distance for third party landowners as 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. 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.
Biodiversity (Including Birds)	Larger development footprint would result in greater potential for habitat loss.	Smaller Proposed Project footprint would result in lesser potential for habitat loss. As detailed in Chapter 6 '*Biodiversity*', the Proposed Project has been designed

Environmental Considerations	Option 1 Larger number of smaller turbines	Option 2 Chosen option of a 23-turbine layout
		to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors. With the implementation of the mitigation measures described in Chapter 7 Ornithology, the residual effects for collision risk are not significant.
Land, Soils, and Geology	Larger development footprint would result in greater volume of spoil to be generated, excavated and sorted. Neutral - Geotechnical investigations followed by careful design would lead to no significant environmental impacts	Smaller development footprint would result in less volume of spoil to be generated, excavated and sorted. As detailed in Chapter 4, the Proposed Project has been designed to utilise the existing roads to minimise ground disturbance where possible. Neutral – Geotechnical investigations followed by careful design would lead to no significant environmental impacts. As detailed in the assessment in Chapter 8, no significant effects on topsoil and subsoils will occur.
Hydrology and Hydrogeology	Neutral - Project design specific drainage design removes the potential for significant environmental effects. Larger development footprint, therefore, increasing the potential for silt-laden runoff to enter receiving waterbodies.	Neutral – Project design specific drainage design removes the potential for significant environmental effects. Smaller footprint would result in less potential for silt laden run-off to enter a waterbody. As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur as a result of the Proposed Project.
Air Quality	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.	Decreased potential for vehicle emissions and dust emissions due to a decreased volume of construction material and turbine component deliveries to the Site. 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.

Environmental Considerations	Option 1 Larger number of smaller turbines	Option 2 Chosen option of a 23-turbine layout
Climate	There would be an increased potential for vehicle emissions and dust emissions due to an increased volume of construction material and turbine component deliveries to the Site.	Decreased potential for vehicle emissions and dust emissions due to a decreased volume of construction material and turbine component deliveries to the Site. As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Wind Farm, 2,778,170 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 145.2MW 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).
Noise and 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.	Potential for decreased noise levels at nearby sensitive receptors due to increased separation distance between sensitive receptors and turbine locations. 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.
Landscape and Visual	Smaller turbines may be less vertically 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	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology. No material difference between the two options for indirect effects on recorded monuments.	Smaller Proposed Projectfootprint would decrease the potential for impacts on unrecorded, subsurface archaeology No material difference between the two options for indirect effects on recorded monuments. The selected layout represents a balanced approach in terms of Proposed Project footprint and archaeological risk.

Environmental Considerations	Option 1 Larger number of smaller turbines	Option 2 Chosen option of a 23-turbine layout
		As detailed in the assessment in Chapter 14 and following the implementation of mitigation measures, there will be no significant direct or indirect effects on known or unknown archaeology and cultural heritage during the construction, operation and decommissioning phases. Archaeological monitoring under licence of the smaller footprint will be implemented during the construction phase.
Material Assets – Traffic and Transport	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials and turbine components.	As detailed in Chapter 15 Material Assets, there will be no significant effects on traffic and transport during the construction, operational and decommissioning phases 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 at the Site.
Material Assets- Utilities, Waste Management, Telecommunications and Aviation	No material difference between the three options for gas, water, waste management, telecommunications and aviation.	No material difference between the two options for gas, water, waste management, telecommunications and aviation.
Vulnerability to Major Accidents Natural Disasters	Larger Proposed Project footprint would result in a higher risk in relation to major accidents and natural disasters due to increased land disturbance and a larger excavation footprint.	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. A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Chapter 16 of this EIAR.

For the reasons set out above, the proposal for a 23-no. turbine layout with larger turbine was considered to have the least amount of environmental effects when compared to a larger number of smaller turbines.

3.2.5.2 Alternative Turbine Layout and Development Design

The design of the Proposed Project has been an informed and collaborative process from the outset, involving the designers, developers, engineers, landowners, environmental, hydrological and geotechnical, landscape, archaeological, 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 Project 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 Project 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 680m, 700m or 740m setback (dependant on turbine height in proximity to the sensitive receptor) 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 200-metre infrastructure/excavation buffer;
- **Hydrology**: Watercourses plus 50-metre buffer where possible;
- **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.

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.

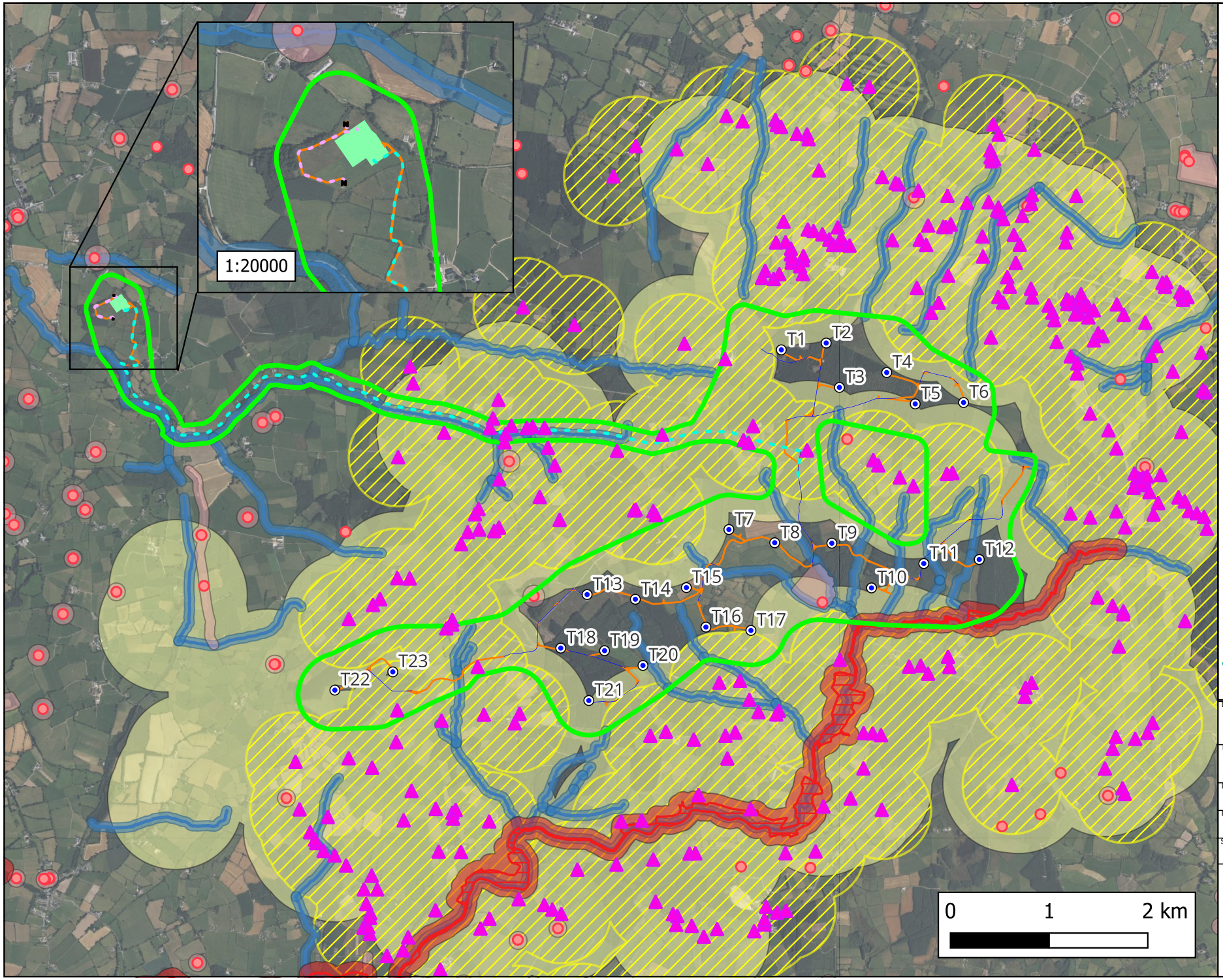
The inclusion of the constraints on a map of the Site allowed for a viable area to be identified. An initial turbine layout was then developed to take account of all the constraints mentioned above and their associated buffer zones and the separation distance required between the turbines. Following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

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

Geotechnical investigations were also undertaken on the Site to provide detail and clarity on the nature and extent of subsoils and bedrock as a means of characterising the Site. This allowed for the identification of suitable areas for the turbines, Proposed 110kV Substation, Proposed 220kV Loop-in Substation, borrow pits 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 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

Proposed Project

- Proposed Turbine Locations
- 220kV Loop-in Substation
- Proposed New Roads
- Upgrades to Existing Roads
- Proposed Construction Compounds
- Proposed 220kV End Masts
- Proposed 220kV Underground Cabling route
- Proposed 110kV Underground Cabling Route

Dwellings

- Sensitive Receptors
- Sensitive Receptor Buffer (500m)
- Sensitive Receptor Buffer (680m, 700m,740m)

Ecology

- Blackwater River Special Area of Conservation (SAC)
- SAC 100m Buffer

Hydrology

- Watercourses
- 50m Watercourse Buffer

National Monumets

- National Monuments
- SMRZone + 30m Buffer

N

Drawing Title: Site Constraints and Faciliators

Project Title: Slievegrine Renewable Energy Development

Drawn By	Checked By
SOR	NS
Project No.	**Drawing No.**
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Scale	**Date**
1:50,000	25.09.2026

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3.2.5.2.2 *Alternative Proposed Project Layout Iterations*

The final design of the Proposed Project, 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 Project 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 Site 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 Project 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 Project 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 Project layout. The initial constraints study identified a significant viable area within the overall study area of the original site. The initial turbine layout comprised of up to 28 no. turbines, however the proposed 23-turbine layout was refined following feedback from the environmental project team, landowners, and the need to respect on-site constraints. The Proposed Project 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 Project.

