

3 ALTERNATIVES CONSIDERED

3.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the reasonable alternatives examined by the Applicant, which are relevant to the Carrigeen Renewable Energy Development (the Project) and its specific characteristics. It includes a summary of the main reasons for the option chosen, taking into account the effects of the Project on the Study Area. Alternatives were assessed in accordance with relevant legislation (EIA Directive) and guidance documents (Guidelines on the Information to be Contained in EIARs (Environmental Protection Agency (EPA), 2022¹)) and Guidance on the preparation of the EIAR (European Commission, 2017)². The assessment considers the potential effects during the following phases of the Project:

- Construction of the Project
- Operation of the Project
- Decommissioning of the Project

3.2 STATEMENT OF AUTHORITY

This chapter has been prepared by Jennings O'Donovan & Partners Limited (JOD). It was drafted by Kathlyn Feeney and Ciara Gilligan, and reviewed by Sarah Moore.

Detailed biographies/CVs of those of those who contributed to the preparation of this EIAR have been included in **Appendix 1.1: Author Qualifications**.

Kathlyn Feeney is an Environmental Scientist working with JOD since January 2024. Kathlyn graduated with a First-Class Honours Degree (BSc. Hons) in Environmental Science from Atlantic Technological University, Sligo. She forms part of the Environmental team responsible for preparing the EIARs. Kathlyn's main responsibilities include supporting senior consultants in report writing, Geographic Information System (GIS), Feasibility Studies and Shadow Flicker analysis.

Ciara Gilligan is a Senior Environmental Consultant and holds a Bachelor (Hons.) Degree in Earth and Ocean Sciences from University of Galway. She has worked in environmental consultancy for over 9 years and has prepared various Environmental Reports and EIARs. This includes the preparation of alternative consideration chapters for other wind farms.

¹ Environmental Protection Agency (EPA), (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency, Ireland.

² European Union (2017). Environmental Impact Assessment of Projects. Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014-52/EU).

This chapter was reviewed by Ms. Sarah Moore who is an Environmental Scientist in JOD with over 17 years of environmental consultancy experience. She has obtained a MSc in Environmental Engineering from Queens University, Belfast, and a BSc in Environmental Science from University of Limerick. Since joining JOD, Sarah has been involved as a Project Environmental Scientist on a range of renewable energy, wastewater, structures and commercial projects. She has experience in the preparation of Appropriate Assessments, Ecological Impact Assessments, Environmental Impact Assessments, Shadow Flicker analysis and Geographic Information Systems.

3.3 METHODOLOGY

3.3.1 Requirements for Alternatives Assessment

Article 5(1) of the Environmental Impact Assessment of Projects Directive 2011/92/EU³ as amended by Directive 2014/52/EU⁴ (EIA Directive) requires:

“Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least: ...

(d) 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”.

Annex IV, Part 3 of the EIA Directive as amended (Information Referred to in Article 5(1)) (Information for the Environmental Impact Assessment Report) states that:

“... 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 environmental effects”.

In 2022, the EPA published the ‘Guidelines on the information to be contained in Environmental Impact Assessment Reports’ (EPA Guidelines 2022⁵), which 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”.*

³ European Union (2011). Directive 2011/92/EU 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 projects on the environment (codification).

⁴ European Union (2014). Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

⁵ EPA. (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Available at https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf. [Accessed 19th March 2026].

The EPA Guidelines 2022, stipulate the following:

“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 alternatives can include:

- a ‘do-nothing’ alternative
- alternative locations
- alternative layouts
- alternative designs
- alternative processes
- alternative mitigation measures.”

As stated in the EPA Guidelines 2022 on:

“The objective is for the Developer to present a representative range of the practicable alternatives considered. The alternatives should be described with ‘an indication of the main reasons for selecting the chosen option. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or ‘mini-EIA’) of each alternative is not required”⁶.

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 this chapter (**Chapter 3: Alternatives Considered**) of the EIAR.

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

- ‘Do Nothing’ alternative;
- Strategic site selection;
- Alternative Wind Farm Site design and layout;
 - Alternative number of Wind Turbines;

⁶ EPA. (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports.

- Alternative Turbine Delivery Route;
- Alternative Grid Connection; and
- Alternative mitigation measures.

When considering a wind farm project, 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 Commission, 2017⁷) 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”*.

The objective of the Applicant was to identify a site capable of producing circa 50MW wind energy project in a suitably zoned location.

Other technology types (such as solar) have not been assessed as this is not in line with the project objectives to develop a wind farm and to maximise the energy capacity output from a zoned site in line with targets and objective.

3.4 ‘DO-NOTHING’ ALTERNATIVE

Annex IV, Point 3 of the EIA Directive 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.

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 climate neutral economy, this is outlined in further detail in **Chapter 4:**

⁷ European Union (2017). Environmental Impact Assessment of Projects. Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014-52/EU).

