MWP

Chapter 04 Alternatives

Ballinla Wind Farm

Ballinla Wind Farm Limited

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4. Alternatives

4.1 Introduction

This chapter of the EIAR outlines the consideration of Alternatives in relation to the Proposed Development (a full description of which is available in Chapter 2), which is a mandatory part of the EIA process. The legal requirements of the EIA Directive 2011 and the amending Directive 2014, relating to the assessment of alternatives are set out in Article 5(1)(d) and Annex IV point 2 of the Directive.

Article 5(1) states that 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 point 2 expands further:

> 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 EU Commission guidance "*Guidance on the preparation of the Environmental Impact Assessment Report*" (2017) defines alternatives as: 'Different ways of carrying out the Project in order to meet the agreed objective'. That guidance states 'The number of alternatives to be assessed has to be considered together with the type of alternatives, i.e. the 'Reasonable Alternatives' referred to by the Directive. 'Reasonable Alternatives' must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives. In addition, 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.'

Ultimately, alternatives have to be able to accomplish the objectives of the project in a satisfactory manner, and should also be feasible in terms of technical, economic, political and other relevant criteria.

The EPA guidance "*Guidelines on the information to be contained in Environmental Impact Assessment Reports*" (2022) says:

> "*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*."

The EPA 2022 guidance also states that analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR.

The purpose of alternatives analysis is therefore principally to examine the different possibilities for meeting the project's needs and objectives, and to determine whether or not the project objectives can be met by different means that avoid, minimise, or mitigate potential significant environmental effects of the proposed project.

During the project design process, alternative wind farm layouts and scales were fully considered in order to find the optimum design solution for the site, with the least level of environmental effect. This chapter therefore

Figureslines the site selection process, the process of design evolution for the Proposed Development, the reasonable alternatives considered during the project inception and design process, including a comparison of the environmental effects and the principal reasons for proceeding with the current planning application. The following elements are considered further in this chapter:

- Site Selection.
- Project Design Process.
- Alternatives Considered.
- Do Nothing Scenario.

4.2 Site Selection Process

Prior to selection of the site to cater for such development, a detailed screening exercise was undertaken by the Applicant using a number of criteria and stages to assess the potential of a large number of possible sites, on lands under consideration, suitable to accommodate a wind energy development.

These included:

- Wind resource.
- Proximity to grid.
- Compliance with planning designation.
- Avoidance of environmental designations.
- Separation distance from dwellings.
- Site accessibility.
- Level of visual impact.

Interrelated to this, the Proposed Wind Farm must, in non-environmental terms, be commercially viable to ensure it will attract the necessary project finance to progress to the construction phase and ultimately deliver renewable electricity to the National Grid which is an objective of National energy policy.

A technical review of potential candidate sites for wind energy development over a wide area in the region was conducted using a desk-based geographical information system (GIS) screening exercise. The first step in the selection process was to examine high level constraints to eliminate areas which were deemed unsuitable for wind turbines. This identified all registered environmental designations, protected views, cultural and heritage sites, and other areas of special sensitivity.

Alternative locations were eliminated in the early stages of the site selection process as the goal for this project was to deliver a large-scale wind farm. The Proposed Development site was the site identified as most suitable to take forward as a potential wind farm location. The following is a summary of the methodology used in the screening process.

4.2.1 Phase 1 Initial Screening

The screening process involved the application of a defined set of spatial and policy-based criteria to the wider study area. These criteria were informed by national and regional planning guidance, including the relevant County Development Plan(s) and associated Renewable Energy Strategies. The objective was to identify lands where wind energy development would be considered acceptable in principle, subject to further environmental and technical assessment.

Key considerations during Phase 1 included:

- Policy Designations: Lands were assessed against the zoning and policy designations set out in the County Development Plan. Areas not identified as being at least "open for consideration" for wind energy development were excluded from further analysis.
- Environmental Constraints: Areas subject to statutory environmental designations, such as Natura 2000 sites (Special Areas of Conservation (SAC), Special Protection Areas (SPAs) and Natural Heritage Areas (NHAs)), were excluded to avoid potential significant effects on sensitive ecological receptors.
- Landscape and Visual Sensitivity: While not fully assessed at this stage, areas identified in planning policy as having high landscape sensitivity were noted for further consideration in later phases.

The outcome of the Phase 1 screening was the exclusion of large portions of the county where wind energy development would be inconsistent with planning policy or where significant environmental constraints were present. The remaining areas were then carried forward for more detailed Phase 2 assessments, which included technical feasibility, grid connection potential, and environmental sensitivities.

