CHAPTER 4 ALTERATIVES

Brittas Wind Farm

Brittas Wind Farm Ltd

November 2024

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4. Consideration of Alternatives

4.1 Introduction

This chapter of the EIAR presents a description of the alternatives to the proposed project, location and design that were studied and discusses the rationale for the proposed project option chosen. This section sets out a description of the reasonable alternatives considered by the Applicant, 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.

The Directive 2011/92/EU as amended by Directive (2014/52/EU) (referred to as the 'EIA Directive) Art.5 (1)(d) requires that the EIAR prepared by the developer to contain "*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*."

This chapter therefore outlines the main reasonable alternatives studied during the project inception and design process and the principal reasons for proceeding with the current planning application.

4.1.1 Competency of Assessor

The assessment was completed by Maura Talbot MA (Human Geography), BA Hon (Geography), BA Hon. (Economics) Maura has had 25 years of experience working as a Senior Environmental and Socio-Economic Specialist Consultant on a full time and freelance basis. She has managed and contributed to environmental and social impact assessments (ESIAs and EIAs) of roads, powerlines, mines, biofuel estates, golf courses, conservation, tourism, and residential developments in a number of countries. She has also provided specialist input into Strategic Environmental Assessments (SEAs) related to mining developments, conservation, forestry and municipal spatial planning processes.

4.2 Scope

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

The alternatives considered included the following:

- Alternative Sites;
- Alternative Design; and
- Do-Nothing Scenario.

4.3 Principle of the Project

The principle of the proposed Brittas Wind Farm is fully compatible with planning policy at all levels of government (see Planning Report submitted with the planning application). The case for providing renewable energy infrastructure over the traditional reliance on fossil fuels has been well documented.

The Climate Action and Low Carbon Development Act 2015 as amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 establishes a legally binding framework with clear targets and commitments set in law, and ensures the necessary structures and processes are embedded on a statutory basis to ensure Ireland achieves its national, EU and international climate goals and obligations in the near and long term. The Climate Action Plan 2024 (CAP24) implements the carbon budgets and sectoral emissions ceilings and sets a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050. The CAP24 provides a framework for delivering the Government's target of a 51% reduction (relative to 2018). Wind energy is at the heart of the Plan with a target of 9GW of onshore wind energy by 2030 (currently around 4.4GW, WEI 2022), requiring a commitment to significant additional onshore wind capacity. The Brittas project will contribute up to 1.4% of this target.

The common theme throughout policies at a national and regional level is the need to promote and enhance renewable energy in Ireland. This project will contribute directly towards meeting Ireland’s renewable energy production targets and specific objectives for onshore wind capacity.

In response to the European Commission’s REPowerEU action statement the Government of Ireland issued the National Energy Security Framework in order to address Ireland’s energy security needs in the context of the war in Ukraine. It sets out how Ireland is seeking to phase out dependency on gas, oil and coal imports as soon as possible and replace with renewable sources such as wind, solar and bioenergy. This in order to address the urgent need to secure Irelands energy supply.

The new Irish National Energy Security Framework underlines the importance of renewable energy generation projects, such as the Proposed project, in securing Ireland’s energy supply in light of the ongoing conflict in Ukraine and associated energy supply chain issues leading to shortages and energy price increases.

On a local level, the current County Development Plan aims to establish County Tipperary as a leader in renewable energy provision and a low carbon economy. As the project is for a wind farm, it will reduce emissions of greenhouse gases and has been developed having regard to the Tipperary Renewable Energy Strategy 2022. The project is located in an area Open for Consideration for New Wind Energy Development according to the current wind energy strategy.

4.4 Site Selection

The identification of new wind farm sites is driven by the Government’s national targets for renewable electricity as set out in the Climate Action Plan (2024), which aims to increase onshore wind energy to 9GW by 2030. This will require the build out of 4.6GW of new onshore wind projects over the next 6 years. Therefore, the identification and development of new wind farm sites is important to achieve these national targets.

The site selection process for wind farm development is guided by high-level plans, strategies and guidance such as County Development Plans, Renewable Energy Strategies at a County level and the National Wind Energy Development Guidelines. These documents set out appropriate areas and development guidance for wind farm development which is considered at an early stage of site selection to ensure only suitable sites are considered for wind energy projects. In terms of alternatives, the EPA’s Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) states the following:

> "Higher level alternatives may already have been addressed during the strategic environmental assessment of relevant strategies or plans. Assessment at that tier is likely to have taken account of environmental considerations associated, for example, with the cumulative impact of an area zoned for industry on a sensitive landscape. Note also that plan-level/higher-level assessments may have set out project-level objectives or other mitigation that the project and its EIAR should be cognisant of. Thus, these prior assessments of strategic alternatives may be taken into account and referred to in the EIAR"

The project applicant, Brittas Wind Farm Limited (a subsidiary of Ørsted Onshore Ireland Limited), continuously examines lands across Ireland for potential wind energy development sites. The team have a detailed screening process, based in Geographical Information System (GIS) software, using a number of criteria and stages to assess the potential of a large number of possible sites and their suitability to accommodate a wind energy development. All lands examined are in third party ownership and the commencement of the project development process is subject to legal agreement with the landowner(s).

The GIS database used to identify potential wind farm sites draws upon a wide array of key spatial datasets with the overall aim of identifying constraints and excluding sensitive sites. The spatial datasets include:

- Ordnance survey land data,
- House location data,
- Transport (proximity to major roads),
- Existing wind energy and grid infrastructure data,
- Wind Speeds
- Environmental data such as ecological designations and EPA watercourse data,
- Landscape designations,
- Wind energy strategy designations,

The following is a summary of the methodology used in this screening process which illustrates in broad terms how the Brittas Wind Farm site was identified.

4.4.1 Phase 1 – Initial Wide Area Screening

This stage in the identification process discounts lands that are considered too sensitive for development or not available for development under a number of high-level criteria, as follows:

- Sensitive Amenity or Scenic Areas designation in the County Development Plan;
- Sensitive habitats/species;
- Policy Context for Wind Energy Development;
- Tourist areas/sites/trails;
- Proximity to the National Grid;
- Lands utilised for other wind farm developments; and
- Telecommunications masts and links;

This stage of screening is applied using Ørsted's in-house expertise and local knowledge and is subsequently validated externally in terms of the engineering considerations, policy context, local grid capacity and industry trends. This process was used to identify the lands for the Brittas Wind Farm project. Orsted's high-level site search is described below.

Figure 4-1 shows an area including the Brittas Wind Farm site with constraints mapped. Initially, ecologically sensitive areas are identified including Natura 2000 sites and National Heritage Areas. The County Development Plan Policy is then applied showing areas open to consideration and areas unsuitable for wind energy development. This is shown in Figure 4-2 along with the ecological designations. Following the examination of these diagrams, an area without any mapped constraints is identified and further examined.

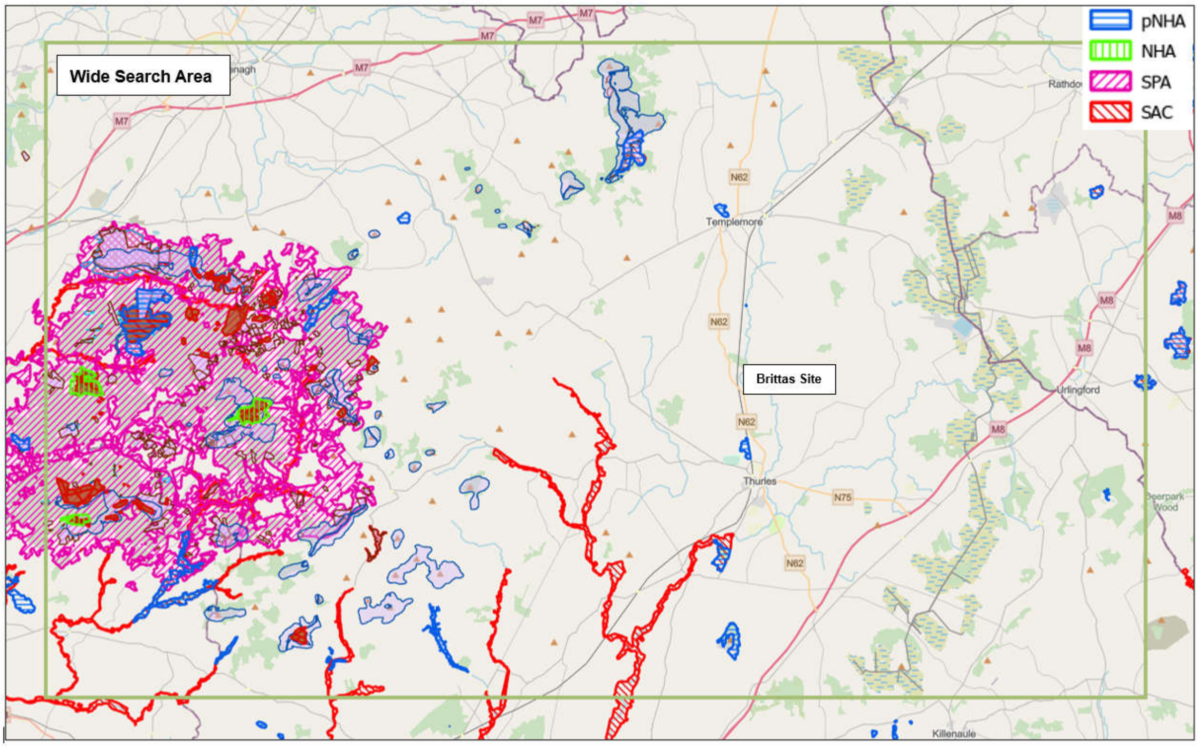


Figure 4-1: Map of Thurles and surrounds with high level sensitive area criteria mapped. Phase 2 – Site Specific Screening

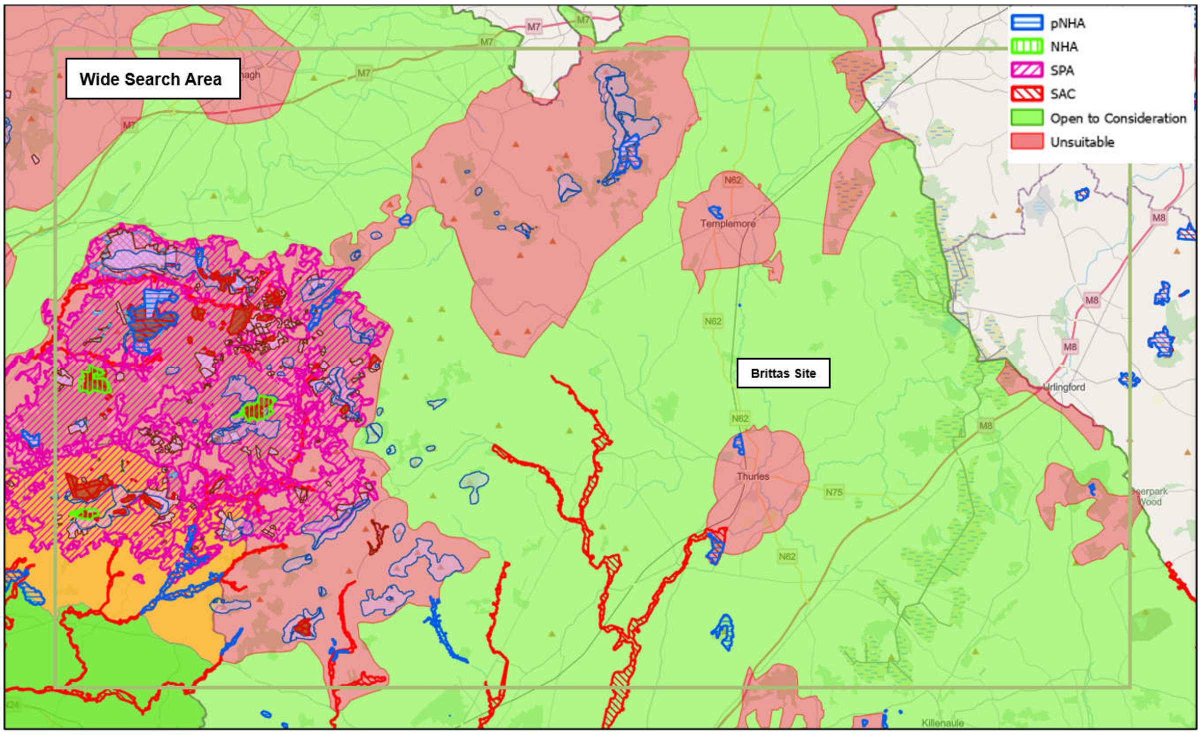


Figure 4-2: Mapping of Areas open to WF development consideration and areas with less favourable policy

Following the wide area screening, a more focused examination is conducted on areas identified as less constrained in order to find a viable wind farm site. A viable site will ideally consist of a large, continuous, unobstructed area of 'developable land'. Again, a constraints-led approach was used to identify sensitivities across an area to determine if the lands are 'developable' for wind energy. The following spatial datasets are applied:

- Setback from mapped rivers and streams;
- Avoidance of registered monuments;
- Appropriate setback from residential receptors;
- Setback from utilities such as overhead lines; and
- Unfavourable slopes and ground condition;

The following **Figures 4-3, 4-4 and 4-5** show the process of identifying 'developable' lands where turbines and related infrastructure could potentially be placed. **Figure 4-3** shows two adjacent study areas, the Brittas Wind Farm Site and an alternative site located to the east. In this diagram, ecological designated sites are identified. No designated sites are located in either of the study areas. **Figure 4-4** introduces mapped watercourses in the area and applies a 50m setback to the streams/rivers, the registered monuments and their zones of notification as well as utility infrastructure crossing the study areas (overhead electricity lines).

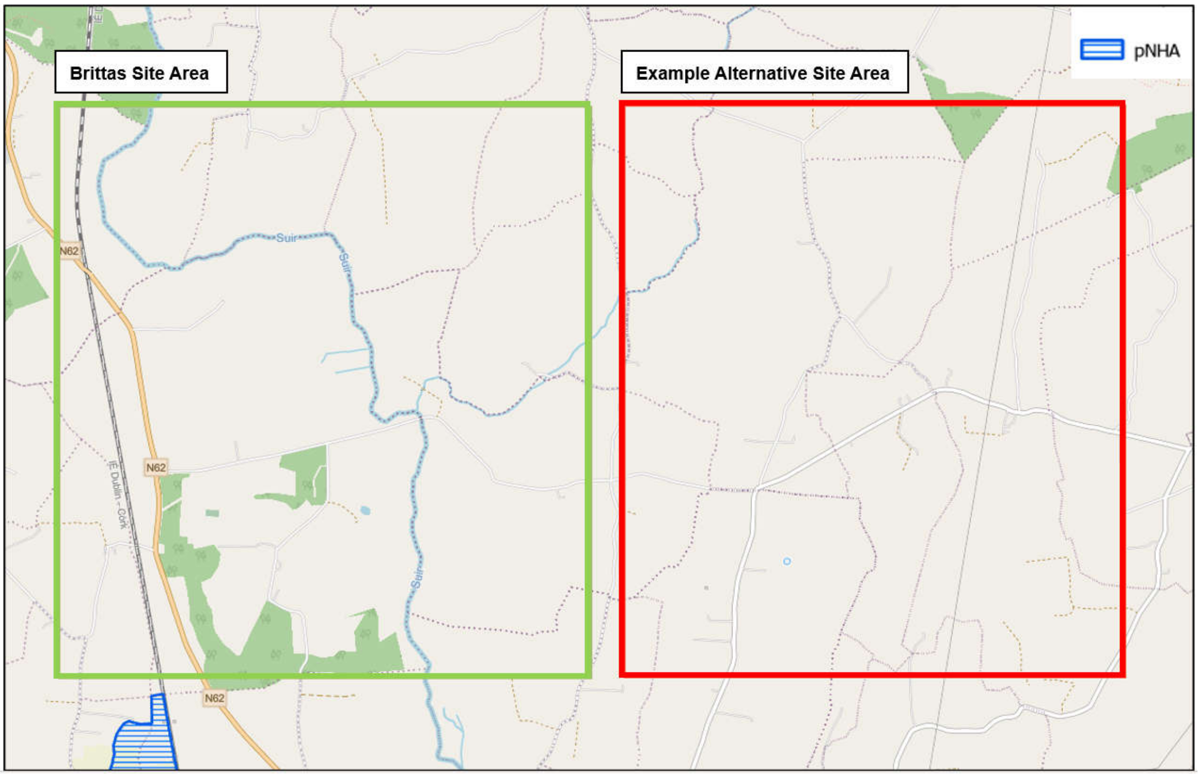


Figure 4-3: Comparison of Brittas site and adjacent site to the East, mapping ecological designations