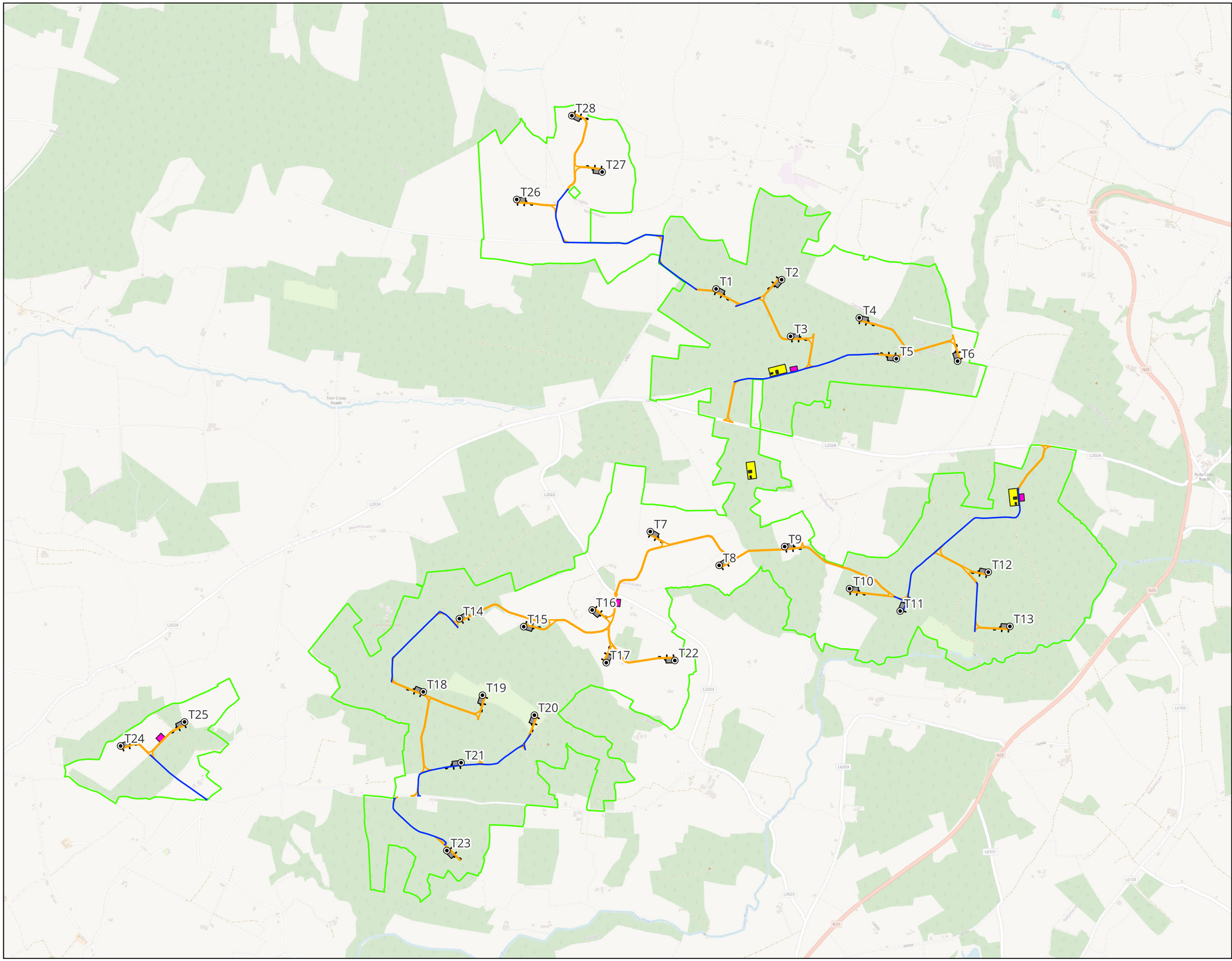
Please note, across the design iterations outlined below, some proposed turbines were renumbered in certain cases following the omission of other turbines from the layout.

Proposed Project Layout Iteration No. 1

Iteration No.1, as shown below in Figure 3-3, comprises the original proposed layout for the Proposed Project. This layout comprised 28 no. turbines, with a range of dimensions with a maximum overall ground-to-blade tip height of 185 metres, rotor diameter of 162 metres, hub height of 104 metres, and was determined on the basis of a desk study.

3 potential 110kV substation locations were proposed initially and presented to the project team for detailed investigations and assessment and constraints analysis.

Upon review of desk-based constraints and results of site surveys, several amendments to Iteration No, 1 and these are further detailed below as Iteration No. 2.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Locations
- Proposed Hardstands
- Existing Roads to be Upgraded
- Proposed New Roads
- Temporary Construction Compounds
- Proposed 110kV Substation Options

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Drawing Title: Proposed Layout Iteration 1

Project Title: Slievegrine Renewable Energy Development

Drawn By	Checked By
MC	NS
Project No.	Drawing No.
240740	Figure 3-3
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Proposed Project layout Iteration No. 2

As detailed above, Iteration No. 1 was subject to a detailed constraints analysis and site visits which resulted in amendments to the layout based on environmental and ecological factors.

A key change presented in Iteration No. 2 was removal of the northwestern cluster of turbines (T26-T28). These turbines were removed from the design of the Proposed Project due to the presence of golden plover identified during bird surveys in the vicinity of this area.

Iteration No. 2. is presented in Figure 3-4 and comprised 24 no. turbines, hardstands, site access roads, construction compounds, 38kV underground cabling works of existing Dungarvan- Foxhole 38kV overhead line, 38kV end masts and the Proposed 110kV Underground Cabling Route to a new 220kV loop-in substation (which is discussed further in Section 3.2.5.8 below). It includes a refined turbine layout that was based on an updated constraints mapping exercise, telecommunications scoping and results of a hydrological walkover. Constraints that informed this design iteration include dwellings buffers (500m for involved landowners and between 680m, 700m or 740m for third party landowners dependant on the turbine tip height closest to their property), relevant setback from telecommunications links (as specified by the operator or as deemed appropriate in Appendix 15-5 Telecommunications Impact Assessment), setback from National Monuments plus 30m buffer, Natura 2000 sites plus a 200m buffer and avoidance of ecologically sensitive habitats/species.

The proximity of T13 to the River Licky, and drainage concerns raised following a hydrological site walkover resulted in the omission of T13. Furthermore, Turbine 6 and all associated infrastructure was relocated to avoid a badger sett located within the vicinity of the turbine in compliance with recommendations from '*Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes*'[10].

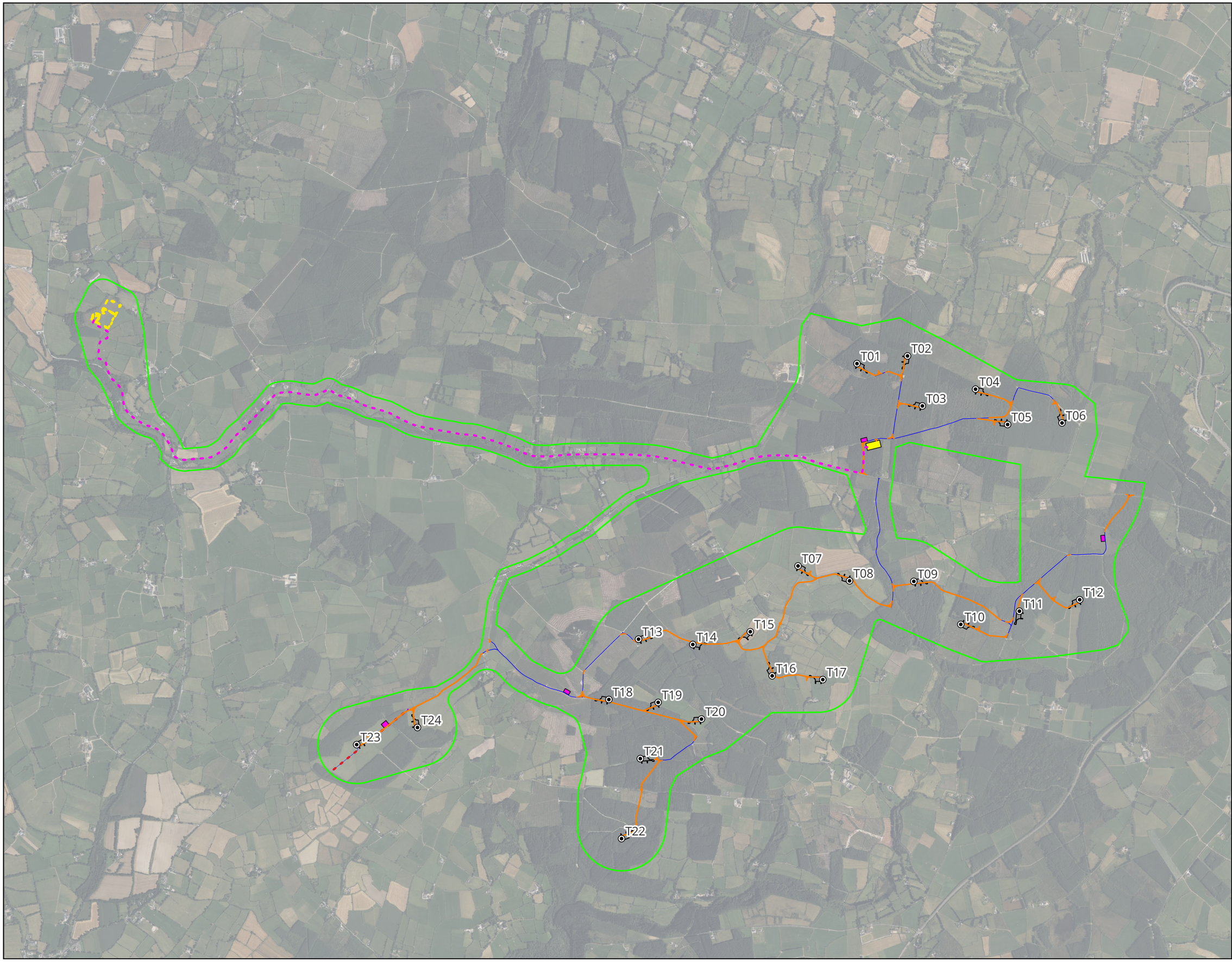
The undergrounding of approximately 1,230m of the existing Dungarvan-Foxhole 38kV overhead line to facilitate the placement of T23 and T24 was also included in Iteration No. 2.

