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DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED COOM GREEN ENERGY PARK GRID CONNECTION

VOLUME 2 – MAIN EIAR

CHAPTER 3 - SITE SELECTION AND ALTERNATIVES

Prepared for:

Coom Green Energy Park Limited

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3. SITE SELECTION AND CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 Introduction

The following chapter, in accordance with EIA guidance document: *'Guidance on the preparation of the Environmental Impact Assessment Report'* (EU, 2017), sets out the reasonable alternatives which were considered by the Applicant for the Proposed Development. It provides a summary of the rationale for selecting the chosen design/layout having considered the site constraints, comments from prescribed bodies, comments from the general public, and environmental impacts. It describes the site selection process, alternative design philosophies, alternative layouts and the do-nothing alternative.

3.2 Statement of Authority

This chapter was prepared by Ida Wulff and reviewed by Trevor Byrne, both of Fehily Timoney and Company. Please refer to Appendix 1.1 for relevant CVs of the contributors to this EIAR.

Ida Wulff is a Graduate Planner with Fehily Timoney and Company and holds a Masters' degree in Planning and Sustainable Development, and a Bachelor's degree in International Development from University College Cork.

Trevor is an Associate Director at Fehily Timoney and a chartered member of Engineers Ireland with over 15 years of industry experience and over 10 years' experience in the preparation of EIAR's for large scale renewable energy projects. Trevor holds a Master's degree in Sustainable Energy Systems and a first-class honours degree in Civil and Environmental Engineering. Trevor also holds an Advanced Diploma in Planning and Environmental Law from the Honourable Society of Kings Inns. Throughout his career to date, Trevor has provided technical advisory services through all stages of project delivery from feasibility assessment, impact assessment, design, expert witness, contract administration and construction.

3.3 Project Background and Objective

CGEP is a permitted development (ACP Ref: 308885-20) consisting of a 22-turbine wind farm, 110 kV substation, 20 no. battery energy storage containers and all associated ancillary works. The EIAR carried out for the permitted CGEP development included assessment of the grid connection to the national grid. The grid connection element of the permitted CGEP development was not included in the planning application. The purpose of the Proposed Development is to carry out an up to date EIAR on the proposed grid connection to facilitate planning consent for same.

Several grid connection options were considered in the 2020 EIAR. At the outset of the project, a range of potential grid connection options were considered in the vicinity of the CGEP site. Each option was first examined with respect to capacity. Once capacity was confirmed, the environmental impacts of the potential options were examined. The options considered are made up of existing grid infrastructure in proximity to the subject site. The developer consulted with EirGrid during the examination of options to identify capacity in the network and to seek advice on feasible options. The options considered are set out in detail in Chapter 2 of the 2020 EIAR.

This EIAR involved the examination of up to date alternatives with respect to the Proposed Development as described in Chapter 2 of this EIAR. Namely the following key elements:

- A 110 kV Underground Cable (UGC) Grid Connection Route from the permitted onsite substation at Lackendarragh to the existing Barrymore 110 kV substation located near Rathcormac, Co. Cork (also referred to herein as the ***'110 kV GCR'***);
- A 33kV Underground Cable (UGC) Collector Network Route between the western and eastern arrays of the permitted Coom Green Energy Park (CGEP) development (also referred to herein as the ***'33 kV CNR'***);
- A 110kV onsite substation at Lackendarragh, in line with the latest Eirgrid functional specifications (also referred to herein as ***'110 kV Substation'***).

3.4 Alternatives Assessment

The requirement in relation to alternatives in the EIA process is set out in *the European Union Directive 2011/92/EU, as amended by Directive 2014/52/EU on assessment of the effects of certain public and private Projects on the environment* (the "EIA Directive"). Article 5 (1)(d) states that an EIAR should include:

> *"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)(f) of the EIA Directive requires that the EIAR contains *"any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."*

This is further reinforced in Annex IV of the EIA Directive which states that the information provided in an EIAR should include:

> *"2. A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."*

This chapter has particular regard to the environmental considerations which influenced the selection of alternatives and details the evolution of the Proposed Development through alternatives considered, indicating the main reasons for selecting the chosen option taking into account the effects on the receiving environment and considering the comparison of environmental effects of each alternative.