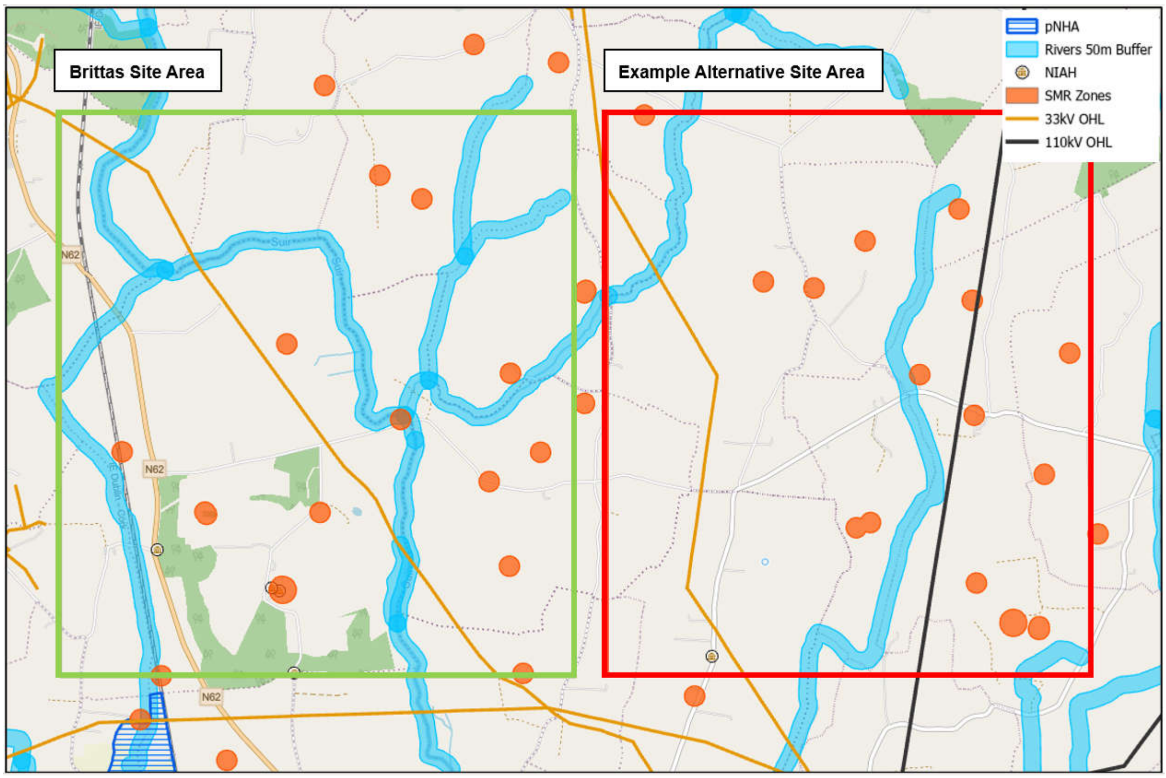


Figure 4-4: Mapping of River buffers, ecological designations, SMR (Heritage) Zones and Overhead lines for the Brittas and adjacent lands to the east

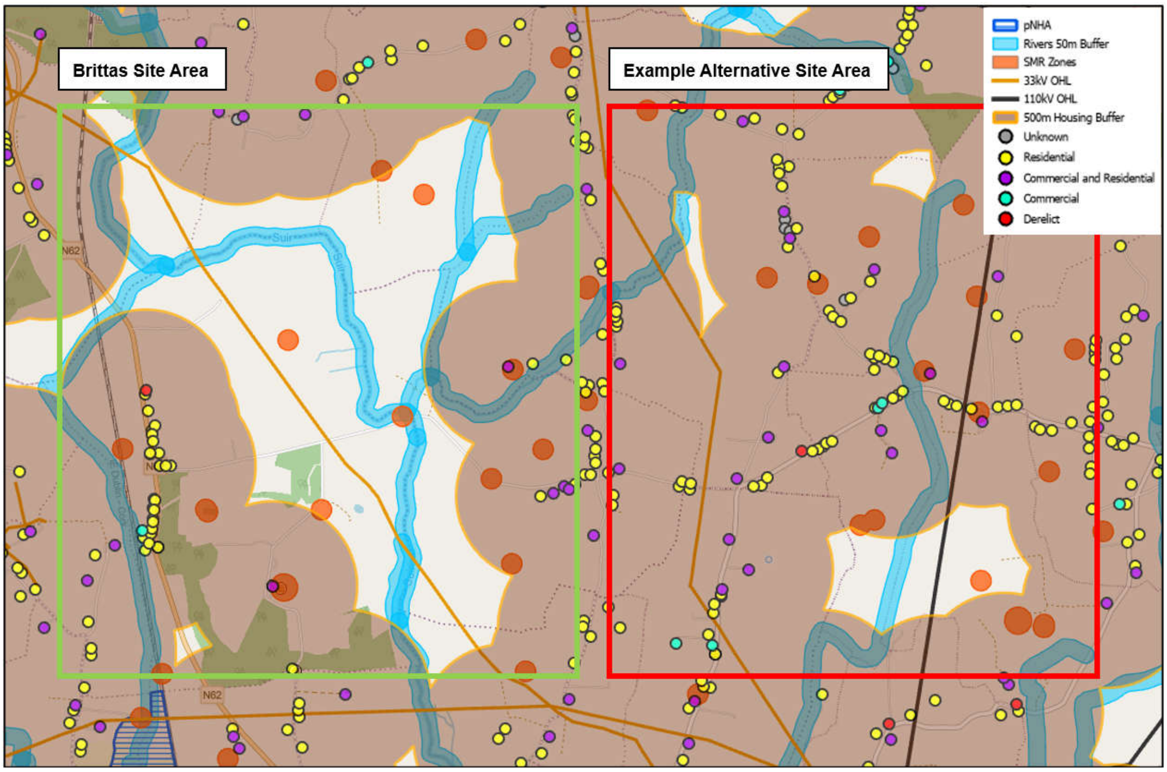


Figure 4-5: Map adding the 500m Housing Buffer to the previous mapped layers.

Figure 4-5 then shows the locations of residential receptors and applies a minimum of 500m setback from each dwelling. Subject to limited exceptions, this is the minimum residential dwellings setback allowed for in the draft Revised Wind Energy Development Guidelines (2019). The remaining areas outside of the environmental buffers are considered 'developable' for wind energy development. From the examination of Figure 4-5, it is clear that the Brittas site area has a large 'developable' area compared to the alternative site area. The developable area identified will likely reduce further during detailed environmental assessment. Large developable areas are preferred as they are more likely to produce a greater energy yield and achieve a financially viable project, as well as a project that will contribute substantially and meaningfully to Ireland's national renewable electricity targets and greenhouse gas emission reduction targets.

Following the identification of a viable site, a decision is then made as to whether the site should be taken forward for landowner negotiations and more detailed environmental assessment.

This is a high-level view of how the Brittas Wind Farm Site was identified.

Other commercial considerations are also considered in the site identification process such as:

- Viable wind speeds;
- Land ownership title issues; and
- Proximity and access to the national grid.

Initially, Ørsted identified the Brittas site as suitable private lands for development. The process of engaging with landowners in the area to establish interest in the project was commenced in 2021.That resulted in a number of landowners concluding option agreements allowing for initial surveying to commence thereafter.

4.4.2 Alternative Wind Farm Sites

The process of identifying viable wind farm sites across Ireland has narrowed significantly over the past two decades. This is as a result of new and updated policies and guidelines, additions of new designations across the country such as SAC and SPAs, expansion of housing across the countryside and the build out and operation of other wind energy developments. As a result, viable wind farm sites have become smaller and more complex. However, as described in Section 4.3, the Climate Action Plan (2024) has identified targets to provide a total of 9GW of onshore wind energy by 2030, i.e. requiring an additional 4.6 GW of onshore Wind Energy by 2030, therefore, the identification and build out of sites across Ireland must continue.

The effort to achieve Ireland's onshore wind energy targets will not be achieved by one site alone, but will require a combination of many new sites across Ireland to collectively achieve the nation's climate goals. The Brittas Wind Farm site provides a good opportunity to achieve a portion of these 2030 targets across one continuous site. Viable sites with limited sensitivities that can be taken forward for renewable energy development should be considered in the public interest as they provide a significant opportunity for Ireland's transition to a low carbon economy and improving the nation's energy security.

Using the Phase 1 screening methodology outlined in section 4.4.1, six individual sites were identified across County Tipperary and were examined further for viability. The six sites are identified in Figure 4-6. Each site was examined spatially and then scored against high-level environmental and policy criteria including the following:

- Potential landscape and visual effects (County Development Plan 2022-2028)
- Wind Speed (SEAI Wind Atlas 2024)
- Sensitive Habitat (NPWS 2024 & County Development Plan 2022-2028)
- Proximity to Designated Sites (NPWS 2024 & County Development Plan 2022-2028)
- Proximity to the National Grid (EirGrid Transmission System Map 2023)
- Wind Energy Policy (County Development Plan 2022-2028)

- Potential effects on Heritage and Tourism (County Development Plan 2022-2028)
- Flooding (OPW Floodinfo Data 2024)
- Turbine Delivery Access (proximity to major routes – Ordnance Survey Ireland 2024)
- Potential effects on Aviation (proximity to aviation facilities - Ordnance Survey Ireland 2024)

The scoring of each site was then compared and the sites with the lowest scores where constraints were highest were discounted from further consideration. The sites that had higher scores where further investigated as potential wind farm sites. Table 4-1 shows the scoring of each site under the environmental and policy criteria where a scale of 1 to 5 was used. 1 meaning very constrained and 5 meaning not constrained. The Brittas Wind Farm site is listed as Site 1.

Following the analysis of Table 4-1, two sites were discounted, Site 3 and Site 6. The main constraints at these sites were considered to be heritage, ecological designations and habitat and landscape designations. The four remaining sites were further examined with emphasis focused on the most significant constraints. In the majority of cases, the remaining sites were located within an area zoned "Unsuitable for Wind Energy Development" in the Tipperary County Development Plan. Furthermore, the majority of the remaining sites also fell within areas of greater landscape sensitivity as set out in the County Development Plan. Therefore, Sites 2, 4 and 5 were considered less favourable to accommodate wind farm development due to their policy background.

Following an environmental and policy comparative study, Site 1 (the Brittas site), was determined to be the most viable site identified. The site was then examined further for viability and a comprehensive feasibility study was conducted to determine its developability as a wind farm site. This included gauging landowner interest, investigating access to the national grid, investigating the possibility of delivering large turbine components to the site and further investigation of each of the policy and environmental criteria set out in Table 4-1. Following analysis of these project elements, the Brittas Project was taken forward for environmental assessment and design.

It should be noted that the high-level assessment of alternative sites provided above does not preclude any of these sites from being taken forward for wind farm development, for instance if wind energy policy zoning were to change in the future. However, the sites discounted above were not considered further as part of this project.

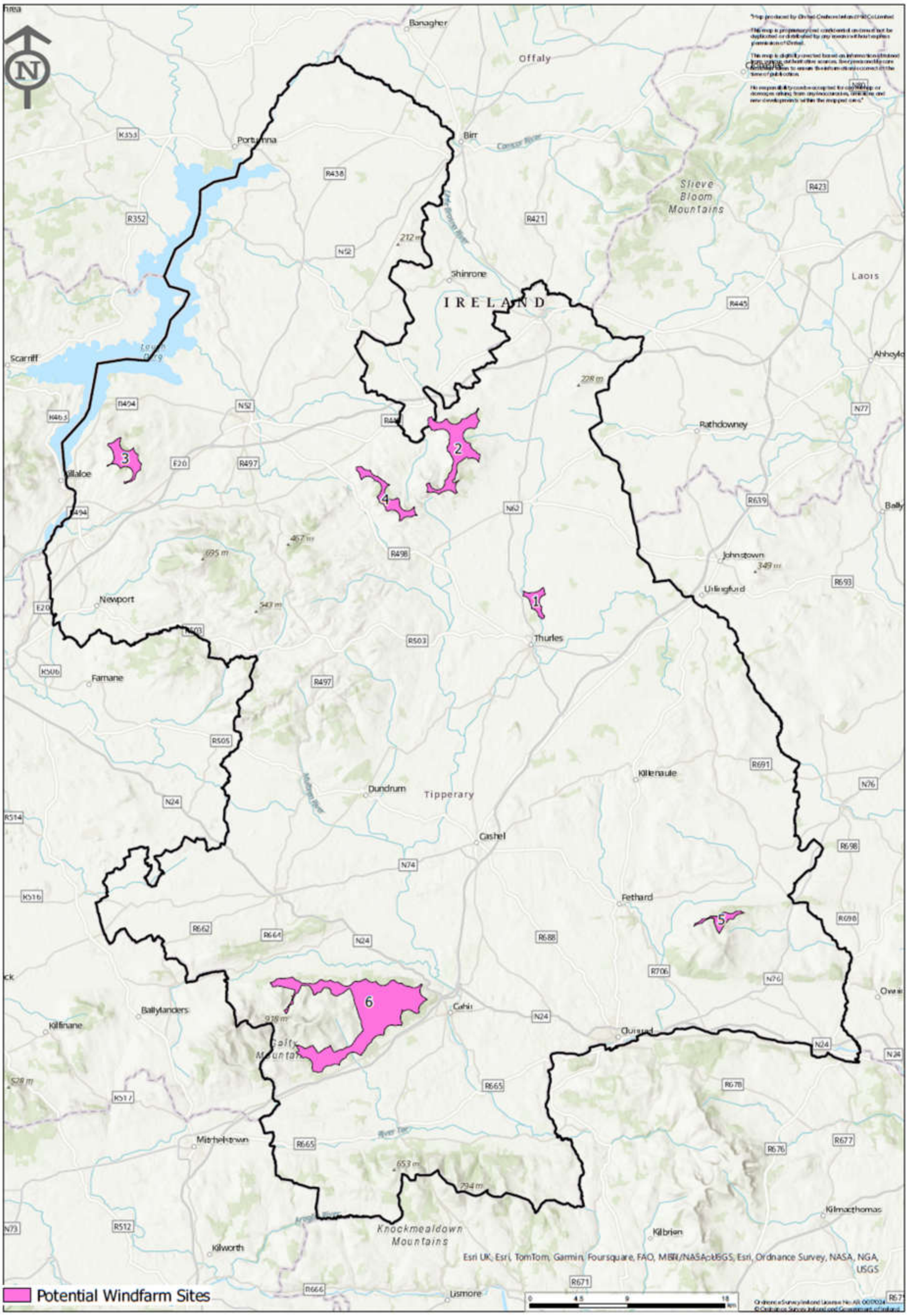


Figure 4-6: Alternative Sites Considered

Table 4-1: Alternative Sites Environmental & Policy Comparison

Environmental/Policy Criteria	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Landscape & Visual Effects	3 – Flat site - No landscape designation	2 – Upland Secondary Amenity Area	1 – Upland Primary Amenity Area	2 - Secondary Amenity Area	1 – Upland Primary Amenity Area	1 – Upland Primary Amenity Area
Wind Speed	3 – Good average wind speed	5 – High average wind speed	4 – good average wind speed varying across the site	5 – high average wind speed	2 – low average wind speed varying across the site	4 – good average wind speed varying across the site
Habitat Sensitivity	5 – No sensitive habitat identified	3 – Some sensitive habitat identified – Alpine heath	2 - Sensitive habitat identified – Alpine & wet heath	4 - Some sensitive habitat identified – Alpine heath	4 – Some sensitive habitat identified – Alpine heath	3 - Sensitive habitat identified – Dry heath
Proximity to Designated Sites	4 - In proximity to Lower River Suir SAC	3 - In proximity to Kilduff, Devilsbit Mountain SAC	4 – Proximity to Lough Derg SPA	4 – Proximity to Slievefelim to Silvermines Mountains SPA	4 – In proximity to Lower River Suir SAC	1 – Adjacent Galtee Mountain SAC
Proximity to National Grid	5 – Close proximity to Thurles 110kV substation	4 - Medium proximity to Ikerrin 110kV substation	4 - Medium proximity to Nenagh 110kV substation	4 – Medium proximity to Nenagh 110kV substation	4 - Medium proximity to Doon 110kV substation	5 – Close proximity to Cahir 110kV substation
Wind Energy Policy	5 – Open to consideration	1 - Unsuitable for new wind energy development	1 - Unsuitable for new wind energy development	1 - Unsuitable for new wind energy development	1 - Unsuitable for new wind energy development	1 - Unsuitable for new wind energy development
Heritage & Tourism Effects	5 – No significant heritage or tourism receptors	4 – Amenity Trails on site	1 – Amenity Trail on site and proximity to Lough Derg	4 - Amenity Trails on site	5 - No significant heritage or tourism receptors	3 – Amenity Trail on site and proximity to Galtee Mountains
Flooding	2 – Flooding identified on site	5 – No flooding identified on site	5 – No flooding identified on site	5 – No flooding identified on site	5 – No flooding identified on site	5 – No flooding identified on site
Delivery Access	5 – Close proximity to national road network	4 – Medium proximity to national road network	2 – Constrained access to regional road network	5 – close proximity to regional road network	4 - Medium proximity to regional road network	5 - Close proximity to national road network
Aviation	5 – No airports in proximity	3 – Within military restriction zone	3 – Within military restriction zone	4 – Partly in military restriction zone	5 - No airports in proximity	3 – Within military restriction zone
TOTAL SCORE	42	34	27	38	35	31

4.5 Wind Farm Design Process

The proposed project 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.

4.5.1 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, site access, flood extents and ground conditions, including slope, soil and drainage regime, protected areas and heritage resources as per the Wind Energy Development Guidelines (2006).

The design process involved the completion of an initial constraints analysis and 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 and assessment team. Site visits between 2022 and 2023 have informed the proposed project 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 below.

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

- Topography;
- Sensitive Habitats;
- Protected Areas;
- Bat Ecology;
- Public Roads and Population Density;
- Ornithology;
- Soils and Geology;
- Hydrology and flood risk extents;
- Archaeology; and
- LVIA.