Planning and Legislative Context. The binding EU targets have been transposed into Irish National Policy in the 2024 and 2025 Climate Action Plan which focuses up to 9 GW future electricity production on the onshore wind energy sector accounting for 80% of the share of electricity demand by 2030 together with offshore wind (5GW), solar (8GW) and new flexible gas plant (2GW). This demonstrates the significance of wind energy in the Irish energy context and highlights the need for the Project in reaching both EU and national renewable energy targets.

As outlined in the revised Directive EU/2023/2413⁸ Ireland is obliged to ensure that 42.5% 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 CO₂ 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 (2025) which aims to:

- Reduce CO₂ 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 scheduled to close by 2023, and Moneypoint Power Station (915 MW) was scheduled to close by 2025 (but has been extended to 2029). These closing dates have been delayed arising from concerns about security of electricity supply. The delays mean that more carbon emissions will arise. It highlights the urgency of constructing this and other wind farms; and
- Increase electricity generated from renewable sources to 80%, indicatively comprised of up to 9 GW onshore wind energy by 2030.

Furthermore, the Climate Action and Low Carbon Development (Amendment) Act (2021) prescribes a reduction of 51% of 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 the Wind Farm Site would occur would remain unchanged. Consequently, the

⁸ Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 <http://data.europa.eu/eli/dir/2023/2413/oj> [Accessed: 19th March 2026]

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 Roscommon’s wind energy resource would be lost at this Wind Farm Site. The environmental effects of the ‘Do-Nothing’ scenario compared to proceeding with the Project is detailed in **Table 3.1**.

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 recently published EPA report Ireland’s Greenhouse Gas Emissions Projections 2024-2055 (May 2025) highlighted that Ireland is not on track to meet the national target of 51% emissions reduction target by 2030 compared to 2018 under the Climate Action and Low Carbon Development 2015 (as amended), nor is it projected to meet its EU target of 42% emissions reduction compared to 2005 under the Effort Sharing Regulations.

The Project has the potential to prevent approximately between 51,600 tonnes of CO₂ emissions per annum, or 1,806,000 tonnes of CO₂ emissions will be displaced over the proposed 35-year lifetime of the wind farm, see **Chapter 19: Climate** for details on the methods used. This would otherwise be released to the atmosphere through the burning of fossil fuels in the “Do-Nothing” scenario. This would result in continued global warming and fail to limit warming contrary to the Paris Agreement to the United Nations Framework Convention on Climate Change (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 the 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 an estimated 80-100 jobs during the construction phase of the Project, and 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 choice of developing a renewable energy project at this Wind Farm 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 project

Criteria	Residual Effect of the Project	Do-Nothing Alternatives
Population & Human Health	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 community via the community benefit fund.
Terrestrial Ecology	The loss of grassland, bogland and forestry because of the Project will result in a residual slight negative effect at a local level. Through the Biodiversity Enhancement Management Plan (BEMP) (Appendix 6.1) , the proposed Project will result in a net gain of hedgerow/treeline within the Wind Farm Site, as well as the creation of new native woodland. Therefore, a Positive effect for biodiversity within the Wind Farm Site will accrue over time.	Main land use on the Wind Farm Site, namely peat harvesting, agricultural and forestry, will continue. Without intervention, there would be no improvement in habitat quality or expansion leading to a missed opportunity for ecological enhancement.
Aquatic Ecology	With the appropriate mitigation in place there is expected to be no negative residual effect on any aquatic species, habitat or on water quality at a local or catchment level as a result of the Project.	If the Project does not proceed, lands at and in the vicinity of the Wind Farm Site will likely continue to be used for agricultural purposes. This 'Do-Nothing' scenario would result in no significant change in effects to aquatic ecology and habitats within or downstream of the Wind Farm Site subject to the continuation of current activities and practices.
Ornithology	Enhancements laid out within the BEMP (Appendix 6.1) would ensure that the Project	The future baseline in the presence of the 'Do-Nothing' impact will, in general, be

Criteria	Residual Effect of the Project	Do-Nothing Alternatives
	has an overall positive effect on those sensitive ornithological features identified within this assessment as well as biodiversity as a whole.	relatively similar to the current baseline, and the populations of the ornithological features that are relevant to the Project would be largely consistent with that of the existing baseline conditions.
Soils & Geology	The residual effects on the soils and geology environment as a function of the Project is that there will be a change in ground conditions at the Wind Farm Site with natural materials such as subsoil and bedrock being replaced by concrete, subgrade and surfacing materials. This is a negative impact of moderate significance at a local scale.	Should the Project not proceed, the existing land-use practices will continue with associated modification of the existing environment, including the underlying soils and geology, through agriculture and forestry with no significant change in effects on soils and geology.
Hydrology & Hydrogeology	Non-significant effects following implementation of mitigation measures.	Should the Project not proceed, the existing land-use activities will continue with associated gradual alteration of the existing environment and associated pressures on surface water and groundwater quality. The flood plain extents will remain as they are.
Air & Climate	Slight to moderate temporary localised residual effects arising from fugitive dust emissions during construction. Long-term positive effect on air quality and climate due to avoidance of burning of fossil fuels and the net displacement of 51,600 tonnes of CO ₂ per annum.	There will be no improvement in air quality or a reduction of greenhouse gas emissions. By the Project not proceeding, it will not assist in achieving the renewable energy targets set out in the Climate Action Plan 2025. Fossil fuel power stations will be the primary alternative to provide the required quantities of electricity resulting in greenhouse gas and other air pollutant emissions.
Noise	Not significant to slight temporary noise impacts associated with construction activities. Long-term slight to moderate negative effect on the dwellings closest to the Project	There will be no change in noise emissions.

