3 ALTERNATIVES CONSIDERED

3.1 INTRODUCTION

This Chapter of the Environmental Impact Assessment Report (EIAR) provides 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, considering the effects of the Project on the environment. Alternatives were assessed taking commercial, planning history, existing infrastructure, construction, operational and key environmental constraints into consideration.

3.2 STATEMENT OF AUTHORITY

Jennings O'Donovan & Partners Ltd. (JOD) have extensive experience in all aspects of wind farm development, from design and planning stages through to construction. JOD have been active as engineering consultants in the wind energy market in Ireland since 1998 and have completed numerous wind farm projects, varying from single wind turbine installations to large-scale, multi-turbine developments with a total of over 2,000 megawatts (MW) generation capacity.

Evan Concar., M.Sc., B.Sc. is an Environmental Scientist and Planner. He holds a first-class MSc in Climate Change, Agriculture, and Food Security from the University of Galway and a Bachelor (Hons.) Degree of Arts with Geography and Spanish, also from the University of Galway. He is experienced in report writing, EIA Report chapter writing, Planning Compliance, Planning and Environmental Reports, Feasibility Studies, Stakeholder Engagement, and assisting with Project Management.

Breena Coyle BA, MSc MRTPI HD Planning and Environmental Planning Law. Breena has over 16 years' experience in the private sector and has a thorough knowledge of the planning system. Breena holds a MSc in Environmental Planning from Queens University Belfast and a Bachelor of Arts in History & Geography from NUI Galway. She is a Member of the Irish Planning Institute and a Member of the Royal Town Planning Institute. Since joining JOD, she has developed experience in a range of sectors through various projects and planning issues with a current focus within the environmental and renewable energy sector.

This report has been reviewed by David Kiely, Director, Jennings O'Donovan & Partners Limited who holds a BE in Civil Engineering from University College Dublin and MSc in Environmental Protection from IT Sligo. He is a Fellow of Engineers Ireland, a Chartered Member of the Institution of Civil Engineers (UK) and has 42 years' experience. He has

extensive experience in the preparation of Traffic and Transport Assessments, Traffic Management Plans, EIARs and EISs for environmental projects including Wind Farms, Solar Farms, Wastewater Projects and various Commercial Developments. David has also been involved in the construction of over 60 wind farms since 1997.

3.3 METHODOLOGY

3.3.1 Requirements for Alternatives Assessment

Annex IV of the EIA Directive as amended (Information Referred to in Article 5(1) (Information for the Environmental Impact Assessment Report) elaborates as follows*:*

"2. 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".

The Environmental Protection Agency (2022) states that "*It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option".*

The EPA guidance documents on EIAR preparation[1] [2], stipulates the following:

"The presentation and consideration of the various alternatives investigated by the applicant is an important requirement of the EIA process…. and the alternatives can include:

- *a 'do-nothing' alternative (where appropriate);*
- *alternative locations;*
- *alternative layouts;*
- *alternative designs;*
- *alternative mitigation measures and*
- *alternative processes*".

The objective is for the Developer to present 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.

[1] EPA. (2002). Guidelines on the information to be contained in Environmental Impact Statements.
[2] EPA. (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports.

In an effective EIA process, different types of alternatives may be considered at several key stages during the process. As environmental issues emerge during the preparation of the EIAR, alternative designs may need to be considered early in the process or alternative mitigation options may need to be considered towards the end of the process. These various levels of alternatives are set out in chapter.

Taking the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- 'Do Nothing' Option
- Strategic Site Selection
- Alternative Wind Farm Design and Layout
- Alternative Turbine Numbers and Specifications
- Alternative Grid Connection
- Alternative Renewable Energy Technologies
- Alternative Turbine Delivery Route
- Alternative Mitigation Measures

When considering a wind farm development, given the intrinsic link between layout and design, the two will be considered together in this chapter.

3.3.2 Approach to Alternatives

The Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Union, 2017) states that reasonable alternatives *"must be relevant to the proposed project and its specific characteristics, and resources should only be spent on assessing these alternatives"* and 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"*.

3.4 'DO-NOTHING' ALTERNATIVE

Annex IV, Part 3 of the EIA Directive as amended requires a *"description of the relevant aspects of the current state of the environment (baseline scenario) and 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 guidance (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'."

Ireland has adopted binding agreements to reduce dependency on fossil fuels and increase energy production from sustainable sources, creating a requirement for the nation to transition to a low carbon economy. The binding EU targets have been transposed into Irish National Policy in the 2025 Climate Action Plan which focuses up to 9 gigawatts (GW) future electricity production on the wind energy sector. This demonstrates the significance of wind energy in the Irish energy context and highlights the need for the proposed Derreenacrinnig West Wind Farm in reaching both EU and national renewable energy targets.

Ireland is obliged to ensure that 32% of the total energy consumed in heating, electricity and transport is generated from renewable resources by 2030 and reduce its greenhouse gas emissions by at least 55% by 2030, relative to its 1990 levels, with an overall objective of carbon neutrality by 2050. This is in order to help reduce the nation's CO_2 emissions and to promote the use of indigenous renewable sources of energy. These targets have been incorporated into national policy in the Climate Action Plan (2024) which aims to:

- Reduce CO_2 eq. emissions from the electricity sector by 62-81%.
- Deliver an early and complete phase-out of coal and peat fired electricity generation. (Note although peat-fired electricity generation has ceased in Ireland, coal and oil fired plants are still operational. Tarbert Power Station (620 MW) was supposed to close by 2023, and Moneypoint Power Station (915 MW) was supposed to close by 2025. This is now delayed arising from concerns about security of electricity supply. This delay means that more carbon emissions will arise. It highlights the urgency of constructing this and other wind farms).
- Increase electricity generated from renewable sources to 80%, indicatively comprised of:
    - Up to 9 GW onshore wind energy.

Furthermore, the Climate Action and Low Carbon Development (Amendment) Act (2021) will act to reduce 51% emissions over a ten-year period to 2030, in line with the programme for Government which commits to a 7% average yearly reduction in overall greenhouse gas emissions over the next decade, and to achieving net zero emissions by 2050.