4.2.2 Phase 2 Grid Constraints

Following the initial policy and environmental screening, the remaining candidate areas were assessed in Phase 2 for technical feasibility, with a particular focus on grid connection potential. This stage involved a review of the existing electricity transmission and distribution infrastructure, including proximity to substations, available capacity on the local network, and the feasibility of connecting to the grid without requiring extensive or cost-prohibitive upgrades. Areas located at significant distances from the existing grid or where network capacity was known to be constrained were deprioritized. This screening ensured that only sites with a realistic prospect of timely and cost-effective grid connection were carried forward for more detailed environmental and technical assessment. The consideration of grid constraints at this stage was essential to ensure the viability and deliverability of the Proposed Development.

4.2.3 Phase 3 Screening

Phase 3 of the screening process involved a detailed evaluation of the short-listed areas identified in earlier phases, with a focus on site-specific environmental sensitivities and technical feasibility. These included the following considerations:

- Amenity, tourist or scenic areas.
- Insufficient development area.
- Lands utilised for other wind farm developments.
- Natura 2000 Sites.
- Natura ecological designations.
- Sensitive habitat/species of bird.
- Land ownership considerations.
- Residential density considerations.
- Potential project scale.
- Sites with impractical/irregular shape/layout/topography.

The application of the above criteria resulted in the discounting of further land areas, leaving reduced areas for further assessment. The site selection process was, by necessity, strategic and desk-based in nature in order to narrow down the areas suitable for a wind farm. This is considered to be a rational and appropriate approach,

and its implementation was clearly founded on knowledge and observation. Based on the screening process, the Proposed Development site was the preferred site of scale to take through to the next stage of validation.

4.2.4 Site Validation

The Proposed Development site was further examined under the following headings to confirm its suitability for wind energy development. The main policy, planning and environmental issues considered for the validation of this wind farm site included:

- Alignment with the local development plans and renewable energy strategy.
- Obtainable and economic connection to the National Grid.
- Site specific environmental constraints.
- Consistently high average annual wind speeds.
- Proximity to local communities.
- Site topography.
- Access issues for turbine delivery and construction activities.

The above exercises, based on a number of key environmental, technical and policy-related criteria, determined that the Proposed Development site represented a suitable location for the Proposed Development in County Offaly. The Proposed Development site has satisfied a number of key criteria required for successful wind energy development and these are presented in Table 4-1.

Table 4-1: Summary of Site Suitability Criteria

Suitability Criteria	Proposed Development Site
Wind Resource	The predicted wind speeds at the site vary between 7.9m/sec and 8.1m/sec as shown in Sustainable Energy Ireland's Wind Atlas
Proximity to Grid	Underground cable (UGC) Proposed Grid Connection from the proposed onsite 110kV substation via a route on public road for 8km to the existing Philipstown 110kV substation.
Compliance with Planning Designation	The Offaly County Wind Energy Strategy (WES), part of the Offaly County Development Plan (CDP) 2021-2027, has identified the site as being located in 'Areas Open for Consideration for Wind Energy Development'. All wind turbines are sited within the 'Areas Open for Consideration for Wind Energy Development'. The wind energy development policy from the Offaly County Wind Energy Strategy (WES) states that these areas are open for consideration for wind energy development as these areas are characterised by low housing densities, do not conflict with European or National designated sites and have the ability by virtue of their landscape characteristics to absorb wind farm developments.
Avoidance of Environmental Designations	There are no Natura 2000 sites within the Proposed Wind Farm footprint. The nearest identified site is the Long Derries, Edenderry SAC which is located 7.6km to the west of the study area.
Separation distance from dwellings	Four times the tip height (185m) setback distance of 740m as per the Draft Wind Energy Development Guidelines (2019).
Site Accessibility	Primary access to the Proposed Development site can be achieved the local public road linkage (L5010) between the L-5006 in the east and the R400 to the west.
Level of Visual Impact	Assessment of the capacity to absorb the proposed wind farm development.

4.2.5 Local Planning Policy

The key objectives of the Offaly County WES are as follows:

- Reflect and plan for technological advances in wind farms over the next number of years.
- Support wind energy as a renewable energy source which can play a vital role in achieving national targets in relation to reductions in fossil fuel dependency and greenhouse gas emissions
- Identify key areas within the county that are 'Open for Consideration for Wind Energy Developments' or 'Unsuitable for Wind Energy Developments' based on wind speed, access to the electricity grid and substations, and avoidance of adverse impacts on the landscape and designated sites.
- Consider the potential for micro-generation (generation that is less than 11kW) wind energy developments and for small community-based proposals outside key areas within the county that are 'Open for Consideration for Wind Energy Developments'.
- Ensure full compliance with the requirements of EU SEA Directive 2001/42/EC and Statutory Instrument 436/2004 [Planning and Development (Strategic Environmental Assessment) Regulations 2004] on the assessment of the effects of certain plans and programmes on the Environment, and the Planning and Development Act 2000 (as amended), the EU Habitats Directive (92/43/EEC) and EU Birds Directive (2009/147/EC).