This analysis of constraints identified environmental concerns, or the potentially significant environmental effects, associated with the proposed project site. Environmental concerns consisted of constraints or setback distance (e.g. buffer from residential dwellings, ecologically sensitive areas, flood extents and archaeological and heritage resources on site). Buffers and set back distances are the principal tool used by wind farm designers when incorporating mitigation by design and avoidance. This can only be done when all the environmental sensitivities have been established across the project area. Buffers and set back distances derived from relevant guidance documents such as the Wind Energy Development Guidelines (2006 and 2019), stakeholder input, studies (as outlined above) and project experience are then put in place. **Table 4-2** summarises the physical and environmental constraints which have informed the wind farm design.

Table 4-2:Physical and Environmental Sensitivities

Study Area	Design Constraint
Sensitive Habitats	Identification of habitat type within the site and minimisation of infrastructure within ecologically valuable habitat, or in proximity to national and European designated habitats and protected areas.
Bat Ecology	Up to 95m Felling buffer from the centre of each turbine, as recommended in Scottish Natural Heritage Guidelines (2021).
Ornithology	River Suir corridor identified as an important habitat. 50m buffer applied between infrastructure and river course.
Soils and Geology	Identification of peat depths and rock outcrops. Avoidance of peat slide risk and constructability risk areas.
Hydrology	Minimum infrastructure distance of 50m from watercourses as recommended by Forest Service and IWEA Guidelines.
Flood Risk Zones	Minimum distance of 10m from high flood risk zone as mapped by OPW.
Public Roads	Apply a minimum distance of 200m from proposed turbine locations to national and regional roads as recommended in the Draft Wind Energy Development Guidelines (2019).
Archaeology	Minimum distance of 20m from areas of Archaeological importance, based on professional judgement.
Neighbouring Dwellings	Setback of 4 times tip height from turbine centre to dwellings, as per appropriate separation distances set out in the Draft Revised Wind Energy Development Guidelines, 2019. In the case of the proposed turbines for this project, that amounts to a setback of 720m from neighbouring dwellings.
Noise Sensitive Receptors	According to the 2006 Wind Energy Development Guidelines, noise is unlikely to be a significant problem where the distance of the nearest turbine to any noise sensitive property is more than 500m.

Table 4-3 below lists the potential constraints that were found to not be relevant to the proposed wind farm site.

Table 4-3: Potential Constraints not relevant to the proposed Wind Farm Site

#	Potential Constraints	Reason not relevant
1	Topography	Site is relatively flat with elevations ranging from 100m to 120m AoD. The centre and southern parts of the study area are low-lying regions incised by the Suir River, which flows into the site from the northwest. The ground levels drop by 5-10 m AoD along the river and slope up towards the embankment. The northern and eastern regions of site also consist of rivulets flowing into the study area from the northeast direction.
2	Protected Ground Water Resources	There are no protected ground water resources at the project site.
3	Karst and quaternary sediments	No karst features are located at the site
4	Peat soils	No significant peat deposits were identified at the site.
5	Water and Gas Infrastructure	No water or gas pipelines traverse the site.
6	Landscape and visual effects	Due to the flat and highly modified and intensively managed agricultural land uses in the area, and the lack of any scenic designations, the landscape value of the site and immediate environs were assessed and considered to be low-medium. No significant landscape value constraints to the development were identified.

There are two existing infrastructure networks that will be affected by the proposed project. This included the permitted 38kV ESB overhead powerline from Borrisaleigh to Thurles Substation, and an existing telecoms mast located in the northwest of the site. Alternatives for these are discussed in sections 4.6.8 and 4.6.9 below.

4.5.1.1 Neighbouring Dwellings

While the proposed wind farm site is located on agricultural lands, there are a number of neighbouring residential dwellings located adjacent to the site along the N62 and other local roads surrounding the site. The locations of these dwellings were mapped and used together with the 720m dwelling setback to define the developable area for the wind farm. No turbines have been located within 720m of any existing or permitted dwellings uninvolved with the project.

4.5.1.2 Sensitive Habitats

The wind farm site mainly consists of agricultural fields and plantation forestry as well as river habitat. The habitat survey has mapped and classified all habitats within the site, with a particular focus on Annex I habitats or habitats with specific sensitivities. Detailed botanical surveys were carried out of the areas around the proposed turbine locations and other proposed infrastructure. The findings of the habitat surveys had a significant influence on the design of the project where avoidance of sensitive features and habitats was given high priority. No turbines or associated infrastructure have been located in the areas identified as having moderate or high habitat sensitivity.

Aquatic surveys included kick sampling (for benthic macroinvertebrates, where suitable habitat exists) to establish a baseline water quality rating at suitable locations and a review of habitat suitability for Annex II species such as White clawed Crayfish. All the survey data captured is presented in Chapter 6 Biodiversity. The findings of the aquatic ecology surveys have informed the drainage design of the proposed wind farm which will avoid negative effects on water quality of the existing watercourses across the site. In addition, no turbines or associated infrastructure have been located within the river course.

4.5.1.3 Ornithology

Bird populations have been surveyed within the site and surrounding areas, extending up to 6km outside the proposed project site. Best practice survey methods were used to assess populations of sensitive species, including vantage point surveys to assess patterns of flight activity across the wind farm site. Disturbance and displacement effects have been predicted using best knowledge from relevant scientific research, and making precautionary assumptions where evidence is limited. Collision risk modelling has been used to predict the potential number of collisions per year based on the patterns of flight activity recorded in the vantage point surveys, using the proposed wind turbine parameters (height and blade diameter). This data was used to identify potential effects on bird species.

4.5.1.4 Bat Ecology

Static surveillance of bats has been undertaken across the wind farm site in accordance with wind farm survey guidelines to determine bat species present and activity level at static stations. The data collated has been analysed using the Bat Eco Tool and bat activity has been mapped across the site. Walking transects were undertaken along fields and forestry within the site area and along the local road network to document the local bat populations in relation to commuting and foraging habitats. We have also undertaken dusk and dawn surveys of buildings and structures within and adjacent to the wind farm site to document bat roosts. All of the transect works were undertaken in accordance with the most up-to-date scientific guidance. This data was used to identify sensitive bat habitats – particularly in the broadleaf forest area to the south of the site where more sensitive habitat for bat species was identified. The turbines have been located in areas that would minimise the impact on broadleafed trees and woodlands which are bat sensitive habitats.

4.5.1.5 Public Roads and Population

The Rossestown Road (L-8017) also known locally as the 'Dark Road' runs through the middle of the proposed project site crossing from west to east. This will be the main access road for the site connecting to the N62 to the west.

As per the best practice 2006 Wind Energy Guidelines and the 2019 Draft Wind Energy Guidelines a setback from national and regional roads and railways of a distance equal to the tip height of the turbine plus 10% should be applied. A 200m setback from national and regional roads and railways has been maintained in the project's design.

4.5.1.6 Soils and Geology

The proposed site is underlain by Carboniferous Limestones, namely the Ballysteen Formation and Waulsortian Limestone. The sites overall structural setting is due to the Caledonian strikes which extend across the midlands from the Shannon estuary to the Irish Sea. The predominant soil type within the majority of the study area is *''BminDW- Deep well drained mineral with calcareous composition (mainly basic)''* followed by *''BminPD – Poorly drained mineral with calcareous composition (mainly basic)''* according to Teagasc / EPA Soil Map available on the Geological Survey of Ireland online mapping system.

A summary of the ground types encountered during the SI in the exploratory holes is listed below, in approximate stratigraphic order:

- Topsoil: encountered typically in 300mm thickness across the site. Topsoil was noted as 'peaty' in several locations;
- Recent deposits (peat up to 0.5m depth): Very soft organic silt was encountered underneath the topsoil layers in some locations;
- Fluvioglacial deposits: typically medium dense sands and gravels interspersed with layers of sandy gravelly clay; and
- Glacial Till: sandy gravelly clay, frequently with low cobble content, typically firm or stiff in upper horizons, becoming very stiff with increasing depth.

The soils and geology on the site were found to present no constraints to the proposed project or the siting of the turbines and associated facilities. Only one location in the proposed project site was mapped as having bedrock near the surface. The site investigation survey confirmed this. The proposed borrow pit is proposed at this site.

MWP

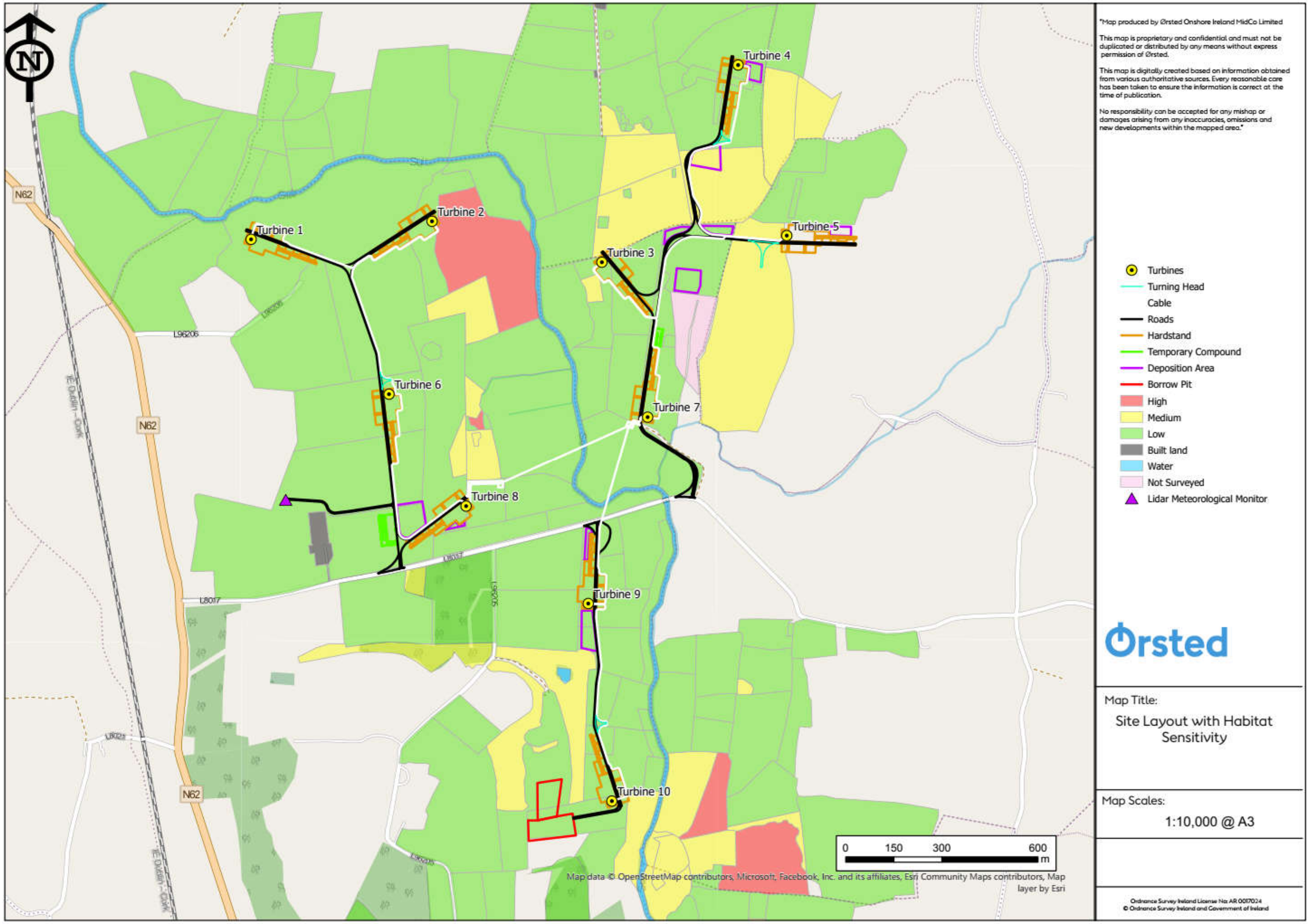


Figure 4-7: Mapping of Sensitive Habitats on the proposed project site showing the final Wind Farm layout.

4.5.1.7 Hydrology – Flood Risk

The River Suir flows mostly in an southerly direction through the middle of the proposed project site. This river is designated as a Natura 2000 site downstream of the proposed project site after Thurles. This protected area is named the Lower River Suir SAC (Site code 002137).

There are three tributaries that confluence with the River Suir in the proposed project site (see Figure 4-8). These include:

- The Rossestown Bridge Stream (IE_SE_16S020500) flows to the east of the proposed project site and confluences with the River Suir at the Rossestown Bridge
- The Athnid More Stream (IE_SE_16S020500) confluences with the above mentioned stream to the north of Turbine 5.
- The Rossestown Stream (IE_SE_16R010300) flows to the east of the proposed project site and confluences with the Rossestown Bridge Stream.
- The Farranreigh 16 Stream (IE_SE_16D020400) is located to the east of Thurles and is crossed by the grid connection over a single span arch bridge before connecting into the Thurles substation. The grid connection route crosses this stream over a single span arch stone bridge.

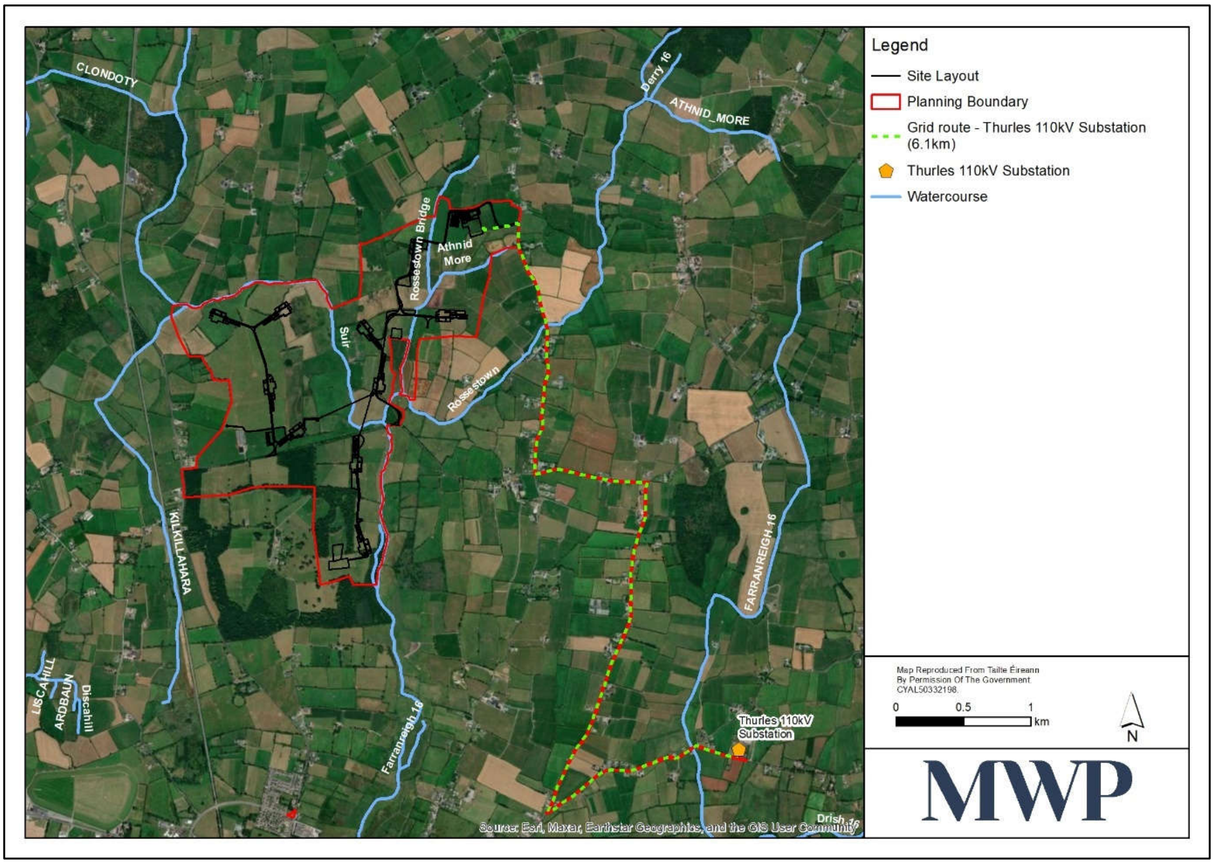


Figure 4-8: River Suir and tributaries running through the proposed project site

The location of the turbines was designed to ensure that the majority of the turbines are located outside of Flood Zone A and Flood Zone B, therefore placing the turbines in Flood Zone C.

The hardstand associated with Turbine 4 is shown to be within Flood Zone A. However, the flood risk assessment found that the depth of flooding at the hardstand for Turbine 4 is negligible (See Appendix 9A).

The access roads for the proposed wind farm have been designed to use the existing road crossing over the River Suir. Three new access track crossings over the tributaries coming into the River Suir from the east cannot be avoided for Turbines 7, 3, 4 and 5 and the BESS and Substation. Where an open drain or watercourse is encountered, the internal site cable trenches will cross the open drain or watercourse within the road carriageway via new or existing access track crossing points to minimise the requirement for in-stream works.

The two proposed inter-connecting underground cables to link the three access tracks, have also been designed to use horizontal directional drilling (HDD) to cross under the River Suir and avoid any instream works.

4.5.1.8 Archaeology

As mapped in Figure 4-9, there are four recorded monuments (two ringforts: TN035-075, TN035-076; and two enclosures: TN041-008 and TN041-087) within the Red Line Boundary of Proposed Wind Farm Site and one recorded monument (ringfort TN041-026) situated within 120m of the proposed grid connection corridor for the project (See Figure 4-10). The Proposed Project has been designed to avoid direct effect on all those monuments and remain at least 20m away from them. Consequently there will be no direct physical effect to any of the known monuments. In the case of the grid route, the proposed works will be under the existing public road and will not directly affect the TN 041-026 monument which is located close to the road on the west side.