The alternatives considered have been described in line with the EPA 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022). The Guidelines state that:

> *"It is generally sufficient to provide a broad description of each main alternative, and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."*

This Chapter also details non-environmental factors of the design process where they are relevant to the evolution of the Proposed Development.

Consequently, taking account of the legislation and guidance requirements, this chapter of the EIAR addresses alternatives under the following main headings:

- 'Do Nothing' Alternative;
- Alternative Locations (Strategic Site Selection);
- Alternative 110kV Substation Locations;
- Alternative 110kV Grid Connection Route; and
- Alternative 33kV Collector Network Route.

3.4.1 Do-Nothing Alternative

Article IV, Part 3 of the EIA Directive states that the EIAR should include "a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge". This is referred to as the "do nothing" alternative.

Through its commitments under CAP 24 and CAP 25, Ireland is obliged to ensure that 80% of the total energy consumed in heating, electricity and transport is generated from renewable resources by 2030. This is in order to help reduce the nation's CO2 emissions and to promote the use of indigenous renewable sources of energy. These targets have been incorporated into national policy, most recently within the latest Climate Action Plans (2024 & 2025). Of note is the European Commission Guidance (EU, 2017)[1] which acknowledges that the do-nothing scenario may not be a reasonable alternative where there is a pressing need for the project supported by policy.

In the "Do-Nothing" scenario, the prospect of increasing the production of sustainable energy in Co. Cork through wind energy resources would be lost at this location. The nation's ability to produce sustainable energy and reduce greenhouse gas emissions to meet EU targets and National targets, as set out above and in Chapter 4 - Policy, would be stifled. This may contribute to Ireland incurring significant financial penalties from the EU if targets are not achieved. Additionally, it would affect Ireland's commitment to "pursue efforts" to limit warming as agreed to in the Paris Agreement (2015). This will result in continued likely significant negative effects to air quality and climate.

According to EirGrid's 'Generation Capacity Statement 2023-2032' (Eirgrid, January 2024), the energy demand in Ireland is forecasted to increase 43% by 2032 (median scenario). This is a marked increase on previously predicted forecasts with the 2020-2029 Generation Capacity Statement predicting only 33% (median scenario) increase in demand. Much of this revised forecasting is attributable to the predicted demand by data centres, with the CSO statistical publication of 'Data Centres Metered Electricity Consumption' (23 July 2024) noting that energy demand by data centres increased by 20% between 2022 and 2023. EirGrid's publication predicts that 30% of all electricity demand is expected to come from data centres by 2032.

[1] European Commission (2017), Guidance on the preparation of the environmental impact assessment report (Directive 2011/92/EU as amended by 2014/52/EU)

Under the "Do-Nothing" scenario, the socio-economic benefits associated with the Proposed Development will be lost. In the event that the Proposed Development would not go ahead, the CGEP Project in its entirety would not be constructed, resulting in a loss of approximately 100 jobs during the construction, operation and maintenance phases (and a similar number during decommissioning). For the Proposed Development, which is the subject of this EIAR, approximately 50 jobs would be generated during the construction phase, and for the operation and decommissioning phase approximately 25 jobs would be created. Please refer to Chapter 2 – Proposed Description of Development which sets out the full extent of the Community Benefit to be provided, should the scheme go ahead. Furthermore, under the "Do-Nothing" scenario the local community will not benefit economically from the community benefit fund associated with the Proposed Development which could be used to improve physical and social infrastructure in the locality.

In the "Do-Nothing" scenario, the potential environmental effects of the Proposed Development as set out throughout this EIAR will not occur.

3.4.2 Alternative 110kV Substation Locations

The proposed 110kV substation at Lackendarragh is situated in the same location as the previously consented substation at Lackendarragh (ACP Ref. PA04.308885), and is considered the optimal location for the substation. A constraints-led approach was followed in the identification of the site, where general constraints and environmental sensitivities were identified and screened out of the site selection process to avoid environmentally sensitive receptors.

3.4.3 Alternative 110kV Grid Connection Route

At the outset of the project, a range of potential grid connection locations were considered in the vicinity of the CGEP site. Each option was first examined with respect to capacity. Once capacity was confirmed, the environmental impacts of the potential options were examined. The options considered are made up of existing grid infrastructure in proximity to the subject site. The developer consulted with EirGrid during the examination of options to identify capacity in the network and to seek advice on feasible options, as would be standard good practice. The options are set out below in Table 3-1 with their respective capacity as indicated by EirGrid.