Criteria	Residual Effect of the Project	Do-Nothing Alternatives
	as a result of the operational phase.	
Landscape & Visual	Aside from design iterations, which are embedded in the assessed Project, other specific landscape and visual mitigation measures are not considered necessary/ likely to be effective. Thus, the impacts are assessed in Chapter 12: Landscape and Visual Assessment . It is not considered that there will be any significant effects arising from the Project.	The receiving landscape stays in the same or similar condition as it currently is.
Material Assets	<p>The Project will have a temporary, slight negative impact on agricultural land use due to the removal of grazing lands during the construction phase and a long-term slight negative impact on agricultural land use for the duration of the operation phase of the Project.</p> <p>The Project will have a no significant effects from waste, and a slight negative effect on natural resources in the area during construction.</p>	<p>If the Project does not proceed, lands within the Wind Farm Site will continue to be used for peat harvesting, agricultural and forestry purposes. In this case, the likely evolution of the baseline environment is to a reduction in soil fertility.</p> <p>Under the 'Do-Nothing' scenario, there will be no offset to fossil fuel use and no provision of additional renewable electricity generation infrastructure in the local area.</p>
Cultural Heritage	<p>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 Project. This is due to the fact that any remains that are encountered during the course of monitoring or test trenching will be subject to preservation by record or preservation in-situ.</p> <p>Residual effects will remain with regards to the setting of archaeological, architectural</p>	There will be no potential for cultural heritage effects.

Criteria	Residual Effect of the Project	Do-Nothing Alternatives
	and cultural heritage sites, due to the fact that the effects on the setting of the sites cannot be mitigated. These effects will not be significant or permanent, and will be removed following the decommissioning of the turbines. As detailed in Appendix 15.1: Heritage Impact Assessment (HIA) .	
Traffic and Transport	Moderate localised short-term impact due to construction and decommissioning activities. During operation, effects are predicted to be not significant.	No potential for increased traffic during construction.

3.5 STRATEGIC SITE SELECTION

The cost of building each megawatt of electricity-generating capacity in a wind farm is in the region of €1.5 million. It is therefore critical that the most suitable the Wind Farm Site for the Project was chosen. The site selection process for the Project has been fully informed by national, regional and local policy at a macro level (see **Chapter 4: Planning and Legislative Context**), as well as site-specific factors that influence the turbine layout and project design on the Wind Farm Site at a micro level (see **Section 3.6** below).

The key policy, planning and environmental considerations for the selection of a potential Wind Farm Site included:

- Site location relative to Roscommon County Council's Renewable Energy Strategy (RES)⁹ classification of areas considered suitable for wind farm development;
- Low population density;
- Consistent wind speeds;
- Protection of visual amenity;
- Low potential for impact on designated National and European sites;
- Located outside areas designated for protection of ecological species and habitats;
- Access to the national electricity grid possible within a viable distance; and
- Sufficient area of unconstrained land that could potentially accommodate wind farm development and turbine spacing requirements.

⁹ Roscommon County Council 2022 - Roscommon County Development Plan 2022-2028 Vol I. Renewable Energy Strategy. <https://www.rosdevplan.ie/roscommon-county-development-plan-2022-2028/> [Accessed: 19th March 2026].

These criteria are explained further below in so far as they influenced the site identification exercise undertaken in respect of the ultimate selection of the Carrigeen Renewable Energy Development ('the Project'). From an early stage in the design process, it was also considered optimal to seek a site capable of accommodating a large number of turbines within reasonable proximity to each other. This would limit the geographical spread of the turbines, consolidate supporting infrastructure and also reduce the number of clusters of turbines that may be required. The development of multiple, separate wind farm sites spread throughout a wider area would require supporting infrastructure (i.e., roads and cabling etc.) to run from each wind farm site to the connecting substation thereby increasing the amount of infrastructure required for development and increasing the potential for environmental impacts to occur. Therefore, the provision of a centralised location would concentrate the necessary infrastructure into a single geographic area.

3.5.1 Compliance with Planning Policy/Designation Areas

The planning policies set out in detail in **Chapter 4: Planning and Legislative Context** of this EIAR outline the planning objectives of the Council with regard to wind energy development.

As detailed in **Chapter 4: Planning and Legislative Context** areas within the Roscommon County have been designated as being "Most Favoured", "Less Favoured" and "Not Favoured" for wind energy development potential (refer to **Figure 4.1**). The proposed Wind Farm Site is located in an area classified as "Less Favoured". This designation is described as follows: *'Wind farm development will be considered, but the sensitivities revealed in these areas would render exploitation more problematic and therefore these areas are less favoured for wind energy development'*.

