3.0 CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) contains a description of the reasonable alternatives that were studied which are relevant to the project and its specific characteristics and provides an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.

In 2014, Environmental Impact Assessment (EIA) Directive 2011/92/EU was amended by Directive 2014/52/EU and Article 5, relating to the preparation of an EIAR by the developer, was amended to state the following should be included regarding alternatives:

"…a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment" (Article 5(1)(d)).

This is further reinforced in Annex IV the Revised EIA Directive (Information Referred to in Article 5(1) (Information for the EIAR) states that:

"A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."

The Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Union, 2017) states that reasonable alternatives

"must be relevant to the proposed project and its specific characteristics, and resources should only be spent on assessing these alternatives" and that "the selection of alternatives is limited in terms of feasibility. On the one hand, an alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible alternative"[1].

In addition as noted by the Environmental Protection Agency (EPA) in the Guidelines on the Information to be Contained in EIARs (May 2022) *"Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR"* and *"that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics'.*[2]*"*

The EPA EIAR Guidelines (2022) also stipulates in Section 3.4 (consideration of alternatives) that '*The presentation and consideration of the various alternatives investigated by the developer is an important requirement of the EIA process'.*

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[1] https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf

[2] https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf

The alternatives may include:

- Alternative locations;
- Alternative designs; and
- Alternative processes.

This chapter provides information on the consideration of alternatives, including 'do nothing' (Section 3.3.1), alternative locations (Section 3.3.2), alternative design and layout, (Section 3.3.4), and alternative processes (Section 3.3.5).

3.1.1 Statement of Authority

This chapter was prepared by Serena Byrne, and John Staunton of TOBIN Consulting Engineers. Serena Byrne is a project scientist at TOBIN Consulting Engineers, with over 11 years' multidisciplinary experience in engineering and environmental consulting. She has recently completed a MSc in Environmental Sustainability in University College Dublin on a part time basis, including an EIA Procedures module.

This chapter has been reviewed by John Staunton PhD, Senior Project Manager and Environmental Scientist in TOBIN. John has more than fourteen years' postgraduate experience in both research and environmental consultancy. John holds a BSc and PhD in Environmental Science and has considerable experience in project managing wind energy developments and carrying out associated impact assessments including in preparing assessments in relation to population and human health (human beings). It was also reviewed by Orla Fitzpatrick, Technical Director in TOBIN. Orla has twenty years experience working in the delivery of EIA projects in environmental consultancy. She holds a BSc in Geophysics and MSc in Environmental Consultancy and has considerable experience as technical approver of environmental deliverables for major infrastructure projects.

3.2 METHODOLOGY

3.2.1 Standards and Guidance Documents

The following documents and guidance were reviewed in the preparation of this chapter:

- Environmental Protection Agency (EPA), Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022);
- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Union, 2017);
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems (DoHPCLG, 2017);
- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment; and
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

Consideration was also given to the following as part of the literature review:

- Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) (EPA, 2003); and
- Best Practice Guidelines for the Irish Wind Energy Industry (IWEA, 2012).

3.3 CONSIDERATION OF ALTERNATIVES

In accordance with Directive 2011/92/EU as amended by Directive 2014/52/EU and taking into account the above standards and guidance documents listed, including the EPA EIAR Guidelines (2022) this chapter addresses alternatives under the following headings:

- 'Do Nothing' Option, i.e. without the proposed project proceeding;
- Alternative Locations;
- Alternative Layouts;
- Alternative Design;
- Alternative Processes;
- Alternative Mitigation Measures.

Each of these is addressed in the following sections. When considering a wind farm development, given the intrinsic link between layout and design, the two will be considered together in this chapter.

3.3.1 'Do-Nothing' Option

The "Do-Nothing" scenario is not to develop the proposed project and to leave the existing environment as it is, with no changes made to the current land-use practices. In such a scenario, the prospect of capturing a valuable renewable energy resource would be lost and as a result the opportunity to contribute to meeting Government and EU targets to produce electricity from renewable resources and the reduction of greenhouse gas emissions would also be lost. Furthermore, the chance to generate additional local employment and investment would not occur, the local economy would remain less diverse, and continue to rely primarily on agriculture and forestry as its main source of income.

The 2009 EU Renewable Energy Directive (2009/28/ EC) set Ireland a legally binding target to meet 16% of our energy requirements from renewable sources by 2020. In 2018, the Directive was recast (2018/2001/EU) to move the legal framework to 2030 targets, setting a new binding target of at least 32% with a clause for a possible upwards revision by 2023. At that time Ireland was committed to meeting 40% of electricity demand from renewable sources, with 10% for transport and 12% for heat. It is now established that Ireland has not met the 2020 renewable energy targets. Under the 'Do-Nothing scenario', there will be no opportunity to provide additional renewable energy into the electricity grid.

Under the 2021 Climate Action Plan, which is discussed further in Chapter 4 of this EIAR (Policy Planning and Development), the following targets have been set out:

- Reduce CO_2 equivalent emissions from the electricity sector by 62-81%% from 2018 levels relative to 2030 pre-National Development Plan projections;
- Deliver an early and complete phase-out of coal- and peat-fired electricity generation;
- Increase electricity generated from renewable sources to 80%, indicatively comprised of:
  - At least 5 GW of offshore renewable energy;
  - Up to 2.5 GW of solar photovoltaic (PV) energy; and
  - Up to 8 GW of **onshore** wind capacity.

Under the "Do-Nothing" scenario, the Cloghercor Wind Farm project would not go ahead, the development of wind turbines would not be pursued, and all lands associated with the proposed project would remain in their current uses (primarily forestry). The prospect of creating sustainable energy would be lost at this site. The nation's ability to produce sustainable

energy and reduce greenhouse gas emissions to meet EU targets and targets set out in the Climate Action Plan (2021) would be reduced.

Over the 35-year life of the wind farm it is anticipated that between 2,947,716 and 4,452,786 tonnes of carbon will be offset in the production of electricity, which would otherwise be released to the atmosphere through the burning of fossil fuels in the "Do-Nothing" scenario. Importation and use of fossil fuels would continue, and Ireland's energy security would remain vulnerable. According to EirGrid Group's All-island Generation Capacity Statement 2021 – 2030, the growth in energy demand for the next ten years will be between 18% (low demand scenario) and 43% (high demand scenario)[3]. In addition, the proposed project will provide employment both in the local area and to the wider economy through the construction and operational phases as described in Chapter 5 (Population and Human Health). It will also provide investment in the local community in terms of community benefit funds and an amenity facility. Under the 'Do-Nothing' scenario, the socio-economic benefits associated with the proposed development will be lost.

In the scenario where the proposed project does not proceed, the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions would be lost.

Table 3-1: Environmental Impacts of the Do-Nothing Alternative relative to the Chosen Option

Environmental Consideration	Do Nothing Alternative
Human Health and Population	No increase in employment as a result of the project. No long-term investment in sustainability in the locality. No long-term development of a recreational facility locally.
Biodiversity	Forestry would continue to be clear-felled / managed as part of the ongoing forestry growth cycle. No potential for construction/operation phase impacts.
Ornithology	No potential for construction/operation phase impacts to bird populations.
Land, Soils and Geology	Forestry works will be carried out as required. No potential for construction phase impacts.
Hydrology and Hydrogeology	Forestry works will be carried out as required. No potential for construction phase impacts.
Shadow Flicker	No potential for shadow flicker, however, the applicant has committed to zero shadow flicker.
Material Assets – Telecommunications & Aviation	Neutral - No potential for impacts on telecommunication links and flight activity. However, the applicant has avoided impacts on telecommunications and flight activity.

[3] http://www.eirgridgroup.com/site-files/library/EirGrid/208281-All-Island-Generation-Capacity-Statement-LR13A.pdf

Air Quality and Climate	Missed opportunity to contribute to the reduction of carbon and greenhouse gas emissions.
Noise and Vibration	No potential for additional noise at nearby sensitive receptors.
Cultural Heritage	No potential impacts on archaeology or local cultural heritage.
Landscape and Visual Impact	Existing landscape and visual amenity in the area will remain unchanged.
Traffic	No potential increased traffic volumes on local roads. No works required in other areas for turbine delivery.