From the options detailed in Table 3-1, two connection locations were brought forward for environmental assessment following confirmation of capacity from EirGrid.

Table 3-1: Potential Grid Connection Options and Capacity

	Connection Location Options	Capacity
1	Connection to Barrymore 110kV substation	Yes
2	220kV substation on the Knockraha - Kilronan line	Yes
3	Connection to Kilbarry 110kV substation	No
4	Connection into Knockraha 220kV substation	Unlikely
5	Connection to Mallow – Kilbarry 110kV line	No
6	220kV Loop in to Knockraha – Clashavoon line	Unlikely
7	Connection to Mallow 110kV substation	No
8	38kV connection to Fermoy North – Mallow line	No

A detailed analysis of these were carried out in Chapter 3 - Site Selection and Alternatives in Volume 2 of the EIAR accompanying the original CGEP application (ACP Ref. PA04.308885). Following assessment laid out in aforementioned chapter, option 1, connection to the Barrymore 110kV substation via UGC, was chosen as the optimal option for the grid connection arrangement.

For further details of the selection process for the 110kV GCR, please refer to the Chapter 3 - Site Selection and Alternatives in Volume2 of the EIAR accompanying the original CGEP application (ACP Ref. PA04.308885).

3.4.4 Alternative 33kV Collector Network Route Options

Options assessments were carried out to inform the EIAR accompanying consented CGEP (ACP Ref. PA04.308885). Following these assessments, a 110kV interconnector cable route connecting the western CGEP array to the new Lackendarragh substation was identified and assessed. As a part of this EIAR, new alternatives have been considered to connect the Wind Parcel to the new Lackendarragh substation.

Following further detailed review of the previously assessed 110kV interconnector cable route and extensive consultations with Eirgrid as a part of the ECP 2.4 process, where the consented CGEP development received a grid connection offer, a decision was made to reconsider the approach for interconnection between the western wind farm array and the proposed Lackendarragh substation. Spatial (land) constraints, Eirgrid technical requirements and commercial implications all combined to dictate this reconsideration, with new alternative routes sought as well as a reduction in voltage from 110kV to 33kV.

TLI were appointed by the Applicant to carry out a feasibility and route options assessment for the 33kV Collector Network Route, in order to identify potential route corridors between the western CGEP array and the new Lackendarragh 110kV Substation. A detailed study area constraints map was created in AutoCAD for this purpose, and this combined data from numerous sources including aerial imagery, protected areas, river networks, ESB network data, architectural heritage, and monuments data.

A desktop analysis followed by site surveys were carried out using the study area constraints map to identify viable UGC routes between the wind park sites and the Lackendarragh 110kV substation. In order to carry the desired maximum export capacity (MEC) of the wind park sites to Lackendarragh 110kV substation, three no. 33kV circuits will be required from Wind Parcel 1 into Wind Parcel 2, with an additional two no. 33kV circuits added there within the wind farm boundary to the proposed Lackendarragh substation.

Initially the following preliminary collector network connection routes were identified from the desktop analysis:

1. Route Option 1: UGC route from T15, T10 & T9 locations to Lackendarragh 110kV substation location via northern local road routes, as previously assessed in the consented CGEP EIAR (ACP Ref. PA04.308885)
2. Route Option 2: UGC route from T13, T10 & T9 locations to Lackendarragh 110kV substation location via southern local road routes.
3. Route Option 3: UGC route from T13, T10 & T9 locations to Lackendarragh 110kV substation location through private lands and Coillte lands.
4. Route Option 4: UGC route from T13, T10 & T9 locations to Lackendarragh 110kV substation location through private lands and wind parcel 2 access roads.

Surveys of the four preliminary route options (refer to Appendix 3.1 for detailed TLI route option mapping) identified were carried out onsite in order to examine the feasibility of each route corridor and identify any additional constraints which were not visible during the desktop analysis (i.e., ground conditions, additional infrastructure, etc.). The proposed routes were analysed and altered based on the site conditions in order to select the most feasible route corridors available.

3.4.4.1 Route Option 1: UGC route from T15, T10 & T9 locations to Lackendarragh 110kV substation location via northern local road routes.