Under a 'Do Nothing' alternative, the Project will not be constructed. The land upon which Project will occur would remain unchanged, from the civil works previously constructed for the windfarm. The main land use of the Site would remain as commercial forestry and agriculture. Consequently, the environmental impacts, identified in the EIAR, positive and

negative, would not occur. However, in the "Do-Nothing" scenario, the prospect of creating sustainable energy through County Cork's wind energy resource would be lost at this Site.

The nation's ability to produce sustainable energy and reduce greenhouse gas emissions to meet EU targets and National targets, as set out above, would be stifled. This may result in the nation incurring significant financial penalties from the EU if targets are not achieved.

The Proposed Development has the potential to prevent approximately 5,966 tonnes of CO_2 emissions per annum, or approximately 238,640 of CO_2 emissions will be displaced over the proposed 40-year lifetime of the wind farm, see **Chapter 9: Air and Climate** for details on the Carbon Calculator method. This would otherwise be released to the atmosphere through the burning of fossil fuels in the "Do-Nothing" scenario. This would not assist in Ireland's contribution to reducing global warming and would fail to limit warming as agreed to in the Paris Agreement (2015). This will result in continued negative impacts to air quality and climate.

According to EirGrid Group's All-island Generation Capacity Statement 2021 – 2030 (EirGrid, 2021), the growth in energy demand for the next ten years on the Island of Ireland will be between 18% and 43%. In the 'Do-nothing' scenario, importation of fossil fuels to maintain growing energy supply will continue and Ireland's energy security will remain vulnerable. A "Do-nothing" scenario would contribute to strain on existing energy production and may impact on economic growth if energy demand cannot be met. The delay in closing Tarbert and Moneypoint means we continue to rely on imported fossil-fuels with unpredictable pricing, a vulnerable supply chain and higher carbon emissions.

Under the "Do-Nothing" scenario, the socio-economic benefits associated with the Project will be lost. These benefits include approximately 25 No. jobs during the peak construction phase of the Project, and between 2 long-term jobs once operational. Furthermore, under the "Do-Nothing" scenario the local community will not benefit economically from the community benefit fund associated with the Project which could be used to improve physical and social infrastructure within the vicinity of the Project.

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**. Refer to each respective chapter for full details of residual impacts.

Table 3.1: Environmental effects of 'Do-Nothing' compared with a wind farm development

Criteria	Residual Impact of the Project	Do-Nothing Alternative
Population & Human Health (incl. Shadow Flicker)	Long-term positive economic benefit to local area due to job creation and Community Benefit fund.	No increase in local employment and no financial gains for the local economy or community via the community benefit fund. No upgrading of local forest tracks or creation of new tracks which can be used for walking and mountain biking. No potential for shadow flicker or noise to affect sensitive receptors.
Terrestrial Ecology	Overall positive benefit due to proposed biodiversity enhancements.	The ecology of the Site would be expected to remain similar as at present due to the existing infrastructure (hardstands, site tracks, etc).
Land & Soils	These residual impacts of the development are localised, (and due to the existing infrastructure on site), imperceptible significance at a local scale.	Should the Proposed Development not proceed, the existing land-use practices will continue with associated modification of the existing environment which consists of the previously constructed infrastructure (hardstands, site tracks etc.), including the underlying soils and geology, through agriculture.
Hydrology & Hydrogeology	Non-significant impacts following implementation of mitigation measures.	Should the Proposed Development not proceed, the existing land-use practice of commercial afforestation and agricultural activities will continue with associated gradual alteration of the existing environment and

Criteria	Residual Impact of the Project	Do-Nothing Alternative
		associated pressures on surface water and groundwater quality.
Air & Climate	Long-term positive impact on air quality and climate due to avoidance of burning of fossil fuels and the net displacement of between	There will be no increase in air quality or a reduction of greenhouse gas emissions. By the Proposed Development not proceeding it will not assist in achieving the renewable energy targets set out in the Climate Action Plan 2024. As a result, fossil fuel power stations will be the alternative to provide the required quantities of electricity resulting in greenhouse gas and other air pollutant emissions.
Noise	Non-significant to slight temporary noise impacts associated with construction activities. Temporary moderate impact along the grid route at certain dwellings during construction. The operational noise impacts are imperceptible.	There will be no change in noise emissions.
Landscape & Visual	The scale of the Proposed Development will be well assimilated within its landscape context without undue conflicts of scale with underlying landform and land use patterns. For these reasons the magnitude of the landscape impact is deemed to be **High-medium** within the Site and its immediate environs (c.1 km) reducing to **Medium** and then **Medium-low** for the remainder of the central EIAR Study Area. Beyond 5 km from the Site, the magnitude of landscape impact is deemed to reduce to **Low** and **Negligible** at increasing distances as the wind farm becomes a proportionately smaller and	In this instance, the existing civil works and agricultural land contained within the Site would continue to be used for agricultural grazing in the do-nothing scenario. As this aligns with the current scenario, no additional landscape or visual impacts are likely to occur.

Criteria	Residual Impact of the Project	Do-Nothing Alternative
	integrated component of the overall landscape fabric.	
Material Assets	Positive impact by offsetting use of fossil fuel. Positive impact due to provision of electricity infrastructure.	No offset to fossil fuel use. No provision of additional renewable electricity generation infrastructure in the local area.
Cultural Heritage	No residual impacts.	There will be no potential for Cultural Heritage impacts as much of the ground disturbance works are already complete. Due to the current infrastructure on Site, there is not much additional ground disturbance to be completed.
Traffic and Transportation	Moderate localised short-term impact due to construction and decommissioning activities.	There will be no potential for Traffic and Transport impacts.