3.3.2 Site Selection

The site selection process for wind farm development is guided by high-level plans, strategies and guidance such as County Development Plans and the 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 assure 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, Cloghercor Wind Farm Ltd (a joint venture between FutureEnergy Ireland (FEI) and Ørsted), continuously examine the lands under their stewardship and otherwise for candidate sites for wind energy development. In 2014, FEI's under Coillte at the time Renewable Energy Development Team undertook a detailed screening process, through Geographical Information System (GIS) software, using a number of criteria and stages to assess the potential of a large number of possible sites, on lands within its stewardship (c. 441,000 hectares), suitable to accommodate a wind energy development. The GIS database drew upon a wide array of key spatial datasets such as forestry data, ordnance survey land data, house location data, transport, existing wind energy and grid infrastructure data, and environmental data such as ecological designations, landscape designations and wind energy strategy designations available at the time.

The following is a summary of the methodology used in this screening process.

<u>Phase 1 – Initial Screening</u>

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

- Committed Lands for other developments;
- Millennium Sites (This is a Coillte environmental designation – these sites were planted and managed for provision of a tree for every household in the country as part of the Millennium tree planting project);

- Life Site (This is a Coillte environmental designation – these former forested sites were cleared and are managed for biodiversity);
- Wild Nephin Properties (This is a Coillte designation. Since 2014 these properties have been incorporated into National Parks);
- Farm Partnerships and Leased Lands;
- National Parks; and
- Natura 2000 and Nationally Designated Sites (SAC, SPA, NHA, pNHA).

FEI also reviewed Donegal County Council's CDP 2014 - 2024 and Renewable Energy Strategy (RES) provisions and did not proceed with further analysis where the policy context was not supportive of wind farm development. In this regard, areas were not brought forward for further analysis if they were not identified as being at least "open for consideration" for wind farm development.

Lands where the average wind speed at 80 metres above ground level is less than 7 m/s and, therefore, potentially not suitable for a commercially viable wind energy development were also discounted at this stage. In addition, sites with a contiguous area of less than 300 hectares were discounted.

Phase 2 – Grid Constraints

The electricity transmission system is the backbone of the nation's power system, efficiently delivering large amounts of power from where it is generated to where it is needed. As part of the site selection process, it was necessary to consider the potential for grid connection, including in terms of distance to potential connection nodes and the grid capacity at the nodes, in the local area, to accommodate the connection.

Phase 3 – Screening

The next stage of the screening process removes lands from further analysis with the following attributes:

- Sensitive Amenity or Scenic Areas designation in the CDP (at the time of the screening process);
- Tourist areas/sites/trails;
- Lands utilised for other wind farm developments;
- Telecommunications masts and links;
- Sensitive habitat/species of bird;
- Land ownership title issues;
- Relatively high residential density in vicinity;
- Unfavourable slopes and ground conditions.

This stage of screening was generally applied using FEI's in-house expertise and local knowledge and was subsequently validated externally in terms of the engineering considerations and the likelihood of obtaining a successful grant of planning permission based on industry trends. A screening process was conducted by FEI across the country in 2014 and again in 2017 identifying a range of suitable sites, including the Cloghercor site, which were taken forward for detailed assessment.

Ørsted has a similar screening process, particularly for Phase 2 and Phase 3 Screening as detailed above, and have identified suitable sites such as Cloghercor, in a similar manner. For the project, Ørsted identified suitable private lands for development. The process of engaging with landowners in the area to establish interest in the project was commenced in early 2019. That resulted in a number of landowners concluding option agreements and initial surveying

commenced in autumn 2019. Engagement between Ørsted and FEI (then Coillte Renewable Energy Development Team) also commenced as their processes identified suitable lands adjacent to these private lands. While discussions between Ørsted and FEI were ongoing surveying was expanded to a wider portion of the site in summer 2020 to include all proposed lands. Ørsted and FEI entered into a co-development agreement in winter 2020 to progress the project as joint venture partners.

Ørsted and FEI had a pre-existing relationship where their site screening activities identified similar locations. Separate co-development agreements for these sites were entered into and brought forward for planning. These sites include the following:

- Coom, County Cork;
- Ballinagree, County Cork.

As these sites have all been brought forward to planning, and are subject to EIA, a description of the reasonable alternatives studied which are relevant to each project and its specific characteristics, together with an indication of the main reasons for selecting the chosen option with regards to their environmental impacts are provided in the EIAR accompanying the applications for same.

The alternative to the proposed project site screening process would be to bring forward a site that does not pass one or all of the above phases of screening. In that instance, there could be the potential for the construction and operation of a wind energy development which may have an adverse effect on ecologically designated or sensitive areas and visually sensitive (scenic) or amenity areas. There could also be the potential for greater shadow flicker, noise and traffic impacts if the candidate site was located in an area with a higher number of residential dwellings. In addition, a site with an average wind speed less than 7m/s (at 100m above ground level) and/or not located within practical proximity of existing grid infrastructure and may not be economically viable.

3.3.3 Combined Site Selection

Following the site selection processes undertaken by FEI and Ørsted both parties agreed to share resources to develop the site together. The separate identification and initial development of the proposed project site reinforces the suitability of the site location for a wind energy development.

3.3.4 Alternative Layouts / Designs

During the EIAR assessment stage, environmental surveys of the site of the proposed project were carried out to establish the baseline environment. All site constraints were identified and updated as further detailed assessment was undertaken. The locations of county roads, streams, residential dwellings, landowner boundaries, telecommunication links, ecologically sensitive areas, archaeological sites and visually sensitive areas were noted. Separation distances to identified constraints were determined using a Geographical Information System (GIS) (See Figure 3-1 for the Cloghercor Wind Farm Constraints Map). The scoping and consultation exercises (statutory and non-statutory bodies and the public) also fed into the site layout/design (See Section 1.8 of Chapter 1 (Introduction)), where, for example, information about ecologically sensitive areas was provided by the National Parks and Wildlife Service which resulted in redesign of the turbine layout.

The site layout design stage considered the size, number and positioning of turbines and layout of associated site infrastructure i.e. internal access tracks, temporary construction compounds, met masts, substations, etc. Alternatives considered for each of these elements are

documented in the following sections. It was an iterative process comprising input from the design team, environmental specialists, internal and external stakeholders. As an iterative process, environmental effects were reduced or eliminated through changes to the design, where possible. The constraints which were identified are provided as Figure 3-1.