Despite these sensitivities, it is recognised that having regard to the geographical location and the nature of the underlying geology of Roscommon, wind energy development currently represents one of the most viable sources of renewable energy production in the County.

County Roscommon covers a total area of approximately 2,548km². The total area designated as "Most Favoured" is approximately 927km², which represents approximately 36% of the County's area.

In the initial stage of site selection, the Applicant prioritised areas designated as “Most Favoured” for wind energy development. However, following detailed analysis, these areas were deemed not feasible for the Project due to a combination of factors, including:

- Existing or proposed wind energy developments, resulting in cumulative visual and environmental impacts.
- Limitations in national grid infrastructure and capacity, restricting connection feasibility;
- Proximity to residential dwellings and businesses, triggering setback requirements that limited viable Wind Turbines locations.
- Presence of sensitive habitats and flight paths of protected species, particularly airborne species.
- Presence of archaeological sites and protected structures, imposing statutory development restrictions.
- Aviation flight paths and low-flying aircraft considerations, creating safety and regulatory constraints.
- Telecommunication systems interference (avoiding disruption to TV, radio, and wireless networks).
- Landownership consent agreements (lack of agreement with landowners posed significant barriers to any proposed Wind Farm Site assembly and Project viability).

Given the constraints identified within “Most Favoured” areas, the Applicant undertook a robust assessment of “Less Favoured” areas to identify a proposed Wind Farm Site that meets technical, and environmental criteria (as described below in **Sections 3.5.2 – 3.6.6**). Through this comprehensive selection process, the Wind Farm Site emerged as feasible and appropriate for development from a planning policy perspective. This approach aligns with national renewable energy targets and the objectives of the RCDP (2022-2028), supporting Roscommon’s contribution to Ireland’s low-carbon energy transition.

3.5.2 Separation Distance from Residential Dwellings and Population Density

A setback of four times the tip height (740m) was applied to third-party dwellings in the surrounding area subject to a minimum setback of 500m for involved dwellings. The population density for County Roscommon (as described in the **Chapter 5: Population and Human Health**) is 27.6 persons per km². This is significantly lower than the average national population density of 73 persons per km²¹⁰.

¹⁰ Central Statistics Office (2022). Available online at: <https://www.cso.ie/en/releasesandpublications/ep/p-cpp1/censusofpopulation2022profile1-populationdistributionandmovements/populationdistribution/> [Accessed 1st September 2025].

3.5.3 Wind Resource

The Irish Wind Atlas produced by Sustainable Energy Ireland¹¹ shows average wind speeds for the country. The Wind Atlas shows that wind speeds on the Wind Farm Site are suitable for wind energy development (7.6m/sec at 75m, 8.2m/sec at 100m, and 8.9m/sec at 150m).

3.5.4 Visual Amenity

The RCDP identifies the value of the landscape character within the county and the Landscape Character Assessment (LCA) is also one of the main policy areas which will inform the issue of suitability of wind farms within the County. The Wind Farm Site is located in a LCA designated as 'Moderate' Value which is the lowest LCA value rating of LCAs in County Roscommon, as stated in the current RCDP 2022-2028.

3.5.5 Avoidance of European Designated Sites

The Wind Farm Site is not located within any area designated for ecological protection.

The nearest Natura 2000 sites, i.e., Special Area of Conservation (SAC) or Special Protection Area (SPA) is the Cloonshanville Bog SAC (Site Code: 000614) located 230m north of the closest turbine (T1) and the Bellanagare Bog SAC/SPA (Site Code: 000592/004105) located 2.1km south-west of the closest turbine (T2).

3.5.6 Proximity to the National Grid

The Wind Farm Site is located 12km south-west of the existing Flagford 220kV substation. The Carrick on Shannon 110kV substation is located 14.2km north-east of the Wind Farm Site and the Tonroe 110kV substation is located 13.7km west of the Wind Farm Site. Therefore, a wind energy development at this location has a number of route options to enable connection to the national electricity grid.

3.5.7 Summary

From the review of the criteria set out above, the Wind Farm Site was identified as a suitable candidate site for the provision of a wind farm of the scale proposed. The Wind Farm Site is located predominantly within peat harvesting, agricultural land and existing commercial forestry which allows the Wind Farm Site to take advantage of existing Site Access Roads (which will be upgraded in specific locations). This combined with the proximity to the existing Flagford 220kV substation further highlights the suitability of the Wind Farm Site as it can make further sustainable use of these established items of infrastructure. The Wind

¹¹ SEAI (2026). Available online at: <https://maps.seai.ie/apps/WindAtlas/> [Accessed 13th January 2026].

Farm Site does not overlap with any designated sites and is located in an area with a relatively low population density with suitable annual wind speeds.