Other amendments included rerouting internal access roads in order to avoid hedgerow removal insofar as possible, some slight amendments to construction compound locations, as well as other amendments to turbine positions to optimise wind-yield whilst also maintaining appropriate setback distances from residential receptors.

Furthermore, the substation location was refined from 3 potential locations to one location north of the L-2024.

The layout in Iteration No. 2 was presented to the project team for further investigations and constraints analysis. These investigations included habitat mapping, ecological surveying, intrusive site investigation and geotechnical surveys, further hydrological investigations, and archaeological surveys of the Site.

[10] https://www.tii.ie/media/gtajacj2/guidelines-for-the-treatment-of-badgers-prior-to-the-construction-of-a-national-road-scheme.pdf



Map Legend

- EIAR Site Boundary
- Proposed Turbine Locations
- Proposed Hardstands
- Existing Roads to be Upgraded
- Proposed New Roads
- Construction Compounds
- Proposed 110kV Substation Options
- Proposed 110kV Grid Connection
- Proposed 38kV End Masts
- 38kV Underground Cable
- Proposed 220kV Loop-In Substation

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Drawing Title
Proposed Layout Iteration 2

Project Title
Slievegrine Renewable Energy Development

Drawn By	Checked By
MC	NS
Project No.	Drawing No.
240740	Figure 3-4
Scale	Date
1:30,000	2026-09-23

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Proposed Project layout Iteration No. 3

Layout Iteration No. 3, as presented in Figure 3-5, comprised 23 no. turbines, hardstands, construction compounds, a meteorological mast, the Proposed 110kV Substation, Proposed 220kV Loop-in Substation, 38kV underground cabling works of existing 38kV Dungarvan- Foxhole OHL, 38kV end masts, site access roads and the Proposed 110kV Underground Cabling Route (discussed in Section 3.2.5.8 below).

A final hydrological walkover was undertaken during the wet season, revealing that Turbine 22 as seen in Figure 3-4 was located in a hydrologically constrained area with high levels of surface water runoff, draining directly in tributaries of the River Licky. Furthermore, the production of photomontages and public opinion expressed at the Public Information Exhibition on the 4th of February 2026 revealed that this turbine may cause some surrounding effects at some sensitive receptor locations. In the interest of visual amenity and protection of the hydrological/ecological resource of the river Licky, it was decided that T22 of Layout Iteration 2 be omitted from the Proposed Wind Farm. Furthermore, the hydrological walkover during the wet season revealed that the Proposed 110kV Substation location was sited in an area with high levels of surface water pooling. Equally its position had the potential to result in visual effects on nearby sensitive receptors. As a result, the substation was moved south into an area of commercial conifer plantation. This location is enclosed and visually contained by swathes of forestry from all sides ensuring it will be screened by vegetation from nearby receptors, including nearby dwellings and the L2024 Local 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 well as presence of an unmapped stream.

Map Legend

- EIAR Site Boundary
- Proposed Turbine Locations
- Proposed Hardstands
- Proposed Meteorological Mast
- Existing Roads to be Upgraded
- Proposed New Roads
- Construction Compounds
- Proposed 110kV Substation
- Proposed 110kV Underground Cabling Route
- Proposed 38kV End Masts
- 38kV Underground Cable
- Proposed 220kV Loop-in Substation

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13 T14 T15 T16 T17 T18 T19 T20 T21 T22 T23

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Drawing Title: Proposed Layout Iteration 3

Project Title: Slievegrine Renewable Energy Development

Drawn By	Checked By
MC	NS
Project No.	Drawing No.
240740	Figure 3-5
Scale	Date
1:30,000	2026-09-23

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Proposed Layout Iteration No. 4- Final Proposed Project Layout

Iteration No.4, as presented in Figure 3-6, comprises of 23 no. turbines the dimensions of which are outlined in Table 3-3 above, upgrades to existing and proposed new roads, one met mast (80m height), one communications relay mast (30m height), 6 no. construction compounds, 5 no. borrow pits, the Proposed 110kV Substation, the Proposed 220kV Loop-in Substation, internal wind farm 33kV cabling, 38kV underground cabling, 38kV end masts, 220kV end masts, biodiversity enhancement areas, and 110kV underground cabling and 220kV underground cabling.

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 Hedgerow (WL1) to facilitate the Proposed Project. Measures such as the planting and bolstering of hedgerow habitats, establishment of 3.6ha of broadleaf woodland and the establishment of riparian planting areas for the protection of water quality in the River Licky, and ergo freshwater pearl mussel, are proposed as part of the Proposed Project. Further details are provided in Appendix 6-4: Biodiversity Management and Enhancement Plan.

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 onsite borrow pits were redesigned and scaled appropriately to ensure that they provided a sufficient level of stone for the entirety of the Proposed Project, whilst also being capable of acting as a storage area for the vast majority of spoil generated within the Site once voided, with any remaining spoil being utilised for landscaping within the Site.

The final proposed 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. It is considered that the final proposed turbine layout is not only the most environmentally prudent option, but similarly the most appropriate layout to maximise the wind yield within the Site.

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

615000

620000

590000

585000

N

T1
T2
T3
T4
T5
T6
T7
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T9
T10
T11
T12
T13
T14
T15
T16
T17
T18
T19
T20
T21
T22
T23

0 0.9 1.8 km

EIAR Site Boundary

Proposed Project

- Proposed Turbine Locations
- Proposed Hardstands
- Proposed Met Mast
- Proposed New Roads
- Proposed Borrow pits
- Construction Compounds
- Proposed Telecommunications Relay Mast
- Upgrades to Existing Roads
- Proposed 38kV Cable Track
- Proposed 38kV OHL Interface End Masts
- Proposed 38kV Underground Cable
- Proposed 110kV Substation
- Proposed 110kV Grid Connection
- Proposed 220kV End Masts
- Proposed 220kV Loop-in Substation
- Proposed 220kV Underground Grid Connection Route
- Proposed Hedgerow Planting (5.5km)
- Proposed Native Woodland Planting (3.6ha)
- Proposed Screening Planting

Overhead Line

- Existing Knockraha-Cullenagh 220kV Overhead Line

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

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EIAR Site Boundary - NOT TO SCALE

Drawing Title
Final Proposed Project Layout

Project Title
Slievegrine Wind Farm

Project No.	Drawing No.	Scale
240740	3-6	1:30,000
Drawn By	Checked By	Date
SOR	NS	21/09/2026

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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 3-5 below.

Table 3-5 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 (1, 2, 3) and all associated Infrastructure	Chosen Option of the Final 23 no. Turbine Layout and all associated infrastructure
Population and Human Health (incl Shadow Flicker)	Likely potential for increased shadow flicker impacts on nearby sensitive receptors due to the increased number of turbines in Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). Shadow flicker effects would likely be similar for Proposed Layout Iteration No. 3 (23 turbine layout). Regardless, the effects of shadow flicker and noise can be mitigated using curtailment strategies to meet threshold criteria.	There is no potential for significant shadow flicker effects from the proposed turbines. Shadow flicker effects can be mitigated to meet threshold criteria. There is no potential for significant noise and vibration effects from the proposed turbines. Furthermore, noise emissions can be curtailed to meet threshold criteria. 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. 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.