All proposed turbines are located within areas designated as 'Open for Consideration for Wind Energy Developments'. The wind energy development policy from the Offaly County WES states that these areas are open for consideration for wind energy development as these areas are characterised by low housing densities, do not conflict with European or National designated sites and have the ability by virtue of their landscape characteristics to absorb wind farm developments. This site is not contained within or directly adjacent to a Natura 2000 site.

4.3 Design Process

The Proposed Development has been designed to minimise potential environmental effects and to maximise wind potential on site. The design was developed following a step-by-step process in line with the EIA Directive which informed and identified the buildable areas suited to turbines, access tracks and infrastructure, based on avoidance of unsuitable areas and following good practice of mitigation by design.

4.3.1 Identification of Environmental Sensitivities

There are a number of drivers that will ultimately influence how a design layout for a project evolves. For wind farm development, this is usually concerned with location and placement of development components within a limited footprint at the site, which is largely defined by aspects such as noise, set-back from residential dwellings, habitat, access, grid connectivity and ground conditions, including slope, soil and drainage regime.

The EIA process involved the completion of all baseline studies to generate environmental constraints that informed the design for the optimum wind farm layout. These studies were undertaken by the environmental, planning and engineering professionals that made up the wind farm design team. Site visits between 2023 and 2025 have informed the Proposed Development EIAR and planning application.

The design process is an iterative process, resulting in the assessment of numerous design iterations (or revised designs) to ensure the identified environmental and engineering constraints are applied to successive layout designs. The design iterations, as reasonable alternatives, and the evolution of the final design, or final alternative are discussed.

Following consultation and baseline assessment of the site, the following key environmental factors were identified:

- Topography.
- Sensitive Habitats.
- Bat Ecology.
- Public Roads and Population Density.
- Ornithology.
- Soils and Geology.
- Hydrology.
- Archaeology.
- LVIA.

Based on the environmental sensitivities identified on site and the potential for significant environmental effects, it is considered that, through appropriate site design and the implementation of targeted mitigation measures, any such effects associated with the proposed development can be either eliminated or effectively mitigated. The design process has been guided by the principles of avoidance and minimization, including the application of buffer zones and setback distances that reflect best practice and site-specific constraints. These measures have been developed in accordance with the design requirements set out in the Wind Energy Development Guidelines, ensuring that the proposed layout aligns with national policy standards. Table 4-2 summarises the physical and environmental constraints which have informed the wind farm design.

Table 4-2: Physical and Environmental Sensitivities Considered

Sensitivity	Design Constraint
Topography	Topography is generally flat, consequently, no topographic constraints identified.
Sensitive Habitats	Infrastructure to avoided ecologically valuable or sensitive habitats to minimise ecological disturbance.
Bat Ecology	Based on the SNH buffer formula and proposed turbine dimensions, the following habitat management and/or felling distances were calculated for each of the turbines: T1 = 77 m, T2 = 89 m, T3 = 77 m, T4 = 83 m, T5 = 91 m. A modified buffer around turbines T6 and T7 will be required to ensure the stream and bordering tree lines, found in the southwest of the site, are retained.
Public Roads	Apply a minimum distance of height of the turbine to the tip of the blade plus 10%. from proposed turbine locations to public roads as recommended in the Draft Wind Energy Development Guidelines (2019).
Ornithology	Turbine locations to be selected to avoid key flight paths, foraging areas, and proximity to sensitive bird habitats.
Soils and Geology	Areas with high peat slide risk or poor constructability to be avoided.
Hydrology	Turbines to be sited at least 50m from EPA registered watercourses.
Archaeology	A minimum 20m buffer was maintained around recorded archaeological features, based on professional judgement and site-specific assessments.
LVIA	Turbines to be sited in a way that minimises their visual intrusion and respects the character of the surrounding landscape through the appropriate identification of Zones of Theoretical Visibility (ZTV) within 20km of the Proposed Development.
Noise Sensitive Receptors	Adopt relevant separation distances between turbines and identified noise sensitive receptors.

4.3.1.1 Topography

There are no steep slopes within the footprint of the Proposed Development. The site is described as being flat land. The topography of the area is flat with elevations ranging between 69.5m to 78.6m above Ordnance Datum (AOD).

4.3.1.2 Sensitive Habitats

The project has been designed to minimise the footprint of the Proposed Development within sensitive habitats. This has been achieved in collaboration with engineering constraints, for example by taking account of habitat value from ecological site visits and survey work and areas potentially impacted. The project design has followed the basic principles outlined below to reduce and where possible eliminate the potential for significant effects on ecological receptors:

- Avoidance/minimisation of turbine array and wind farm infrastructure at sensitive habitats (e.g. hardstanding areas designed to the minimum size necessary to minimise habitat loss).
- Avoidance of wildlife refuge sites (e.g. waterbodies) insofar as possible.
- The Proposed Grid Connection route and internal access tracks were selected to utilise existing built infrastructure for the majority of their lengths where possible (i.e. cables to be laid within public road and existing tracks).