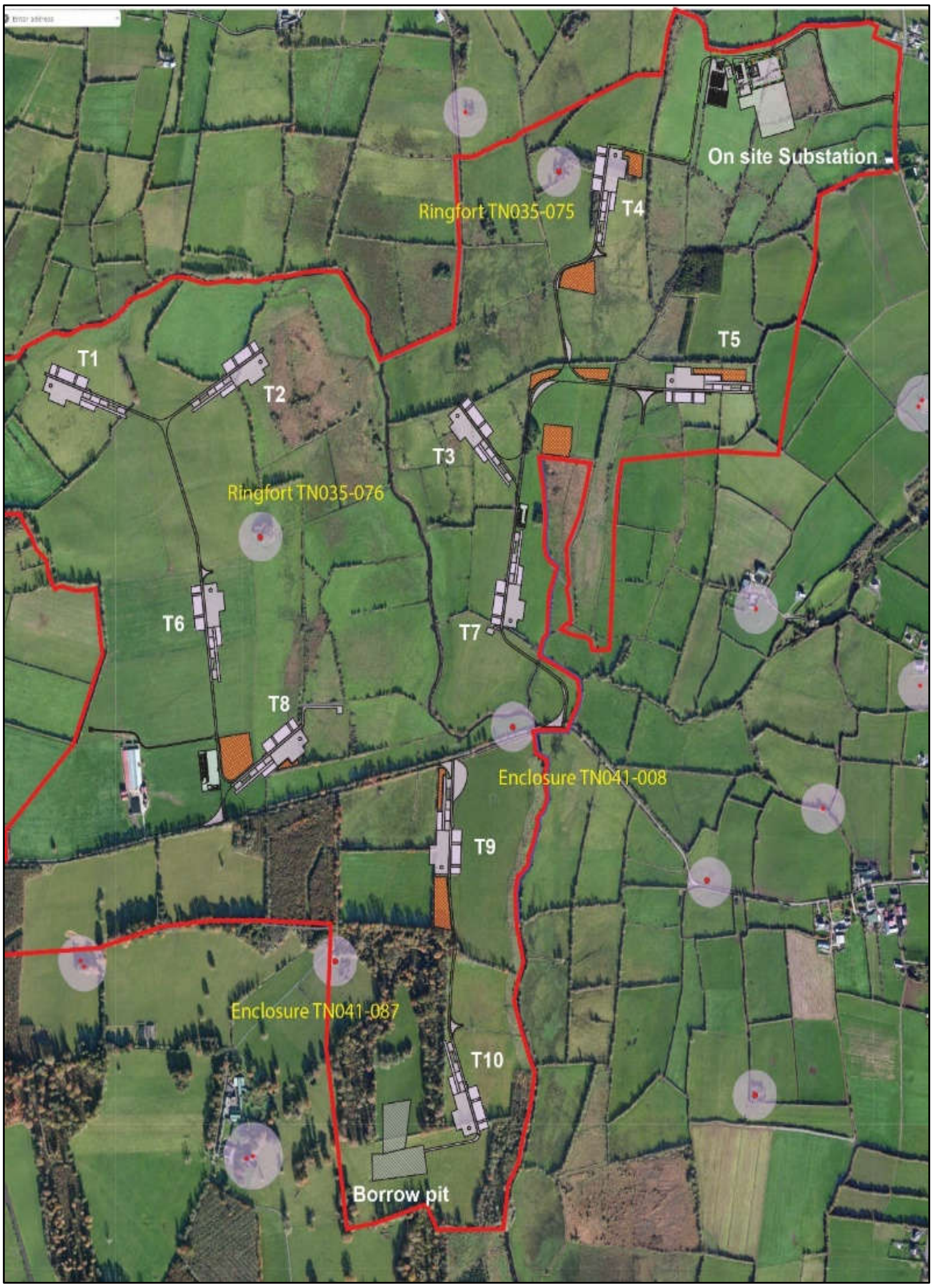


Figure 4-9: Map indicating the location of the recorded monuments within the Proposed Wind Farm (Red Line Boundary) in relation to the proposed layout. (www.archaeology.ie)

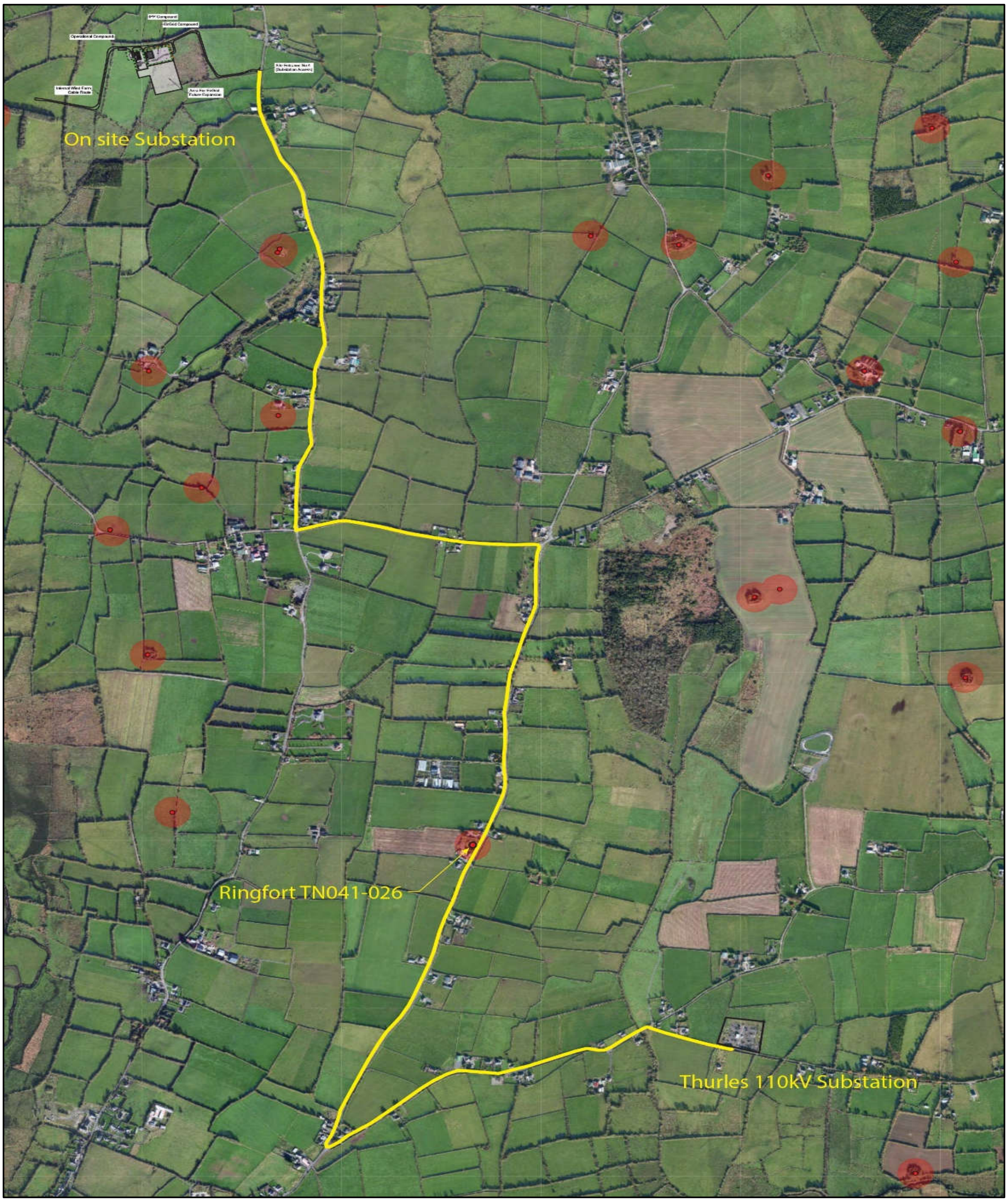


Figure 4-10: Location of the ringfort TN041-026 abutting proposed grid connection route

4.5.1.9 Public Consultation

Public consultation for the project was commenced at an early stage to make local residents aware of the project and to encourage feedback and local knowledge to shape the project and inform the environmental assessment. Public consultation was commenced in June 2022 with an initial newsletter drop to all dwellings within 1.5km of the project site. This document set out the applicant's intention to investigate the possibility of a wind farm project in the area. The newsletter included some high-level objectives of the project and listed contact details for the community liaison officer.

The applicant held public consultation events at 3 separate stages of the project. Each of these events were preceded by a newsletter drop where the project manager and community liaison officer knocked on doors within 1.5km of the project site, spoke to local residents about the proposal, invited people to the upcoming event and delivered the updated newsletters which indicated the time and venue of each consultation event.

The first event was held in Thurles Sarsfields GAA Club on the 17th of April 2023. The event presented maps of the developable area and outlined potential options for the grid route and turbine delivery route. The project design had not yet been commenced therefore it was a good opportunity for members of the public to input their thoughts.

The second event took place on two separate nights, the first at Thurles Sarsfields GAA Club on the 10th of October 2023 and the second at Loughmore Castleiney GAA Club on the 11th of October 2023. The main purpose of this event was to present the initial design of the project, provide an update on the progress and to invite feedback from the local community. Draft photomontages were presented at this event.

The third and final event was held in Rahealty Community Centre on the 12th of June 2024. This event presented the final layout of the project, the available results of the environmental assessment of the project and informed the local community about the approximate planning submission timeline.

As well as four separate project newsletters, the applicant prepared a project website and online exhibition space which presented project updates, environmental information, a draft photomontage viewer and contact information for the project team. Each of the four project newsletters were also available on the website.

Website: https://brittaswindfarm.com
Online exhibition: https://innovision.ie/brittas

Feedback was submitted by local residents throughout the development process, including via email, phone calls and direct conversation between the project manager, community liaison officer and local residents. The feedback was used to shape the design of the project in understanding the developable area, constraints and sensitive habitats.

4.5.2 Constraints Mapping and Buildable Area

Once the key sensitive environmental concerns were identified, separation distances to constraints were applied using Geographical Information Systems (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. Figure 4-4 outlines the watercourses, flood extents, water resource protection areas, biodiversity areas, communication links, dwellings buffers and archaeological constraints on the proposed wind farm site.

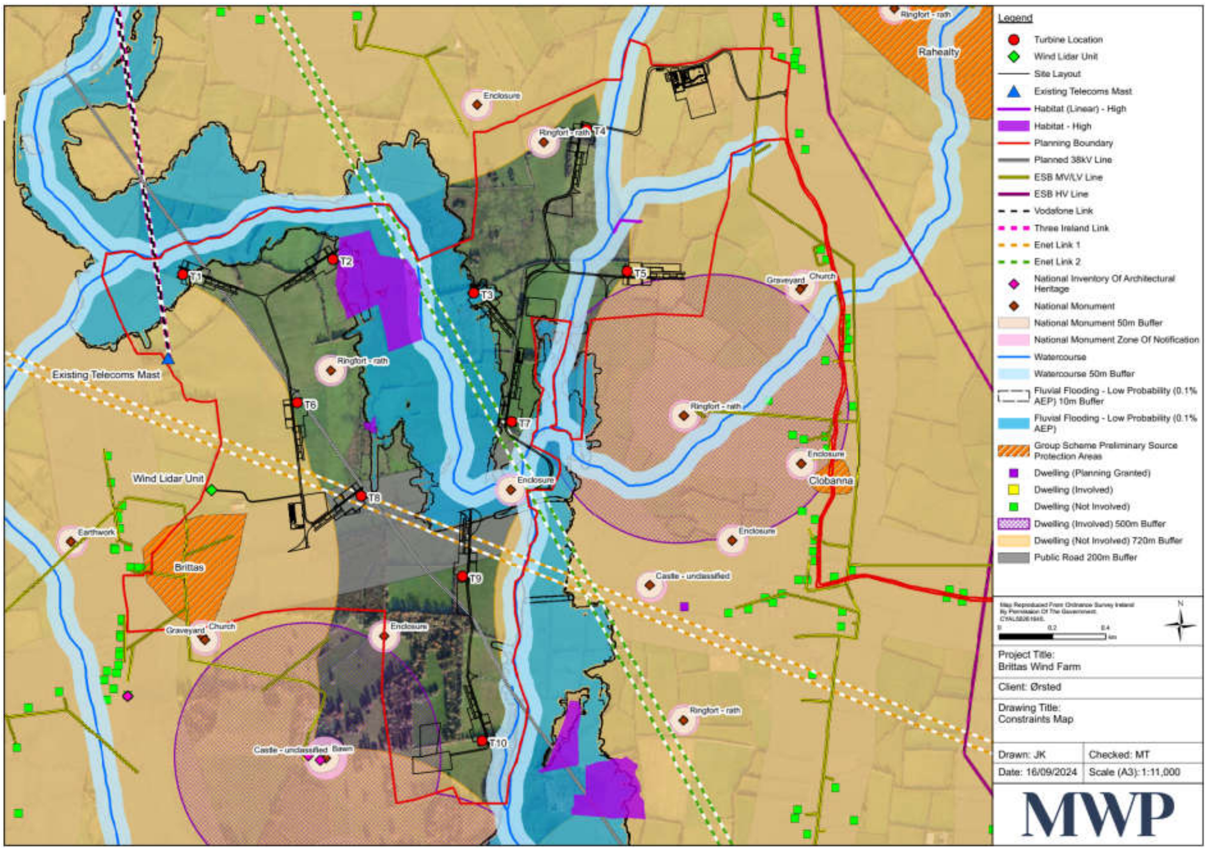


Figure 4-11: Environmental Constraints

4.5.3 Preliminary planning stage design

Following identification of all the environmental, technical and engineering constraints for the site, a preliminary layout that fits with the remaining developable area was produced. The layout included the preliminary internal access track network and provisional locations for the electrical substation compound, permanent meteorological lidar, 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**) for the SID planning application.

A number of alternative wind farm design layouts were considered on an iterative basis to arrive at the optimum wind farm layout. A comparison of the environmental effects of the design layouts facilitated the selection of the optimum wind farm layout. The presentation and consideration of the various reasonable alternatives investigated by the applicant is an important requirement of the EIA 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 negative environmental effects.

The proposed project examined various turbine layout configurations applying habitat maps, water features and flood risk areas, biodiversity impacts, topographical and ground survey data and residential receptors before choosing the current layout.

4.5.4 Planning stage design

The planning stage design of the wind farm was driven by a process of mitigation by avoidance as well as a principle of using existing infrastructure to the maximum possible extent. In many cases, the relocation of a turbine, substation or internal access track was not straightforward because other turbines and access tracks also had to be moved so as to maintain the required separation distances between turbines, as well as other technical and environmental constraints, buffers and set-backs.

In total, the preliminary turbine layout underwent 3 iterations driven by engineering, environmental, technical and landowner considerations as the project evolved. These were relatively minor geographically given the site constraints, however, required significant effort and input from the design team.

4.6 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 Grid Connection Methodologies; and
- Reasonable Alternative Construction Methodologies.

4.6.1 Alternative Turbine Options

To generate the maximum amount of wind energy on this site, the developers have proposed to use the largest turbines available that could potentially be delivered to site along the existing road networks. The possibility of using a larger number of smaller turbines to produce the same amount of energy proved not to be feasible given the limited size of the site due to all the environmental constraints to the proposed site discussed in section 4.5 above.

Due to the three practical constraints listed below, the wind farm developers applied to ABP for flexibility on the alternative turbine models for the Brittas Wind farm. This application was granted by ABP on the 8 May 2024 (see Appendix 1A). Flexibility for three turbine types was granted providing flexibility on three different hub heights, rotor diameters, blade lengths and variations in the hardstanding areas at the base of each respective turbine model. The reasons for the flexibility application included:

- the exact turbine model will be subject to a competitive procurement process that will only commence if the project receives consent.
- Potential obsolescence of existing technology
- To allow the developers to take advantage of new technologies which may become available during the consenting process.

Consequently, at this pre-application stage it is not possible to be definitive about the exact turbine type.

The characteristics of the three turbine types proposed, which provided the range that has been assessed in the EIAR, are presented in Table 4-4 and Figure 4-12 below. A single turbine type will be taken forward for construction. The final turbine type is subject to a procurement process.