Option 1: 33kV UGC from Wind Parcel 1 & Wind Parcel 2 to Lackendarragh 110kV Substation location – 13.76km

Route Option 1 utilises the local road network to the north of Wind Parcel 1 in order to gain access to Wind Parcel 2 where it utilises internal access tracks to connect into Lackendarragh 110kV Substation. This option stretches 13.76km.

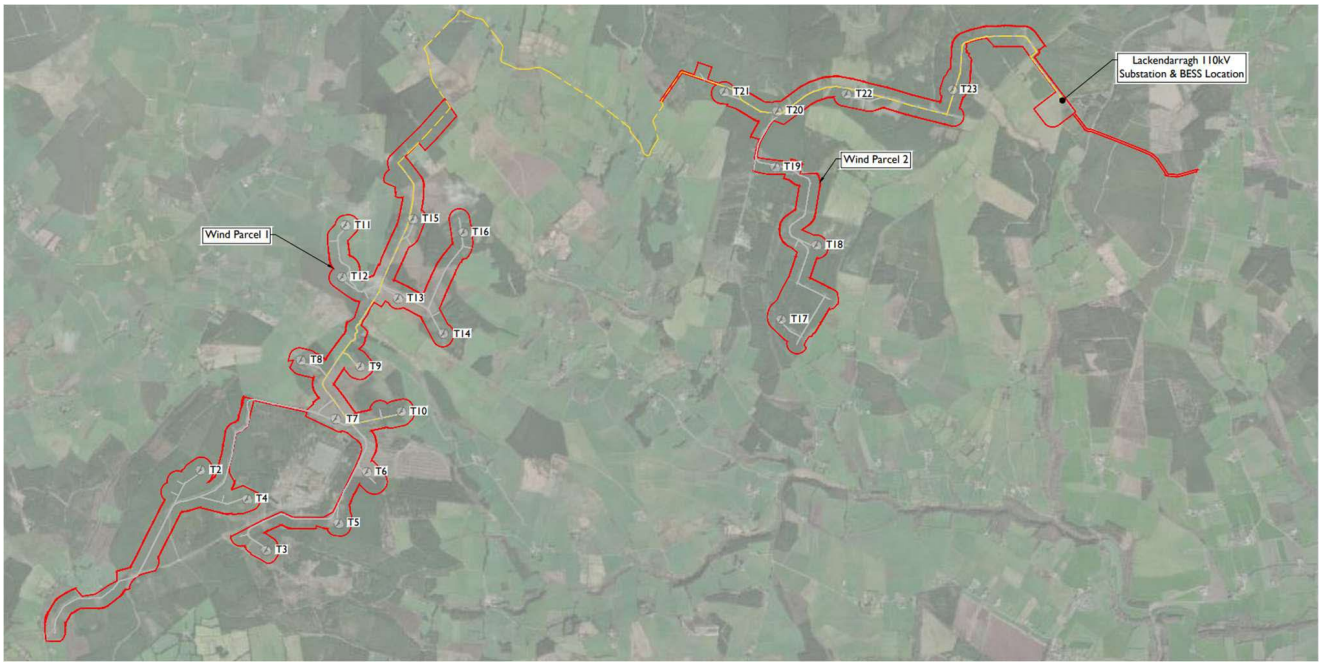

Plate 3-1: Collector Network Route Option 1 Layout Plan

This route originates within Wind Parcel 1 (T15, T10 & T9), traversing the Toor River north following the internal access roads of Wind Parcel 1. It will then traverse along local roads, crossing 3 no. bridges. Horizontal Directional Drilling (HDD) would potentially be required for 2 no. of these bridge locations. It is then required to traverse across 5 no. culverts, one of which is located on a sharp bend in the road.

A summary of the constraints associated with Route Option 1 is found below:

Table 3-2: Route Option 1 Constraints

Route Option 1 Constraints:
1. Two bridges potentially requiring HDD.
2. Third-party lands potential required for Bridge 2 & 3 HDD section.
3. Number of sharp bends and local roads of a narrow nature may not be suitable for triple circuit 33kV UGC circuits.
4. Increased road openings required given the increased usage of public roads in comparison with other options.

3.4.4.2 Route Option 2: UGC route from T13, T10 & T9 locations to Lackendarragh 110kV substation location via southern local road routes

Option 2: 33kV UGC from Wind Parcel 1 to Lackendarragh 110kV Substation location – 13.29km

Route Option 2 utilises the access roads within Wind Parcel 1 and the local road network to the south of Wind Parcel 1 in order to gain access to Lackendarragh 110kV Substation. This option stretches 13.29km.