4.3.1.3 Bat Ecology

For low risk sites, such as the Proposed Development, a Bats and Onshore Wind Turbines: Survey Assessment and Mitigation (2021) document prepared jointly by Scottish Natural Heritage, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (BCT) with input from other key stakeholders, recommends a buffer distance of 50m between a turbine blade tip and the nearest woodland. This buffer creates a clearance setback of 50m between the arc of the blade's sweep and the forest edge which could be used by bats without risk of collision with the turbine blades. Based on the SNH buffer formula and proposed turbine dimensions, the following habitat management and/or felling distances were calculated for each of the turbines: T1 = 77 m, T2 = 89 m, T3 = 77 m, T4 = 83 m, T5 = 91 m. A modified buffer around turbines T6 and T7 was assessed as the best option to ensure ecological pathways at the Leitrim stream, found in the southwest of the site, are retained. Further details in relation to the calculation and buffers is provided in Chapter 6 Biodiversity and the Bat Survey Report (Appendix 6-2, Volume III).

4.3.1.4 Public Roads and Population Density

The Wind Energy Development Guidelines (2006) outlines the below in relation to turbine proximity to public roads and railways:

'Although wind turbines erected in accordance with standard engineering practice are stable structures, best practice indicates that it is advisable to achieve a safety set back from National and Regional roads and railways of a distance equal to the height of the turbine and blade.'

As outlined in the Draft Wind Energy Development Guidelines (2019):

'it is advisable to achieve a safety set back from National and Regional roads and railways of a distance equal to the height of the turbine to the tip of the blade plus 10%.'

The Proposed Development achieves the above setback, as outlined in draft guidelines.

As per the Turbine Delivery Route Assessment (Appendix 2C), the delivery route to the Proposed Development is feasible for all turbine components related to the Proposed Development.

A review of the 2022 Census of Population shows that the recorded population density surrounding the Proposed Development varies, with the populations increasing when closer to the towns of Edenderry and Rhode. Further details in relation to population density are included in Chapter 5 Population and Human Health.

4.3.1.5 Ornithology

As advised by a qualified Ornithologist and in line with best practice, should any protected species, be recorded breeding within the given distances of the works area, specific buffer zones depending on the species will be established around the expected location of the nest. All works will be restricted within the zone until it can be demonstrated by an ornithologist that the species has completed the breeding cycle in the identified area.

See Chapter 7 Ornithology for additional information.

4.3.1.6 Soils and Geology

According to Geological Survey of Ireland (GSI) mapping, the Proposed Wind Farm is primarily underlain cutover peat with localised areas of limestone derived till. According to GSI mapping, the bedrock beneath the Proposed Wind Farm is limestone of the Edenderry Oolite Member.

Given the site's generally flat topography and lack of significant slope gradients, the risk of peat instability or landslide is considered to be low, however areas of deep peat will be avoided where feasible.

4.3.1.7 Archaeology

There are no known archaeological sites or monuments within the boundary of the Proposed Wind Farm. Several Recorded Monuments and Places (RMP) are located in the vicinity, recorded heritage assets in the immediate site vicinity are comprised of enclosures, ring forts and crop circles with several recorded sites and monuments in the wider surrounds. A minimum 20m buffer will be applied to all recorded heritage assets and any potential features identified onsite.

4.3.1.8 Public Consultation

Feedback received through public consultation with local residents, as well as engagement with statutory bodies including ABP and OCC, has played a significant role in shaping the design of the Proposed Wind Farm. Concerns raised by the local community, ABP and OCC were carefully considered and addressed through iterative design revisions, including the repositioning of turbines and setback distances.

A summary of the organisations/groups consulted and the consultation that happened is provided in Chapter 1 Introduction. The issues raised were subsequently considered in the EIA process.

4.3.2 Constraint Mapping and Buildable Area

Once the key sensitive environmental concerns were identified, separation distances to constraints were applied using GIS. Constraint mapping was generated, which identified the most and least environmentally sensitive, or constrained, areas within the site. This approach highlights potentially significant environmental impacts early on in the design process in order that they can be avoided, and if that is not possible, impacts reduced or mitigated. It also limits the area for development within the study site thereby limiting the number of turbines and associated infrastructure.

The constraint mapping documented and visually communicated the environmental concerns (e.g. sensitive habitat, water features) to the wind farm design team, thereby highlighting the optimum locations (areas with few or no constraints) for wind farm infrastructure. Constraint mapping was also cognisant of relevant consultation concerns. Figures 4-3 and 4-4 outline the watercourse and habitat constraints.