Table 4-4: Characteristics of the three types of turbines proposed that provided the range which has been assessed in the EIAR

Turbine Type	Rotor Diameter	Tip Height	Blade length	Hub Height
A (1)	150m	180m	73.7m	105m
B (2)	155m	180m	76m	102.5m
C (3)	149m	180m	73m	105m

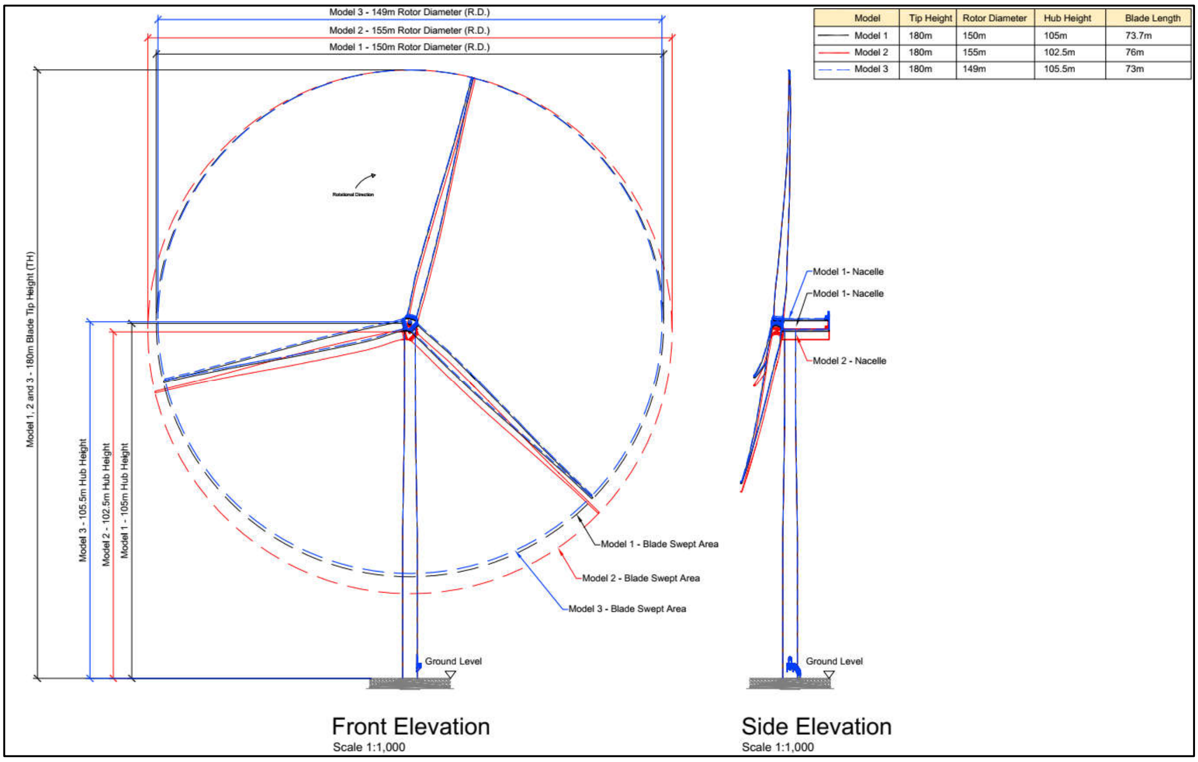


Figure 4-12: Diagram illustrating the differences between the range of turbine types being considered and applied for in the planning application.

Turbine hardstands are required to accommodate the delivery of the turbine components prior to their erection, to support the cranes during erection and to provide a safe working area during construction, operation and decommissioning. Each type of wind turbine will have an individual associated turbine hardstand area adjacent to the foundation. The combined footprint of the three turbine hardstand options is detailed in Figure 4-13. This is the hardstanding that is proposed as it combines all three potential options within a single footprint. A comparison of three separate potential hardstands are illustrated in Figure 4-14. The hardstand areas will be excavated and bear onto rock (or other suitable bearing stratum) with a foundation of 0.5-1.5m depending on the local bedrock profile. In the decommissioning phase, the hardstands will be left in situ and covered over by soil and revegetated. See planning application Drawing No. 22156-MWP-00-00-DR-C-5404 for the hardstand details.

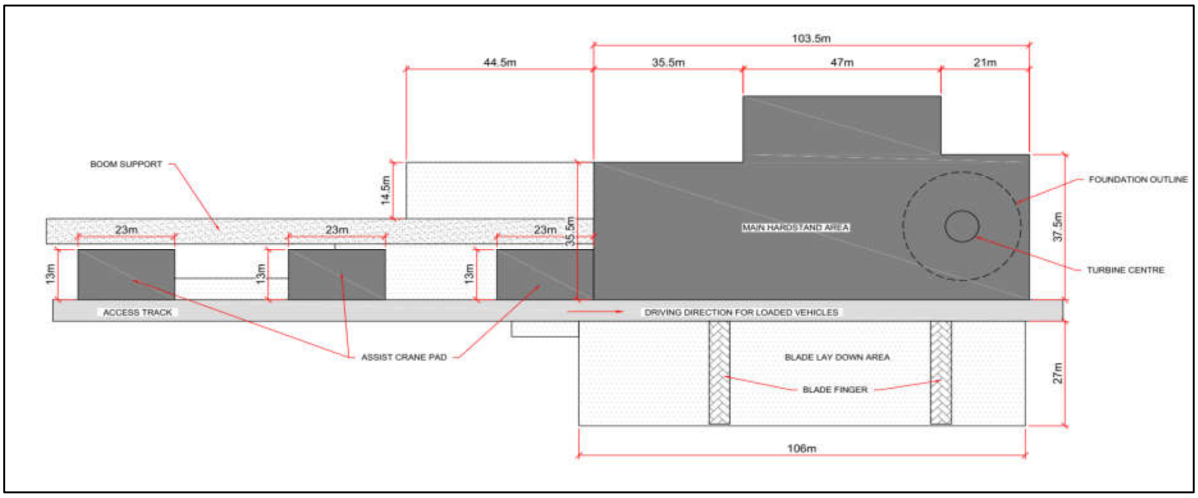
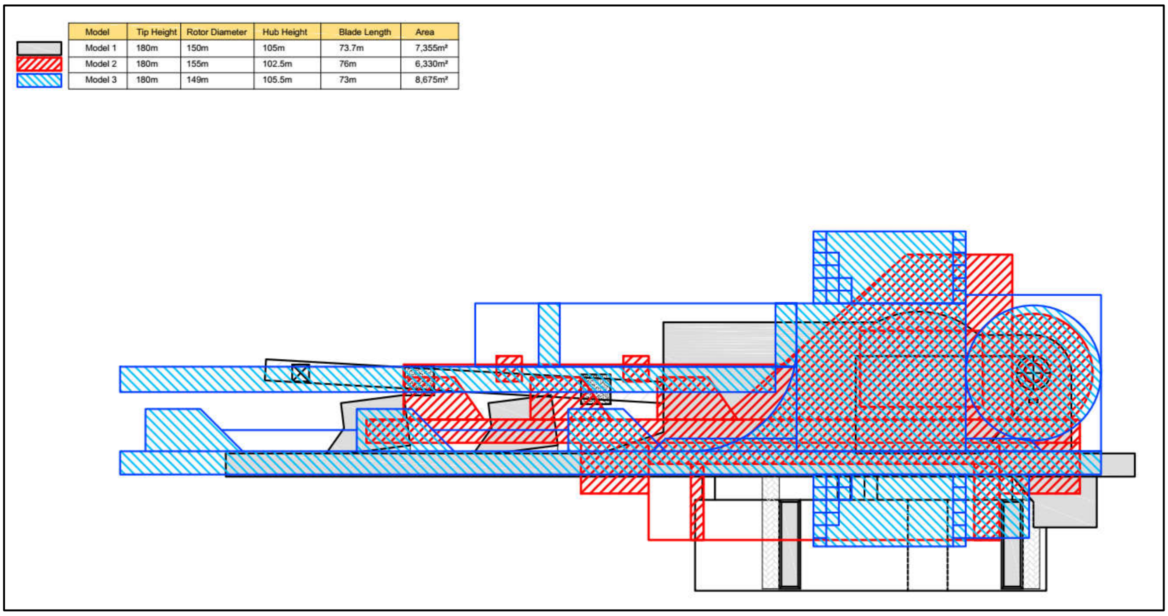


Figure 4-13: Proposed Combined Hardstand Layout



Model	Tip Height	Rotor Diameter	Hub Height	Blade Length	Area
Model 1	180m	150m	105m	73.7m	7,355m²
Model 2	180m	155m	102.5m	76m	6,330m²
Model 3	180m	149m	105.5m	73m	8,675m²

Figure 4-14: Drawing Comparing Turbine Hardstand A(1), B(2) and C(3)

4.6.2 Turbine Layout Alternatives Considered

In total there were three turbine layout iterations considered prior to determining the optimum layout with minimal environmental impact. The final turbine layout was primarily influenced by physical and environmental sensitivities. The sequence of turbine layout iterations developed during the design process are listed in Table 4-5 which outlines the design improvement as the land agreements, environmental assessments, neighbouring developments and design considerations 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. 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.

Figures 4-15 to 4-18 present the various iterations in the turbine layouts. Table 4-6 provides a comparison of site conditions and environmental effects in relation to the design improvements from initial to final design.

Table 4-5: Design Evolution and Iterations

Iter-ations	Description of Iteration	Reason for Change	Design Change/Improvement
Preliminary Layout (Fig 4-15)	10 No. Turbines (Tip height 180m)	N/A	N/A
1 (Fig 4-16)	11 No. Turbines (Tip height 180m)	Micro-siting changes to avoid uninvolved landowners, minimize the access tracks, create more spacing between turbines to allow for future minor micro-siting and to reduce impact on broadleaf woodland, reduce potential noise on dwellings, reduce overlap between turbines, avoid the river and flood extents.	T4 moved in from housing buffer to reduce potential noise on nearby dwellings. T3 moved to a more central point to reduce overlap. T9 moved west away from river. T10 moved further south west away from hedgerow. Access tracks for T3, T7 and T9 to run through hardstands to reduce overall footprint. Original T8 moved south east away from river and sensitive habitat and becomes T11. T2 moved closer to the River and additional turbine (T6) added to the north west access track. The original T6 becomes T9 and is moved north east out of the woodland and positioned on access track to T10. The original T7 is moved north west. The turbines are re-numbered.
2 (Fig 4-17)	11 No. (Tip height 180m) & associated infrastructure	Identified monument (castle) under the L-8017 road at the entrance to the proposed access track for T11, removal of access track required. Alternative access road proposed across the Suir River with new bridge. T05 hardstanding flipped to reduce footprint.	Change in access road to T11. Removal of access track and alternative access crossing the river Suir connecting to the access road for T10. Less footprint require due to reorientation of T05 hardstanding and crane pads.
3 Figure 4-18)	10 No. Turbines (Tip height 180m) & associated infrastructure	Planning permission granted for new dwelling on L-8017 road within 720m setback of T11. T11 was removed from the layout to maintain the required 720m setback from the new permitted dwelling. It was also decided to re-site T10 to increase the dwelling setback and reduce the impact on broadleaf forestry. This was possible due to the removal of T11. T04 moved 20m north east to avoid effects on a nearby registered monument. T05 hardstanding reorientated back to its original alignment due to presence of a watercourse which would overlap with the crane pad.	Required 720m setback from all neighbouring dwellings maintained. Reduced the loss of historic broadleaf forestry around T10. T09 move approx. 85m west to increase setback from river and from nearby dwellings. Felling avoided at a registered monument adjacent T04. T05 hardstand placed back in its original orientation to avoid effects on nearby watercourse.

Figure 4-15: First Preliminary Layout with 10 Turbines

Figure 4-16: Iteration 1 Layout – more streamlined 11no. 180m Tip Height Turbine Layout

Figure 4-17: Iteration 2 – 11no. Turbine layout with 180m Tip Height Turbines with access to T11 over the River Suir

Figure 4-18: Iteration 3 - 10 No. Turbines Layout with T11 removed

The final turbine layout (Iteration 3 in Figure 4-18 above) represents the most appropriate design for the site conditions, following an iterative approach of design optimization 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. Figure 4-19 provides a comparison of the initial and final proposed layouts for the wind farm.

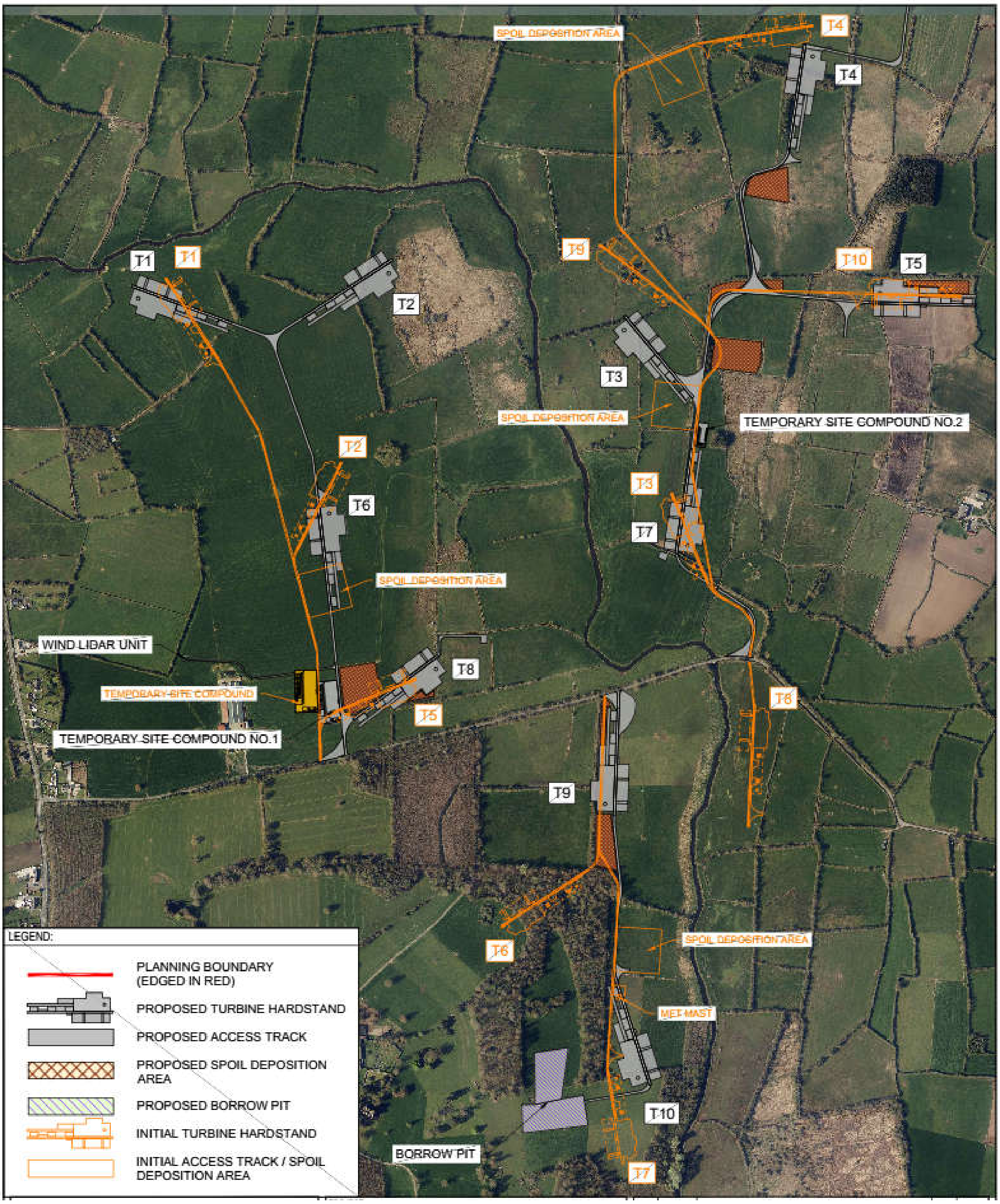


Figure 4-19: Comparison of the initial and final proposed layouts for the Brittas wind farm

Table 4-6: Comparison of Environmental Effects of Layouts

Environmental Factor	Preliminary Layout (10 turbines)	Iteration 1 (11 Turbines)	Iteration 2	Final Layout (10 Turbines)
Design Change	10 turbines and access tracks.	Streamlining of access tracks. Relocation of T9 and T10 to minimize impact on broadleaf forest. T11 added on west side with its own access track.	11 Turbines & new access track for T11 from T10 with new bridge over River Suir.	Removal of T11 for a total of 10 turbines.
Population and Human Health	720m setback of 11 turbines from all surrounding dwellings and minimum 500m from some involved landowner dwellings.	720m setback of 11 turbines from all surrounding dwellings and minimum 500m from some involved landowner dwellings.	720m setback of 11 turbines from all surrounding dwellings and minimum 500m from some involved landowner dwellings.	Setback of 10 turbines from dwellings has been maximised and meets the requirements set out in the Wind Energy Development Guidelines. One turbine was removed to meet the requirements due to a newly permitted dwelling adjacent to the site.
Biodiversity	Larger area of land take across site and removal of broadleaf forestry required.	Relocation of T9 and T10 to minimise impact on broadleaf forest.	New bridge over the River Suir – increasing risks of ecological effects but no significant issues of concern. Reorientation of T05 hardstand interacts with a watercourse. Greater potential negative effects.	Sensitive habitats avoided, development footprint and impacts on hedgerows have been minimised. Minimised the removal of broadleaf forestry.
Air and Climate	10 turbines produce less power and provide less reduction of carbon emissions compared to the 11-turbine design.	11 turbines would produce more renewable electricity and providing a greater reduction of carbon emissions.	11 turbines would produce more renewable electricity and providing a greater reduction of carbon emissions.	10 turbines produce less power and provide less reduction of carbon emissions compared to the 11-turbine design.
Landscape and Visual	10 turbines (180m tip height). 10 turbines visible in certain areas throughout the landscape.	11 turbines (180m tip height). 11 turbines visible in certain areas throughout the landscape.	11 turbines (180m tip height). 11 turbines visible in certain areas throughout the landscape.	Turbines reduced to 10, thus slightly reducing visual effect.
Water	50m watercourse buffer to turbine locations	50m watercourse buffer to turbine locations	50m watercourse buffer to turbine locations. New bridge crossing over the River Suir. Hardstanding at T05 overlaps with a	50m watercourse buffer to all turbine locations. Significant flood risk areas have been avoided. Potential effects at watercourse

Environmental Factor	Preliminary Layout (10 turbines)	Iteration 1 (11 Turbines)	Iteration 2	Final Layout (10 Turbines)
			watercourse. Greater potential for negative effects.	crossings reduced due to removal of bridge point to T11 and reorientation of T05 hardstand.
Land and Soils	Low risk design incorporating erosion controls and sustainable drainage systems	Low risk design incorporating erosion controls and sustainable drainage systems. Less footprint required due to inclusion of 'drive-through' turbine hardstandings at T06, T07 and T09.	Low risk design incorporating erosion controls and sustainable drainage systems	Low risk design incorporating erosion controls and sustainable drainage systems. Soil surveys undertaken and peaty soils found to be minimal and limited to the north east corner of the site.
Noise	720m setback of 10 turbines from all surrounding dwellings and agreed 500m setback from some involved landowner dwellings.	720m setback of 11 turbines from all surrounding dwellings and agreed 500m setback from some involved landowner dwellings.	720m setback of 11 turbines from all surrounding dwellings and agreed 500m setback from some involved landowner dwellings.	720m setback of 10 turbines from uninvolved dwellings has been maintained and agreed setback from some involved landowner dwellings has been maximised as much as possible. One turbine was removed to meet the requirements for the newly permitted dwelling adjacent to the site.
Cultural Heritage	No works within archaeological buffers around protected structures and monuments	National monument under the public road at the proposed entrance to access tracks for T11 would potentially be affected.	New access road to T11 from T10 over the River Suir would avoid impact on registered monument located under the public road at site entrance for T11 in Iteration 1. This change ensured there would be no works within archaeological buffers around protected structures and monuments	No works within archaeological buffers around protected structures and monuments. T04 moved slightly to avoid tree felling adjacent a registered monument.