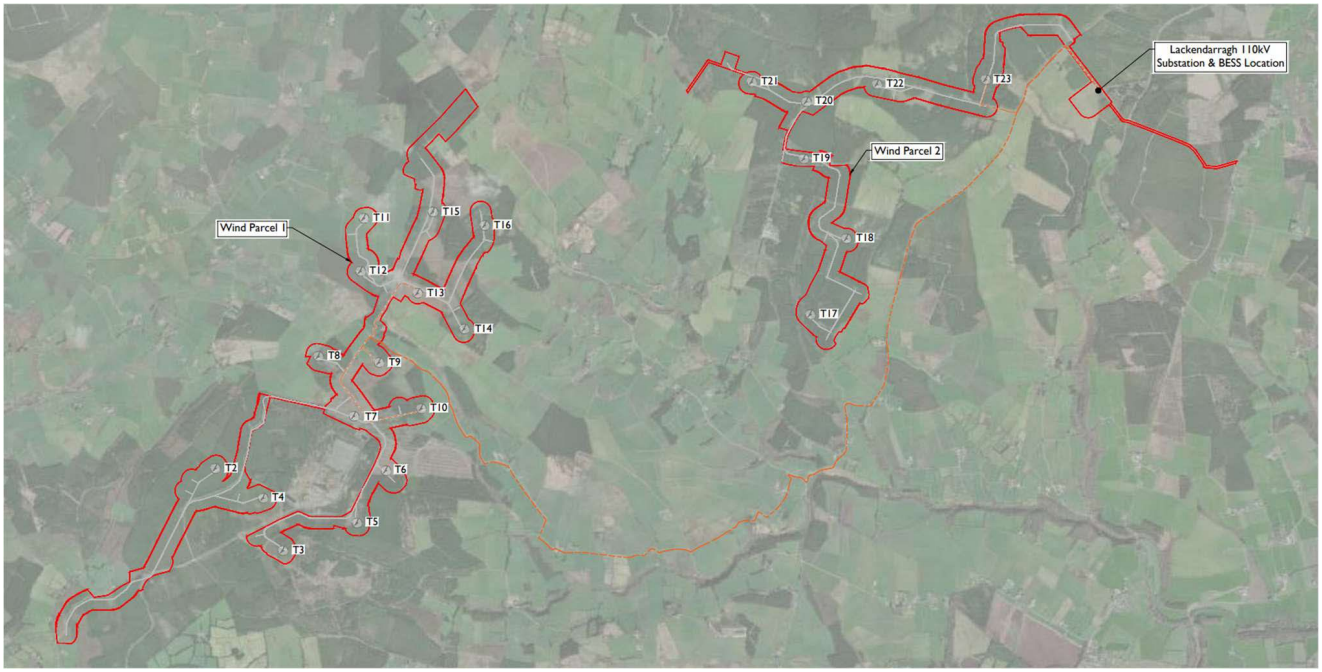

Plate 3-2: Collector Network Route Option 2 Layout Plan

This route originates within Wind Parcel 1 (T13, T10 & T9). It will traverse existing wind farm access roads, local roads and along the Toor River. It will cross the Toor River via 6 no. culverts. It then crosses the Toor River via 5 no. bridges, 3 no. of which potentially requires for HDD based on initial site visit. 2 no. of the bridges are also located in very close proximity to The Blackwater River (Cork/Waterford) Special Area of Conservation (SAC).

A summary of the constraints associated with Route Option 2 is found below:

Table 3-3: Route Option 2 Constraints

Route Option 2 Constraints:
1. Excessive amount of road openings required (ca. 11.2km)
2. One of the bridge will be very difficult to HDD if no cover available in bridge deck.
3. Landowners will likely be required at a number of Bridge locations.
4. Two bridges will potentially have to be traversed with 4 UGC circuits.

3.4.4.3 Route Option 3: UGC route from T13, T10 & T9 locations to Lackendarragh 110kV substation location via optioned third party optioned lands and wind parcel 2 access roads.

Option 3: 33kV UGC from Wind Parcel 1 & Wind Parcel 2 to Lackendarragh 110kV Substation location – 13.10km

Route Option 3 utilises much of both Wind Parcel 1 & Wind Parcel 2 internal access roads. The proposed route option traverses a section of local road to the south that joins both wind parcels. This option stretches 13.10km.