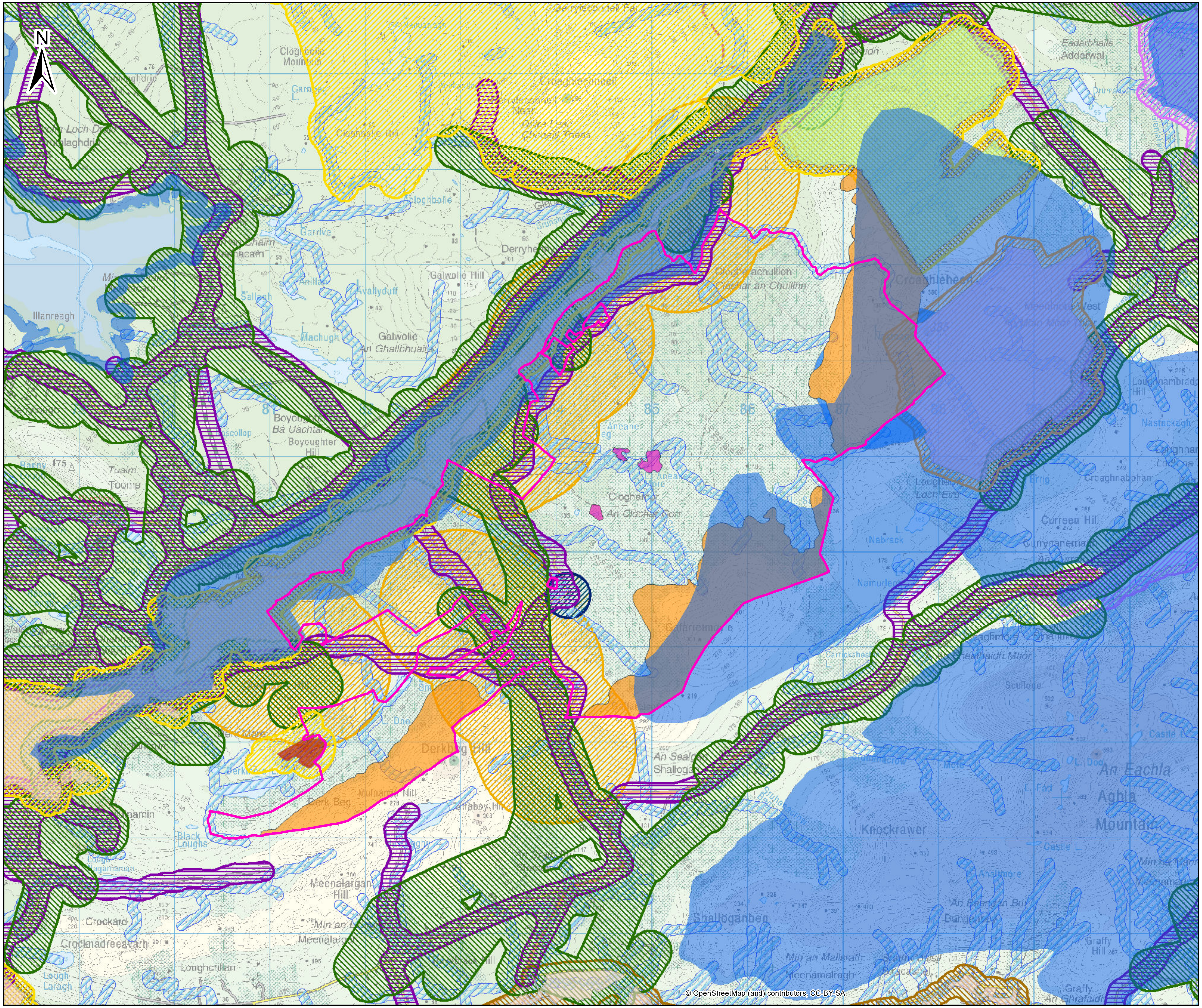
Constraints and environmental sensitivities were first identified, and buffers applied in order to determine a viable area within the site to accommodate development. The constraints identified and resulting design solutions are listed in Table 3-2 below.

Table 3-2 Environmental Considerations

Environmental Consideration	Required Setback/Constraint	Design solutions
Residential Amenity	The existing 2006 Wind Energy Development Guidelines (WEDGs) and the 2019 Draft Revised WEDGs do not have a prescribed minimum setback but indicate that a 500 m setback distance should be sufficient.	In order to minimise potential noise effects and impacts on residential amenity, it was decided early in the design process that a set-back of 800m would be appropriate. The proposed layout has achieved a high level of separation between dwellings and turbines by providing a minimum separation distance of >800m. The closest dwelling is located approximately 925m away from proposed turbine T16, which is more than 4x times the maximum tip height (in this case 4 x 200m) , in line with the setback requirements in the 2006 and Draft 2019 Guidelines.
Flora and Fauna	Mitigatory measures designed to avoid potential impacts on species and habitats.	The potential effects on Flora and Fauna as outlined in Chapter 6 (Biodiversity) shows that the proposed project will have no significant effect on ecological features. Significant presence of flora and fauna is limited across the site, with majority of the site occupied by conifer plantation. Consideration has been given to identify sensitive areas on the site (for example, bird nesting locations and sensitive lakes) and these areas will be avoided. In addition, a program of habitat enhancement is proposed.
Ornithology	Avoidance of nesting area, foraging sites and migratory routes.	As per Chapter 7 (Ornithology) mitigation measures were designed to reduce any impacts to bird populations, including: • Construction Disturbance Mitigation; • Mitigation of Operational Disturbance to breeding Golden Eagles; • Mitigation of Displacement impacts to Golden Eagles; and • Post Construction Monitoring These are described further in Chapter 7 (Ornithology).
Soils and Geology	Avoid areas of peat.	The proposed site is not a sensitive site in terms of soils and geological environment, due to commercial forestry and the sites low geological value. Topography, along with the soils and underlying geology varies throughout the site. Generally, the

Environmental Consideration	Required Setback/Constraint	Design solutions
		site comprises peat 1.2m peat thickness underlain by silty sand GRAVELS with angular cobbles and boulders. Bedrock in the region is quite shallow and commonly occurs within 2m of ground level. There is no evidence of peat instability on the site as a result of any previous development. The proposed infrastructure was designed to avoid any areas of deep peat on site. The principal risks associated with soil and geology at the site are the management of soils, and the loss of construction and operational materials (concrete, fuel and oil, etc) to water. It is expected that these risks can be fully mitigated through the adoption of construction and operational good practice.
Hydrology	Avoid impact on drainage regime.	In identifying and avoiding direct impacts on drainage features the proposed development has implemented 'avoidance of impact' measures. Examples include bottomless culverts or clear span structures for all drainage crossings and replicating drainage width, side slopes and substrate in proposed drainage channels where existing site drains need to be rerouted.
Water Quality	Minimum setback from significant rivers and streams and appropriate mitigation designed to avoid siltation during construction.	There will be 2 no. watercourse crossings along the grid connection route. Both will avoid in-stream works. A 50m setback from main infrastructure (turbines, substation, borrow pits, compounds) to watercourses will be maintained. Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channel along the 50m buffer zone boundary.
Noise and Vibration	The 2006 wind Energy guidelines states that 'a lower fixed limit of 45dB(A) or a maximum increase of 5dB(A) above background noise at nearby noise sensitive locations is considered appropriate to provide protection to wind energy development neighbours.' Similarly, these guidelines indicate "*A fixed limit of 43dB(A) will protect sleep inside properties during the night*."	As stated above a 800 m minimum setback from nearby dwellings has been achieved. The appropriate day and night noise limits will be adhered to by the proposed development, as described in Chapter 12 (Noise & Vibration).
Shadow Flicker	Zero shadow flicker.	The proposed project has committed to Zero shadow flicker. This is compliant with the 2006 Wind Energy Guidelines and is in line with both the emerging best practice and the Draft Wind Energy Guidelines 2019. This is described in further detail in Chapter 10 (Shadow Flicker).
Cultural Heritage	No direct impact on recorded archaeological monuments or architectural sites.	The final layout has been designed to ensure that there is no direct impact on recorded archaeological monuments or architectural sites.

Environmental Consideration	Required Setback/Constraint	Design solutions
Material Assets	No significant impacts to any telecommunications networks or aviation in the area.	The final layout has been designed to ensure that there is no direct impact on telecommunication links. It has also been found that the proposed project will have no significant impact on aviation related activities.



Legend

- Proposed Wind Farm Site Boundary
- 20m Buffer From Cultural Heritage Sites
- Especially High Scenic Amenity (EHSA)
- Breeding Teal lakes
- Coolvoy Bog SAC
- Derkmore Wood Nature Reserve
- Golden Plover buffer
- High quality blanket bog
- Meenmore West Bog NHA
- Ridgeline (above 180 m contour)
- West Of Ardara/Maas Road SAC
- 100m buffer from Natural Heritage Area (NHA)
- 100m Buffer From pNHA
- 220m Buffer from 38kv line
- 100m Buffer From Roads
- 100m Buffer From Special Protection Area (SPA)
- 100m Buffer From Special Area of Conservation (SAC)
- SMR Zone of Notification
- 50m Buffer From WFD Rivers
- 220m buffer from House 034 Curtilage
- 800m buffer from Sensitive Receptors Curtilages

0 500 1,000 1,500 2,000
Metres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	21/02/2023	Final issue	S.P	S.N
Issue	Date	Description	By	Chkd.

Client:

Cloghercor Wind Farm ltd.

Project:

Cloghercor Wind Farm

Title:

Figure 3-1:
Constraints Map

Scale @ A3: 1:36,841

Prepared by: S.Pezzetta
Checked: J.Staunton
Date: February 2023

Project Director: O.Fitzpatrick

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Draft: A

Within the viable area which emerged from the above constraint analysis three main alternative design options were considered throughout progressive stages of the design. These alternative designs / layouts are illustrated in Figure 3-2.