3.5 STRATEGIC SITE SELECTION

3.5.1 Strategic Site Screening

Phase 1 – Initial Screening

This stage in the selection process discounted lands that were not available for Proposed Development under a number of criteria, as follows:

1. Committed Lands for other developments
2. Farm Partnerships and Leased Lands
3. National Parks
4. Natura 2000 and Nationally Designated Sites (SAC, SPA, NHA, pNHA)

3.5.2 Suitability of the Candidate Site

It is critical for the Developer and their project team to ensure that the most suitable site for development of a proposed wind farm is identified and progressed through planning due to the financial commitments involved i.e., the cost of building each MW of electricity-generating capacity in a wind farm is in the region of €1.8 million to €2.0 million. The site suitability has been fully informed by national, regional and local policy constraints and the location accords with these policies and objectives.

The Site was further examined in the context of the following elements which are considered decisive in determining viability for a wind farm project:

- National Grid Connection Capacity;
- Designated sites;
- Wind Speeds, and
- Population Density.

3.5.3 The 2010 Environmental Impact Statement (EIS)

For the original grant of planning for the wind farm, there were three alternative sites considered for the location of the wind farm (**Figure 3.1**). These locations were:

- Option 1 – Glanbannoo Upper
- Option 2 – Garranes North
- Option 3 – Derreenacrinnig West

Option 1 was disregarded for the following reason:

- This site was discarded because it is located in an area designated as "Strategically unsuitable" for wind farm developments and by developing a wind farm at this location it would contravene the Cork Development Plan, 2009.

- The site would be visually dominant from the S111 Scenic Route which extends around Bantry Bay. Because of the distance from the S111 scenic route to Derreenacrinnig West (11 km) the proposed Derreenacrinnig West Wind Farm visual impact is negligible.

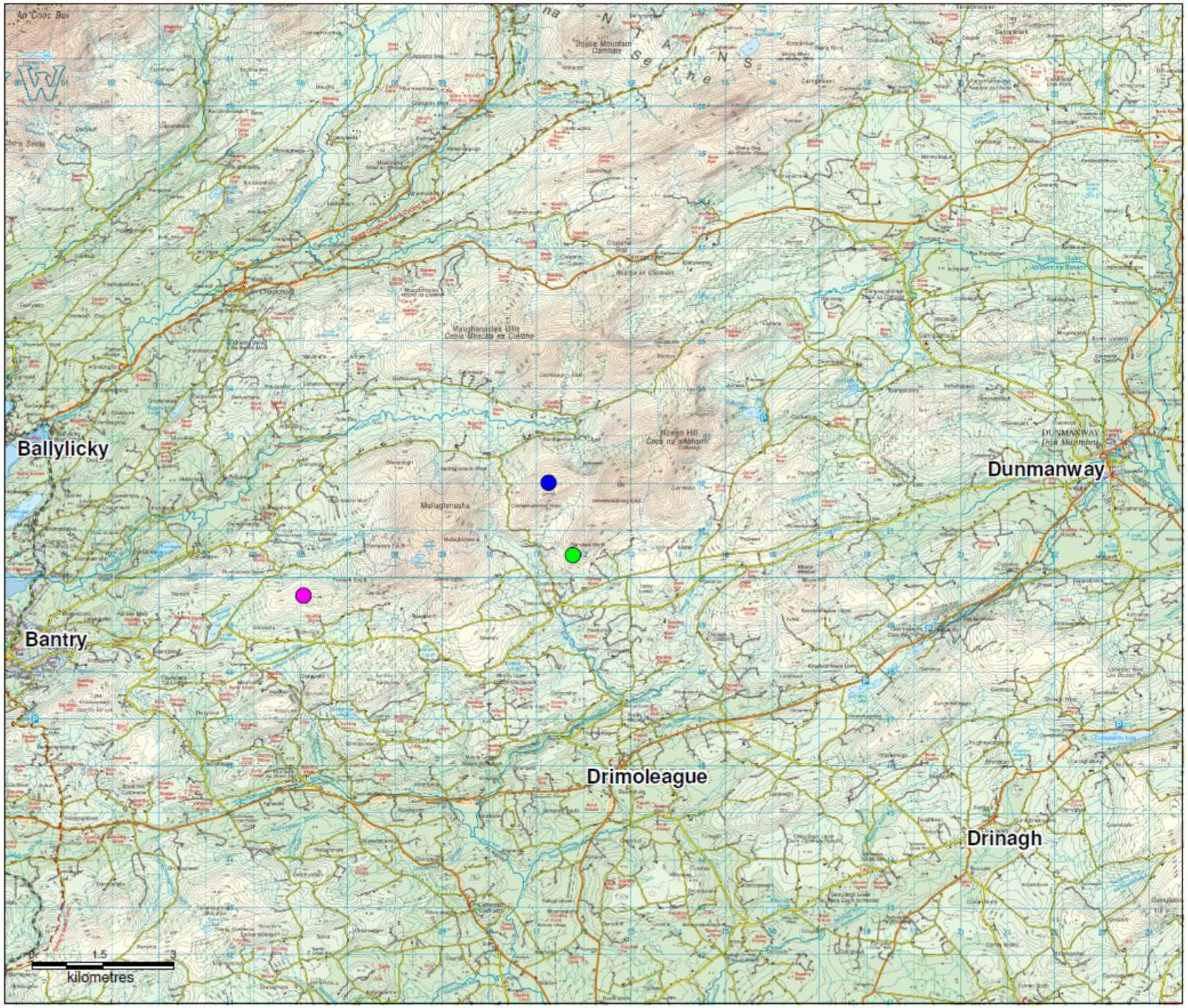
Option 2 was disregarded for the following reasons:

- Turbines positioned at this site would be visually dominant for 6 km of the S30 Scenic Route as designated by Cork Development Plan, 2009. The proposed turbines at Derreenacrinnig West are only visible for 3.4 km of this 34 km scenic route.
- The high potential for shadow flicker and elevated noise levels due to the proximity of houses within 500 m which would not comply with the Wind Farm Planning Guidelines 2006.
- High density of historic archaeological features at the site.

Option 3 was selected for the following reasons:

- The undulating nature of the surrounding landscape has the ability to screen the Proposed Development resulting in the lowest visual impact on scenic amenities.
- No recorded archaeological features in the vicinity of the site.