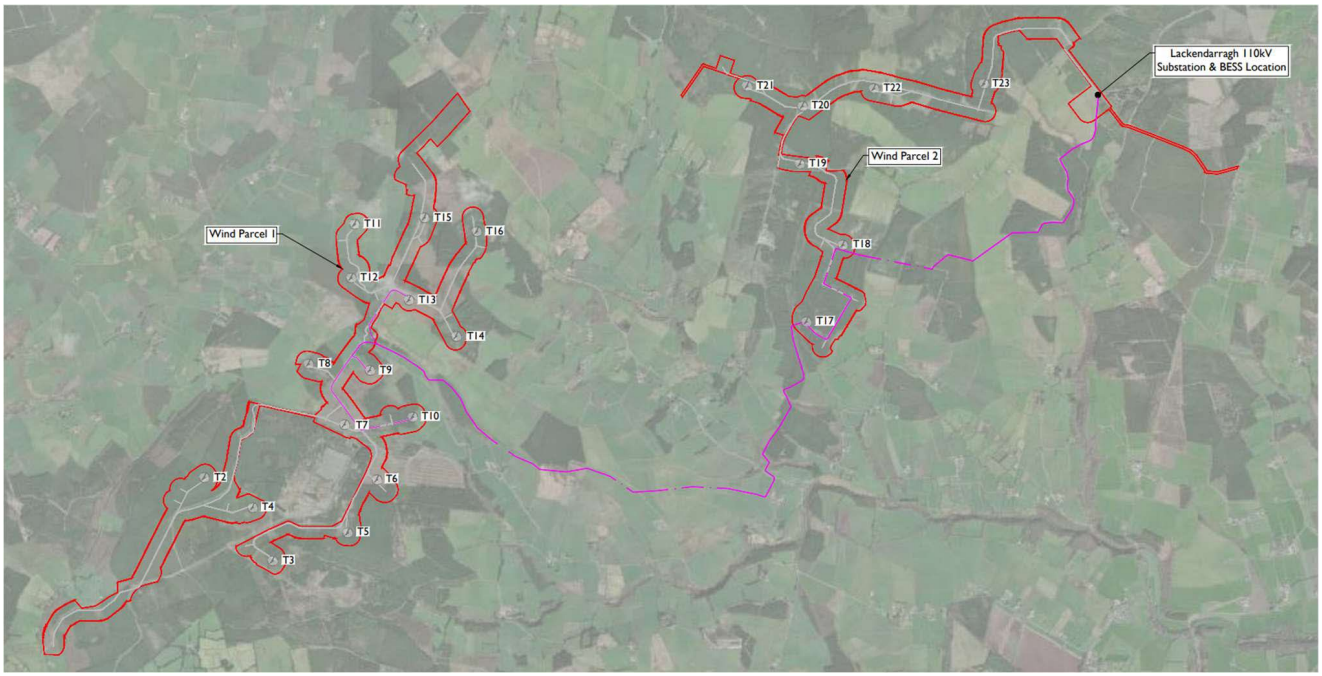

Plate 3-3: Collector Network Route Option 3 Layout Plan

This route originates within Wind Parcel 1 (T13, T10 & T9). It traverses primarily existing wind farm access roads and local roads. Like the other options, it will traverse the Toor River and will cross 4 no. culverts. This option will also travel through areas of grassland, agricultural fields, and forestry with mature tree plantation. It will cross the Toor River through 4 no. watercourse crossings, which potentially require HDD. 1 no. of these watercourse crossings located within the Blackwater River (Cork/Waterford) SAC. This option also makes use of existing forestry tracks within an area of forestry plantation with felled trees.

A summary of the constraints associated with Route Option 3 is found below:

Table 3-4: Route Option 2 Constraints

Route Option 3 Constraints:
1. Steep gradient change either side of the Bridle River. Full topo survey required should this be the preferred route option.
2. Traverses an S.A.C.
3. Four open watercourse crossings required.

3.4.4.4 Route Option 4: UGC route from T13, T10 & T9 locations to Lackendarragh 110kV substation location via optioned third-party lands and wind parcel 2 access roads.