The location of individual turbines is influenced by a range of design constraints. As information regarding the proposed site was compiled and assessed, the number of turbines, size and location of turbines were revised and amended to take account of the physical constraints of the site and the requirement for buffer zones and other areas which were not favourable for turbine locations for reasons such as visual constraints, noise constraints, ecological constraints, etc.

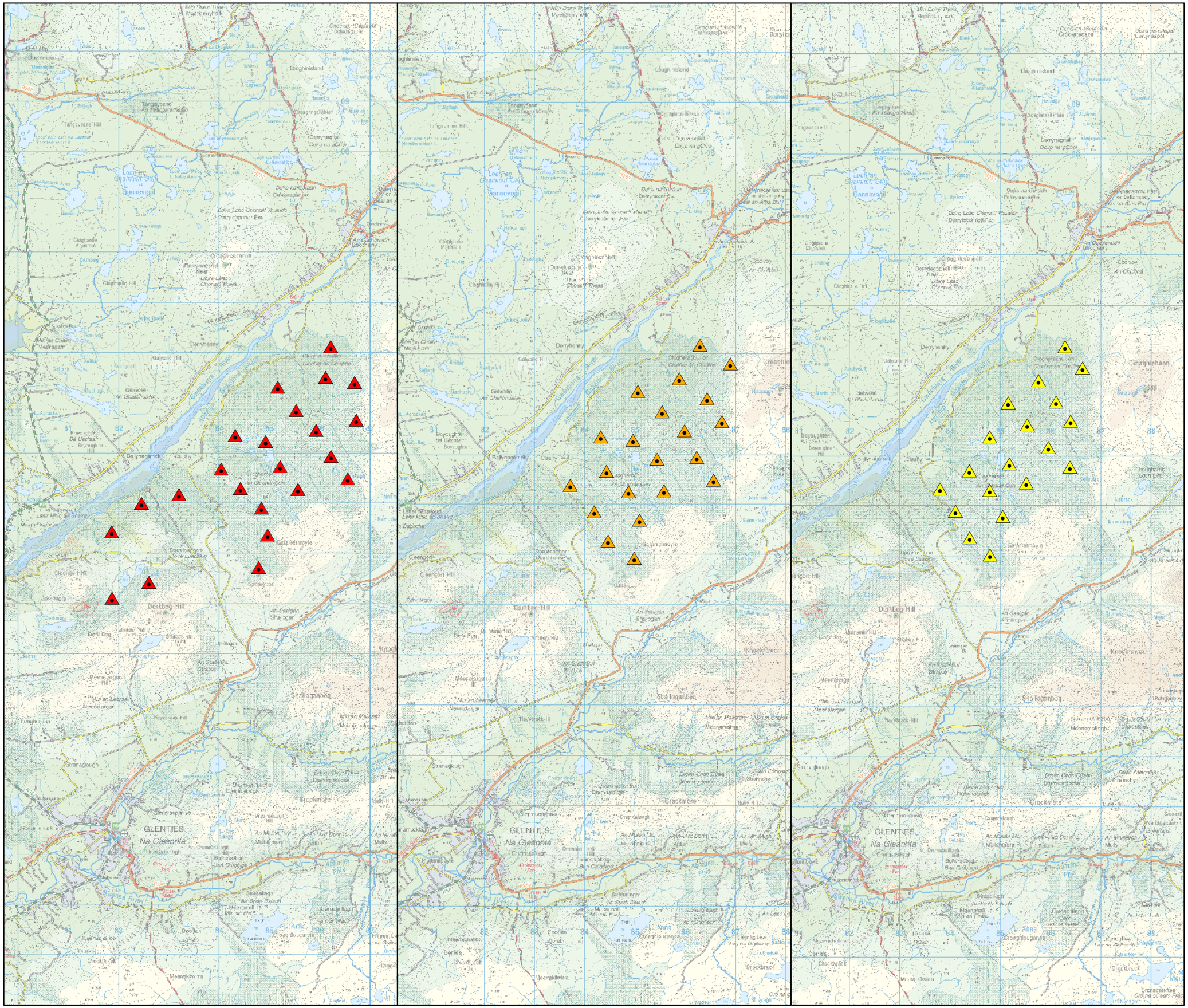
The proposed wind turbine layout has been optimised using appropriate wind farm design software to optimise the energy yield from the site, while maintaining sufficient distances between the proposed turbines to ensure turbulence and wake effects do not compromise turbine performance. Development of the final proposed wind farm layout has resulted from feedback from assessments carried out during preparation of this EIAR, and feedback received during the scoping and consultation exercises described in Chapter 1 (Introduction) (See appendices 1-3 and 1-4).

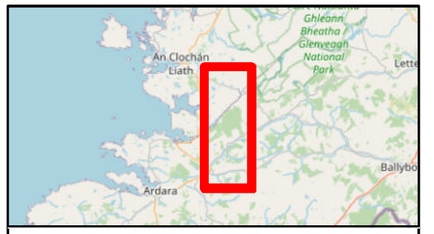
As previously mentioned, consideration was also given to relevant guidance, namely the current WEDGs (2006), the IWEA Guidelines (2012), the EPA EIAR Guidelines (2022) and guidelines and recommendations from the relevant local authority's county development plans and wind energy strategies. Cognisance was also taken of the Draft Revised WEDGs (DoEHLG, 2019), in particular with regards to setback distances to dwellings.

The initial constraints study identified a significant viable area within the proposed development site (Figure 3-2 Site Layout Design History Map – Turbine Locations), in which potential turbine layouts were developed. These turbine layouts were then refined a number of times following feedback from the project team during detailed site investigations and from consultees. At the initial stage, a project design was drafted which would maximise the wind energy potential of the site.

The resulting draft layout consisted of 23 no. turbines with initial distances to houses of >800m. This layout was based on turbine tip heights of between 185 - 200m and rotor diameters of approximately 164m. This layout maximised the available area within the site whilst staying out of areas constrained for various reasons (telecommunications links, sensitive biodiversity areas, etc.). The turbine type made the most of the wind resource on site.

The layout was the subject of a design review by Landscape & Visual specialist consultants Macroworks and TOBIN (See Table 1-3 in Chapter 1 (Introduction)). This review was focussed on landscape and visual impacts while also considering the feedback received from the public consultation. The review considered draft photomontages from a number of different locations. These locations were selected as a combination of the most sensitive views, population centres and fullest views of the project. The review concluded that the 23 no. turbines were too widely spread out and were located too close to the river (from a visual perspective). It was found that reducing the number and condensing the cluster was better from a landscape and visual impact perspective as it appeared to be a more defined and less sprawling development, in particular from the Lettermacaward area. This conclusion informed the next iteration of layout design.





Legend

- 19 Turbines
- 21 Turbines
- 23 Turbines

0.5 0 0.5 1 1.5

Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	21/02/2023	Final issue	S.P	J.S
Issue	Date	Description	By	Chkd.

Client:

Cloghercor Wind Farm ltd.

Project:

Cloghercor Wind Farm

Title:

Figure 3-2:
Development of Site Layout Design

Scale @ A3:

Prepared by:	Checked:	Date:
S.Pezzetta	J.Staunton	February 2023

Project Director: O.Fitzpatrick

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The next iteration of the layout design took the recommendations from the layout review and developed a more tightly grouped cluster of the same dimensions with a total of 21 turbines. This layout is generally quite similar to the final layout however following detailed environmental surveys and consideration of feedback through consultation (statutory and public – See Section 1.8 of Chapter 1 (Introduction)) it was decided to further reduce the number of turbines, tightening up the cluster for the final proposed layout.

A summary of the designs considered is set out in Table 3-3 below:

Table 3-3 Layout Design Changes

	Initial 23 no. turbine Consideration	21 no. turbine Consideration	Current Design Proposal
Distance to houses	>800m	>800m	>800m
Shadow Flicker	none	none	none
No. of Turbines	23 no.	21 no.	19 no.
Turbine Height	185-200 m	185-200 m	185-200 m
Potential Output	Between 115-165.6 MW	Between 105-151.2 MW	Between 95-136.8 MW

The adjustments through each layout iteration resulted in placement changes to turbines to ensure sufficient distances were maintained from sensitive receptors and constraints, and to maintain the required separation distances between turbines. The potential environmental effects of the initial layout (23 no. turbines) and the second layout (21 no. turbines) when compared with the current proposed project are provided in Table 3-4 below.