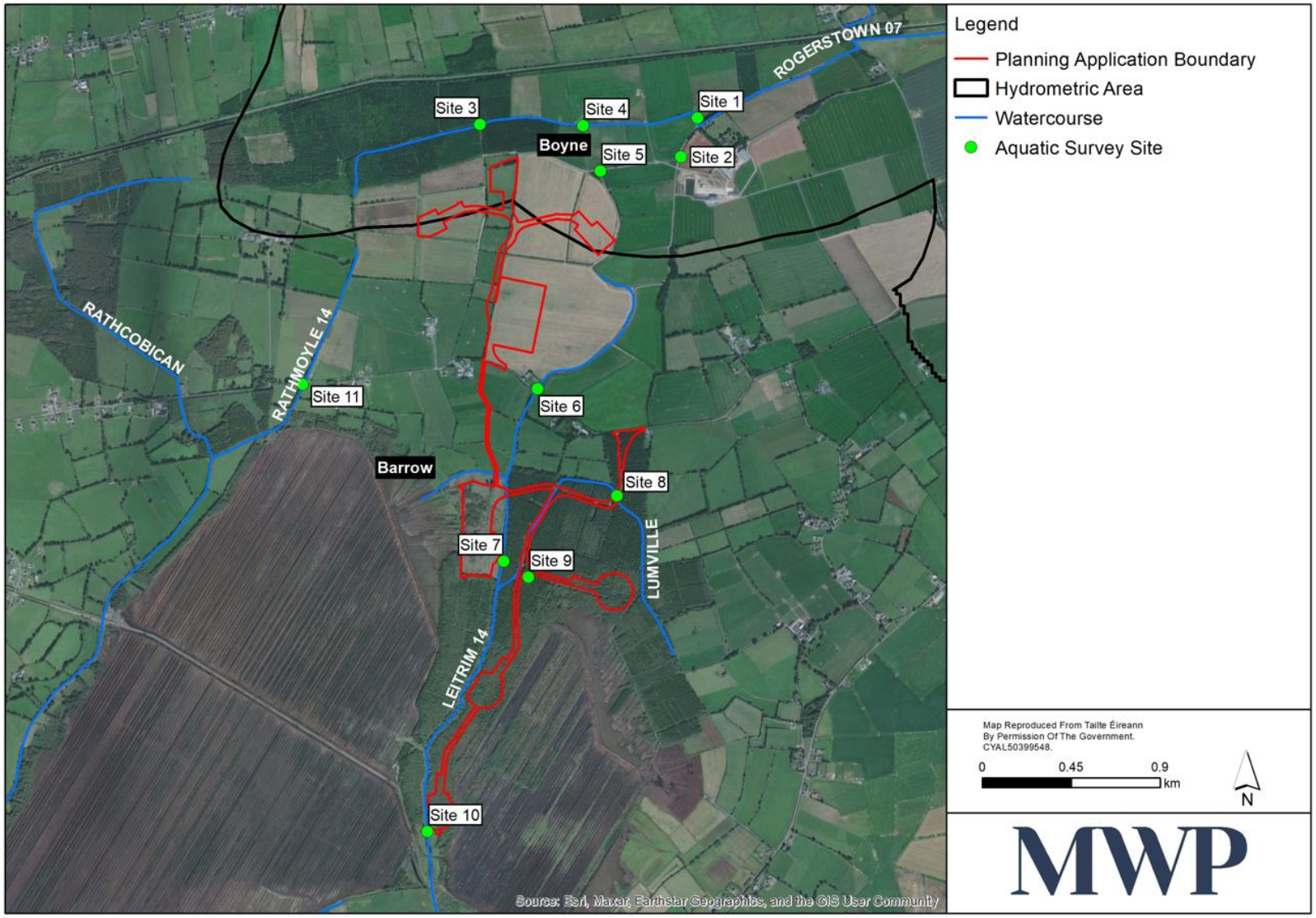

Figure 4-1: EPA registered Watercourse Constraints

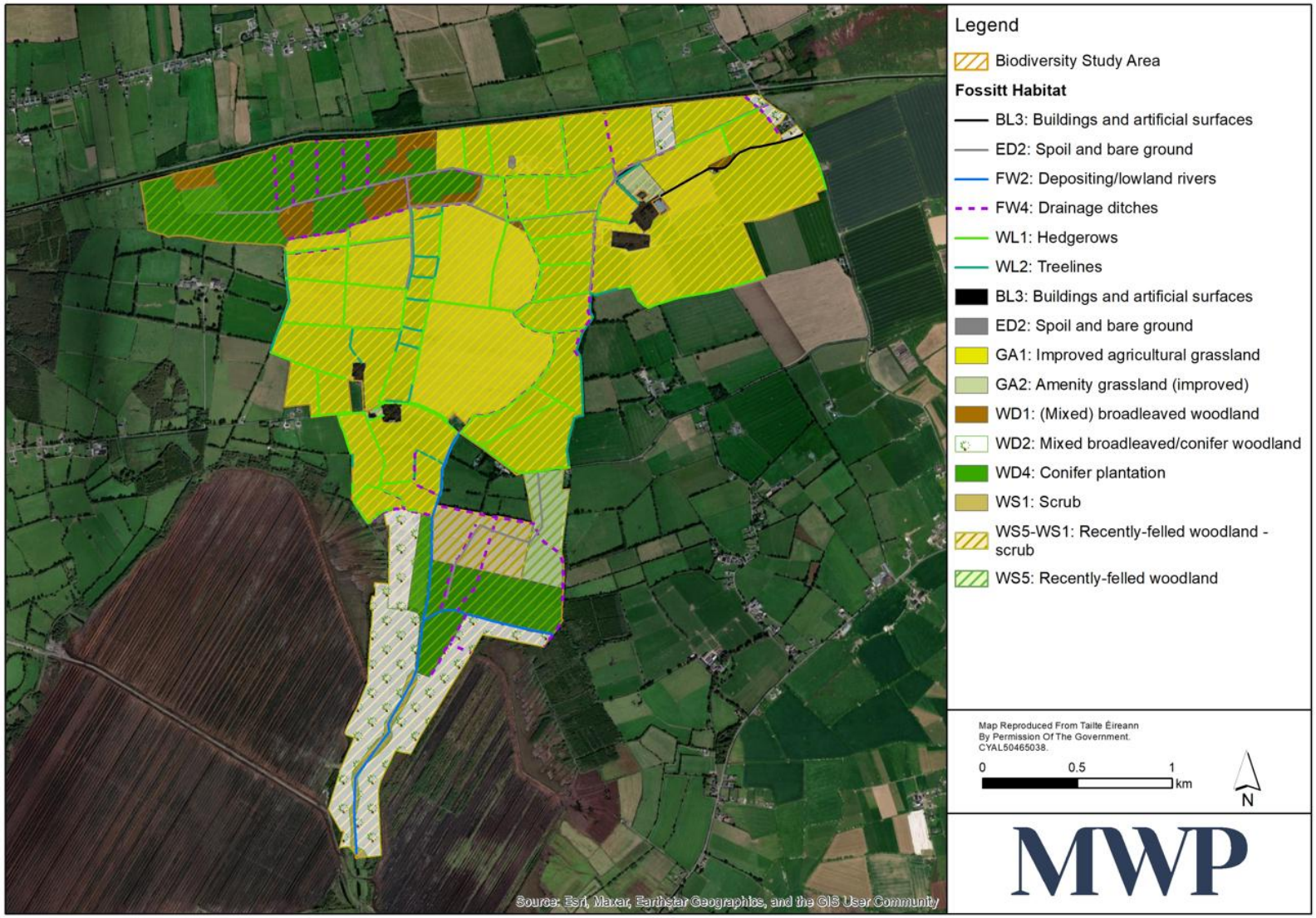

Figure 4-2: Habitats Identified

4.3.3 Preliminary Planning Stage Design

Following identification of all the environmental, technical and engineering constraints for the site, a preliminary layout that fit within the remaining unconstrained areas was developed. The layout included the preliminary internal access track network and provisional locations for the electrical substation compound, permanent meteorological mast, borrow pit and deposition areas. The technical design criterion for the layout was to maximise the annual energy yield, while maintaining the required separation distances between turbines. The preliminary design layout was then used as a basis for a more detailed site assessment on which the final detailed design would be developed (refer also to Chapter 3 Civil Engineering).

4.3.3.1 Position of Turbines

A range of alternative wind farm layouts and configurations were considered through an iterative design process to identify the most suitable layout for the site. This process involved a comparative assessment of the potential environmental effects associated with each design option, enabling the selection of a layout that balances technical feasibility with environmental sensitivity. The consideration of reasonable alternatives is a core requirement of the EIA process, and in this case, alternative turbine arrangements and development scales were fully explored. The final layout was informed by detailed analysis of habitat mapping, hydrological features, biodiversity constraints, peat depth data, and proximity to residential receptors, ensuring that the selected design represents the optimum solution with the least potential for environmental impact.

4.3.4 Detailed Planning Stage Design

The detailed design of the proposed wind farm was guided by a principle of mitigation through avoidance, alongside a strong emphasis on maximising the use of existing infrastructure. Where possible, turbines, access tracks, and the substation were positioned to minimise environmental impact and reduce the need for new ground disturbance. However, relocating individual components was often complex, as adjustments to one element—such as a turbine or access road—necessitated corresponding changes to others in order to maintain required separation distances, comply with technical constraints, and respect environmental buffers and setbacks. Over the course of the design process, the initial layout underwent five iterations, each informed by engineering, environmental, technical, and landowner considerations. While the geographic extent of these changes was relatively limited due to site constraints, they required significant coordination and input from the multidisciplinary design team to ensure that the final layout achieved a balance between technical feasibility and environmental sensitivity.