- Turbines at this site were only visible for 26.16% of the Zone of Theoretical Visibility assessment area (30 km).
- There are no houses located within the required ten rotor diameters (Windfarm Planning Guidelines, 2006) from the proposed turbines. The nearest house is located 884 m from the proposed turbine and hence there will be no negative noise or shadow flicker effects.
- Good wind resource.
- No environmental designations of conservation concern within 7 km of the proposed wind farm site.
- Relatively straightforward access to the site.



NOTES

Figured dimensions only to be taken from this drawing
All dimensions to be checked on site.
All Levels are in Metres and Relate to O.S. Datum Malin
All Maps are Referenced to Irish National Grid (I.N.G.)

Key to Map Features:

- Option 1 - Glanbannoo Upper
- Option 2 - Garranes North
- Option 3 - Derreenacrinnig West

Rev:	Description:	Drawn:	Ch'kd:	Date:

Client:

Client Representative:

JENNINGS O'DONOVAN an RSK company

Project:
Derreenacrinnig West Wind Farm, Co Cork.

Drawing Title:
Alternative Sites Considered Map

Drawn By: M.H Date: Nov 2010
Checked By: M.O'B Date: Nov 2010
Stage: EIS
Scales: N.T.S
Drawing No. Revision:

Figure 3.1: Alternative Site locations for original grant of planning

3.5.4 Overview of Selected Site – Derreenacrinnig West, Drimoleague, Co. Cork

3.5.4.1 Existing Infrastructure

Civil works at the wind farm site had been progressed as part of Planning Reg. Ref. 10/857 (see **Chapter 1 – Section 1.5** for further details). These civil works comprise the internal site tracks, wind turbine hardstands, substation hardstand, and construction compound hardstand. Certain areas of the civil works will require minor upgrades, with some of the hardstands requiring small areas for extension, however overall, these civil works remain in good condition. The presence of these civil works was the deciding factor in selecting the Site, as it will mitigate the environmental impact of constructing new civil works in an alternative area.

3.5.4.2 Availability of Wind

The Site is at an elevation of between 200 m and 402 m OD (Malin Head). According to the Wind Atlas, prepared by Sustainable Energy Authority of Ireland (SEAI), the mean wind speed at the Site ranges from 7 m/s to 9 m/s at an elevation of 75 m above ground level. This is a good wind speed, which is considered suitable for wind energy development.

3.5.4.3 Environment

The Site does not hold an International or National Environmental Designation. The nearest environmental designation is Carriganass Castle pNHA approximately 7.6 km northwest of the Site. This was a key consideration at the time of the original site selection for the 2010 EIS.

3.5.4.4 Development Control

There are no designated areas for Nature Conservation on or adjacent to the proposed Derreenacrinnig West Wind Farm and the Site is not located in a Strategic Search Area or a Strategically Unsuitable Area.

3.5.4.5 Distance from Dwellings

The nearest population centre is Drimoleague, located approximately 5.3 km to the south of the Site. The closest occupied dwelling is located approximately 0.98 km from the nearest proposed turbine.

3.5.4.6 Terrain

The terrain is categorised as hilly farmland. Exposed or shallowly sub-cropping bedrock is the dominant spatial coverage soil and subsoil unit at the Site. However, much of the Site is overlain by a thin layer of peat or peaty topsoil which is typically <0.5 m deep. The already constructed site tracks and hardstands mean that much of the site within the redline boundary has already been modified and that the terrain on site is highly accessible.

3.6 WIND FARM DESIGN AND LAYOUT

The design of the Proposed Development has been informed by the designers, Developers, engineers, landowners, environmental, hydrological and geotechnical, archaeological specialists, telecommunication specialists, and traffic consultants. The aim is to reduce potential for environmental effects while designing a project capable of being constructed and viable and maximising wind resource.

3.6.1 Constraints Led Approach

The design and layout of the Proposed Development follows the recommendations and industry guidelines set out in the 'Wind Energy Development Guidelines' (Department of the Environment, Heritage and Local Government, 2006), 'Best Practice Guidelines for the Irish Wind Energy Industry' (Irish Wind Energy Association, 2012) and the Draft Revised Wind Energy Development Guidelines, December 2019. The layout and design were an iterative process which followed the constraints-led design approach.

The constraints-led design approach consists of the identification of environmental sensitivities within the Site by the design team with a view to identifying suitable areas in which wind turbines may be located. The resulting area is known as the 'Developable Area'.

The constraints identification process included the gathering of information through detailed desk-based assessments, field surveys and consultation. Sensitive receptors were mapped and the design constraints were applied. Setback buffers were placed around different types of constraints 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 Department of the Environment, Heritage and Local Government Wind Energy Guidelines (DoEHLG, 2006) and other relevant Best Practice standards, which are identified in each chapter of this EIAR. The proposed setbacks also comply with the Draft Wind Energy Guidelines 2019 requirements.

3.6.2 Turbine Layout

The final proposed turbine layout of the Proposed Development shown in **Chapter 2 - Figure 2.1** 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 and feedback from consultations that have been carried out during the EIAR process.

The EIAR and wind farm design process was an iterative process. As information regarding the Site was compiled and assessed, the number of turbines and the proposed layouts was revised and amended to take account of the physical constraints of the Site. Findings at each stage of the assessment were used to further refine the design, always with the intention of minimising the potential for environmental impacts.

The development of the final proposed wind farm layout has resulted following feedback from the various studies and assessments carried out as well as ongoing negotiations and discussions with landowners and the local community. The specific locations of the various turbines were reviewed during the optimisation of the site layout. This was achieved by strictly adhering to the Developable Area for the location of the turbines and avoiding known constraints for the site infrastructure.

3.6.2.1 Preliminary Layout 1

In 2011 planning was granted for a wind farm within the same developable area with 7 turbines (See **Chapter 1 – Section 1.5**). The 7 turbines comprised of a hub height of 55 metres and a rotor diameter of 52 metres. These turbines were selected by the Developer as they were among the most up to date technology available at the time. The turbines considered for design iteration layout 1 of the Proposed Development were required to have; a wind class suitable for the site location, low noise output, three blades, cylindrical type towers, good financial security by the manufacturer (such that operation and maintenance support, spares, etc., are available through the full operational life of the turbine), and a proven track record of the manufacturer.