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations (1, 2, 3) and all associated Infrastructure	Chosen Option of the Final 23 no. Turbine Layout and all associated infrastructure
Biodiversity and Ornithology	Larger Proposed Project footprint would result in greater potential habitat loss in Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). Greater potential impact on identified sensitive ecological receptors due to location of infrastructure within badger habitat in Proposed Project Layout Iteration No. 1, 2, and 3.	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. The Proposed Project includes for a BMEP, providing a local boost to biodiversity. Please see Appendix 6-4 for details. As detailed in Chapter 7, the Collision Risk Assessment (CRA) indicated that the impact of the Proposed Project 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.
Land, Soils and Geology	Greater potential impact on topsoil, and subsoil due to the increased level of groundworks required to accommodate additional turbines and associated infrastructure for Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). Potential impact on topsoil and subsoils is neutral for Proposed Project layout Iteration No. 3 (23 turbine layout). Larger Proposed Project footprint would result in greater volume of spoil to be generated, excavated and sorted. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.	As detailed in the assessment in Chapter 8, topsoil and subsoil excavation volumes will be managed within the Site, and the residual effects on topsoil and subsoil are not significant. Geotechnical investigations followed by careful design means no significant environmental impacts are predicted.
Water	Larger footprint would result in a greater potential for silt-laden runoff to enter natural	Project design specific drainage design and planting of 3.6ha of Native Woodland Planting

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations (1, 2, 3) and all associated Infrastructure	Chosen Option of the Final 23 no. Turbine Layout and all associated infrastructure
	watercourses within and around the site for Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). The presence of turbines in hydrologically constrained areas in proximity to the River Licky would result in a greater potential for silt-laden runoff to enter the River Licky/ River Blackwater (Cork/Waterford SAC). Potential for runoff is decreased in Proposed Project Layout Iteration no. 3 (23 turbine layout) due to the movement of the Proposed 110kV Substation outside of the area prone to pooling of surface water. Project design specific drainage design removes the potential for significant environmental effects.	removes the potential for significant environmental effects. Movement of Proposed 110kV Substation outside of the area prone to pooling of surface water would reduce the potential for silt-laden runoff to enter natural watercourses. As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.
Air Quality	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 and decommissioning phase for Proposed Wind Farm Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). 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 Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout) due to decreased reliance on traditional fossil fuel-based energy generation. Air quality emission effects are neutral for Proposed Wind Farm	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.

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations (1, 2, 3) and all associated Infrastructure	Chosen Option of the Final 23 no. Turbine Layout and all associated infrastructure
	Layout Iteration No. 3 (23 turbine layout).	
Climate	An increased number of turbines could result in a greater amount of exhaust emissions from construction and decommissioning vehicles and plant and the transport of materials and workers to/from the Site for Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). 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 Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). Climate related emission effects (losses and savings) are neutral for Proposed Project Layout Iteration no. 3 (23 turbine layout).	As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Project, 2,778,170 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 145.2MW of clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in CAP25.
Noise and Vibration	An increased number of turbines could have a greater noise impact for Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). The noise impacts are neutral for Proposed Project Layout Iteration no. 3 (23 turbine layout).	Fewer turbines will generate reduced noise levels; fewer turbines sited 4x tip height from third party sensitive receptors. 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).

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations (1, 2, 3) and all associated Infrastructure	Chosen Option of the Final 23 no. Turbine Layout and all associated infrastructure
Landscape and Visual	An increased number of turbines could have a greater visual impact for Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). Greater potential impact on visual receptors due to location of infrastructure within designated set-back buffers for Proposed Project Layout Iteration No. 1, 2, and 3.	The reduced number of proposed turbines layout ensures a setback in excess of the required setback set out in the Draft Guidelines (DoHPLG, 2019) for third party receptors. The final layout adheres to the relevant setback from dwellings (500m from all dwellings, 680m, 700m or 740m (dependant on most proximate turbine dimensions) for third-party dwellings in the case of the Proposed Project).
Cultural Heritage	Larger Proposed Project footprint would increase the potential for impacts on unrecorded, subsurface archaeology for Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). 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 Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). The cultural heritage impacts are neutral for Proposed Project Layout Iteration No. and 3 (23 turbine layout).	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. Archaeological monitoring under licence will be implemented during the construction phase.

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations (1, 2, 3) and all associated Infrastructure	Chosen Option of the Final 23 no. Turbine Layout and all associated infrastructure
Material Assets – Traffic and Tranpsort	Potential for greater traffic volumes during construction phase due to larger Proposed Project footprint and requirement for more construction materials and turbine components for Proposed Wind Farm Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout). Traffic impacts are neutral for Proposed Wind Farm Layout Iteration no. 3.	As detailed in Chapter 15, there will be Negligible to Slight, Temporary to 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.
Material Assets- Utilities, Waste Management, Telecommunications and Aviation	Whilst 2 no. turbines are located within telecommunications link buffers, the re-routing of these links will ensure that there is no potential for negative effects on telecommunications. The increased number of turbines associated with Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout) could result in a higher MW output in the operational phase which would result in a positive impact on the electricity supply and energy independence on a national scale. No material difference between the layout Iteration no. 1, 2 and 3 and the Proposed Wind Farm layout for gas, water, waste management and aviation.	Whilst 2 no. turbines are located within telecommunications link buffers, the re-routing of these links will ensure that there is no potential for negative effects on telecommunications. The generating capacity of 145.2MW of the Chosen Option will result in a positive impact on the electricity supply and energy independence on a national scale. No material difference between the Proposed Project layout Iteration no. 1, 2 and 3 for gas, water, waste management, telecommunications and aviation.
Vulnerability to Major Accidents Natural Disasters	A larger number of turbines could have a greater potential risk relating to major accidents and natural disasters for Proposed Project Layout Iteration No. 1 (28 turbine layout) and Layout Iteration No. 2 (24 turbine layout) due to increased land disturbance and larger excavation footprint.	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.

Environmental Consideration	Initial Proposed Wind Farm Layout Iterations (1, 2, 3) and all associated Infrastructure	Chosen Option of the Final 23 no. Turbine Layout and all associated infrastructure
	Impacts from major accidents and natural disasters are considered to be neutral for Proposed Project Layout Iteration No. 3 (23 turbine layout).	A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Chapter 16 of this EIAR.

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 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 13.5km of new internal roads are required for the Proposed Project, while approximately 8.7km of existing roads that are primarily currently used for commercial forestry activities, as well as agriculture in some instances, will be upgraded. These roads will require upgrading/widening to facilitate the movement of abnormal loads through the Site.

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, whilst also 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 whilst facilitating the delivery of abnormal loads.

An alternative option to making maximum use of the existing road network within the Proposed Project would be to construct a new road network, having no regard to existing roads or tracks. This approach was not favoured, as it would likely require over 22km of new roads and would create unnecessary disturbance to the receiving environment of the Site. This strategy would also create the need for additional cut and fill material to be used in the construction of new road networks, and extraction of significantly more material from the proposed borrow pits. Please see Table 3-6 for a comparison of environmental effects when compared against the chosen option.

Table 3-6 Comparison of environmental effects when compared against the chosen option (maximising the use of the existing road network)

Environmental Consideration	Entirely New Road Network	Use and Upgrade/Resurface of Existing Site Tracks/Local Roads
Population and 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.
Biodiversity and Ornithology	Larger Proposed Project footprint would result in greater habitat loss compared to the chosen option.	Smaller Proposed Project footprint will result in lesser habitat loss.
Land, Soils and Geology	Larger Proposed Project 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 Proposed Project footprint which leads to a reduction in spoil volumes and stone required to be excavated. No material difference between the two options for geotechnical/stability.

Environmental Consideration	Entirely New Road Network	Use and Upgrade/Resurface of Existing Site Tracks/Local Roads
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 and 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 Proposed Project footprint would increase the potential for impacts on unrecorded, subsurface archaeology.	Smaller Proposed Project footprint would decrease the potential for impacts on unrecorded, subsurface archaeology.
Landscape and 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 Proposed Project footprint. No material difference between the two options in potential for impact on gas, water, telecommunications aviation assets.	Smaller Proposed Project footprint results in a reduced construction traffic movements on site due to smaller Proposed Project 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 Project, reduces the use of off-site existing quarry material assets.

Investigation of construction phase borrow pit locations was supervised by MKO, with on-site investigations carried out by Irish Drilling Ltd. under the supervision of MKO. 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, 33 no. trial pit locations were selected over the 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 5 no. borrow pits within the 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 volume to be extracted from the borrow pit for the Proposed Project is approximately

396,000m^3, 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, 5 no. borrow pit locations were identified to supply the stone requirements while keeping the borrow pits at a reasonable size. The details of these borrow pits are discussed comprehensively in Section 4.3.1.8 of Chapter 4 *'Description of the Proposed Project'.* These locations were chosen based on a combination of environmental sensitivities, material suitability, depth to bedrock, and ease of access.

Initially, 6 no. borrow pit locations were considered, 2 no. within the northern section of the Proposed Wind Farm, with 4 no. present in the middle and southern portion of the Site. Following further consideration, it was determined that it would be more environmentally prudent to reduce the horizontal extent of these borrow pit locations and distribute them throughout the site in a more consistent manner. Furthermore, the stone requirements for the site were serviceable by a lower number and size of borrow pits than initially considered necessary. Thus, the number and extent of the borrow pit locations was reduced. The proposed borrow pit locations are sited in locations which allow for convenient extraction of stone and subsequent access to proposed infrastructure, whereas the initial proposed locations required additional length of delivery routes to areas such as T22 and T23 wherein no borrow pit was initially sited.



Map Legend

- EIAR Site Boundary
- Proposed Borrow Pit Location
- Initial Borrrow Pit Locations

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Drawing Title
Proposed and Initial Borrow Pit locations

Project Title
Slievegrine Renewable Energy Development

Drawn By	Checked By
MC	NS
Project No.	Drawing No.
240740	Figure 3-7
Scale	Date
1:20,000	2026-05-19

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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 23 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. Given quantities in excess of 396,000m^3 are required to facilitate the Proposed Project, the importing of stone from quarries in the surrounding areas would cause undue pressure on traffic and transport in the wider area.