3.6 WIND FARM DESIGN AND LAYOUT

The design of the Project has been informed by the designers, the Applicant, engineers, landowners, environmental specialists, hydrological and geotechnical specialists, 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. Throughout the preparation of the EIA, the layout of the Project has been revised and refined to take account of the findings of all site investigations, which have brought the design from its first initial layout to the current proposed layout. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory organisations, the local community and local authorities as detailed in **Section 1.11 of Chapter 1: Introduction**.

3.6.1 Constraints Led Approach

The design and layout of the Project follows the recommendations and industry guidelines set out in the Wind Energy Ireland (WEI) Guidelines, 'Best Practice Guidelines for the Irish Wind Energy Industry' (Irish Wind Energy Association (now known as WEI), 2012) and has due regard to the 'WEI Guidelines'. 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 Wind Farm Site by the design team with a view to identifying suitable areas in which Wind Turbines may be located.

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 works will take place. The size of the buffer zone for each constraint has been assigned using guidance presented in the WEI Guidelines and other relevant Best Practice standards, which are identified in each chapter of this EIA. The proposed setbacks have regard to the WEI Guidelines.

The constraints map for the Wind Farm Site, as shown in **Figure 3.1**, encompasses the following constraints and associated buffers in accordance with relevant guidance/best practice and professional judgement:

- Distance to major watercourses of at least 50m.
- Distance to minor watercourses (e.g. land drains) of at least 10m, where possible.
- Dwellings, min. 500-metre setback and 4 times the Wind Turbine tip height for non-involved inhabited properties (740m).
- Avoidance of more sensitive habitats, e.g., Annex I.
- The mapped 1:1,000 year flood event extents on Wind Turbine locations.

This demonstrates the avoidance of significant effects on the receiving environment through mitigation by design.

The Wind Farm Site layout design builds on the existing site characteristics and includes the following:

- Available lands for the Wind Farm Site.
- Separation distance from landowners.
- Distance from designated sites.
- Acceptable wind resource.
- Existing access points and general accessibility of all areas of the Wind Farm Site due to existing road infrastructure.
- Avoidance of environmental constraints.

The inclusion of the constraints on GIS allowed for a refined Wind Farm Site to be identified. An initial Wind Turbine layout was then developed to take account of all the constraints mentioned above, their associated buffer zones and the separation distance required between the Wind Turbines.

Following the mapping of all known constraints, detailed site investigations were carried out by the project team. The ecological assessments of the Wind Farm Site encompassed habitat mapping and extensive surveying of birds and other fauna. These assessments, as described in **Chapter 6: Biodiversity**, were used to inform the selection of the optimal siting of Wind Turbines and associated infrastructure works (e.g. construction of Site Access Roads, Turbine Hardstands, Onsite Substation etc.).

Similarly, the hydrological and geotechnical investigations of the Wind Farm Site informed the proposed locations for Wind Turbines, Site Access Roads and other components of the

Project, such as the Onsite Substation, Permanent Met Mast and the Temporary Construction Compounds. This included site investigation works (**Chapter 10: Soils and Geology**) and the identification of watercourses, groundwater constraints, flood risk and wells (**Chapter 11: Hydrology and Hydrogeology**). Where specific areas were deemed as unsuitable (e.g., e.g., unstable peat giving high risk for slippage)) for the siting of Wind Turbines or Site Access Roads, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out of consideration. The Wind Turbine layout for the proposed Project has also been informed by wind data which has been collected from a temporary meteorological mast and the results of noise assessments as they became available.

3.6.2 Wind Turbines Layout

The final Wind Turbine layout of the Project takes account of all site constraints and the distances to be maintained between Wind Turbines and dwellings, roads, etc. The layout is based on the results of all site investigations that have been carried out during the EIA process.

The number of turbines and layout has had regard to wind-take by siting the Wind Turbines to achieve optimal performance, and noise by ensuring no Wind Turbines are constructed in a location that would lead to noise impacts in exceedance of the WEI Guidelines.

As information regarding the Wind Farm Site was compiled and assessed, the number of Wind Turbines and the proposed layout have been revised and amended to take account of the physical constraints of the Wind Farm Site. The requirement for buffer zones and other areas in which no Wind Turbines could be located was also compiled and assessed. 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 final layout of the Project 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 Wind Turbines were reviewed during the optimisation of the Wind Farm Site layout. This was achieved by strictly by avoiding known constraints for the site infrastructure.

3.6.2.1 First Layout (14 Wind Turbines)

The initial site screening identified a significant Wind Farm Site within the overall study area suitable for 14 No. Wind Turbines. The first layout (14 Wind Turbines) is shown in **Figure**

3.2. Following the initial site surveys, new constraints were mapped for the Wind Farm Site. The 14 Wind Turbines layout was then amended to 12 Wind Turbines with the removal of T8 and T9. These turbines were removed due to landowner constraints.