3.6.2.2 Preliminary Layout 2

The Developer initially looked at layouts with 7 No. turbine, which was generally concentrated on the existing footprint. However, these turbines are no longer being manufactured. It was recommended to reduce the overall extent and scale of the Proposed Development to 3 No. turbines by using 3 larger turbines instead of 7 smaller turbines. The 3-turbine layout is designed to minimize the potential environmental effects of the wind farm, while utilising the maximum energy yield from the Site's wind resource. The 3 No. turbines comprise a hub height of 78.3 m, and rotor diameter of 82 m, further information on the current turbine layout can be found on **Chapter 2 – Section 2.7**.

3.6.3 Biodiversity Enhancement Area

A biodiversity enhancement area comprising heath and acid grassland will be established to the north of the Site. This area will restore existing site tracks and hardstands constructed

as part of the original grant of planning infrastructure. This approach reduces the Project's residual footprint but also delivers a net gain in biodiversity.

3.6.4 Internal Site Access Tracks Layout

It was deemed necessary during the initial design of the Proposed Development that existing roads would be utilised where possible to minimise the potential for impacts by constructing new roads as an alternative.

As the overall site layout was finalised, the most suitable routes between each component of the Proposed Development were identified, taking into account the existing tracks and the physical constraints of the Site. Locations were identified where upgrading of the existing road would be required. This included where sections of new roads would need to be constructed, in order to ensure suitable access to and linkages between the various project elements.

Traffic assessments were undertaken to confirm that the new turbine components could be successfully delivered to and transported in the Site.

3.6.5 Location of Ancillary Structures

The alternatives considered are discussed for the following ancillary infrastructure required for the Proposed Development: a temporary construction compound (a single compound versus two smaller compounds), and electricity substation.

3.6.5.1 Construction Compound

The use of a single temporary construction compound as opposed to two smaller compounds located in different areas of the Site is proposed and will result in less disturbances to the Site and a reduced visual impact during construction. A comparison of the potential environmental effects of constructing a single, large construction compound when compared against constructing two smaller compounds is presented in **Table 3.2**.

Table 3.2: Environmental Effects from Constructing a Two Smaller Temporary Construction Compounds Compared to One Large Temporary Construction Compound

Criteria	Comment
Population & Human Health (incl. Shadow Flicker)	Neutral
Biodiversity	Potential for a greater impact to the Site ecology by constructing two construction compounds in different areas of the Site.
Soils & Geology	Potential increased amounts of peat extraction required if constructed on other part of the Site.
Hydrology & Hydrogeology	The use of multiple construction compounds sites has the potential to increase the risk of erosion and increase risk to watercourses.
Air & Climate	The use of multiple Temporary Construction Compound sites has the potential to increase the number of potential dust sources on the Site.
Noise	Potential for increased noise impacts on nearby sensitive receptors.
Material Assets	Neutral
Landscape & Visual	Potential for greater visual and landscape impacts due to the construction of tracks.
Cultural Heritage	Neutral
Traffic and Transport	Less efficient movement and management of material across the Site.

3.6.6 Designated Sites

The Site is not located within any area designated for ecological protection. The nearest Nature 2000 site, i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA) is Derryclogher (Knockboy) Bog SAC which is approximately 5.5 km from the 110 kV Ballylickey Substation end of the Grid Connection. The Glengarriff Harbour and Woodland SAC is approximately 5.6 km from the 110 kV Ballylickey Substation end of the Grid Connection, while the Bandon River SAC is approximately 13.2 km from the Site. The closest national site to the Proposed Development is the Derryclogher (Knockboy) Bog Proposed NHA, which is 5.5 km to the northwest.

The effects on designated sites are fully addressed in **Chapter 6: Biodiversity**.

3.6.7 Wind Speeds

The Irish Wind Atlas produced by SEAI shows average wind speeds for the country. With the upland nature of the landscape, the Wind Atlas shows that wind speeds on the Site are consistent with a wind farm development 7.7 m/sec at 30 m, 8.4 m/sec at 75 m, 9.1 m/sec at 100 m and 8.8 m/sec at 150 m.

3.6.8 Population Density

The Developer sought to identify an area with a relatively low population density. Having reviewed the settlement patterns in the vicinity of the Site, the EIAR Study Area has emerged as suitable to accommodate the proposal. The population density of the EIAR Study Area (as described in the **Chapter 5: Population and Human Health**) is 20.6 persons per square kilometre. This is significantly lower than the average national population density of 68.1 persons per square kilometre.

3.6.9 Number of Turbines

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 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 Site. The 3 No. turbine layout selected for the Site has the smallest development footprint, while still achieving the optimum output.

3.6.9.1 Height of Turbines

The turbine model to be installed will have an overall ground to blade tip height of 119.3 m, a rotor diameter of 82 m and a hub height of 78.3 m. The use of alternative smaller turbines at this Site would not be possible due to them not being manufactured anymore. Also, they would fail to make the most efficient use of the wind resource passing over the Site.

3.6.10 Summary

From the review of the criteria set out above, the Site and Grid Connection were identified as suitable locations for the provision of the Proposed Development of the scale proposed (the initial seven turbine layout which has now reduced to three). The Site already has access tracks and hardstands to take advantage of which will need to be upgraded

throughout the Site. Having established infrastructure within the Site reduces the potential environmental damage within the site environs. The Site does not overlap with any environmental designations and is located in an area with a relatively low population density with appropriate annual wind speeds.

3.7 GRID CONNECTION

Three high level options were initially explored as part of the Grid Connection Assessment. These options are shown in **Figure 3.2**.

With a non-contestable Gate 3 grid connection agreement in place between Dreenacrinnig West Wind Farm Limited and ESB Networks (ESBN), it was important for the Developer and ESBN to consider a number of alternative grid connection layouts and routes. A number of alternative grid connection routes were considered as part of the EIA process. The most important factors were to provide an environmentally acceptable and cost-effective solution.