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 3-7.

Table 3-7 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 and 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 a reduced requirement for daily HGV trips on public roads 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 and Ornithology	Reduced habitat loss and ground disturbance for flora, fauna and birds.	Increase in habitat loss due to borrow pit footprint, however, as assessed in Chapter 6 '*Biodiversity*', these are habitats 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. Reduction in requirement for spoil management areas due to the fact void borrow pits will be backfilled with spoil. 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.
Land, Soils and Geology	Slight reduction in spoil to be excavated, however, additional spoil placement areas would be required as	Reduction in the requirement for spoil management areas due to ability to backfill void borrow pits with spoil.

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pits
	borrow pit voids would not be available for the placement of excavated spoil. 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.	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.
Hydrology and Hydrogeology	Smaller Proposed Project footprint and reduced potential for silt laden runoff to enter receiving watercourses.	Larger Proposed Project footprint and increased potential for silt laden runoff to enter receiving watercourses. As discussed in Chapter 9 *'Hydrology and Hydrogeology'*, no significant effects on watercourses are anticipated due to the excavation of borrow pits.
Air Quality	Potential for increased vehicular and dust emissions from increased traffic movements within and surrounding the Site, due to the volume of rock to be imported.	More ground disturbance due to onsite borrow pits which can give rise to dust emissions, however, lower traffic volumes arriving and departing the 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 and 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 Proposed Project footprint would reduce the potential for impacts on unrecorded, subsurface archaeology.	Slightly larger Proposed Project footprint would increase the potential for impacts on unrecorded, subsurface archaeology.
Landscape and 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, the borrow pit faces are visually screened by vegetation and topography at a majority of viewpoints and there would be a reduced HGV presence

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pits
		on site and on the local road network as materials will be won onsite. Furthermore, the borrow pits 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 Areas

The Enhancement Areas have been specifically designed to compensate for the loss of linear habitat within the Site, as well as target the key threats/pressures within the Site relating to freshwater pearl mussel (namely, agricultural and forestry runoff into the Licky and its tributaries). The enhancement measures aim to protect the water quality of the River Licky, and as such, must be local to the area to do so. Furthermore, the replanting of hedgerow, and establishment of native broadleaf woodland within the Site will occur locally to preserve the local resource, rather than offset the population elsewhere. As such it was deemed that there were no reasonable alternatives to the location of the Biodiversity Enhancement Areas. Furthermore, hedgerow replanting areas within the Site were comprehensively considered, with the final proposals ensuring that all enhancement areas are within the Site, whilst ensuring that hedgerow replanting does not put any airborne species (i.e. bats and birds primarily) at risk by funnelling them towards turbine blades. Furthermore, riparian planting and livestock proof fencing has been strategically sited to reduce poaching from livestock on the banks of tributaries of the River Licky in an effort to prevent pollution at it's source. As such, the Proposed designs are considered the most appropriate for enhancement and protection of the local biodiversity resource of the Site.

The alternative to the Biodiversity Management and Enhancement Plan is to either not propose these measures or propose measures/ lands which are not suitable and not in line with best practise. Neither of these options are preferable when compared to the chosen option, which will local wildlife within and downstream of the Site.

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, telecommunications relay mast and 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, connecting all 23 no. turbines to the Proposed 110kV 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 Substation, however this would lead to a greater environmental disturbance and a greater volume of spoil requiring management.

3.2.5.6.2 *Alternative Meteorological Mast Location*

The met mast is located at the approximate centre of the Proposed Wind Farm. The met mast is located in an area of agricultural pastures, which is an area of lower ecological value. The location of the proposed met mast was deemed to be a suitable location within the Site for the collation of data.

While other locations to situate the proposed met mast within the Site were examined, the above location was deemed to be most suitable due to the low ecological value of the habitat as well as the ability of the proposed met mast to service the entirety of the Site without the requirement for a second mast elsewhere.

3.2.5.6.3 *Alternative Communications Relay Mast Location*

The communications relay mast is located at the north of the Proposed Wind Farm. The communications relay mast is located in an area of commercial conifer plantation, a habitat of inherently low ecological value. The location of the proposed communications relay mast was deemed to be a suitable location within the Site for the relaying of potentially effected telecommunications links.

Whilst other locations to situate the proposed comms relay mast within the Site were examined, the above location was deemed to be most suitable due to the low ecological value of the habitat as well as the ability of the proposed met mast to relay both links within the Site without the requirement for a second mast elsewhere.

3.2.5.6.4 *Alternative Construction Compounds Location*

The construction compounds will be used for the storage of construction materials, staff facilities and car-parking areas for staff and visitors. The use of 6 no. construction compounds (inclusive of the construction compound at the Proposed 220kV Loop-in Substation and a construction compound at the Proposed 110kV Substation) was deemed preferable to the alternative of a single large compound. Principally, it will result in significantly shorter distances for traffic movements within the Site during construction. As the Proposed Project layout became more defined, the construction compounds were sited to facilitate the most efficient flow of construction processes within the Site.

The construction compounds are located strategically within each section of the 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 6 no. 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 110kV 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** –at least 2 times the turbine fall distance, to ensure safety and compliance with regulations.

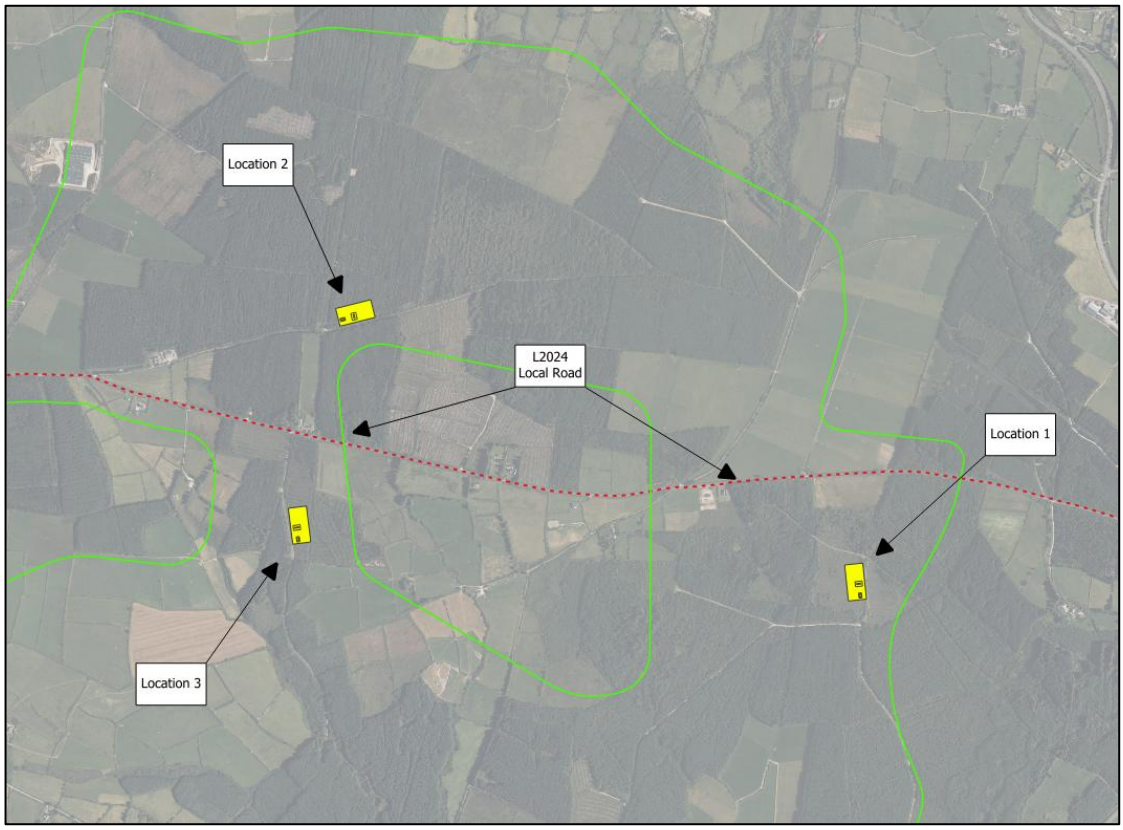
- **Natural screening** – preference for locations that benefit from existing topography or vegetation to reduce visual impact.
- **Grid connection feasibility** – proximity to the national grid, with a focus on achieving the shortest and most efficient cable route to minimise land disturbance and potential 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, three separate options were evaluated as part of the first iteration for the Proposed 110kV Substation location which were subject to desktop assessment and site visits.

Three options for a 110kV substation location were considered, all three of which were located within a short distance of the L2024 and accessible via existing forestry access tracks. Furthermore, all three compounds were located within areas of commercial conifer plantations. It should be noted that Figures 3-8 below portrays early-stage project design (i.e. Proposed Project Layout Iteration No.1 as seen in Section 3.2.5.2.2 above).

3.2.5.7.1 *Iteration No. 1 – 3 Potential Locations*

Figure 3-8 Initial 110kV Substation Iterations



110kV Substation Location 1

As seen in Figure 3-8, Location 1 is located within coniferous forestry approximately 320m south of the L2024 local road in the townland of Reanaviddoge. This location is accessible via existing forestry

access roads and is screened from nearby sensitive receptors due to the presence of large stands of Sitka spruce surrounding the location.

