

# MWP

## **Chapter 04 Consideration of Alternatives**

### **Carrownagowan 110 kV Grid Connection**

## 4. Consideration of Alternatives

### 4.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents a description of the reasonable alternatives studied by the Applicant, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the Proposed Development on the environment.

The EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) Art.5 (1)(d) requires that the EIAR prepared by the developer contain *“a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.”*

This chapter therefore describes the reasonable alternatives considered during the project inception and design process for the consented Carrowmagowan Wind Farm, which are relevant to the Proposed Development, and the principal reasons for proceeding with the current planning application taking into account the effects of the Proposed Development on the environment.

### 4.2 Scope

The European Commission (EC) guidance ‘Guidance on the preparation of the Environmental Impact Assessment Report’ (2017) defines alternatives as: *“Different ways of carrying out the Project in order to meet the agreed objective”*. That guidance states *“The number of alternatives to be assessed has to be considered together with the type of alternatives, i.e. the ‘Reasonable Alternatives’ referred to by the Directive. ‘Reasonable Alternatives’ must be relevant to the proposed Project and its specific characteristics, and resources should only be spent assessing these Alternatives. In addition, the selection of Alternatives is limited in terms of feasibility. On the one hand, an Alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an Alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible Alternative.”*

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

During the design phase of the consented Carrowmagowan Wind Farm, a number of alternatives for the grid connection were considered and are summarised in this chapter:

1. Alternative substation locations (i.e. existing grid nodes on the National Electricity Grid) to connect into; and
2. Alternative grid connection route options to Ardnacrusha Sub-station.

The following alternatives were considered for this EIAR:

1. Alternative grid connection designs of the preferred grid connection route option; and
2. Do-nothing alternative.

### 4.3 Alternatives Considered

#### 4.3.1 Alternative Substation Locations

TLI Group was engaged to examine the various options available for a 110kV grid connection to an existing 110 kilovolt (kV) Electricity Supply Board (ESB) Substation. A 110kV grid cable is necessary as opposed to a lower voltage cable to serve the permitted 19 turbine wind farm, as the output will be a minimum of 90 megawatt (MW). The two 110kV ESB Substations considered for the Carrownagowan Wind Farm Grid Connection were Ardnacrusha 110kV Substation and Ennis 110kV Substation because they were the nearest.



Figure 4-1 Ardnacrusha 110kV Substation Location



Figure 4-2 Ennis 110kV Substation Location

As stated above, these two substations were selected due to their relative proximity to the wind farm site.

The main reasons for this decision are as follows:

- Electrical capacity is available at Ardnacrusha but limited capacity is available at Ennis 110kV Substation;
- A substation expansion options would be required at Ennis 100kV substation; however, expansion options available at Ennis 110kV Substation are limited due to location adjacent to motorway and regional road;
- The Overhead Line (OHL) routes to Ennis Substation is > 50% longer in comparison to Ardnacrusha Substation and therefore has the potential for increased environmental effects including landscape and visual, water, cultural heritage, biodiversity, and population;
- The Underground cable (UGC) route to Ennis Substation is > 35% longer in comparison to Ardnacrusha Substation and therefore has the potential for increased environmental effects on traffic, soils, water, cultural heritage, biodiversity, and population; and
- Increased project risks associated with the longer grid connection options to Ennis, i.e. potential environmental impacts and landowner issues.

### 4.3.2 Alternative Grid Connection Route Options

TLI was also engaged to identify and analyse 110kV grid connection route options from the permitted Carrowmagowan Wind Farm sub-station to connect to the National Electricity Grid (NEG) at Ardnacrusha. As part of this process, a ranking of the various route options available was completed to assist the decision to pursue an OHL or an UGC option. Twelve alternative grid connection routes were identified and assessed which included six OHL and six UGC options. The nature of the grid route study includes factors of location, scale (length) and design (OHL or UGC) and it was based on desktop analysis, site surveys, constraints analysis and design requirements. Environmental factors considered included Natura 2000 sites, National Heritage Areas (NHAs), national monuments, watercourses, gradient and elevation changes, residential settlements, agricultural buildings, towns, villages and transport infrastructure.

The twelve options were ranked and the highest ranked and most favourable option at an early stage of the process was Option 1, an OHL from Carrowmagowan to Ardnacrusha Substation using a western corridor. However, the Applicant decided upon an UGC for the grid connection and thus the option ranked third (Option 5) (**Figure 4-3**), which was the preferred UGC route option, was chosen for the Proposed Development.

A comparison of environmental effects of all 12 routes is included in **Table 4-1**.