Key considerations were given to environmental matters. For example, some locations had more inherent environmental sensitivities than others. It was possible to avoid such routes in favour of a route which has fewer constraints and more capacity to sustainably assimilate the grid connection.

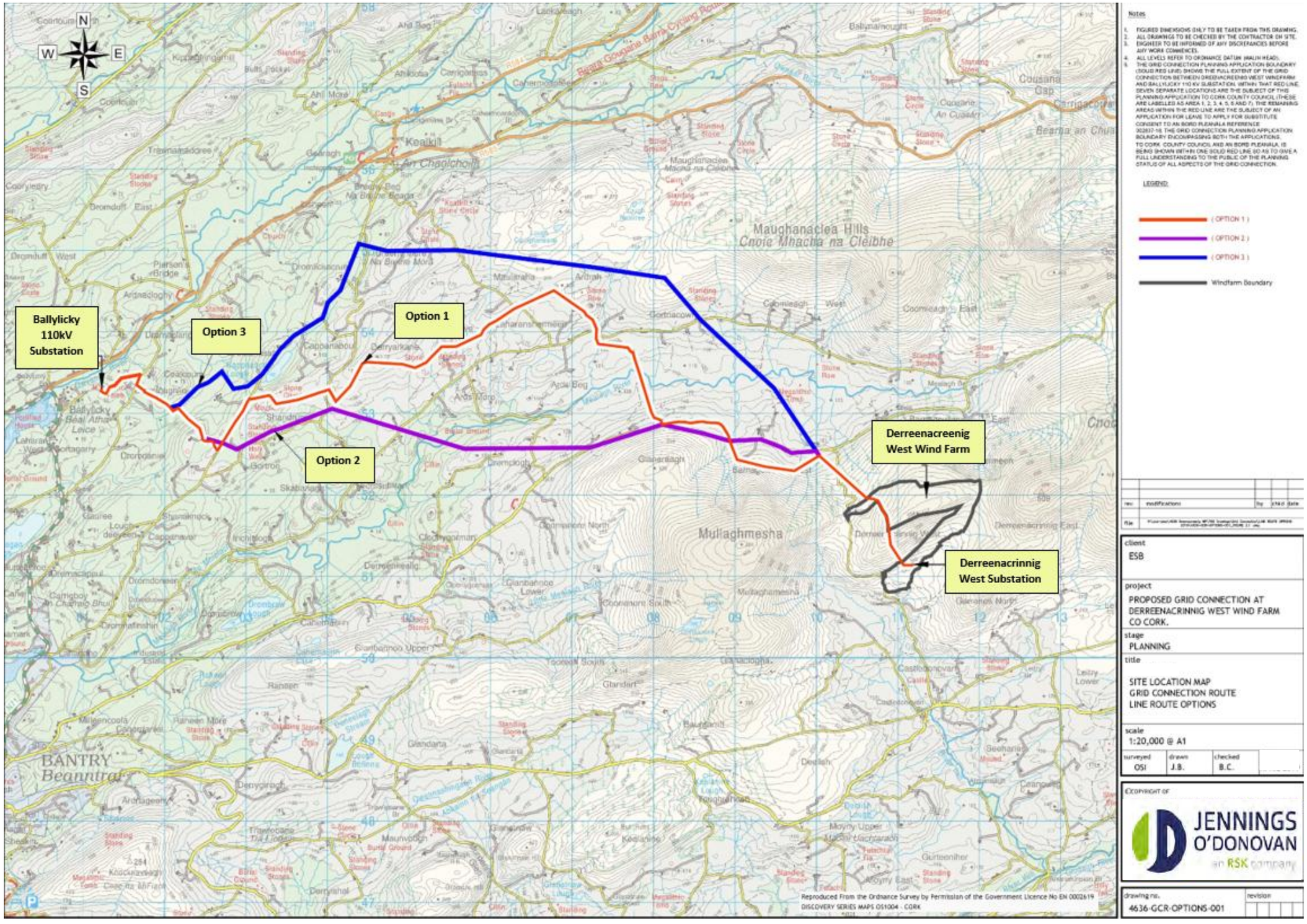


Figure 3.2: Site Location Map Grid Connection Route Options

3.7.1 Grid Connection to Ballylickey Substation

Ballylickey Substation was chosen by the Developer as being the most favourable electricity node to connect into and a connection offer was made by ESBN on this basis. Each of the route options shown in **Figure 3.2** connect into Ballylickey Substation. Both overhead and underground grid connections were considered as options. Therefore, the next step of the process was to select the optimum route option. The key criteria in selecting the route options were as follows:

- Minimise Environmental Constraints.
- Routes were selected to minimise the number of watercourse crossings.
- Minimise disruption to local residents.
- Minimise traffic and transportation obstruction.
- Outcomes of Engagement with landowners.
- Minimise underground cable route length to keep the construction period as short as possible and minimise financial outlay.

The processes associated with the construction and operation of the Grid Connection were identified by the Design and EIAR evaluation teams and also through consultation with interested parties.

As shown in **Figure 3.2,** consideration was given to alternative options from the outset of the Project where the key consideration was given to the avoidance of adverse effects on the environment. The three options identified above do not traverse any European Sites which a key feature of the route selection. As set out above, a number of options were explored for the Grid Connection as part of the EIAR. Consideration was given to various grid connection route alternatives. Both overhead and underground cables (and/or a mix of both) were considered to be technically feasible and viable alternatives for the Project.

3.7.1.1 Option 1

Option 1 was considered to be the preferred route option as it posed the least environmental constraints and was a more cost-effective option than Option 2 and Option 3.

3.7.1.2 Option 2

Option 2 located to the south of the Site of the proposed Derreenacrinnig West Wind Farm was discounted on the basis that it is located in close proximity to a number of archaeological sites. There are a number of dwellings along this route which were not receptive to the proposals and on that basis that option was discounted.