110kV Substation Location 2

Location 2 is located approximately 420m north of the L2024 local road in the townland of Monacullee, and similar to Location 1 is located within an area of coniferous forestry. Location 2 can be accessed via an unnamed road to the west, which facilitates 2 residential dwellings as well as the forestry operations. Substation Location 2 is relatively well concealed by large stands of Sitka spruce, however, is at a significantly higher elevation than the L-2024 local road.

110kV Substation Location 3

Location 3 is located approximately 260m south of the L2024 local road in the townland of Clashbrack. Once again, this location is screened from sensitive receptors by large stands of Sitka spruce. This location is serviced via existing forestry tracks. This option is strategically positioned in close proximity to the L2024 local road which would facilitate a shorter length of underground cabling in order to access the public road corridor.

3.2.5.7.2 *Iteration No. 2 – Location North of the L2024*

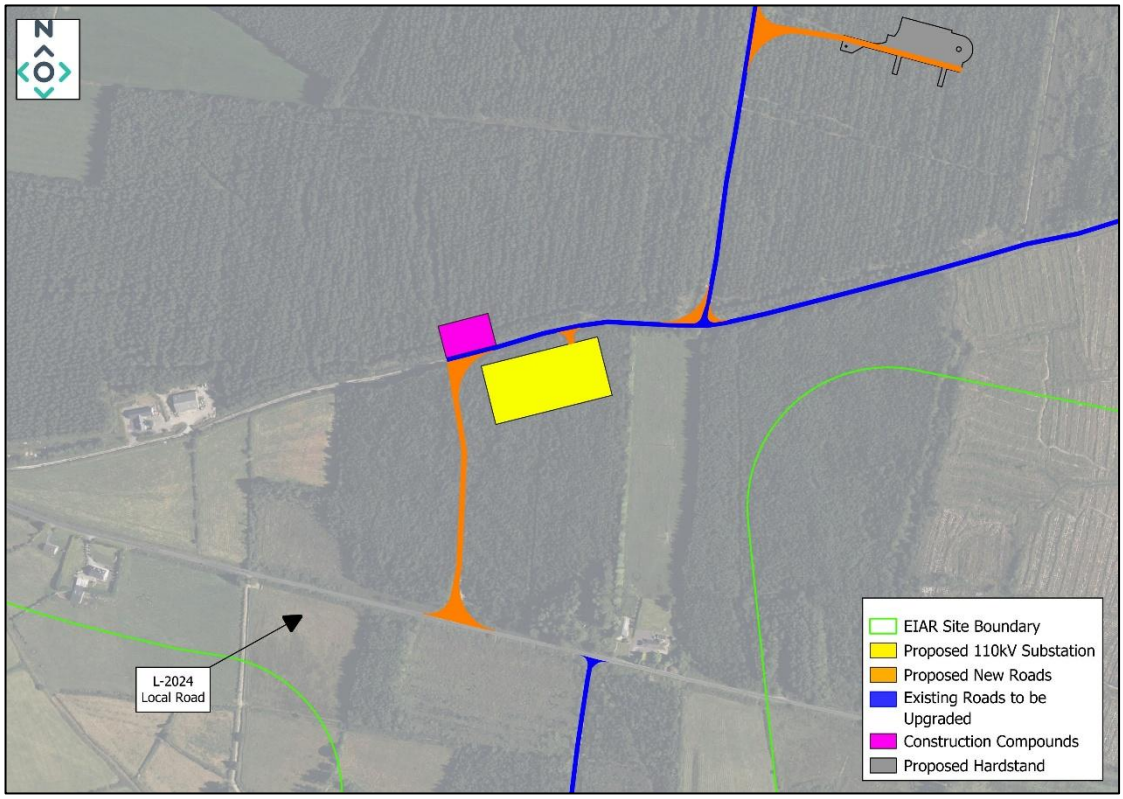


Figure 3-9 Iteration No. 2: 110kV Substation option location along access road to the north of the L2024 (1:4000)

The second iteration located the 110kV substation along the existing forestry road adjacent to substation location 2 included as part of Iteration no.1. The substation was however shifted approximately 300m south, which allowed for access closer to the L2024 local road. A new road approximately 275m in length was proposed to link the substation directly to the L2024 local road.

3.2.5.7.3 *Final Proposed 110kV Substation Location*

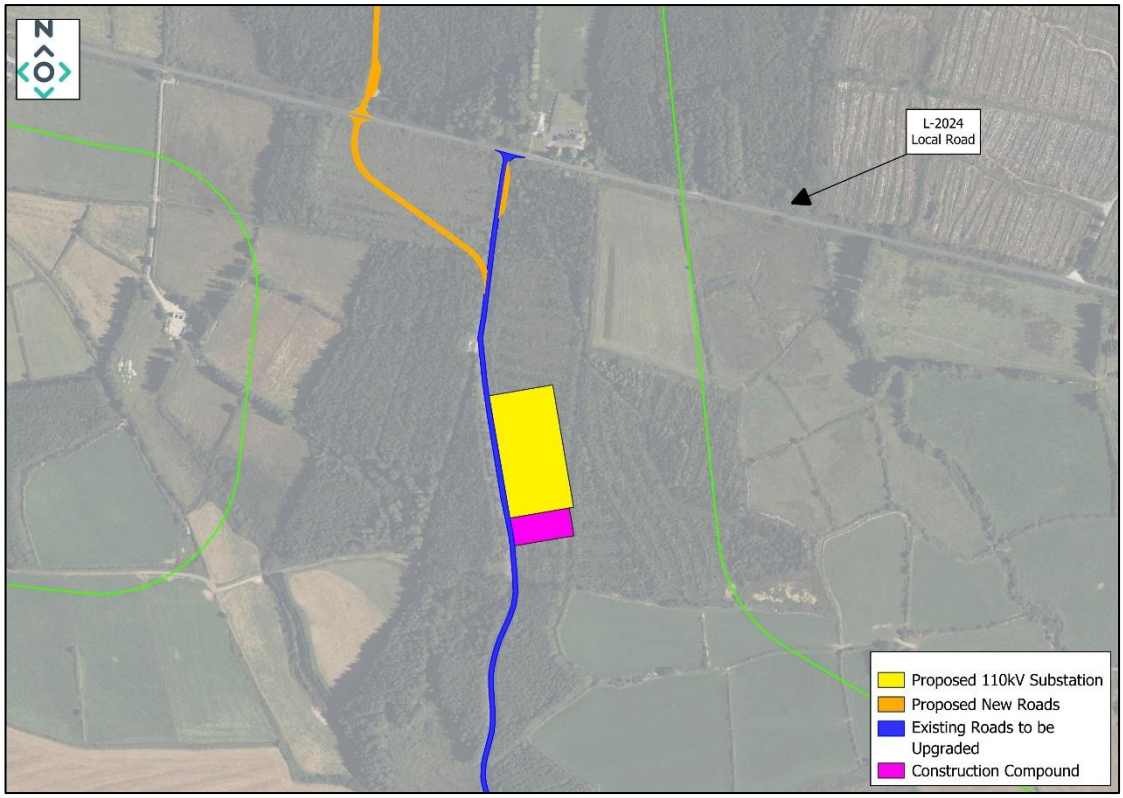


Figure 3-10 Final Proposed 110kV Substation Location: South of L2024 in the townland of Clashbrack (1:4000)

The final Proposed 110kV Substation location is shown in Figure 3-10 above. This area is of low ecological value, situated within an area of commercial conifer plantation, and is largely screened from sensitive receptors by vegetation. This location also achieves a greater distance to the closest sensitive receptors than Iteration No.2. The strategic placement of the Proposed 110kV Substation within this tract of forestry, a location enclosed and visually contained by a large swathe of trees ensures that the Proposed 110kV Substation will not be visible from nearby receptors such as the local residents and the motorists on the L2024 local road. Ground investigation results from the final Proposed 110kV Substation location determined it would be more suitable for constructing the substation when compared to Iteration number 2 (see Table 8-3 of Chapter 8 '*Land Soils and Geology*' for site investigation results).

This chosen location, as shown in Figure 3-10 above, was deemed to be suitable due to the low ecological value of the habitats it is located on, existing forestry access to the Proposed 110kV Substation location, proximity to the local road network for which to facilitate the connection of the Proposed Wind Farm to the national grid, the presence of visual screening, and the appropriate ground conditions ground conditions.

3.2.5.8 Alternative Grid Connection Nodes and Routes Considered

The Proposed Wind Farm will connect to the national grid via 110kV underground electrical cabling, located primarily within the public road corridor, with two short sections (approximately 315m and 800m) passing through the existing forestry tracks and through agricultural lands respectively. 33kV underground electrical cabling will transmit the power output from each wind turbine to the Proposed 110kV Substation, and from there to the Proposed 220kV Loop-in Substation connected to the national grid.

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. 9km underground cabling route would be to construct an approximately 7km long overhead line from the Proposed 110kV Substation to the Proposed 220kV Loop-in Substation location. 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 preferrable 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.

The Megawatt (MW) output of the Proposed Wind Farm is such that it needs to connect to a 110kV substation at minimum. Initially, two existing connection nodes were considered at the outset of the project, Dungarvan 110kV Substation and Woodhouse 110kV Substation. Furthermore, it was considered that there was potential for the Proposed Project to connect into the 220kV Knockraha-Cullenagh overhead electricity transmission line west of the Proposed Wind Farm.