4.6.3 Alternative Substation & BESS Sites and Layouts

Three substation and BESS locations (were identified for the project, both located on the eastern side of the river Suir. These three substation/BESS location alternatives arose from environmental constraints to the first and then the second sites identified during the design process.

The initial site was located in the south-eastern portion of the project lands in proximity to T11 (see Figure 4-20). This substation location was discounted due to the existence of a national monument under the public road at the entrance to T11 access track, which is the track that was proposed to be used for the underground cables to T11 and the substation. Thereafter, T11 was removed from the design and the substation became redundant in this area, with no clear way of connecting to the remainder of the project. The location of the BESS facility had not yet been designed at this stage.

A second substation and BESS location was identified in the north-east of the site between T4 and the L-4120 local road. This substation location (see Figure 4-21) was designed to EirGrid standards requiring two-times fall distance from turbines and maximise the distance from the nearest dwellings and farm buildings. In addition, the tracks to the substation and to the L-4120 road were designed to follow the field boundaries while minimising the impact on hedgerows. The substation site entrance was also positioned to avoid existing property entrances and to ensure the required sightlines would be met.

This site and surrounding areas were then re-assessed by the project ecologist. The ecologist identified that the habitat at the substation location, particularly in the southern portion of the field, appeared suitable for devil's bit scabious and advised that the substation be re-positioned to minimize the impact on the southern part of the affected fields. In response to this recommendation, the substation (and the associated BESS) was repositioned to the northern boundary of these fields (see Figure 4-22). Table 4-7 provides a comparison of the environmental effects of these substation options. Option 3 was consequently chosen as the preferred substation/BESS location option for the proposed project.

Figure 4-20: Initial Proposed Substation Site (South-East of T11)

Figure 4-21: Second Proposed Substation and BESS Location

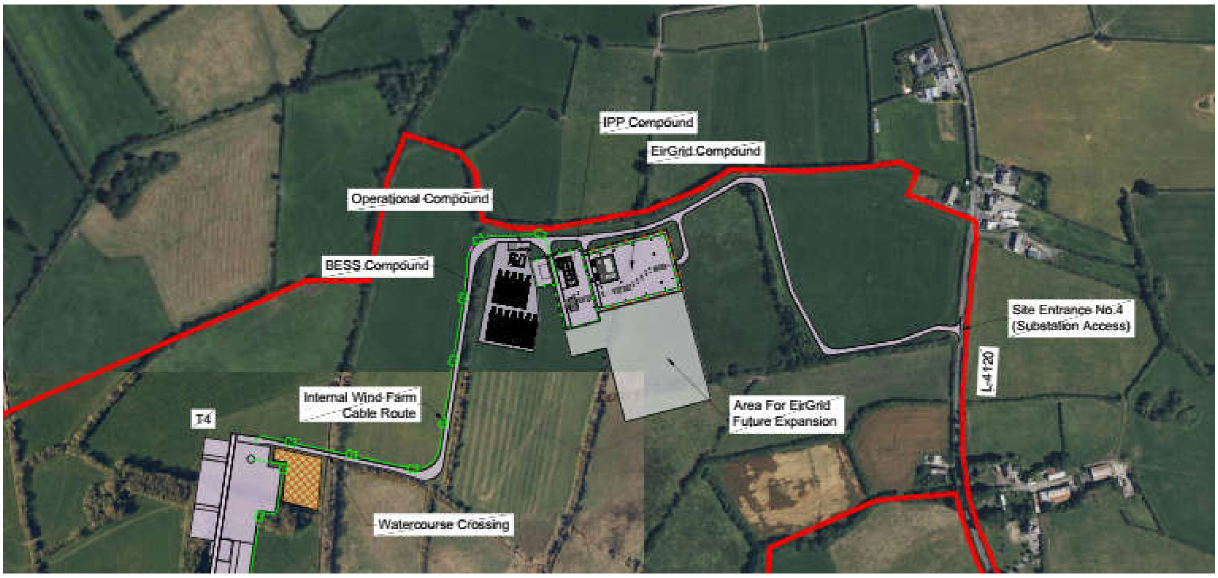


Figure 4-22: Final and Third Proposed Substation and BESS Location

Table 4-7: Environmental Comparison of Substation/BESS Options

Environmental Factor	Option 1 Initial Site SE of T11	Option 2 Second site North East of T4 (southern layout)	Option 3 Second site East of T4 (northern layout)
Population and Human Health	320m from nearest dwelling.	Location defined by 2x fall distance from turbines (360m) and maximised distance from nearest dwellings. (114m from boundary of future expansion area) and Maintenance road entrance was positioned to avoid existing property entrances and ensure the	Boundary of substation is 280m from nearest dwelling.

Environmental Factor	Option 1 Initial Site SE of T11	Option 2 Second site North East of T4 (southern layout)	Option 3 Second site East of T4 (northern layout)
		required traffic sight lines were met.	
Biodiversity	No issues of ecological concern.	Access tracks designed to minimise impact on hedgerows. Location has potential significant effects on sensitive habitat in the south of the affected fields.	Access tracks designed to minimise impact on hedgerows. Location minimises effects on sensitive habitat in the south of the affected fields.
Air and Climate	No differences in air & climate effects		
Landscape and Visual	No differences in landscape and visual effects.		
Water	No issues of concern for water resources.	Southern part of affected fields are wetter than northern areas – greater risk of water quality & ecological effects	Northern part of affected fields are dryer than southern areas – less risk of water quality & ecological effects
Land and Soils	No issues of concern for soils. Access tracks designed to minimise encroachment into agricultural fields.		
Noise	Location is 330m from nearest dwellings.	Location is 114m from nearest dwellings.	Location is 280m from nearest dwellings.
Cultural Heritage	National Monument under the proposed construction access road. Subsequent removal of T11 from layout due to same effects.	No issues of concern for cultural heritage resources.	No issues of concern for cultural heritage resources.
Traffic	Maintenance road entrance was positioned to avoid existing property entrances and ensure the required traffic sight lines were met. Sightlines better for options 2 and 3	Operations and Maintenance road entrance avoids existing property entrances and meets required traffic sight lines. Same as option 3.	Operations and Maintenance road entrance avoids existing property entrances and meets required traffic sight lines. Same as option 2.

4.6.4 Alternative Grid Connections

The proposed Brittas Wind Farm will produce between 57 and 66MW of power. Therefore, it will require a connection to a 110kV substation. A 38kV substation would not have sufficient capacity to accommodate this level of power generation. The Thurles 110kV substation is the closest substation of sufficient size to the project.

The developers undertook a grid route identification study to identify potential grid connection alternatives for the proposed project. This study identified the Thurles 110kV and Ballyraggot 110kV substations as potential grid connection options. **Figures 4-23 and 4-24** provide maps of these two grid route connections. The Thurles connection is 7km long while the Ballyraggott connection is 42km long. An environmental comparison of the two routes is provided in **Table 4-8** below. Given the much longer length, the use of national and regional roads, greater number of water crossings, larger number of close by monuments, and passing through urban areas and sensitive and protected habitats/areas, the Ballyraggot grid route connection is not considered an acceptable environmental alternative. The Thurles route is the preferred route as it is much shorter, with fewer (and small) water crossings, affects mostly rural receptors and local roads, and does not affect any sensitive or protected heritage or ecological resources/areas.

Figure 4-23: Grid Route Option 1 from Brittas Substation to Thurles Substation (7 km)

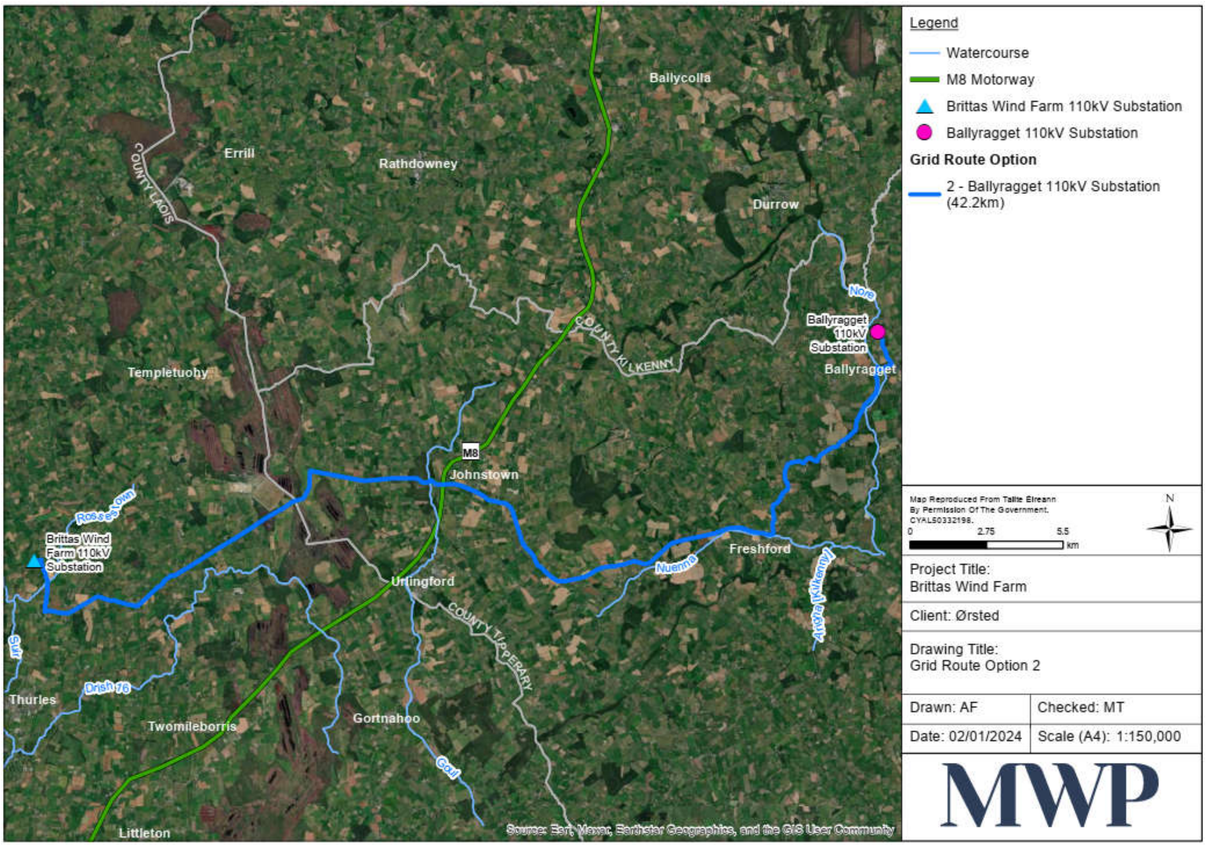


Figure 4-24: Grid Route Option 2 - Brittas to Ballyragget Substation (42km)

Table 4-8: Environmental Comparison of the two Grid Route Connection Options.

Environmental Factor	Option 1 Route to Thurles Substation	Option 2 Route to Ballyragget Substation
Route Length	7km	42km
Types of Roads affected	Local roads only	70% of the route would be along national and regional roads and 30% along local roads. 2 road crossings required including crossing of the M8 motorway.
Number of Water crossings	2	16 (Greater potential for negative effects)
Population and Human Health	The number of noise receptors along the route is relatively small and limited largely to rural residents. Dust, noise and traffic nuisance effects are expected but insignificant and brief-temporary in the locality.	The number of noise receptors along the route would be much greater and would include urban residents and businesses. Dust, noise and traffic nuisance effects are expected but insignificant to slight and temporary to short-term across the region.
Biodiversity	No sensitive ecological areas or protected areas affected.	There are two SACs, and one SPA along this route, mostly at the Ballyragget end where the route would cross the River Nore. There is one NHA (Ballyragget) and two proposed NHAs – The Loughans and River Barrow and River Nore NHA

Environmental Factor	Option 1 Route to Thurles Substation	Option 2 Route to Ballyragget Substation
		along this route. Sections of this route are also mapped as sensitive freshwater pearl mussel areas.
Air and Climate	Dust emissions are the issue of most concern but rated as not significant and brief to temporary for potential receptors. The numbers of receptors is relatively small and mostly rural.	Dust emissions are the issue of most concern but rated as not significant and brief to temporary for potential receptors. However, there are many more receptors along this route – some of which are located in urban areas, creating a greater extent of potential effect.
Landscape and Visual	The affected area is rural and not a tourist route, so landscape and visibility effects would be insignificant. The duration of works is also temporary (3-5 months).	Use of the national and regional roads would increase the number of receptors and visibility of the project during its construction. The duration of the works would be short-term (12-18 months).
Water	Only 2 small water crossings involved. Ground water vulnerability varies along the route and is generally high.	This route would have 16 water crossings some of which around Ballyraggott are SACs. Ground water vulnerability varies considerably along this route and ranges from moderate to extreme.
Land and Soils	No near surface rock or peat would be affected.	No near surface rock would be affected but some of the affected roads pass through peat bogs.
Noise	The number of noise receptors along the route is relatively small and limited largely to rural residents.	The number of noise receptors along the route would be much larger and would include urban residents and businesses. Due to the greater length of the route, the extent of noise effects would be greater and prolonged.
Cultural Heritage	There are three heritage/archaeological sites along this route consisting of: • Graveyard approx. 100m from the road corridor. • A ringfort located directly adjacent the road corridor. • Protected structure located adjacent the road corridor. There are no conservation or protected areas in proximity to this route.	There are at least 28 registered monuments and 14 architectural heritage sites on or immediately adjacent to this route, some of them clustered around towns. At least 14 of these are within the 100m SMR buffer zone. Therefore there is greater potential for negative effects to heritage resources along this route.
Traffic	Only lightly trafficked local roads would be affected for 3 – 5 months.	This route would affect national and regional traffic as well as local traffic over an 18 month period.

4.6.5 Alternative Turbine Delivery Routes

When assessing the potential delivery routes for turbine components from various ports of entry to the project site, numerous potential routes were identified including approaching from the north via the N62 through Templemore town centre and approaching from the south from the M8 motorway via Thurles town centre. Significant pinch points were identified in Thurles town centre and Templemore town centre where complex engineering solutions were required to allow the largest components, the turbine blades, to traverse the built up areas. This resulted in these two options being discounted.

The route identified from Foynes to the project site via Borrisoleigh was assessed as the only viable route which did not require significant disruptions, complex engineering solutions and significant 3rd party land agreements to accommodate the turbine component deliveries. No significant works have been identified for this proposed delivery route.

4.6.6 Alternative Wind Monitoring Facilities

Wind farms greater than 10MW that are connected to the national grid are required to submit meteorological data to EirGrid, therefore meteorological monitoring will be required on site during the operational phase of the proposed Brittas Wind Farm. A temporary 80m high lattice meteorological mast is currently located on the proposed project site. The location of the mast is shown in Figure 4-25 below. The current met mast location is in close proximity to the proposed T6 and will therefore be unviable during the operational phase of the project, as meteorological masts are required to be a distance of at least 2.5 times the turbine's rotor diameter, i.e. 375m, in order to avoid wake interference. Therefore, a new location for operational meteorological monitoring is required.

Rather than continuing to use a meteorological mast for the operational phase of the wind farm, the applicant is proposing to use a lidar meteorological monitoring station. This will replace the existing met mast. The proposed location for the lidar was determined taking into consideration the technical requirement for significant setbacks from turbines and also minimal interference from other structures and landforms such as tall buildings, forestry and undulating topography, and the absence of any other environmental constraints. The proposed location was also based on landowner constraints. It is located west of T8 and T6, close to the large existing farm shed (see Figure 4-26 below). The lidar is a small facility based on a hardstanding area surrounded by a galvanised steel palisade fence, 2.4m in height and measuring 6m by 6m in width (see details in section 2.4.2 of Chapter 2). The use of this lidar unit as an alternative to a meteorological mast will reduce the visual effect of the proposed project as the lidar unit will be obscured by treelines and hedgerows when viewed across country, whereas the use of an 80m meteorological mast can be viewed alongside the proposed wind turbines adding additional infrastructure visible from the wider landscape. Table 4-9 below provides a comparison of the environmental effects of these options. The main benefit of choosing the lidar as an alternative to a met mast is the reduction in visual effects of the development throughout the greater area.