4.4 Alternatives Considered

This section outlines the main reasonable alternatives examined and considered during the project design process and indicates the main environmental reasons for choosing the development as proposed. A comparison of the environmental effects on the alternative considered is also provided.

The alternatives considered include the following:

- Reasonable Alternative Wind Farm Layout and Turbine Scale.
- Reasonable Alternative Proposed Grid Connection Methodologies.
- Reasonable Alternative Construction Methodologies.

4.4.1 Alternative Wind Farm Layout and Turbine Scale

In total there were five layout iterations considered, to determining the optimum layout with minimal environmental impact. The final design layout was primarily influenced by physical and environmental sensitivities. The iterations are listed in Table 4-3 which outlines the design improvement as the layout, size and scale evolved. As outlined in the European Commission's 2017 Guidance, alternatives provide an opportunity to change the design in order to minimise the project's significant effects on the environment. Preventative action is the most effective way to avoid potential negative environmental effects, and this avoidance has been achieved through the design process and the consideration of alternatives and through the review of the project design to minimise environmental effects.

Table 4-3: Design Evolution and Iterations

Iteration	Description of Iteration	Reason for change	Design Improvement
1	Ten turbine layout, with three turbines adjacent to the Grand Canal. The three turbines ranged from 120-300m distance to the canal. Two locations identified for the substation.	N/A	N/A
2	Ten turbine layout. Movement of one turbine from the southern section to the northern section adjacent to the canal. Substation moves to final location now proposed.	Landowner considerations	Design maximises available land.
3	Movement of one turbine from 120m to 200m from the canal.	Potential visual impact from the high amenity area of the Grand Canal.	Reduced landscape and visual impacts on the Grand Canal high amenity area.
4	Eight turbine layout. Removal of two turbines from northern cluster and introduced 500m buffer to the Grand Canal.	Potential visual impact from the high amenity area of the Grand Canal.	Reduced landscape and visual impacts on the Grand Canal high amenity area and residential receptors.
5	Seven turbine layout. Removal of a turbine from the northern cluster.	Potential visual impact from the high amenity area of the Grand Canal. Landowner considerations	Reduced landscape and visual impacts on the Grand Canal high amenity area and residential receptors.

The final layout represents the most appropriate design for the site conditions, following an iterative approach of design optimisation by the engineering and environmental members of the project team. This approach took account of all emerging baseline environmental information during the EIA process, and therefore, the optimum wind farm layout for the development is proposed. Table 4-4 outlines a comparison of site conditions and environmental effects in relation to the design improvements from initial to final design.

Table 4-4: Comparison of Environmental Effects

Environmental Factor	Initial Design	Final Design
Population and Human Health	10 turbine layout	7 turbine layout, reduced impact all-round.
Biodiversity	Larger area across site	Reduced development footprint

Environmental Factor	Initial Design	Final Design
Air and Climate	Large scale project	Project scale reduced, short term construction negative impacts reduced, long term climate positive impacts reduced.
Landscape and Visual	10 turbine layout	7 turbines layout. Reduced landscape and visual effect
Water	10 turbine layout	7 turbine layout, reduced impact all-round.
Land and Soil	10 turbine layout	7 turbine layout, reduced impact all-round.
Noise	10 turbine layout	7 turbine layout, reduced impact all-round.
Cultural Heritage	10 turbine layout	7 turbine layout, reduced impact all-round.

4.4.2 Proposed Grid Connection and Substation

The Proposed Grid Connection from the proposed onsite 110kV substation is located via a route on public road for 8km to the existing Philipstown 110kV substation.

A 110kV underground cable (UGC) Proposed Grid Connection will be trenched into the road or the verge of the public road. The Proposed Grid Connection will travel from the proposed Ballinla Wind Farm 110kV substation along the access tracks for approximately 0.5km to the L5010. On the L5010 the UGC will then travels east for approximately 2km to the L5006. On the L5006 the UGC will progress south on the L5006 for approximately 5km before joining the R401 south for approximately 1km where it will link into the newly constructed Philipstown 110kV substation.

The Proposed Grid Connection route was chosen for the following reasons:

- Utilisation of existing access track and public road infrastructure thereby minimising the requirement for new access track infrastructure associated with the connection.
- Low impact on biodiversity as a result of utilising access track and public roads for the majority of the connection

The proposed 110kV electrical substation and compound will comprise an outdoor electrical yard and two single storey buildings (one for EirGrid and one for the wind farm operator). The EirGrid building will contain a control room, storeroom, office/canteen and a toilet. The wind farm operator building (or IPP substation building) will contain a storeroom, communications room, control room, staff room, office, switchgear room and a toilet.