Following initial grid connection studies, the creation of a new 220kV loop-in substation was identified as the optimum connection node for the Proposed Project, due to the significant length of grid connection cabling required and constraints identified between the Proposed Wind Farm and the Dungarvan 110kV Substation, as well as due to a lack of capacity at Woodhouse 110kV Substation.

Multiple locations were considered to site the Proposed 220kV Loop-in Substation. The chosen location featured a number of agricultural fields in the townland of Ballycullane which were situated directly underneath the 220kV Knockraha-Cullenagh overhead electricity transmission line and lacked environmental sensitivities.

The Proposed Grid Connection has been revised and refined to take account of the findings of the site investigations and baseline assessments, which have brought the design from a range of initial options as presented in Figure 3-11 to the current layout as presented in Figure 3-13.

3.2.5.8.1 *Proposed Grid Connection: Initial Considerations*

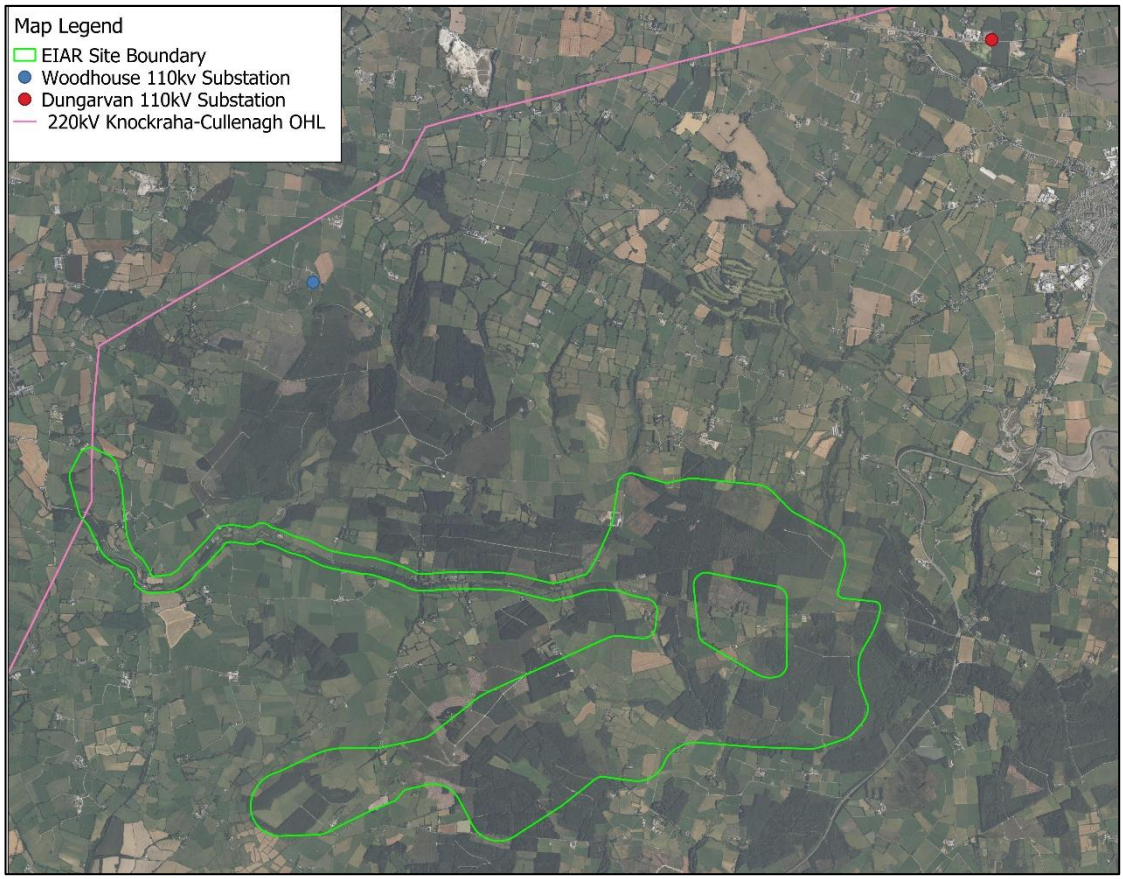


Figure 3-11 Proposed Grid Connection- Initial Considerations

The first iterations examined connection of the Proposed Wind Farm to either the Woodhouse 110kV Substation, Dungarvan 110kV Substation or break into the 220kV Knockraha-Cullenagh overhead electricity transmission line located to the west/northwest of the Proposed Wind Farm. The Dungarvan 110kV Substation was the furthest connection node considered being c.6.4km north of the Site. The second option of the Woodhouse 110kV Substation, which is approximately 4.9km west of the Proposed Wind Farm was considered, however, consultation with EirGrid revealed that the substation didn't have capacity to connect the Proposed Project to the national grid. Lastly, the creation of a new 220kV loop-in substation beneath the existing 220kV Knockraha-Cullenagh overhead electricity transmission line was identified as a possibility given the close proximity of the overhead line to the Proposed Wind Farm and the presence of available lands for the construction of such.

3.2.5.8.2 *Proposed Grid Connection Iteration No. 1a + 1b*

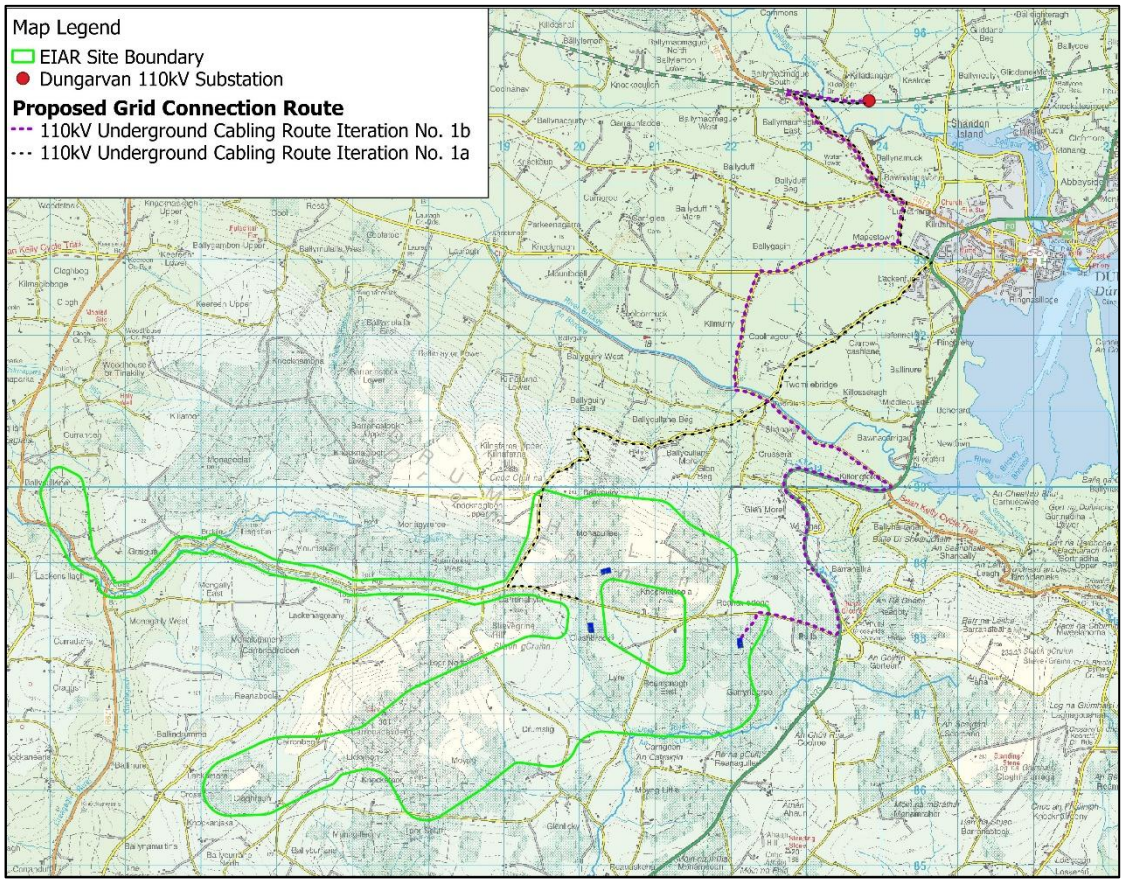


Figure 3-12 Proposed Grid Connection – Iteration No. 1a + 1b

Initially, connection into the Dungarvan 110kV was considered to be the most suitable connection node and as such feasibility studies commenced to chart the most feasible route. Two routes were mapped which originated from the initially considered substation locations 1 and 3 (as discussed in Iteration No. 1 in Section 3.2.5.7.1), a comparison of which is provided in Table 3-8 below.

Table 3-8 110kV Underground Cabling Route Iteration No. 1a + 1b comparison

Topic	Iteration 1a (black)	Iteration 1b (purple)
Length (km)	13.62	15.1km
EPA Watercourse Crossings	4	5
Designated Sites	N/A	Adjacent to Dungarvan Harbour SPA
National Roads	N/A	1

Whilst the underground cabling route removed the necessity for the construction of a loop-in substation, following further assessments and consultations, both routes were ruled out primarily due to capacity issues at the Dungarvan 110kV Substation. As a result, it was evident that breaking into the existing 220kV Knockraha-Cullenagh overhead electricity transmission line was the most viable method to connect the Proposed Project to the National Grid.