3.6.2.2 Second Layout (12 Wind Turbines)

Following the removal of T1 and T11 the layout was redesigned and was reduced to 12 Wind Turbines to allow for optimal spacing between the Wind Turbines and to adhere to setback from constraints identified during the detailed desk-based assessments and field surveys carried out by environmental, hydrological, geotechnical, ecological and archaeological specialists. Design workshops were then held with the individual discipline leads, identifying potential effects of the-12 Wind Turbine layout on the environment, in particular, on ecology, soils and geology, and hydrology. The second layout (12 Wind Turbines) is shown in **Figure 3.3**. The second layout takes account of all site constraints arising from the site investigation results collated during the EIAR (e.g., ecology, ornithology, hydrology, geology, telecommunications etc.) and design constraints (e.g., setback distances from dwellings and third-party lands/infrastructure and distances between Wind Turbines on-site etc.). Landowner constraints for the access road to T8 led to the ultimate removal of this Wind Turbine.

3.6.2.3 Third (Final) Layout (11 Wind Turbines)

Following the removal of T8 from the second layout, the third layout consisted of 11 Wind Turbines within the Wind Farm Site. With continued detailed analysis of the onsite constraints, further minor amendments were made to the layout to ensure the Wind Farm Site is being proposed in the most environmentally responsible way. It was also at this point that the site boundary ('EIAR Boundary') for the purposes of the EIAR was defined. The initial EIAR Boundary was amended to focus on the final iteration of the Wind Turbines layout and the chosen Grid Connection. The final layout is shown in **Figure 3.4**.

A comparison of the potential environmental effects of the three Wind Turbines layouts when compared against the final layout are presented in **Table 3.2**.

Table 3.2: Environmental Effects from Initial to Final Layout

Criteria	First Layout (14 Wind Turbines)	Second Layout (12 Wind Turbines)	Third (Final) Layout (11 Wind Turbines)
Population & Human Health	Larger development layouts comprising additional Wind Turbines	No material environmental difference for	No material environmental difference for

Criteria	First Layout (14 Wind Turbines)	Second Layout (12 Wind Turbines)	Third (Final) Layout (11 Wind Turbines)
(incl. Shadow Flicker)	had the potential to increase the number of nearby sensitive receptors included in the shadow flicker assessment.	population or human health.	population or human health. Difference between the layout is negligible for Population & Human Health and Shadow Flicker.
Biodiversity (incl. Ornithology)	Larger development footprint would lead to an increase in habitat loss. A higher number of turbines could lead to a higher risk from a collision risk perspective.	Larger development footprint would lead to an increase in habitat loss. Difference between layouts is negligible from a collision risk perspective.	No significant environmental impacts. Difference between layouts is negligible from a collision risk perspective.
Soils & Geology	Slight increase in the volume of peat and spoil to be managed due to larger number of Wind Turbines.	Difference between the layout is neutral for soils and geology.	Difference between the layout is neutral for soils and geology.
Hydrology & Hydrogeology	An increase in the volume of peat and spoil to be managed on the Wind Farm Site would increase the potential for silty runoff to enter receiving watercourses.	Difference between the layout is neutral for hydrology and hydrogeology.	Difference between the layout is neutral for hydrology and hydrogeology.
Air & Climate	Larger development layouts comprising additional Wind Turbines had the potential to make a greater contribution to renewable energy targets and greenhouse gas reductions. Overall, a long-term, significant, positive impact on climate.	Overall, a slightly less long-term, significant, positive impact on climate in comparison to earlier layouts due to the reduction in the number of Wind Turbines.	Overall, a slightly less long-term, significant, positive impact on climate in comparison to earlier layouts due to the reduction in the number of Wind Turbines.
Noise	Larger development layouts comprising additional Wind Turbines had the potential to give rise to additional impacts on residential amenity, due to noise.	Difference between the layout is neutral for noise.	Difference between the layout is neutral for noise.

Criteria	First Layout (14 Wind Turbines)	Second Layout (12 Wind Turbines)	Third (Final) Layout (11 Wind Turbines)
Material Assets	There are no conflicts with existing telecommunications links.	Difference between the layout is neutral for material assets.	Difference between the layout is neutral for material assets.
Landscape & Visual	Potential for greater visual impacts due to the wider visual extent of the proposed Wind Turbines.	The Project will result in noticeable landscape and visual changes, this would be most notable in relation to the immediate locality and the landscape of the central study area. It is not considered to have the potential to generate significant effects. A larger number of Wind Turbines would have a slightly greater visual impact. However, the difference between layouts is negligible.	Less intensity from fewer Wind Turbines, however the differential slight.
Cultural Heritage	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.	Difference between the layout is neutral for cultural heritage.	Difference between the layout is neutral for cultural heritage.
Traffic and Transport	Larger development footprint would lead to an increase in construction traffic volumes and traffic impacts across a greater extent of the public road network.	A larger number of Wind Turbines would have a slightly greater visual impact. However, the difference between layouts is negligible.	Difference between the layout is neutral for traffic and transport.