The substation location was chosen for the following reasons:

- Landowner considerations.
- Reduced impact on residential receptors
- EirGrid required separation distances from the 110kV substation to the turbines.

4.4.3 Alternative Construction Methodology

The proposed construction methods are informed and identified by desktop studies, site walkovers and input from ecological and engineering teams. Construction method alternatives were examined for the internal access tracks and source of aggregate materials. These are discussed in the following subsections.

4.4.3.1 Internal Access Tracks

The primary objectives when designing the new internal access tracks was to utilise existing tracks where possible and to locate infrastructure where ground conditions were most suitable. Maximum use has been made of existing tracks, however the Proposed Development, will require new tracks to the majority of the turbines.

New excavated tracks will be constructed using imported stone aggregate and placed over a layer of geogrid, where required, after all organic and soft subsoil material is excavated to formation level. Geotextile material, used to separate the access track building material from the subsoil, may also be laid at formation level.

Depending on ground conditions encountered, new tracks will be constructed as cut and fill or floated design.

Table 4-5: Comparison of Environmental Effects of Access Track Construction Methods

Environmental Factor	Utilising Existing Tracks	Construction of new tracks – cut and fill	Construction of new tracks – Floated
Population and Human Health	No Effect	Additional traffic during construction phase, import of materials	Additional traffic during construction phase, import of materials
Biodiversity	No Effect	Requirement of forest felling	Requirement of forest felling
Ornithology	No Effect	No Effect	No Effect
Air and Climate	No Effect	Emissions during construction phase	Emissions during construction phase
Lands and Soils	No Effect	Removal of overburden	No Effect
Water	No Effect	Increased surface runoff	Increased surface runoff
Noise	No Effect	Construction phase noise	Construction phase noise
Landscape	No Effect	Screened by existing vegetation and nearby forestry and will allow for no visual impact on surrounding receptors	Screened by existing vegetation and nearby forestry and will allow for no visual impact on surrounding receptors
Cultural Heritage	No Effect	No Effect	No Effect
Shadow Flicker	No Effect	No Effect	No Effect
Material Assets	Additional traffic during construction phase.	Additional traffic during construction phase.	Additional traffic during construction phase.

4.4.3.2 Borrow Pit

Options for onsite borrow pits were considered for sourcing rock which could be used for construction. however, the site's geology was considered not suitable for excavation of rock.

As a result, the preferred alternative was to import all the material from authorised quarries outside of the site boundary.

4.5 Do Nothing Scenario

In the 'Do-Nothing' scenario, the site would remain in its current state, comprising a mix of managed agricultural land, forestry, and natural vegetation. Over time, the site would continue to evolve through routine land management practices, including potential commercial forestry operations such as clear-felling and replanting.

No wind energy infrastructure would be developed, and the site's potential to contribute to Ireland's renewable energy generation targets would remain unrealised.

Ireland is legally committed to achieving a 51% reduction in greenhouse gas emissions by 2030 (relative to 2018 levels) and to reaching net-zero emissions by 2050, as set out in the Climate Action and Low Carbon Development (Amendment) Act 2021. The Climate Action Plan 2024 & 2025 and the National Energy and Climate Plan (NECP) 2021–2030 both identify onshore wind as a cornerstone of Ireland's renewable energy strategy, with a target of 9 GW of installed onshore wind capacity by 2030.

In the absence of the Proposed Development, Ireland would continue to rely on imported fossil fuels to meet growing electricity demand. This would undermine national efforts to decarbonise the energy sector, increase exposure to volatile global energy markets, and weaken energy security

Furthermore, the 'Do-Nothing' alternative would represent a missed opportunity to harness the significant wind energy resource available at the site. It would fail to contribute to national and EU renewable energy targets, delay progress toward climate neutrality, and forgo the associated socio-economic benefits, including local investment, community funding, and job creation.

Given the urgency of Ireland's climate commitments and the strategic importance of onshore wind energy, the 'Do-Nothing' scenario is not considered a viable or sustainable alternative.

4.6 Conclusion

The project design process and reasonable alternatives were completed with reference to EIA Directive and EU Guidance Document 2017.

The Proposed Development has been designed to minimise potential environmental effects and to maximise wind potential on site.

Alternatives examined included alternative land areas, site layouts, alternative Proposed Grid Connections and alternative construction methods.

The final site layout (iteration number 5) was determined based on multi-discipline inputs and consideration of topography, biodiversity, land and soils, archaeology, hydrology, landscape, and engineering constraints and assessments. The development, as proposed, is the preferred option as it results in the least effects on resources and receptors while meeting the project objectives of a large-scale renewable wind energy development.

4.7 References

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