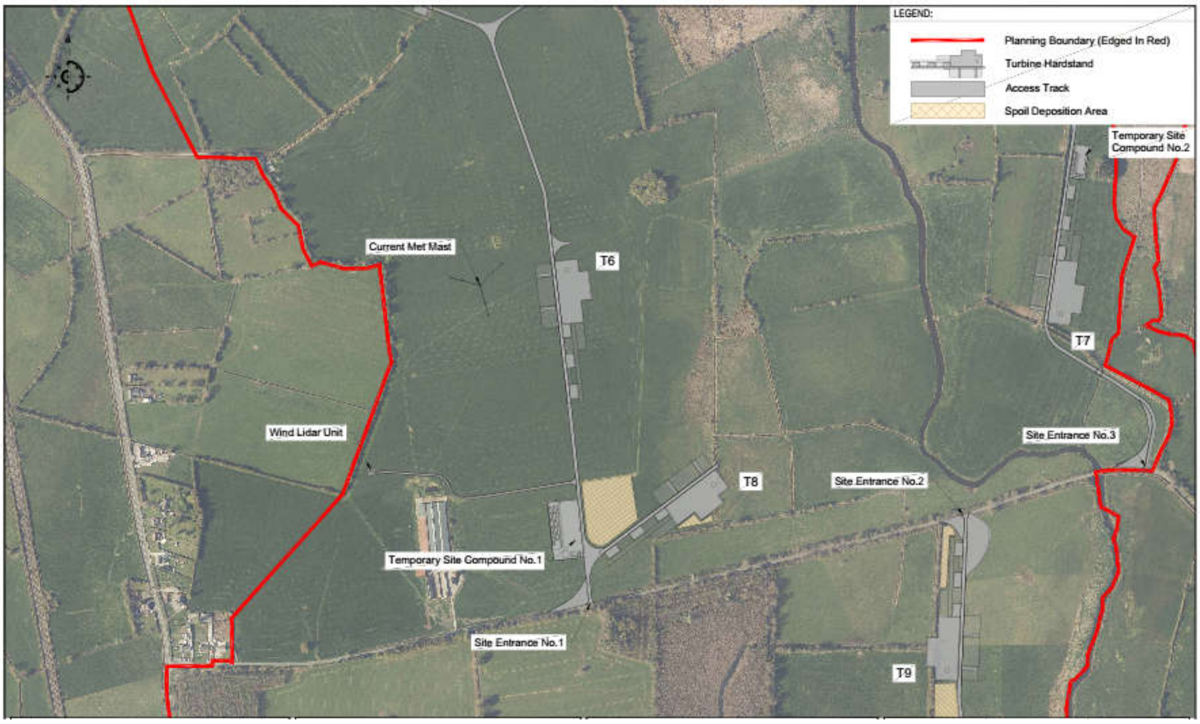


Figure 4-25: Location of existing Met Mast on the proposed project site (see green diamond shape)

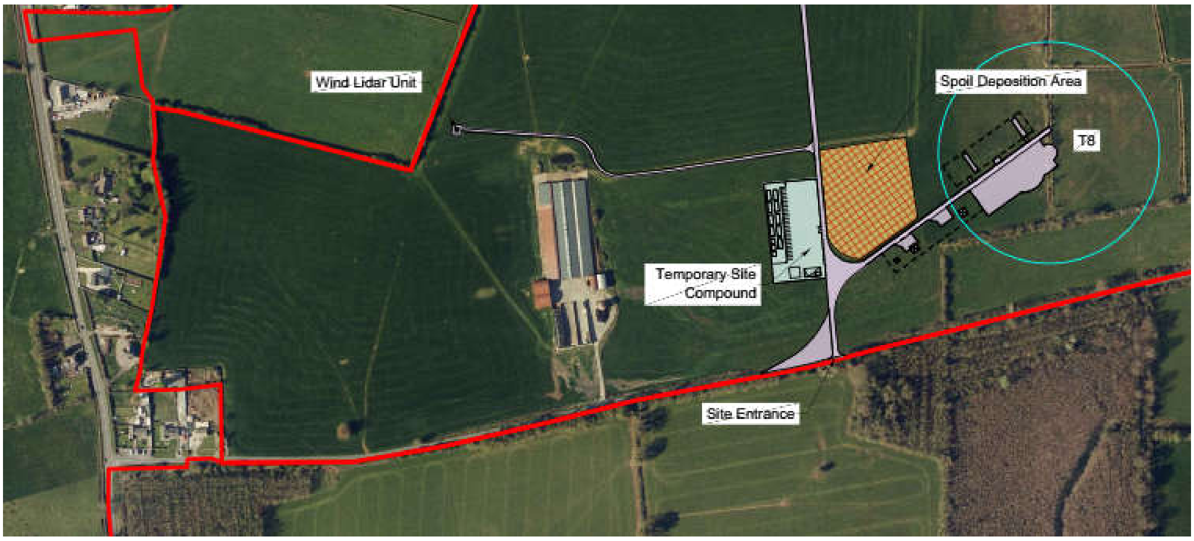


Figure 4-26: Proposed location of Lidar Meteorological Monitoring Equipment on the proposed project site

Table 4-9: Comparison of Meteorological Monitoring Facilities

Environmental Factor	Option 1 Continue to use existing Met Mast west of T6.	Option 2 Use a Lidar monitoring facility at first location further south closer to the existing agricultural sheds.
Technical Constraint	Is closer than the required 2.5 times the rotor diameter from T6 and would therefore cause wake effects on the proposed turbines.	No technical constraint.
Population and Human Health (HH)	570m from nearest dwelling. No change in current situation, except for potential cumulative visual effect with turbines and OHL.	Pop. and HH effects temporary and insignificant during construction. 353m from nearest dwelling and 98m from closest part of farm shed.
Biodiversity	Potential bird and Bat collision risk.	No ecological effects of concern.
Air and Climate	No Perceptible effect.	No air quality effects of concern during construction.
Landscape and Visual	Potential Cumulative visual effect with turbines.	No perceptible visual effect.
Water	No Perceptible effect.	No Perceptible effect.
Land and Soils	No significant effect, but shorter access track would have slightly less effect than option 2.	No significant effect, but access track will be slightly longer than option 1.
Noise	No Perceptible effect.	No Perceptible effect during operation and no significant noise during construction.
Cultural Heritage	No Perceptible effect.	No Perceptible effect.
Traffic	No Perceptible effect.	No Perceptible effect.

4.6.7 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, underground cabling and source of aggregate materials. These are discussed in the following subsections and the environmental effects are compared in Table 4-10.

4.6.7.1 Internal Access Tracks

Internal access tracks are required to interconnect elements of the site and allow access to all proposed wind farm turbines and infrastructure. These will involve the upgrading of existing tracks on founded substrate, the construction of new access tracks on founded substrate or floating tracks. In the case of the Brittas project, there will be some use of existing access tracks that will need to be widened where this is possible, combined with the construction of new access tracks. Most of the access tracks (6.4 km) will be constructed using traditional founded substrates that require cut and fill. In areas where there is peat soil and water pooling, such as in the north-east corner of the Brittas site, there may be a need to use floated access tracks. This will be assessed prior to construction based on more detailed ground investigations. With floated tracks there will be no excavation of existing soils and sub-soils and the access track would be 'floated' on top of the existing soils. These methods of construction are outlined in section 3.4 of Chapter 3. The choice of construction methods for the access tracks will depend on the site conditions where the tracks are proposed to be constructed (ie whether there are existing tracks, and whether there are significant peat and water pooling/drainage issues).

Table 4-10 below compares the environmental effects of these alternatives. There are no significant negative effects associated with either option, and minor reductions in effects associated with using existing tracks and floated tracks.

Table 4-10: Comparison of Environmental Effects of Access Track Construction Methods

Environmental Factor	Utilising and upgrading existing tracks (founded)	Construction of new tracks – cut and fill (founded)	Construction of new tracks – Floated
Comparative Impact	Less cut and fill than new tracks on founded substrate.	Highest comparative volume of cut and fill.	No excavations but new substrate laid on top of existing soils.
Population and Human Health	Less dust, noise, spoil storage and traffic effects than with new (founded) tracks, but not significant	Most dust, noise, spoil storage and traffic effects, but not significant.	Least dust, noise, spoil storage and traffic effects. Effects are not significant.
Biodiversity	No Perceivable Effect	Requirement of minor forest felling	Requirement of minor forest felling
Ornithology	No Perceivable Effect		
Air and Climate	Less emissions than new founded tracks during construction phase, but not significant.	Most emissions during construction phase, but not significant	Least emissions during construction phase, but not significant.
Lands and Soils	Some removal of overburden	Removal of overburden	No excavations
Water	Existing drainage and groundwater flow changed and less of an increase in surface runoff from tracks.	Existing drainage and groundwater flow changed and increased surface runoff from tracks.	Existing groundwater and drainage systems under the tracks left intact. Increased surface runoff from floated tracks.
Noise	Less Construction phase noise. Not significant.	Construction phase noise. Not significant.	Less Construction phase noise. Not significant.
Landscape	Screening by existing vegetation and nearby forestry will allow for no visual impact on surrounding receptors		
Cultural Heritage	No likely Effect	Low risk of effect due to shallow excavations	Very Low risk of effect as no excavations will be required.
Shadow Flicker	No Effect		
Material Assets	Designed for minimal effect on the existing public road network		

Environmental Factor	Utilising and upgrading existing tracks (founded)	Construction of new tracks – cut and fill (founded)	Construction of new tracks – Floated
Traffic	Less traffic during construction phase than new founded tracks, but not significant.	Most additional traffic during construction phase, but not significant.	Least additional traffic during construction phase, but not significant.

4.6.7.2 Underground Cabling

It is proposed to run all internal collector cables along the internal access tracks to minimise the excavations needed and provide easy long-term access to the cables for potential maintenance works. This will also ensure minimal disruption to existing agricultural land uses. Figures 2-22, 2-23 and 2-24 in Chapter 2 illustrate the proposed underground collector cable routes. The internal underground cabling route will be split into three sections and will involve open trenching in the verge of the proposed internal access tracks. Details of the construction and size of these cables is provided in section 3.7.4 of Chapter 3.

In order to avoid road works and traffic disruptions along the L-8017 (Rossestown) road it is proposed to use underground horizontal directional drilling to link up the internal circuit to the north (collector circuit 1) and the southern circuit (collector circuit 2) to the eastern circuit (collector circuit 3) by horizontal direction drilling (HDD) under the L8017 road and River Suir for 350m. This HDD construction option also avoids any works to the existing bridge along the L-8017 next to the eastern site entrance that provides access to T7, T5, T3, T4 and the substation and BESS. See Figure 4-27 below.

The alternative option to the proposed HDD routes is to run the interconnecting cables under the L8017 road between site entrances 1, 2 and 3, and under the access track from site entrance 3 to T7. This may still require HDD under the bridge that goes over the River Suir along this section of the L8017 road, and under one of the tributaries along the access track to T7. However, the length of the HDD will be shorter in this alternative. If the cables can be run along the outside of the bridge over the River Suir then this would avoid HDD under the River Suir. The choice of alternative river crossing methods over the River Suir for this option, would depend on the outcome of consultations with the local roads department.

However, the preferred alternative is to use HDD to directly connect T8 and T9 to T7. This will reduce the cut and fill construction works in the L8017 public road and avoid additional negative effects on local traffic, or the existing bridge over the River Suir.

A comparison of the environmental effects of these two options is provided in Table 4-11.

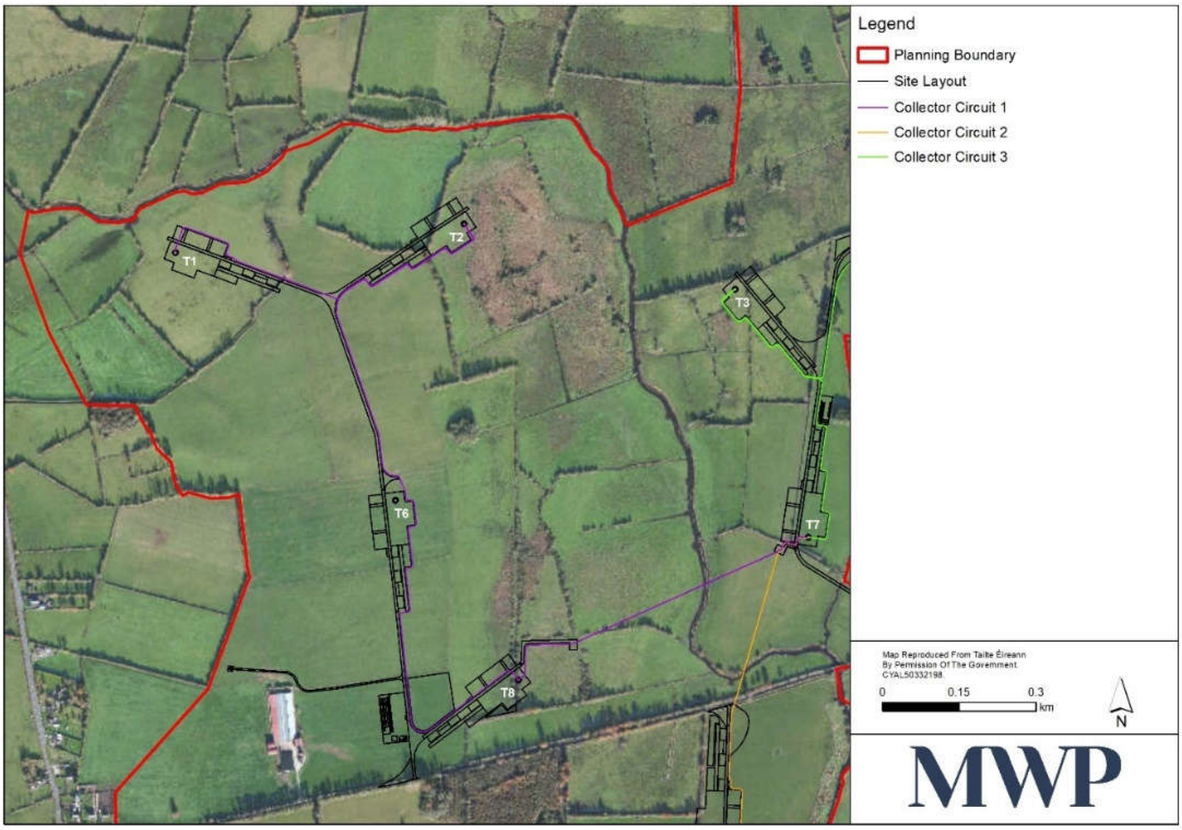


Figure 4-27: Map pf the Proposed Horizontal directionally drilled underground connector cable routes across the L 8017 road and the River Suir (from T8 and T9 to T7)

Table 4-11: Comparison of road and river crossing options for underground cables.

Environmental Factor	Option 1 Underground Cables put under the Rossestown L-8017 road between site entrances 1, 2 and 3.	Option 2 HDD crossing of L-8018 road and River Suir
Population and Human Health	Construction works in the public road will increase road safety risks and have temporary nuisance effects.	The construction works will not affect traffic or the road infrastructure (including the bridge crossing over the River Suir) along the L-8017 Rossestown road.
Biodiversity	No in-stream works or associated water quality effects are envisaged. Any potential construction works on the bridge crossing may have effects on bats and water quality (and associated habitat) effects. These effects could be avoided using HDD under the bridge.	No in-stream works or associated water quality effects are envisaged.
Air and Climate	Dust from construction works in the L-8017 road may result in minor temporary air quality effects.	HDD will avoid the surface construction works and any associated dust effects from Option 1.
	Emissions from construction vehicles will be similar for both options.	

Environmental Factor	Option 1 Underground Cables put under the Rossestown L-8017 road between site entrances 1, 2 and 3.	Option 2 HDD crossing of L-8018 road and River Suir
Landscape and Visual	There will be some temporary visual effects for road users along the L-8017 road section through the development site during construction.	Due to the absence of any road works along the L-8017, there will be no temporary visual effects for road users along the L-8017 road section through the development site.
Water	No instream works are envisaged as crossing will be made either on the outside of the bridge or via HDD under the bridge. Construction works on the bridge crossing over the River Suir may have other habitat effects for bats.	No instream works are envisaged.
Land and Soils	No significant effects on land and soils.	Less land and soil will need to be disturbed and moved than Option 1.
Noise	Construction works in the public road will have some temporary noise effects for road users and the nearest neighbours.	The construction works will have less noise effects for the public road users and does not come within proximity to any dwellings.
Cultural Heritage	The bridge crossing over the River Suir would potentially be affected unless HDD was used under the bridge.	Any effects on the bridge crossing over the River Suir will be avoided.
Traffic	Construction works in the public road will increase road safety risks and have temporary traffic effects.	The construction works will not affect traffic or the road infrastructure (including the bridge crossing over the River Suir) along the L-8017 Rossestown road.