3.7.1.3 Option 3

Option 3 located to the north of the proposed Derreenacrinnig West Wind Farm was discounted because of topographical constraints relating to steep gradients and irregular land form. The route explored as part of Option 3 entailed a number of stream and river crossings.

3.7.1.4 Detailed Route Analysis

Following the selection of **Option 1** identified above, a more detailed route analysis was carried as part of the EIA process as shown in **Figure 3.3**.

3.7.1.5 Environmental Impacts

Key consideration was given to Environmental considerations. In some cases (e.g. river crossings) an overhead line can have a lower environmental impact than a trenched cable crossing. This was another key consideration in the determination of the preferred route. River crossings were unavoidable as each of the identified routes involve a river crossing.

3.7.1.6 Archeological Constraints

Key consideration was given to archaeological sites are part of the preferred Grid Connection route. There are two recorded archaeological sites located within 100 metres of the yet to be constructed overhead circuit portion of the Grid Connection route.

There are three recorded archaeological sites located within 100 metres of the underground cable portions of the Grid Connection route. There will be no direct, negative impacts on any recorded archaeological monument due to the construction of the remaining section of the Overhead Grid Connection.

There is no predicted direct, negative impact on the known archaeological resources due to the proposed construction of the underground cable portion of the Grid Connection route. While the route does pass through the zone of two recorded monuments in Shandrum Beg townland the nature of the topography in the area, combined with the construction of the road that will carry the cable, substantially reduces the archaeological potential of this section of the route.

3.7.1.7 Landowner Engagement

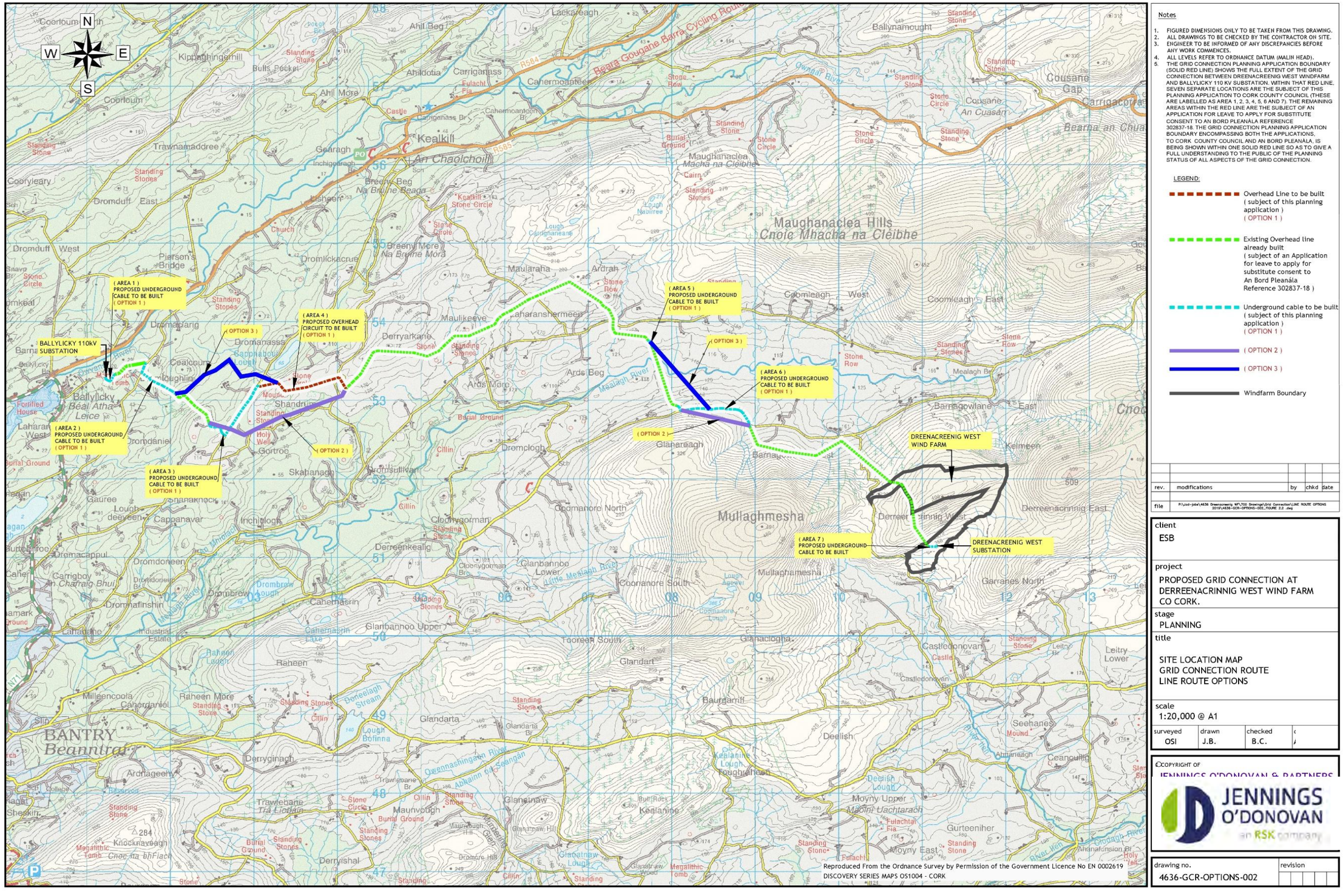
Landowner consent was another critical factor in determining the preferred route. For example, Option 2 and Option 3 shown in **Figure 3.2** were considered less viable due to landowners not being willing to engage in a reasonable way with these options.

3.7.1.8 Technical Feasibility

Over longer distances and higher power levels, there are fundamental electrical engineering constraints on how much power can be transported efficiently on cables. Out of the three route options shown in **Figure 3.2**, Option 1 proved to be the most technically feasible.

3.7.1.9 Visual Impact

In terms of visual impact each of the options explored are located within a High Landscape Area in the Cork County Development Plan. The preferred Grid Connection route was considered to have the least visual impact, is located where possible, close to forestry for background screening.