Table 3-4: Table of environmental effects relative to proposed design layout of 19 no. turbines

Environmental Consideration	Initial Consideration – 23 turbines	Design iteration – 21 turbines
Human Health and Population	Potential for increased impact on sensitive receptors due to closer proximity to some turbines	Potential for increased impact on sensitive receptors due to closer proximity to some turbines
Biodiversity & Ornithology	Larger infrastructure footprint results in an increased potential for effects on habitats. Larger number of turbines leads to potential for increased impacts to bat and bird populations.	Larger infrastructure footprint results in an increased potential for effects on habitats. Larger number of turbines leads to potential for increased impacts to bat and bird populations.
Land, Soils and Geology	Higher number of turbines will give rise to more excavations and disturbance of soil onsite, in addition to requiring more crushed stone for construction. This would therefore have an increased impact.	Higher number of turbines will give rise to more excavations and disturbance of soil onsite, in addition to requiring more crushed stone for construction. This would therefore have an increased impact.

Hydrology and Hydrogeology	Higher number of turbines will give rise to more excavations and disturbance of soil onsite. This would therefore have an increased impact.	Higher number of turbines will give rise to more excavations and disturbance of soil onsite. This would therefore have an increased impact.
Shadow Flicker	No significant difference in impact as project has committed to achieving zero shadow flicker at sensitive receptors.	No significant difference in impact as project has committed to achieving zero shadow flicker at sensitive receptors.
Telecommunications & Aviation	Neutral	Neutral
Air and Climate	Depending on the turbine output, there is potential for greater contribution carbon reduction targets.	Depending on the turbine output, there is potential for greater contribution carbon reduction targets.
Landscape & Visual Impact	Larger number of turbines being spread out over a significantly larger area resulted in a development which was not suitable for the site. Increased impact compared to current proposal.	This layout was greatly preferred to the initial layout. Slightly increased impact compared to the current proposal.
Noise and Vibration	Some receptors would have slightly higher noise although all would be within recommended noise limits.	Some receptors would have slightly higher noise although all would be within recommended noise limits.
Cultural Heritage	Larger site footprint gives rise to a higher potential for negative impacts on archaeology although all known sites of interest would be avoided.	Larger site footprint gives rise to a higher potential for negative impacts on archaeology (but less than 23 turbine layout) although all known sites of interest would be avoided.
Traffic	Increased number of turbines will require more deliveries to site, increasing potential for traffic impacts.	Increased number of turbines will require more deliveries to site, slightly increasing potential for traffic impacts.

3.3.4.1 Turbine Delivery

3.3.4.2 Port of Entry

The port of entry chosen for turbine delivery to this site is Killybegs Port, which minimises the distance and therefore the associated traffic and air quality impacts arising from the delivery.

Given the isolated rural location of the site, the number of reasonable alternatives were limited. Access to the largest ports of Ireland (Dublin, Cork, Foynes, Belfast, etc) was limited by lengthy off-motorway sections and the long distance of travel required. Other harbours/ports in the region such as Sligo harbour does not have the capacity to handle turbine components of the required size. The only other port in the region capable of taking delivery of these wind turbine

components is Foyle Port in Co. Derry. Choosing the Foyle Port option would mean the delivery route would be at least 90km longer than the Killybegs Port option, and after this extra journey, the Foyle Port route option would merge with the initial stages of the Killybegs Port route options. For this reason, the Foyle Port option as the origin is not practical or usable when compared with the Killybegs Port option which has received deliveries of wind turbine components previously for wind farms. Access from Foyle Port to the site also has a number of difficult pinchpoints which would not allow delivery.

Delivery via Killybegs Port allows for the shortest and more direct route to site, with the lowest number of pinchpoints. It therefore has the lowest impact.

3.3.4.3 Turbine Delivery Route

As described in Chapter 2 (Description of the Proposed Project) and viewed in Figure 1-1 of this EIAR, the proposed TDR runs from Killybegs Port and heads north from the port on the R263 to the N56 where it turns eastwards. The route then continues generally eastwards on the N56 to the junction with the R262, where it makes a northerly turn in the direction of Glenties. The route continues northwards to a proposed temporary blade changeover location (where the turbine blades are mounted on a vertical blade transporter for the rest of the route). It then runs north to re-join the N56, where it turns eastwards to Glenties. In the town of Glenties the route joins the R250 and continues traveling in a north-easterly direction until turning to the northwest onto the L6363 local road. It then turns onto the L6483 where it continues to the site entrance for the proposed development. The route is discussed further in Chapter 2 (Description of the Proposed Project) and Chapter 16 (Traffic and Transportation) of this EIAR.

There was an alternative route assessed between Killybegs Port and the site of the proposed wind farm (see Stage 1 Option 1 and Stage 2 Option 1 in Figure 3-3 below). This alternative route runs along the N56 from Glenties and heads northwards towards Ardara. Although the N56 is a national secondary road, this particular section of the road is sub-standard in terms of its cross section and also due to the number of vertical and horizontal constraints which became apparent during the visual assessment. The town of Ardara is a source of major constraints along this route with its narrow streets along with a number of bends and overhead powerlines. There is also a significant rise heading northwards out of the town. The route then took the same route (as the proposed route) through Glenties, after which it followed along the N56, initially heading west out of Glenties where the road has recently been upgraded.

Further along at and beyond Maas, there are a number of sweeping bends where some signage may require temporary removal. After Maas, the road narrows down and there are numerous bends with ditches and banks on both sides forming constraints. This route turns off the N56 onto a local road (L6363) just south of the Gweebarra bridge. Extensive ground works would be required at this junction to create a temporary platform to allow the turbine components to negotiate the corner and continue along the local road. This local road is the narrowest section of the route option. There are numerous difficult bends along the route with ditches and hedging tight to the road boundary in many sections. There are also numerous vertical constraints, in the form of peaks and dips, along this section to the site. This alternative route was therefore assessed as less favourable than the chosen route for the delivery of the turbines.

An assessment of the preferred route between Killybegs Port and the site of the proposed wind farm has been carried out and a number of potential pinch points have been assessed (see the Turbine Delivery Route Assessment drawings as Appendix 2-1 to this EIAR). An

assessment was carried out using site visits and Autotrack to determine what, if any, temporary works are required at these pinch points to allow the turbine components to be moved to the site. The outputs of this autotrack assessment are provided in the drawings at Appendix 2-1. Works range from hedgerow trimming/clearing to facilitate oversail to the temporary placement of hardcore to allow the oversize vehicles pass, or to allow the transfer of turbine blades between different vehicles. A blade changeover area will be temporarily constructed beside the route, comprising an area of hardcore to allow transfer of the turbine blades between vehicles. The required works at each location are detailed in Chapter 2 (Description of the Proposed Project) and drawings shown in Appendix 1-1.

All works required along the turbine delivery route have been assessed as part of this EIAR.

At the end of the construction phase, any areas which were given temporary hardcore surfaces will be reinstated by being covered in topsoil and reseeded. Stock proof fences will be erected along the property boundaries. It is not anticipated that there will be any requirement to use these areas in the operational phase of the proposed development, except in the very unlikely event that a turbine requires a large replacement part such as a rotor or tower. This will need to be agreed with the local authority and involved landowners, and relevant consents obtained if such a situation arose.

Alternative route options were considered from the Killybegs Port to the site as described above and these are presented in Table 3 -5 and Figure 3-3. An alternative port option of a route from Foyle Port was also considered as shown in Table 3-5.