3.6.3 Site Access Roads Layout

The Site Access Roads are required to enable transport of infrastructure and construction materials within the Wind Farm Site. Site Access Roads must be of a sufficient gradient and width to allow safe movement of equipment and vehicles. It was decided during the initial design of the Project that existing tracks would be utilised where possible to minimise the land take required and the resultant potential for impacts by constructing new tracks as an

alternative. This has meant that where possible, the proposed Site Access Roads have followed the existing Site Access Roads on the Wind Farm Site.

As the overall layout was finalised, the most suitable routes between each component of the Project were identified, taking into account the existing Site Access Roads and the physical constraints of the Wind Farm Site. There are sections of existing Site Access Roads throughout the Wind Farm Site, as shown in **Figure 1.2**. Locations were identified where upgrading of the Site Access Roads would be required. This primarily included where sections of new Site Access Roads would need to be constructed, to ensure suitable access to and linkages between the various project elements, and efficient movement around the Wind Farm Site.

An alternative option to utilising the existing road network within the Wind Farm Site would be to construct a new road network, having no regard to existing roads. This approach was considered unfavourable, as it would require unnecessary disturbance to the Wind Farm Site and create the potential for additional environmental impacts to occur. It would also result in an unnecessary requirement for additional cut and fill material to be used in the construction of these new roads. A comparison of the potential environmental effects of constructing an entirely new road network when compared with maximising the use of the existing road network is presented in **Table 3.3**.

Table 3.3: Environmental effects from constructing a new Site Access Road network compared to utilising existing Site Access Roads and creating new Site Access Roads where required

Criteria	Comment
Population & Human Health (incl. Shadow Flicker)	Increase in noise, disruption of the road network as a result of the associated increase in construction activities required onsite and vehicular movements on the local road network.
Biodiversity (incl. Ornithology)	Larger development footprint will result in greater habitat loss which could impact birds.
Soils & Geology	Larger development footprint would result in greater volumes of peat and spoil to be excavated and stored. Larger volume of stone required from on-site borrow pit for road construction.

Criteria	Comment
Hydrology & Hydrogeology	Larger development footprint and increased number of new watercourse crossings, therefore, increasing the potential for silty runoff to enter receiving watercourses.
Air & Climate	Potential for greater dust emissions due to the requirement of an increased volume of stone from the on-site borrow pit. Potential for greater vehicular emissions due to increased volume of construction traffic. However, these will not be significant.
Noise	Neutral
Material Assets	Larger development footprint will result in greater land-take and a change in land use.
Landscape & Visual	Potential for visual and landscape impacts due to the construction of new roads. However, this will not be significant following revegetation after construction.
Cultural Heritage	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.
Traffic and Transport	Neutral

3.6.4 Alternative Grid Connections

The output of the Project is such that it requires a connection to a 110 kV or 220 kV substation. A high-level review of grid connection options was undertaken by the Developer, which examined the viability of the Grid Connection with respect to technical and economic aspects. Further consideration was then given to the route options by the project team with regard to environmental aspects.

Initially two options for the Grid Connection (**Figure 3.5**) were under consideration:

- **Option 1** – Underground connection to Flagford 220kV Substation with the route consisting of ducting in public roads. There were three options in this route;
 - i. **Option A**; which would run through Ballinameen, mainly along the R370 for 23.6km to Flagford 220 kV substation.
 - ii. **Option B**; which would run easterly along local and regional roads L5650, L1402, R368 etc, for 17.5km before reaching Flagford 220 kV substation.

- iii. **Option C**; following a similar route to Option B, although diverting off the L-1217 towards Elphin passing mainly along the regional road R368 for a total of 18.3km before reaching Flagford 220 kV substation.
- **Option 2** – Underground connection to Tonroe 110 kV Substation with the route consisting of ducting in public roads for c.21km.

Through additional surveys, it was found that Option 1 (B) was the preferred Grid Connection option out of the Option 1 choices, as this was the shortest route causing the least disturbance. Option 1 (B) was then brought forward and compared against the Option 2 route to Tonroe. Option 1 (B) was then chosen as the preferred route over Option 2, this was due to Option 2 being a longer connection in public roads which would have caused significant disruption to users of the local road network around Frenchpark. Option 2 also required the crossing of a watercourse that is hydrologically connected downstream to the Tullaghanrock Bog SAC. To reduce disturbance to residents and road users around Frenchpark on the N5 road, which is a major Irish national primary road linking Longford to Westport, and to protect the watercourse and associated downstream Natura 2000 site, Option 1 (B) was selected as the preferred option. A comparison of the potential environmental effects of Option 1 (B) and Option 2 is presented in **Table 3.4**.

Table 3.4: Environmental Effects from Grid Connection Option 2 compared with the preferred Grid Connection Option 1 (B)

Criteria	Option 1 (B): Underground connection to Flagford 220kV Substation	Option 2: Underground connection to Tonroe 110kV Substation
Population & Human Health	Option 1 (B) will have less vehicular movements and road closures, so less disruptions to users of the public road network.	Option 2 is a longer route with more potential to impact on nearby residents due to road closures and vehicular movements associated with the underground connection.
Biodiversity	Shorter route will have a smaller footprint and therefore a smaller potential to impact on habitats.	Option 2 has more potential effects due to the longer distance from the Wind Farm Site.
Soils & Geology	Shorter cable route will have a smaller footprint and therefore a smaller potential to impact soils and geology as the excavation volumes will be reduced.	Longer route with cable trenches have a larger footprint and have a greater potential to impact soils and geology as the excavation volumes will be greater.