Option 4: 33kV UGC from Wind Parcel 1 & Wind Parcel 2 to Lackendarragh 110kV Substation location – 14.47km

Route Option 4 utilises much of both Wind Parcel 1 & Wind Parcel 2 internal access roads as possible. The proposed route option traverses a section of local road to the south that joins both wind parcels. Optioned third party lands are also used along this route to connect into Lackendarragh 110kV Substation. This option stretches 14.47km.

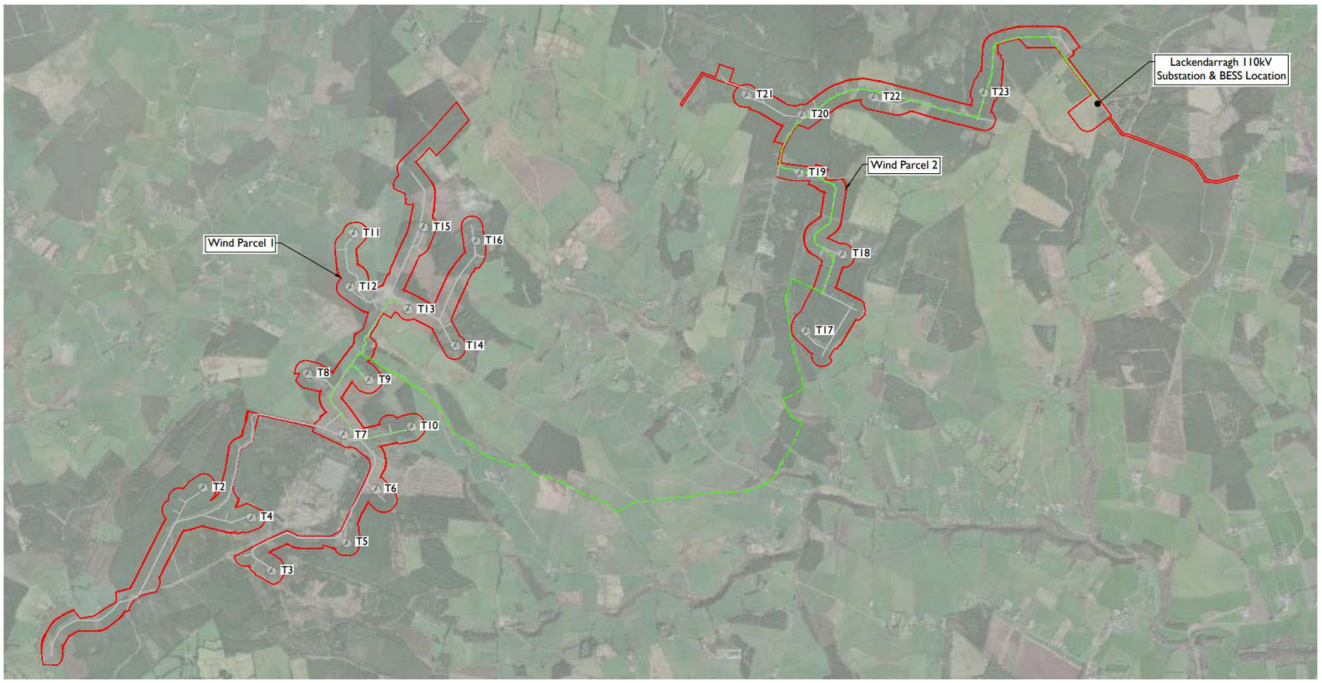

Plate 3-4: Collector Network Route Option 4 Layout Plan

This route originates within Wind Parcel 1 (T13, T10 & T9), and traverses wind farm access roads and local roads. It will also traverse agricultural lands. It will traverse the Toor River via 5 no. culverts. It crosses the Toor River via a watercourse crossing which may require HDD. It also traverses the Red Bog River, which will be undercrossed. It will cross the Bride River situated within Blackwater River (Cork/Waterford) SAC through a watercourse crossing potentially requiring HDD. It is also worth noting that the lands it traverses around either side of the Bride River are steeply sloping.

A summary of the constraints associated with Route Option 4 is found below:

Table 3-5: Route Option 2 Constraints

Route Option 4 Constraints:
1. Significant amount of collector cabling required (ca. 14.87km)
2. Increased number of culvert crossings within wind farm boundary requiring box culvert designs.
3. Steep gradient change either side of the Bride River.
4. Traverses an S.A.C.
5. Four open watercourse crossings required.