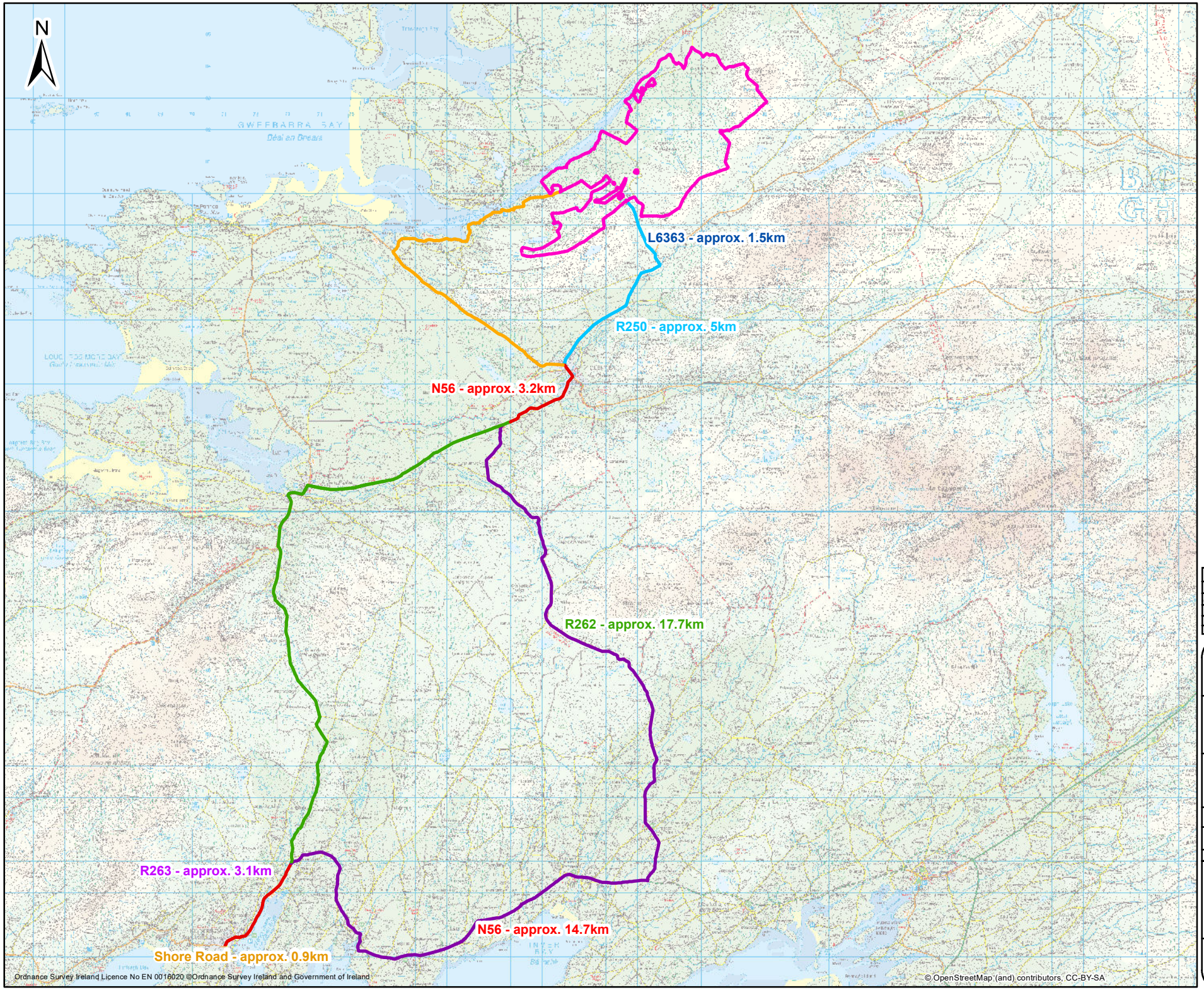
Table 3-5: Table of environmental effects relative to proposed TDR (from Killybegs Port via Ardara and via Maas, and route from Foyle Port)

Environmental Considerations	Alternative A – Route from Killybegs Port via Ardara	Alternative B – Route from Killybegs Port via Maas	Alternative C – Route from Foyle Port
Human Health and Population	This would have a negative impact on residents of Ardara (an additional urban area) as there would be significant works required to allow turbine passage there.	This longer route would require more enabling works to get to site (particularly on the western end of the L6363), resulting in a greater impact to local residents.	This longer route (over 100km longer) would require significantly more enabling works (widening of the road, removal/movement of street furniture, etc. at pinch points) to get to site, resulting in a greater impact to residents along the route. The route also passes within 2km of Killybegs Port where it would have to further contend with the same two potential viable route options to site as the Killybegs Port option.
Biodiversity	Neutral	The more significant works on the L6363 would	The additional works along the length of the route from Foyle Port

		have the potential to cause greater impacts.	would have the potential to have greater impacts. As it is over 100km longer and also includes almost all of the Killybegs Port options, this alternative route has potential to cause a significantly larger impact.
Land, Soils and Geology	Neutral	The more significant works on the L6363 would have the potential to cause greater impacts.	The additional works along the length of the route from Foyle Port would have the potential to have greater impacts. As it is over 100km longer and also includes almost all of the Killybegs Port options, this alternative route has potential to cause a significantly larger impact.
Hydrology and Hydrogeology	Neutral	The more significant works on the L6363 would have the potential to cause greater impacts	The additional works along the length of the route from Foyle Port would have the potential to have greater impacts. As it is over 100km longer and also includes almost all of the Killybegs Port options, this alternative route has potential to cause a significantly larger impact.
Climate and Air Quality	Neutral	Neutral	Longer haul route leading to greater potential for emissions. As it is over 100km longer and also includes almost all of the Killybegs Port options, it has potential to cause a significantly larger impact.
Landscape & Visual	Neutral	Neutral	Neutral
Noise and Vibration	Neutral	The more significant works on the L6363 would have the potential to cause greater impacts.	The additional works along the length of the route from Foyle Port would have the potential to cause greater impacts. As it is over 100km longer and also includes almost all of the Killybegs Port options, it has the

			potential to cause a significantly larger impact.
Cultural Heritage	Neutral	Neutral	Neutral
Traffic and Transportation	Potential to have increased traffic impacts where works would be required in Ardara.	Potential to have increased traffic impacts where more significant works would be required on the L6363.	Potential to have increased traffic impacts where works would be required at numerous locations along the route. As it is over 100km longer and also includes almost all of the Killybegs Port options, it has the potential to cause a significantly larger impact.

The current proposal minimises such impacts and involves the shortest route possible.



Legend

- Proposed Wind Farm Site Boundary

Turbine Delivery Routes Options

- Confirmed Section 2
- Confirmed Section 1
- Stage 1 - Option 1
- Stage 1 - Option 2
- Stage 2 - Option 1
- Stage 2 - Option 2

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Kilometres

NOTES
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

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A	21/02/2023	Final issue	S.P	J.S

Client: Cloghercor Wind Farm ltd.

Project: Cloghercor Wind Farm

Title: Figure 3-3: Alternative Turbine Delivery Route options

Scale @ A4: 1:150,000

Prepared by: S.Pezzetta | Checked: J.Staunton | Date: February 2023

Project Director: O.Fitzpatrick

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3.3.4.4 Site Entrances

The new site entrance (Access point one) for the proposed development will be located along the L6483 road between Doochary and the L6363. This entrance will be the main construction phase entrance to the site. It will facilitate material deliveries to the site (stone, steel and concrete) and staff access, as well as large oversize components such as turbine blades, tower sections and substation components. For further information see Chapter 16 (Traffic & Transportation) and the Traffic Management Plan (Appendix 2-7). This entrance will also be used as the single access/egress point for wind farm maintenance vehicles during the operational phase of the proposed development as well as ongoing forestry activities.

A permitted, not yet constructed, forest entrance (Access point two) further north along this section of the L6483 road will be utilised as a second/alternative construction phase entrance (it will largely function as the site exit for the construction phase). It is not proposed to use this for the operational phase.

An operational phase public car park and entrance to the amenity facilities (Access point three) will be located on the L6483 (northwest of the proposed turbine T16) where the grid connection underground cable (and associated access track) will be intersecting the public road. This will only be used for the operational phase to access the proposed amenity trail.

The proposed site entrances on the L6483 will have adequate visibility as also discussed in Chapter 16 (Traffic & Transportation).

An alternative main site entrance (Alternative access point one) was initially considered to the south on the L6363 but it was found to be less suitable due to the presence of deeper and more sensitive peatland.

It was also considered to have just one site entrance, but it was thought that having the second entrance (which functions as the exit for site traffic) would minimise the use of a long section of public road and therefore reduce the potential impacts.