Criteria	Option 1 (B): Underground connection to Flagford 220kV Substation	Option 2: Underground connection to Tonroe 110kV Substation
Hydrology & Hydrogeology	Option 1 (B) would require watercourse crossings which are hydrologically linked to designated sites.	Option 2 would require watercourse crossings, in particular the River Lung, which is closely hydrologically connected to the Tullaghanrock Bog SAC, Callow Bog SAC and Lough Gara SPA.
Air & Climate	Option 1 (B) will have less vehicular movements and less dust emissions due to the smaller excavation footprint.	There will be higher carbon emissions for Option 2 due to the removal of tarmac and re-installation of road surface, as well as the use of larger amount of plastic ducting. There will also be more vehicle movements and more dust emissions due to a larger excavation footprint.
Noise	Option 1 (B) will have noise generating activities for a shorter period of time with less receptors that could be affected.	Option 2 has a higher potential for construction noise for trench installation over a longer distance and timeframe during the construction phase and a greater number of potential receptors.
Material Assets	Neutral.	There will be a significant amount of road surface material contaminated by bitumen which will need to be disposed at a registered waste facility for underground cables in the public road network associated with Option 2.
Landscape & Visual	Neutral.	Neutral.
Cultural Heritage	Neutral.	Neutral.
Traffic and Transport	Neutral.	Option 2, as it is a longer route along public roads, would have more impact due to road closures and traffic management requirements. In addition, an increase of removal of road surface material to a waste facility would increase traffic on roads.

3.6.5 Alternative Turbine Delivery Route

Wind Turbine components (blades, nacelles and towers) are not manufactured in Ireland and therefore must be imported from overseas and transported overland to the Wind Farm Site. Alternative transport routes to the Wind Farm Site were considered in relation to the Wind Turbine components, general construction-related traffic, and site access locations.

3.6.5.1 Port of Entry

The alternatives considered for the port of entry of Wind Turbines into Ireland for the proposed Project include Port of Galway and Killybegs Port. Both Ports offer a lift-on lift-off procedure to facilitate importation of Wind Turbines. The Port of Galway was selected as the port of entry for this Project because it is located closer to the Wind Farm Site and with a number of the existing wind farms in the vicinity of the Wind Farm Site having used Galway Port route and only temporary accommodation requirements as detailed in **Chapter 16: Traffic and Transport** will be required to facilitate Wind Turbine deliveries on the route. Other ports were not considered as these two options are proven to have the required capabilities for turbine deliveries.

3.6.5.2 Delivery to Wind Farm Site

It is proposed that the Wind Turbine nacelles, tower hubs and rotor blades will be landed at Galway Port. From there they will be transported to the Wind Farm Site via the L5048, R339, N83, N17 and N5 to the upgraded site entrances. This route has proven suitable for the transport of Wind Turbine components for other wind farm developments in the area. The transport analysis (as presented in **Chapter 16: Traffic and Transport**) shows that only relatively minor accommodation works will be required to accommodate the proposed Wind Turbines. The difference in using the Killybegs Port compared to Port of Galway is there would be slightly longer travel distance, a slight increase in air emissions and significant road works required in areas along the Turbine Delivery Route from Killybegs Port.

3.6.6 Alternative Mitigation Measures

Mitigation by avoidance underpins the Project. By avoiding the more ecologically sensitive areas of the Wind Farm Site as much as possible, the potential for environmental effects is reduced. As noted above, the Wind Farm Site layout avoided environmentally sensitive areas through the application of site-specific constraints in the design development. The Wind Farm Site is not located in a designated site for nature conservation and, following the implementation of the habitat enhancement proposals, there will be a net gain in biodiversity on the Wind Farm Site as outlined in **Appendix 6.1: BEMP**.

The approach adopted, has taken environmental considerations into account early in the design process so that mitigation measures are integrated into the fundamental design. The best practice design and mitigation measures set out in this EIAR will contribute to reducing risks and have been designed to break the pathway between the Wind Farm Site and any identified sensitive receptors.

3.7 CONCLUSION

A description of the reasonable alternatives in terms of the design, location, size and scale which are relevant to the Project and its specific characteristics (maximum 62.7MW output, 11 No. Wind Turbine with a tip height of 185m, a hub height of 103.5m and a rotor diameter of 163m – large scale wind farm), has been provided. An indication of the main reasons for selecting the chosen options, including a comparison of the environmental effects has also been provided. Through appropriate consideration of the reasonable alternatives, as outlined in this chapter, the Wind Farm Site has been shown to be a suitable location for the Project given consideration of the main criteria of distances from dwellings, wind speeds, potential environmental effects and acceptable proximity to an existing national grid node.