3.2.5.8.3 Final Proposed Grid Connection Layout

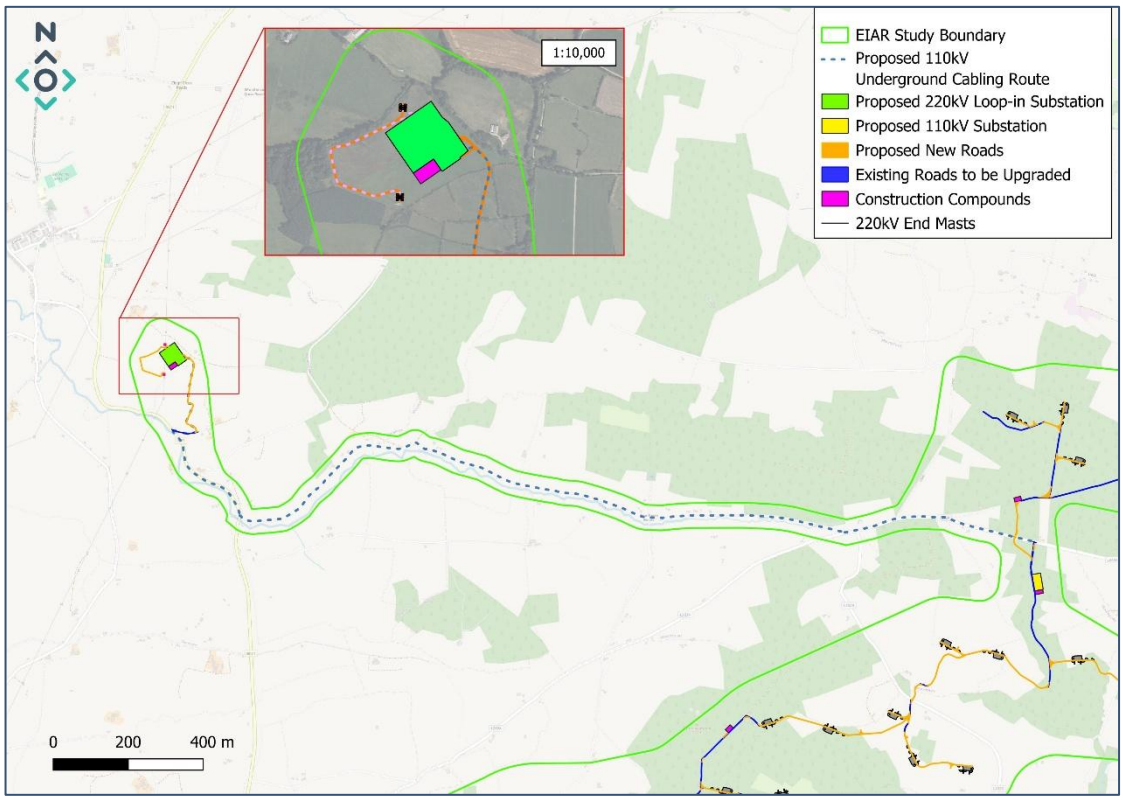


Figure 3-13 Final Proposed Grid Connection

The chosen and final Proposed Grid Connection option is to connect the Proposed Wind Farm to the existing 220kV Knockraha-Cullenagh overhead electricity transmission line via a 220kV "loop-in" substation. An area of agricultural fields in the townland of Ballycullane was chosen as an appropriate location due to the following factors:

- Habitats of lower inherent ecological value,
- Available lands for development,
- Results of geotechnical studies,
- Lesser underground 110kV grid cabling required when compared with Iterations 1a and 1b,
- Less EPA mapped watercourse crossings along 110kV grid cabling route (2 no.),
- No requirement for works within a national road network.

As such, this option was refined further, with the route being as follow:

The Proposed 110kV Underground Cabling Route (displayed in Figure 3-13) is approximately 9km in length and locating primarily within the public road corridor. The underground cabling route leaves the Proposed 110kV Substation in the townland of Clashbrack, running north for approximately 315m within an existing forestry road towards the L2024 local road. The Proposed 110kV Underground Cabling Route continues west within the L2024 local road network for approximately 1.6km before following the L2021 further west for approximately 5.25km. The Proposed 110kV Underground Cabling Route then follows the R671 regional road north for 915m before entering the L99997 local road for approximately 190m, traversing through agricultural pastures for approximately 800 more metres before connecting into the Proposed 220kV Loop-in Substation. The Proposed 220kV Loop-in Substation has been designed to be visually screened from sensitive receptors by the existing topography as well as planting screening at the

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 include Dublin Port, the Port of Waterford, the Port of Cork. The Port of Cork is the principal deepwater facility on the South Coast and caters for dry bulk, break bulk, liquid and project cargoes. Both the Port of Cork and the Port of Waterford were considered during early-stage feasibility analysis for the Proposed Project. The Port of Cork also offers a roll-on roll-off procedure to facilitate import of wind turbine components. The Port of Waterford offers Lift-On Lift-Off, Bulk Handling, Project Pilotage, Towage and Tugs, Rail Transport, Cruise, Storage and Rental services.

All of the aforementioned ports have been used for the importing of turbine components and 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 Waterford was selected as the port of entry for the proposed turbines due to its proximity and ease of access to the Proposed Wind Farm via the N25 national road and consequently minimal turbine accommodation areas required along the route. The turbine delivery route has been assessed in detail in Section 15.1 of Chapter 15 'Material Assets' of this EIAR.

3.2.5.9.2 *Alternative Turbine Component Delivery Option*

As mentioned above, both the Port of Cork and Port of Waterford were considered and investigated as ports of entry. Two routes were assessed for constraints, one from the Port of Waterford (TDR Option 1), and one from the Port of Cork (TDR Option 2), and are briefly outlined below:

TDR Option 1: Port of Waterford (Belview Port)

TDR Option 1 leaves Port of Waterford on Belview Port Rd (N29), following the N29 onto the Slieverue Roundabout and subsequently the Luffany roundabout wherein it continues west onto the N25 national road. The TDR continues along the N25 for approximately 59.3km, passing through Dungarvan before reaching the L2024/N25 junction east of the Proposed Wind Farm. The TDR follows the L2024 local road for approximately 1.1km before entering the Site through the main access junction in the townland of Pulla as discussed in Section 4.5.1 of Chapter 4 'Description of the Proposed Project'. All turbine deliveries will be made to this entrance and will utilise the site access roads from this point on.

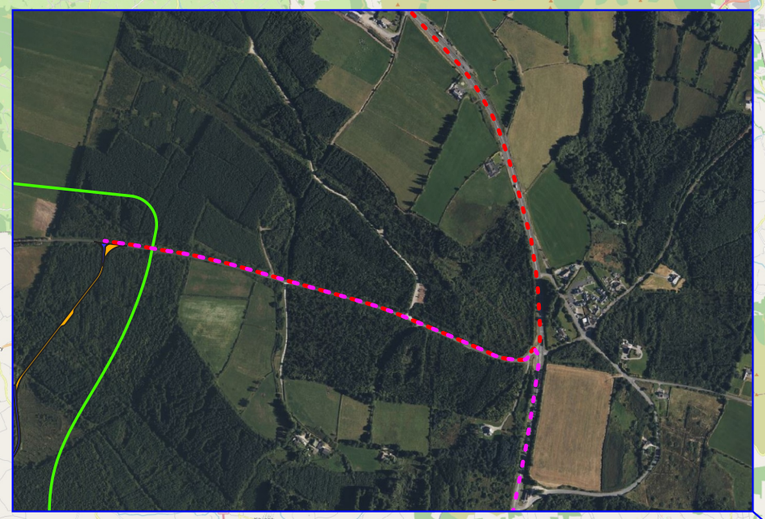
TDR Option 2: Port of Cork (79.6km)

TDR Option 2 leaves Port of Cork and travels west for approximately 6km along the N28 national road before turning north at the Shannonpark roundabout. The route continues North along the N28 and merges onto the N40 before crossing the Douglas Estuary bridge. The route continues along the N40, passing under the River Lee in the Jack Lynch tunnel. The route then follows the N25 national road for approximately 61km before reaching the L2024/N25 junction east of the Proposed Wind Farm. The TDR follows the L2024 local road for approximately 1.1km before entering the Site through the main access junction in the townland of Pulla as discussed in Section 4.5.1 of Chapter 4 'Description of the Proposed Project'.

After analysis of both routes, it was decided that TDR Option 1 would be chosen for turbine delivery, as it requires minimal accommodation works and is 15.5km shorter than TDR Option 2. This route has been proven suitable for the transport of turbine components, and the transport analysis (as presented in Section 15.1 and Appendix 15-2 of this EIAR) has determined that only minor accommodation works will be required to accommodate the proposed turbine components. The turbine delivery route will utilise the national and local 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 15-3, 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.



Port of Waterford

Port of Cork

Map Legend

- EIAR Site Boundary
- Port of Cork TDR
- Proposed TDR (Port of Waterford)

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Drawing Title: Turbine Delivery Routes considered

Project Title: Slievegrine Renewable Energy Development

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MC	NS
Project No. 240740	Drawing No. Figure 3-14
Scale 1:280,000	Date 2026-05-26

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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 and riparian planting at the 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.