Table 3-6: Table of environmental effects relative to proposed site entrance

Environmental Considerations	Option A – Alternative site entrance (to the south of Access point one) (Alternative access point one)	Option B – Having only one site entrance
Human Health and Population	Neutral	This would result in site traffic using more of the public local road network, potentially increasing the impacts
Biodiversity	This entrance required a long additional new site track through peatland, increasing the potential impacts	Neutral
Land, Soils and Geology	This entrance required a long additional new site track through peatland, increasing the potential impacts	There is a permitted forestry site entrance at proposed access point two, and this will be constructed regardless of the current application outcome (albeit with a lower

		intensity of use). There would be an imperceptible reduction in the the impact based on a slightly reduced length of site track construction through an area of forestry.
Hydrology and Hydrogeology	This entrance required a long additional new site track through peatland, increasing the potential impacts	There is a permitted forestry site entrance at proposed access point two, and this will be constructed regardless of the current application outcome (albeit with a lower intensity of use). There would be an imperceptible reduction in the impact based on a slightly reduced length of site track construction through an area of forestry.
Climate and Air Quality	Neutral	Overall neutral. There is a permitted forestry site entrance at proposed access point two, and this will be constructed regardless of the current application outcome (albeit with a lower intensity of use). There would be an imperceptible reduction in the impact based on a slightly reduced length of site track construction through forestry. There would be a slightly increased level of emissions due to the longer travel route for site traffic.
Landscape & Visual	Neutral	Neutral
Noise and Vibration	Additional stone would be required to make the longer site entrance road, potentially increasing noise impacts.	This would require site traffic to pass additional properties, increasing the potential impacts.
Cultural Heritage	This entrance required a long additional new site track, increasing the potential impacts	The Site entrance is permitted, and will be constructed anyway. There would be an imperceptible reduction in the impact based on a slightly reduced length of site track construction through forestry.
Traffic	Additional stone would be required to make the longer site entrance road, potentially increasing traffic impacts on the local road network.	This would require site traffic to pass additional properties along a longer section of local public road network, increasing the potential impacts.

New roadways will have a running width of approximately 6 metres. The proposed new roadways incorporate passing bays to allow traffic to pass easily while traveling around the site.

Road Construction Details are included in Drawing 10798-2040, Appendix 1-1.

3.3.4.5 Substation Locations and Grid Connection

The initial screening process highlighted the nearby electrical grid infrastructure and the available capacity in the area. Based on the scale of the proposed project, it was known that a 110 kV connection would be required to accommodate the likely output from the project. An assessment of the nearest 110 kV infrastructure identified three potential connection points:

- 110kV underground loop-in connection to the Tievebrack-Ardnagappary 110kV overhead line
- 110kV underground connection to Tievebrack 110kV substation
- 110kV underground connection to Binbane 110kV substation

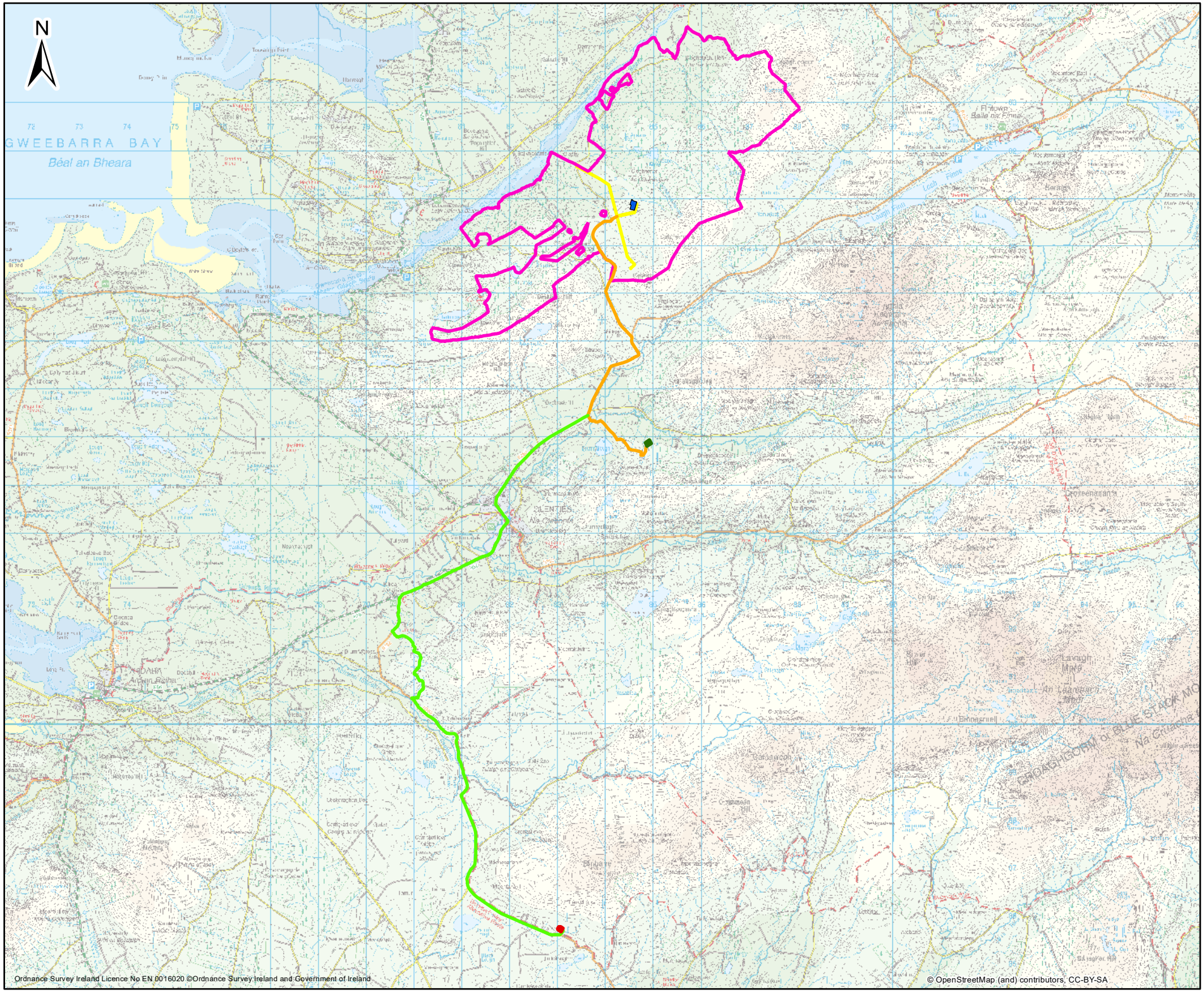
The current proposal comprises an onsite 110kV substation with a loop-in underground grid connection to the existing 110kV overhead line in Cloghercor as shown in Figure 2-4 of this EIAR. Two new end masts will be required in Cloghercor to allow for the connection, drawings of which can be seen in Appendix 1-1 of this EIAR. The proposed grid connection is almost entirely within the site of the proposed wind farm, and only crosses the public road corridor perpendicularly at one point (See Figure 2-4 and Drawing 10798-2003 in Appendix 1-1 of this EIAR).

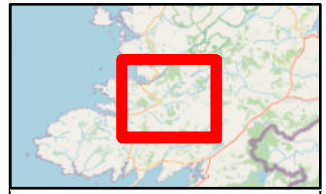
The alternative grid connection options are shown in Figure 3-4.