Notes

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4. ALL LEVELS REFER TO ORDNANCE DATUM (MALIN HEAD).
5. THE GRID CONNECTION PLANNING APPLICATION BOUNDARY (SOLID RED LINE) SHOWS THE FULL EXTENT OF THE GRID CONNECTION BETWEEN DREENACREENIG WEST WINDFARM AND BALLYLICKY 110 KV SUBSTATION. WITHIN THAT RED LINE, SEVEN SEPARATE LOCATIONS ARE THE SUBJECT OF THIS PLANNING APPLICATION TO CORK COUNTY COUNCIL (THESE ARE LABELLED AS AREA 1, 2, 3, 4, 5, 6 AND 7). THE REMAINING AREAS WITHIN THE RED LINE ARE THE SUBJECT OF AN APPLICATION FOR LEAVE TO APPLY FOR SUBSTITUTE CONSENT TO AN BORD PLEANÁLA REFERENCE 302837-18. THE GRID CONNECTION PLANNING APPLICATION BOUNDARY ENCOMPASSING BOTH THE APPLICATIONS, TO CORK COUNTY COUNCIL AND AN BORD PLEANÁLA, IS BEING SHOWN WITHIN ONE SOLID RED LINE SO AS TO GIVE A FULL UNDERSTANDING TO THE PUBLIC OF THE PLANNING STATUS OF ALL ASPECTS OF THE GRID CONNECTION.

LEGEND:

- Overhead Line to be built (subject of this planning application) (OPTION 1)
- Existing Overhead line already built (subject of an Application for leave to apply for substitute consent to An Bord Pleanála Reference 302837-18)
- Underground cable to be built (subject of this planning application) (OPTION 1)
- (OPTION 2)
- (OPTION 3)
- Windfarm Boundary

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client	ESB
project	PROPOSED GRID CONNECTION AT DERREENACRINNIG WEST WIND FARM CO CORK.
stage	PLANNING
title	SITE LOCATION MAP GRID CONNECTION ROUTE LINE ROUTE OPTIONS
scale	1:20,000 @ A1
surveyed / drawn / checked	OSI / J.B. / B.C.

JENNINGS O'DONOVAN an RSK company

drawing no.	revision
4636-GCR-OPTIONS-002	

Figure 3.3: Site Location Map – Grid Connection Route Options

3.8 ALTERNATIVE TURBINE DELIVERY ROUTE

Alternative ports of entry and transport routes to the Site were considered, the latter in relation to turbine component delivery as well as general construction-related traffic.

3.8.1 Port of Entry

The alternatives considered for the port of entry of wind turbines into Ireland for the Proposed Development include Ringaskiddy Port, Co. Cork and the Foynes Port, Co. Limerick. Both Ports offer a roll-on-roll-off procedure to facilitate import of wind turbines. Ringaskiddy Port was selected as the port of entry for the Project because it is located closer to the Site and a number of the existing wind farms in the locality have successfully utilised this port. This reduces the work required on the Turbine Delivery Route.

3.8.2 Turbine Component Delivery to Site

Turbine component delivery routes from Ringaskiddy Port included the N40, the N25 and the N71. This route has proven suitable for the transport of turbine components for other wind farm developments in the area. The transport analysis (as presented in **Chapter 11: Traffic and Transportation**) shows that only minor additional accommodation works will be required to accommodate the proposed turbines, within 2 km from the entrance of the wind farm site.

3.8.2.1 Construction Haul Route

The local road network in the vicinity of the Site and the supplier locations were assessed for the Civil Construction Haul Route. A number of the local roads were not suitable as they were too narrow, or they would have required upgrade works.

The proposed Construction Haul Routes are shown on **Figure 11.4**.

Specific grades of rock fill will be required as fill under turbine foundations while sub-base and base course materials for the access track and turbine hardstand upgrade will be sourced on site from spoil accumulated from previous civil works. Concrete, crushed stone and concrete blocks for construction of the Proposed Development will come from licenced quarries in the locality such as: Roadstone Ballygarvan, Finbarr O'Neill Ltd, Roadstone Castlemore Quarry, Kilmichael Quarries, Mid Cork Quarries, and Keohane Readymix.

These quarries will also be the source of crushed stone and road surfacing for widening works to the Turbine Delivery route and for grid connection works.

For the Grid Connection Route, general material excavated from trenches in public roads will be disposed of to a licensed facility while excavated road surfacing material will be recycled. Excavated road surfacing materials will be recycled and used for temporary reinstatement of trenches. General soil waste will be transported to one or more of the following licensed facilities:

Soil and stone spoil from road widening on the Turbine Delivery Route will be disposed of to the same facilities.

Bitumen and supplementary road surfacing for trench reinstatement can be sourced from Lehane Tarmacadam, Kilbarry, Macroom, Co. Cork or McSweeney Bros, Kilmichael or Murray Bros Tarmacadam Ltd., Ardcahan.

3.9 ALTERNATIVE MITIGATION MEASURES

Mitigation by avoidance has been central to the Proposed Development's evolution. By avoiding the ecologically sensitive areas of the Site as much as possible, the potential for environmental effects is reduced. As noted above, the site layout aims to avoid any environmentally sensitive areas through the application of site-specific constraints. Where loss of habitat occurs at the Site, this has been at least partly mitigated with the proposal of enhancement lands.

The alternative to this approach is to encroach on the environmentally sensitive areas of the Site and accept the potential environmental effects and risk associated with this. 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 sensitive receptors.

The Proposed Development has sought to minimise additional habitat disturbance by maximising the use of existing site tracks and hardstand infrastructure. By repurposing these previously developed areas for construction access, turbine delivery, and operational maintenance, the Proposed Development reduces the need for new groundworks in undisturbed habitats. This approach aligns with the principle of avoidance, as it limits further encroachment into ecologically sensitive zones while optimising the use of already modified land. The existing infrastructure thus serves as a built-in mitigation measure, reinforcing the Proposed Development's commitment to reducing its environmental footprint

3.10 CONCLUSION

A description of the reasonable alternatives in terms of project design, technology, location, size and scale, studied by the Developer, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects has been provided.