3.4.4.5 Collector Network Route Options Conclusion

Initial analysis of the four grid route options shows both benefits and constraints in relation to each interconnector route. Numerous culverts and service utility have been identified, and the best practice procedure will be to cross these by means of flat formation undercrossing method. All options assessed offer similar ranges of connection longitudinal length and cross a number of bridges and fluvial features that again are within a similar range.

Route Option 1 utilises a connection option to Lackendarragh 110kV Substation via the northern public road network available. Two bridges along this route will potentially require HDD. This route option is the shortest route option of the four. The local road network along this route option may not have sufficient width to install minimum three circuits in flat formation at culvert and service crossings.

Route Option 2 utilises a connection option to Lackendarragh 110kV Substation via the southern public road network available. There are five bridges along this route with bridge 5 being a potential concern given the depth of the watercourse beneath the road level and the S.A.C associated with this watercourse. As this route option utilises mainly public roads the total length of road openings required is significantly higher (circa. 11.27km) than other options.

Route Option 3 utilises a connection option to Lackendarragh 110kV Substation via private lands and wind farmlands. This route option has the least amount of UGC required within the public roads (ca. 18m), and traverses the lowest number of culverts and bridges with only 4 watercourses required to be traversed. This route option will have to cross an S.A.C sensitive receptor and some areas of the proposed route option are of steep gradients.

Route Option 4 utilises a connection option to Lackendarragh 110kV Substation via both wind parcels and private lands. This route option follows much the same path as route option 3 so far as the boundary of Wind Parcel 2. The route then utilises the full extent of the access roads within Wind Parcel 2, traveling from north to south. There are a number of precast culverts proposed for within the wind farm would be redesigned to accommodate this route option.

A comparison of the interconnection options identified was carried out and is summarised in Table 3-7 below. The assessment of the interconnection options was based principally on the findings of the various desktop studies and initial site surveys completed. The colour coded rating for each constraint is outlined in Table 3-6 below.

Table 3-6: Legend for Colour Coded Assessments

Legend	Colour	Comparison with other routes
Low Potential Impact		Most Preferable
Medium Potential Impact		Acceptable
High Potential Impact		Least Preferable

Table 3-7: Interconnection Comparison Summary Table

Assessment Criteria	Route Option 1 (Yellow)	Route Option 2 (Orange)	Route Option 3 (Pink)	Route Option 4 (Green)
Longest String Circuit Length (m)	13763	13300	13109	14472
Length of Cable Within WF Land (m)	6020	2404	3726	8000
Length of Cable Within Private Land (m)	0	0	9616	6731
Length of Cable Within Public Road (m)	4346	11274	18	142
Bridge Crossings	3	5	0	0
Culvert Crossings	5	6	3	5
Watercourse Crossings	0	0	4	4
Total Possible HDDs	3	5	4	4
SAC Area Crossings	0	1	1	1
Additional Private Lands Required	Y	Y	N	N

Following the assessment above, Option 3 and Option 4 emerged as the preferred route options. Further analysis including a detailed assessment was then carried out by the EIAR team to identify the optimal final route.

As described in Chapter 2 - Development Description, The BRIDE (BLACKWATER)_010 (and associated Blackwater River (Cork/Waterford) SAC) shall be crossed by placing the proposed cable ducts in an existing stone arched bridge at Chimneyfield.

Several options were considered and assessed for the crossing of the BRIDE (BLACKWATER)_010 including HDD, overhead line (OHL) and placing the cable ducts within the public road. HDD was found to be technically unfeasible following site surveys due to topography. OHL was considered suboptimal due to the need for above ground infrastructure over a wide corridor to accommodate a triple circuit arrangement. Following site surveys, the preferred option was to locate the cables within the public road and cross the BRIDE (BLACKWATER)_010 within the existing bridge.

3.5 Conclusion

This chapter of the EIAR has described the reasonable alternatives considered throughout the development process for the Proposed Development.

The alternative layouts of the Proposed Development were established through the project philosophy of mitigation by design and technical feasibility.

The final proposed layout of the Proposed Development as assessed throughout this EIAR is thought to be the optimal design which minimises effects on the receiving environment, while enabling the provision of significant renewable electricity to the national grid through the consented Coom Green Energy Park, in line with national energy and climate policy.

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