Table 3-7: Table of environmental effects relative to proposed grid connection option

Environmental Considerations	Alternative connection via connection to Tievebrack 110kV substation	Alternative connection via connection to Binbane 110kV substation
Human Health and Population	Greater impacts due to the level of works within the public road and the length of the route	Greatest impacts due to the level of works within the public road and the length of the route
Biodiversity	This would require more significant works over a longer route, increasing the potential for impacts.	This would require most significant works over the longest route, increasing the potential for impacts.
Land, Soils and Geology	This would require more significant works over a longer route, increasing the potential for impacts.	This would require most significant works over the longest route, increasing the potential for impacts
Hydrology and Hydrogeology	This would require more significant works over a longer route, increasing the potential for impacts.	This would require most significant works over the longest route, increasing the potential for impacts
Visual Impact	Neutral	Neutral
Noise and Vibration	This would require more significant works over a longer route, increasing the potential for impacts.	This would require most significant works over the longest route, increasing the potential for impacts
Cultural Heritage	This would require more significant works over a longer route, increasing the potential for impacts.	This would require most significant works over the longest route, increasing the potential for impacts

Traffic	Greater impacts due to the level of works within the public road and the length of the route	Greatest impacts due to the level of works within the public road and the length of the route





Legend

- Proposed Wind Farm Site Boundary
- Proposed Substation Location
- Proposed Grid Connection Route

Alternative Grid Connection Routes

- Option 1
- Option 2
- Tievebrack Substation
- Binbane Substation

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Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
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Title: Figure 3-4: Alternative Grid Connection Route Assessment

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Prepared by: S.Pezzetta | Checked: J.Staunton | Date: February 2023

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Draft: A

3.3.5 Alternative Technology

The process selection for alternative renewable energies, was largely carried out after Cloghercor was chosen as a suitable site for wind energy development. As described previously this site selection process was driven by the suitability of areas within the Coillte landbank for wind energy and site assessment of private land holdings for potential wind farm development. Only when this site was identified, were the full suite of potential technologies for the production and supply of renewable energy to the Irish national electricity grid considered. The following section outlines the alternative technologies and respective considerations in relation to the chosen alternative for the project, onshore wind.

3.3.5.1 Solar Energy

There has been a recent surge of interest in solar energy in Ireland due to rapid improvements in solar technology and cost competitiveness. A report undertaken by KPMG entitled *A Brighter Future – Potential Benefits of Solar PV in Ireland* (November 2015)[4], detailed the potential impacts of solar energy on the Irish electricity network and market, and how it will interact with other technologies, principally onshore wind.

The report notes that while solar PV would diversify Ireland's renewable energy portfolio, its output is unlikely to be correlated with that of wind.

The KPMG report notes that: "*Ireland's progress to date towards meeting its targets has principally been through the deployment of onshore wind energy*".

While solar energy could in theory be implemented at the site as a reasonable alternative to wind energy, it would be less productive in terms of energy output for the same footprint and will contribute less towards meeting Ireland's renewable energy targets. It would also be restricted in certain parts of the site which have steeper slopes. The environmental and financial impacts would be more extensive in terms of the area of forestry required to be felled and replanted elsewhere to accommodate a solar farm. The capacity factor of solar energy is significantly lower than that of onshore wind energy, requiring approximately 3 times the capacity of the proposed wind farm development, (approx. 285-410.4MW) to produce the same amount of energy. Taking solar farms to require 1.6-2 hectares per MW, the land area required to be permanently felled would be in the region of 465 to 820.8 hectares. This area of land would also have to be acquired and replanted elsewhere. There are likely to be increased effects on land use, geology, and hydrology as well as biodiversity, as a result of increased felling works.

Large scale solar farms require a significantly larger footprint than wind farms to produce the equivalent level of electricity. This technology can therefore have a greater environmental impact, especially in forested lands. A wind farm is proposed at this site for the reason that wind energy produces the lowest level of environmental effects at the site. The options are discussed in Table 3-8 below.

Table 3-8: Table of environmental effects relative to proposed wind farm technology

Environmental Considerations	Solar
Human Health and Population	No potential for shadow flicker, but there is some potential for glint/glare.
Biodiversity	Increased habitat loss due to larger development footprint.

[4] KPMG (2015), A Brighter Future. Available at: http://www.irishsolarenergy.org/news-docs/A-Brighter-Future.pdf

Land, Soils and Geology	Greater development footprint resulting in larger areas of works. Works are less intrusive generally than wind.
Hydrology and Hydrogeology	Larger felling area would result in increased risk of silt runoff to local watercourses. Felling will occur on site regardless as part of the forestry cycle.
Air and Climate	Longer carbon payback period associated with solar energy developments.
Aviation & Telecommunications	Less potential to impact on telecommunication links or flight activity.
Landscape and Visual Impact	Potentially less visible from locality due to topographical and vegetative screening.
Noise and Vibration	No potential for noise impacts from solar
Cultural Heritage	More potential for impact on cultural heritage due to the increased site footprint, however works are less intrusive generally
Traffic	Increased potential for impacts in the construction phase due to the larger number of traffic movements required to clear larger area of forest and to bring the infrastructure to site. There are no oversize loads to be brought to site with solar, as the panels fit on normal trucks.

The proposed lands by their relatively remote nature can facilitate large scale developments such as wind farms. The Landscape and Visual impact assessment (Chapter 13 of this EIAR) concludes that the proposed project will not give rise to any significant residual landscape impacts, visual impacts or cumulative impacts. In tandem with this, wind is highly efficient in terms of energy output per unit area and as such will be a valuable contribution of renewable energy to the national grid Overall, the Cloghercor site is classed as a highly suitable location for the deployment of wind energy.

3.3.6 Other Alternatives

Throughout the design and assessment process other aspects of the proposed project underwent a high-level sifting process of alternative options. A summary of this process is provided here for completeness.

The construction methods for the proposed project are dependent on a number of factors specific to the site and design, and have been considered in relation to ground conditions, foundation installation and turbine erection. Site-specific information gathered through intrusive site investigation and environmental surveys was taken into consideration when reviewing alternative methodologies for construction. So, decisions on the construction methods for groundwork and foundation installations, as well as the internal road and grid connection, were informed and based on best practice.

Alternative timelines for the proposed project in terms of construction start date and operational lifespan were evaluated. The delivery timeframe was reviewed in context of the need for the scheme (Section 1.3, Chapter 1 – Introduction) to decarbonise the economy and reduce reliance on fossil fuels, and the proposed construction start date of 2024 reflects this.

The operational lifespan of the wind farm turbines was discussed when reviewing the different turbine types and specifications available on the market. Turbines are generally designed to

last for 35years therefore the operational lifespan of the proposed project was centred around this.

3.3.7 Alternative Mitigation Measures

The mitigation measures proposed in relation to the elements of the project are detailed in the chapters to follow and are also summarised in Chapter 18 (Schedule of Mitigation Measures). The concept of mitigation by avoidance has informed the development of the wind farm design and layout. The final design/layout has been selected to minimise as much as possible the level of construction and operational mitigation required through design minimisation of the potential for environmental effects in the first instance. The mitigation measures proposed are considered to be proven and best practice and the level of mitigation proposed is determined to be proportionate to the potential impact. These are discussed through each of the EIAR chapters as appropriate. The alternative to the proposed mitigation measures would be to propose measures which are not best practice or else not proposing any mitigation measures, neither of which would be appropriate.

The most significant mitigatory measures considered in this chapter have been those which avoid developing on or minimising effects on environmentally sensitive areas and the local population.

3.4 CONCLUSIONS

A study of the reasonable alternatives in terms of project design, technology, location, size and scale has been undertaken and presented in this chapter. The options which are relevant to the proposed project and its specific characteristics of a large-scale wind farm in an upland rural area have been discussed. The overriding reason for selecting the chosen options is to maximise the renewable energy production from the site while minimising the environmental impact. For each alternative, a comparison of the environmental effects has been provided, showing the reasons for the chosen option being favoured relative to the others.

As discussed above the siting and design of the proposed wind farm project has evolved through the consideration of alternatives and allowing for stakeholder input into the process (See Section 1.8 of Chapter 1 on this EIAR (Introduction)). This included initial consideration of the need for renewable energy, the site selection process, the consideration of different viable alternative processes to produce renewable energy, and alternative layouts, scales, and design processes.

Reasonable alternatives were considered with specific regard to the characteristics of the project. Comparisons of environmental effects were noted. The alternatives chosen focused on mitigation by design in order to avoid potential impacts on the environment.

When weighed against all of the alternatives and constraints/facilitators outlined in this chapter, the proposed Cloghercor Wind Farm site has been found to be a highly suitable location for a wind farm site with regard to a number of criteria including wind speed, environmental effects, distance from dwellings and landscape character. The location is particularly appropriate with regard to the foregoing and with regard to ease of access, and proximity to the grid connection.