4.6.7.3 Borrow Pit

An on-site borrow pit is proposed as a source of stone and aggregate materials for the development to minimise the amount of imported material and HGV traffic to the site during the construction phase (see Figure 4-28). It is proposed to make use of the only identified source of stone and aggregate on the proposed project site. This is located close to a historical quarry site on the Brittas Demesne. The potential volume of aggregate that could be sourced from this pit has been assessed (see section 3.12 of Chapter 3). It will be able to provide approximately 15-20% of the aggregate needed for the project. Consequently, the majority of the aggregate needed will be sourced from authorised quarries in proximity the site. The on-site borrow pit will, however, assist in reducing the number of project related HGV on the roads during the construction phase. After all the rock has been extracted from the borrow-pit, it will be backfilled by spoil accumulated on the site. This will reduce the size of the spoil areas and the amount of traffic removing material from site. Thereafter the site will be covered with topsoil and restored to the current pastural land use. A comparison the environmental effects of these two options is provided in Table 4-12.

Table 4-12: Comparison of Environmental Effects of Material Sourcing

Environmental Factor	On-site Borrow Pit	Imported Material
Population and Human Health	Volume of traffic on public road networks kept to a minimum	Increased public disruption due to increased traffic volumes on public road networks associated with import of materials
Biodiversity	Temporary Loss of vegetation and hedgerow and noise disturbance during construction works. Proposed hedgerow and other tree replacement will more than compensate for loss of existing hedgerow.	No loss of on-site vegetation or hedgerow or noise disturbance.
Ornithology	No Significant Effect	No Significant Effect
Air and Climate	Vehicle emissions and dust effects will be lower.	Increased vehicle and dust emissions due to greater transport requirements
Lands and Soils	Ground surface disturbance. Provision of additional long-term repository for storage of surplus excavated soils	Alternative engineered storage facilities required on site for placement/storage of surplus excavated soils or else transported off-site
Water	No Significant effect	No Significant Effect
Noise	Some noise emissions due to excavations but no significant noise effect on nearest receptors	Off-site traffic noise emission but less noise effects than borrow pit works.
Landscape	Imperceptible Effect	Imperceptible Effect
Cultural Heritage	No Significant Effect	No Significant Effect
Shadow Flicker	No Significant Effect	No Significant Effect
Material Assets	Volume of traffic on public road networks kept to a minimum	Additional traffic on public road networks

The preferred alternative is to develop and utilise on site aggregate resources over importation where feasible due to:

- The advantages of reduced traffic volumes on the public road network and associated reduced public disruption, noise, and air quality effects;
- The advantages that an on-site borrow pit provides suitable repositories for storage of surplus excavated soils.

Figure 4-28: Proposed Borrow Pit Site.

4.6.8 Re-routing of ESB 38kV Overhead power line (OHL)

At the date of writing this EIAR an incomplete ESB overhead 38kV powerline passes through the proposed wind farm site (see current route in Figure 4-29). Completion of this overhead line was permitted in mid-2023. This powerline is expected to be constructed prior to the construction of the proposed Brittas Wind Farm project. Due to the requirement for appropriate clearance between overhead lines and wind turbines, the section of this powerline which passes through the proposed wind farm will need to be rerouted.

The wind farm developer will submit a separate planning application for the re-routing of this section of the powerline prior to the construction of the wind farm. Permission to re-route the OHL and completion of the works by the developer will be required prior to the wind farm becoming operational. This will be completed in consultation with the ESB. This powerline is not needed for the operation of the wind farm and cannot be used as a grid connection.

Three rerouting options were considered and are mapped in Figure 4-29. A comparison of the environmental effects of these options provided in Table 4-13. These include:

1) Undergrounding the whole route through the wind farm site along the new access tracks (pink line – Underground Option 1),
2) A new overhead line route to the west of the permitted overhead line (the yellow and blue lines – Overhead Option 1A and 1B), and
3) A new overhead route to the east of the permitted overhead line (green line – Overhead Option 2).

Consultation with the ESB has indicated that the proposal to underground the line through the wind farm is possible, but they would prefer an overhead line for ease of maintenance. Therefore, it is likely that the rerouting of the overhead line will be progressed, in consultation with the ESB, and a separate planning application will be submitted to Tipperary County Council for same.

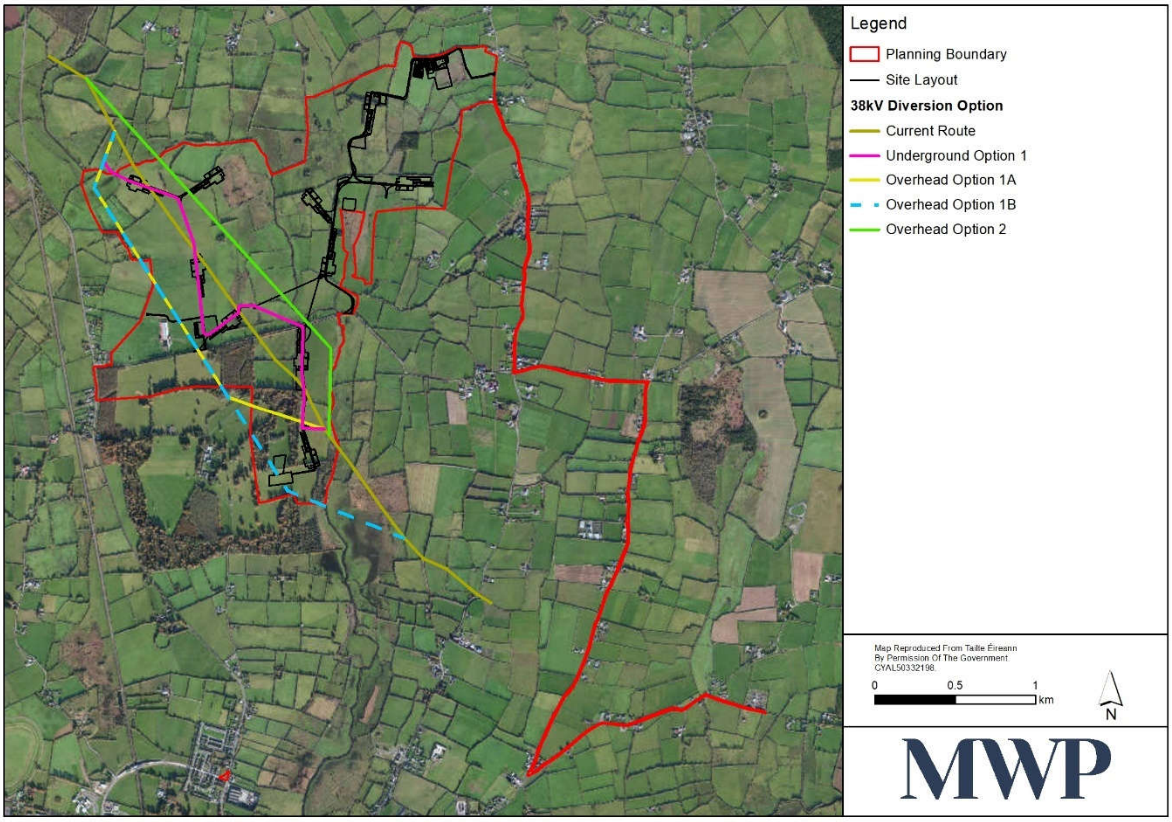


Figure 4-29: Alternative Options for the re-routing of the permitted ESB OHL through the project site.

The underground route would make use of the proposed underground cabling routes along the internal access tracks between T10 and T1. It also proposes to use HDD to connect the route from the middle site entrance to T8 (see Figure 4-30). The underground route would maximise integration with the proposed project cabling and access track works, would reduce the visual effects and avoid any potential negative effects on the woodlands and the River Suir. It would also avoid any high flood risk areas.

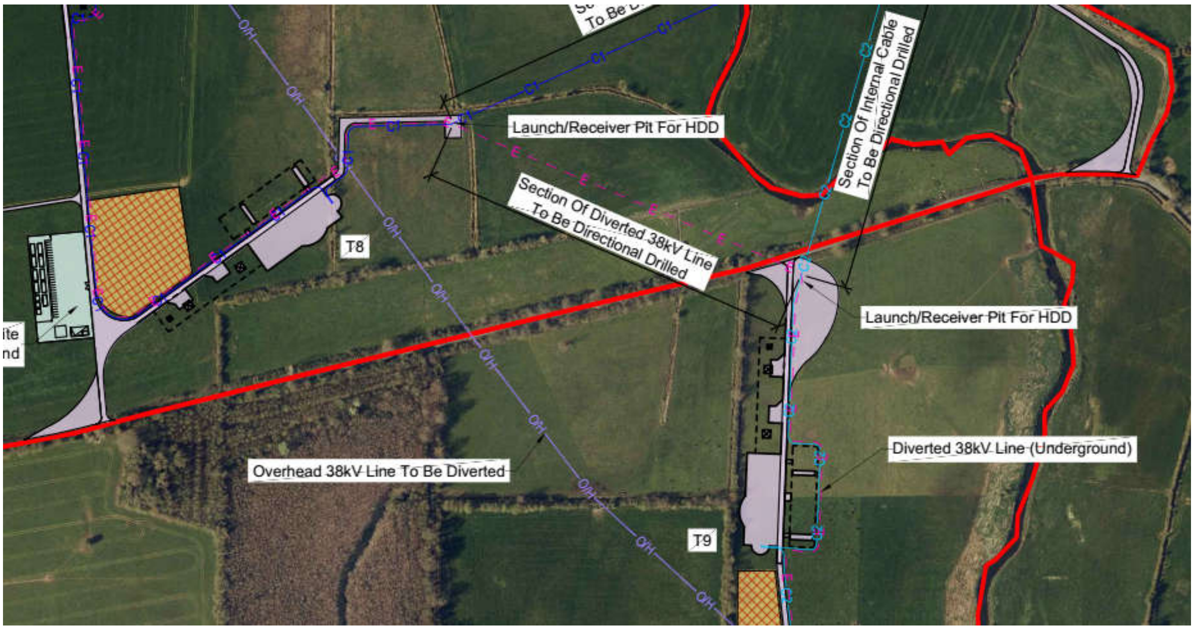


Figure 4-30: Aerial drawing of section of proposed underground re-routing of 38kv ESB powerline using HDD under Rossestown road and the adjacent field (see pink line between Turbine 8 and the site entrance north of Turbine 9).

The ESB indicated their preferred option is to use overhead lines through the site for their ease of maintenance in the long-term. There are a number of constraints on the overhead re-routing options including:

- Maintaining a fall distance from the proposed turbines
- The existing forests and the need to minimise negative ecological effects
- Avoiding interaction with the River Suir where possible
- Staying within involved landowners property boundaries.

Overhead Option 2 (green route in Figure 4-29) is the developer's preferred overhead line route as this is the least impactful option, avoiding effects on existing forest areas and providing an appropriate setback from the proposed turbines. However, this route does come within close proximity to a section of the River Suir. The ultimate choice of alternative will depend on the outcome of consultations with ESB.

Overhead Option 1A (yellow route) requires felling and has potential to impact significantly on the broadleaf forested areas (Figure 4-29), some of which have old-growth trees of high ecological value. Overhead Option 1B (blue route) is an alternative route to re-connect with the permitted overhead line to the south. This would have similar ecological effects to the yellow route (Option 1A), passing through the existing broadleaf forestry.

Table 4-13: Comparison of Environmental Effects of the OHL Re-routing Options

Environmental Factor	Underground Option 1 (Pink) Undergrounding	Overhead Option 1A (Yellow) Shorter Western OHL	Overhead Option 1B (Blue) Longer Western OHL	Overhead Option 2 (Green) Eastern OHL
Population and Human Health	Reduced long-term visual effects.	No Significant Effect	No Significant Effect	No Significant Effect
Biodiversity	Additional water quality risks associated with additional excavations and HDD.	Loss of high value woodlands	Highest loss of high value woodlands	Potential ecological effects from construction in proximity to the River Suir. Can be mitigated.

Environmental Factor	Underground Option 1 (Pink) Undergrounding	Overhead Option 1A (Yellow) Shorter Western OHL	Overhead Option 1B (Blue) Longer Western OHL	Overhead Option 2 (Green) Eastern OHL
Ornithology	No Significant Effect	Potential loss of habitat	Potential loss of habitat	No significant effect
Air and Climate	No Significant Effect	No Significant Effect	No Significant Effect	No Significant Effect
Lands and Soils	Additional erosion and water quality risks associated with additional excavations and HDD. Not significant and can be mitigated.	Not significant erosion and water quality risks.	Not significant erosion and water quality risks.	Slight erosion and water quality risks associated with routing along the banks of the River Suir. Can be mitigated.
Water	As above	As Above	As Above	As above
Noise	No additional effect to the proposed internal WF underground cabling.	No Significant Effect	No Significant Effect	No Significant Effect
Landscape	No additional effect to the proposed internal WF underground cabling.	No Significant Effect	No Significant Effect	No Significant Effect
Cultural Heritage	No Effect	Some potential effects on historical character of Brittas Castle Demesne.	Some potential effects on historical character of Brittas Castle Demesne.	No Significant Effect
Material Assets	No significant Effect	No Significant Effect	No significant Effect	No significant Effect

4.6.9 Alternatives for Telecommunication Infrastructure on Site

There is an existing telecommunications mast on the proposed wind farm site and other telecommunications masts in the vicinity of the project. Links associated these masts may be affected by the operation of the proposed wind turbines. Mitigation for the potential effects are outlined in Chapter 10 of the EIAR (Material Assets) and Appendix 10B. Measures include relaying of radio links and movement of monopoles.

4.7 Do Nothing Scenario

Should the proposed project not be realised, the wind farm will not contribute to Ireland's renewable energy infrastructure, and it will not contribute to Ireland's renewable energy targets or increased energy security. In a do nothing scenario, this site will not contribute to Ireland's commitment to meet its EU and national emissions targets and an opportunity to significantly offset CO2 emissions will be lost.

The proposed project has the potential to offset between 56,174 and 65,043 tonnes of CO^2 emissions equivalent per year. This would otherwise be released to the atmosphere through the burning of fossil fuels in the "Do-Nothing" scenario. This may result in continued contribution to global warming and impact upon the intention to pursue efforts to limit warming as agreed to in the Paris Agreement (2015). This will result in continued negative impacts to air quality and climate.

According to EirGrid Group's Ten-year Generation Capacity Statement 2023 - 2032 (EirGrid, 2023), the growth in energy demand for the next ten years on the Island of Ireland will increase by 43%. In the 'Do nothing' scenario, the contribution of the proposed project (1.4%) to reaching the CAP2024 onshore renewable energy target would be lost. The project has the potential to contribute to 1.4% of the 2030 target.

Under the "Do-Nothing" scenario, the potential environmental impacts of the proposed project as set out throughout this EIAR will not occur. The socio-economic and energy/climate change benefits associated with the proposed project will not occur. Table 4-14 sets out the potential impacts of the 'do-nothing scenario' compared to the residual impacts associated with the Brittas Wind Farm Project in relation to the various environmental topics covered in the individual chapters of this EIAR. Refer to each respective chapter for full details of residual impacts.

A do-nothing scenario would result in the continuation of agriculture and commercial forestry operations at the site.

Table 4-14: Comparison of potential residual effects of the proposed project versus the "Do Nothing Scenario".

Environmental Factor	Proposed Project	Do Nothing Scenario
Activities /Impacts	Construction works will take place for the Wind Farm, grid connection and accommodation works for the turbine delivery route. Agricultural and forestry activity will continue adjacent the wind farm site. Community Development fund may result in other social development projects in the area. Decommissioning will result in removal of wind turbines and maintain site roads, on-site substation and grid connection.	No effects associated with construction works. Existing agricultural land uses will continue along with existing trends.
Population and Human Health	Slight positive effects related to community development projects and job creation in the area.	No change in current trends or effects.
Biodiversity	Slight negative impact on species and habitat. Non-significant impact on aquatic ecology.	No change in current trends or effects.
Ornithology	No significant effects identified.	No change in current trends or effects.
Air and Climate	Non-significant short-term residual impacts arising from dust and emissions during construction. Long-term positive impact on air quality and climate due to avoidance of burning of fossil fuels and the net displacement of between 56,174 and 65,043 tonnes of CO_2 per annum.	No change in current trends or effects. No benefit in terms of achieving emission reduction targets to address air quality and climate change effects.
Lands and Soils	Imperceptible to not significant effects.	No change in current trends or effects.
Water	Imperceptible to slight effects due to potential for increased surface runoff and potential for increased suspended solids during construction. Unlikely due to proposed mitigation.	No change in current trends or effects.
Noise	Imperceptible to non-significant noise effects at nearby dwellings. Potential significant to very significant noise effects at involved dwellings.	No change in current trends or effects.
Landscape	Visual effect varies from not significant to moderate between viewpoints during the operational phase due to the presence of wind turbines.	No change in current trends or effects.
Cultural Heritage	No significant cultural heritage effects.	No change in current trends or effects.
Material Assets	Positive effect due to renewable energy supply during the operational phase. Positive effect for the continued operation of grid and electrical infrastructure.	No change in current trends or effects. No renewable energy benefits.

Environmental Factor	Proposed Project	Do Nothing Scenario
Traffic	Not significant to moderate temporary effects on traffic at the wind farm site and grid route during the construction phase.	No change in current trends or effects.

4.8 Conclusion

The project design process and reasonable alternatives were completed in compliance with the EIA Directive, EU Guidance Document 2017, Wind Energy Development Guidelines (2006) and the EPA's Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

The proposed project has been designed to minimise potential environmental effects and to maximise wind potential on site.

Alternatives examined included alternative site layouts, alternative turbine scales, alternative grid connection options and alternative construction methods. The selected design was based on the project philosophy of mitigation by design.

The final site layout (iteration number 3) 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. The proposal, as assessed throughout the EIAR, is considered to be the optimal design which minimises impacts on the receiving environment, while providing significant renewable electricity to the national grid, in line with national energy and climate policy.

4.9 References

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