The Applicant opted for the UGC as despite the cost implication, there is less environmental effects involved in utilising the existing road network. It was considered that with an OHL, there is potential for visual and ecological impacts and uncertainty over ground conditions with respect to constructing the pylon bases. This Option is also in line with current industry and policy as outlined pg. 42 of the 2019 DRAFT Wind Energy Development Guidelines:

*"...it is considered that underground grid connections for wind energy projects are the most appropriate environmental and/or engineering solution, particularly in sensitive landscapes where the visual impacts need to be minimised. Therefore, this should be the default approach. However, there may be cases where specific ground conditions would prevent this, e.g. in upland locations where peat stability issues can arise from large-scale excavations".*

**Table 4-1 High level comparison of environmental effects of all 12 routes**

Rank	Option	OHL / UGC	Length (km)	Population & Noise	Visual Impact	Traffic	Biodiversity	Land & Soil	Water	Cultural Heritage
1	1	OHL	16.41	Temporary construction noise, Avoids major residential areas	Potential visual effects, OHL to Ardnacrusha	Avoids major residential areas	Habitat / green field requirement. Avoids SAC, SPA, NHA	Third party land use, potential for issue with ground conditions, avoids steep gradient	Avoids SACs, NHA, OHL can cross over stream	Avoids all national monuments. Maybe unknown resources in Greenfield area
2	2	OHL	16.19	Temporary construction noise, close to a dwelling at one location	Potential visual effects	Avoids major residential areas	Habitat / green field requirement/passes through section of private forestry	Third party land use, potential for issue with ground conditions, some areas of steep gradient	Avoids SACs, NHA, OHL can cross over stream	Avoids all national monuments. Maybe unknown resources in Greenfield area
3	5	UGC	20.73	In local road network, avoids busy primary routes, best route in local roads	No visual effects	Avoids primary and busy roads	Less habitat impact as mostly in public road	All in access track and local public road to Ardnacrusha	Stream crossings can be designed to use directional drilling under stream bed	All in public road, unlikely to have effects
4	6	UGC	19.6	In local road network, temporary construction noise	No visual effects	Alternative middle section of route 5	Less habitat impact with most in public road	All in access track and local public road	Stream crossings can be designed to use directional drilling under stream bed	All in public road, unlikely to have effects

Rank	Option	OHL / UGC	Length (km)	Population & Noise	Visual Impact	Traffic	Biodiversity	Land & Soil	Water	Cultural Heritage
5	7	UGC	19.59	In local road network, temporary construction noise	No visual effects	UGC utilizes more primary roads than Option 5 and 6	Less habitat impact with most in public road	All in access track and local public road	Stream crossings can be designed to use directional drilling under stream bed	All in public road, unlikely to have effects
6	8	UGC	18.22	In local road network, temporary construction noise	No visual effects	UGC is required to cross a busy junction outside Ardnacrusha	Less habitat impact with most in public road	All in access track and local public road	Stream crossings can be designed to use directional drilling under stream bed	All in public road, unlikely to have effects
7	3	OHL	18.39	Avoids major residential areas	Potential visual effects	Avoids major residential areas	OHL passes through two SACs	Third party land use, potential for issue with ground conditions, avoids steep gradient	OHL can cross over stream, within SAC however	Avoids all national monuments. Maybe unknown resources in Greenfield area
8	4	OHL	16.83	Avoids major residential areas	Potential visual effects	Avoids major residential areas	OHL passes through larger sections of SACs	Third party land use, potential for issue with ground conditions, avoids steep gradient	OHL can cross over stream, within SAC however	Avoids all national monuments. Maybe unknown resources in Greenfield area

Rank	Option	OHL / UGC	Length (km)	Population & Noise	Visual Impact	Traffic	Biodiversity	Land & Soil	Water	Cultural Heritage
9	9	OHL	24.4	Preferred OHL to Ennis, Avoids major residential areas	Potential visual effects	Avoids major residential areas, but may impact traffic near town	Greenfield areas, potential for habitat loss	Third party land use, potential for issue with ground conditions, avoids steep gradient	Avoids SACs, NHA, OHL can cross over stream	Avoids all national monuments. Maybe unknown resources in Greenfield area
10	10	OHL	25.7	Potential visual effects, alternative to Ennis	Potential visual effects	Avoids major residential areas, but may impact traffic near town	Greenfield areas, potential for habitat loss	Third party land use, potential for issue with ground conditions, avoids steep gradient	Avoids SACs, NHA, OHL can cross over stream	Avoids all national monuments. Maybe unknown resources in Greenfield area
11	12	UGC	26.9	Uses primary roads to Ennis, disturbance to local community	No visual effects	Utilises primary roads, traffic disruption potential on busy routes	Less habitat impact with most in public road	All in access track and primary public road	Stream crossings can be designed to use directional drilling under stream bed	All in public road, unlikely to have effects
12	11	UGC	25.8	Uses local roads to Ennis, disturbance to local community	No visual effects	Utilises local roads, traffic disruption potential near Ennis town	Less habitat impact with most in public road	All in access track and local public road	Stream crossings can be designed to use directional drilling under stream bed	All in public road, unlikely to have effects



It should be noted that Option 5 was chosen as the preferred grid connection route option during the design phase for the now consented Carrowmagowan Wind Farm and was assessed as part of that overall project. Option 5 runs in a northerly direction from the existing ESB Ardnacrusha 110kV substation to the consented Carrowmagowan Wind Farm substation location.

This option forms the basis for this planning application.

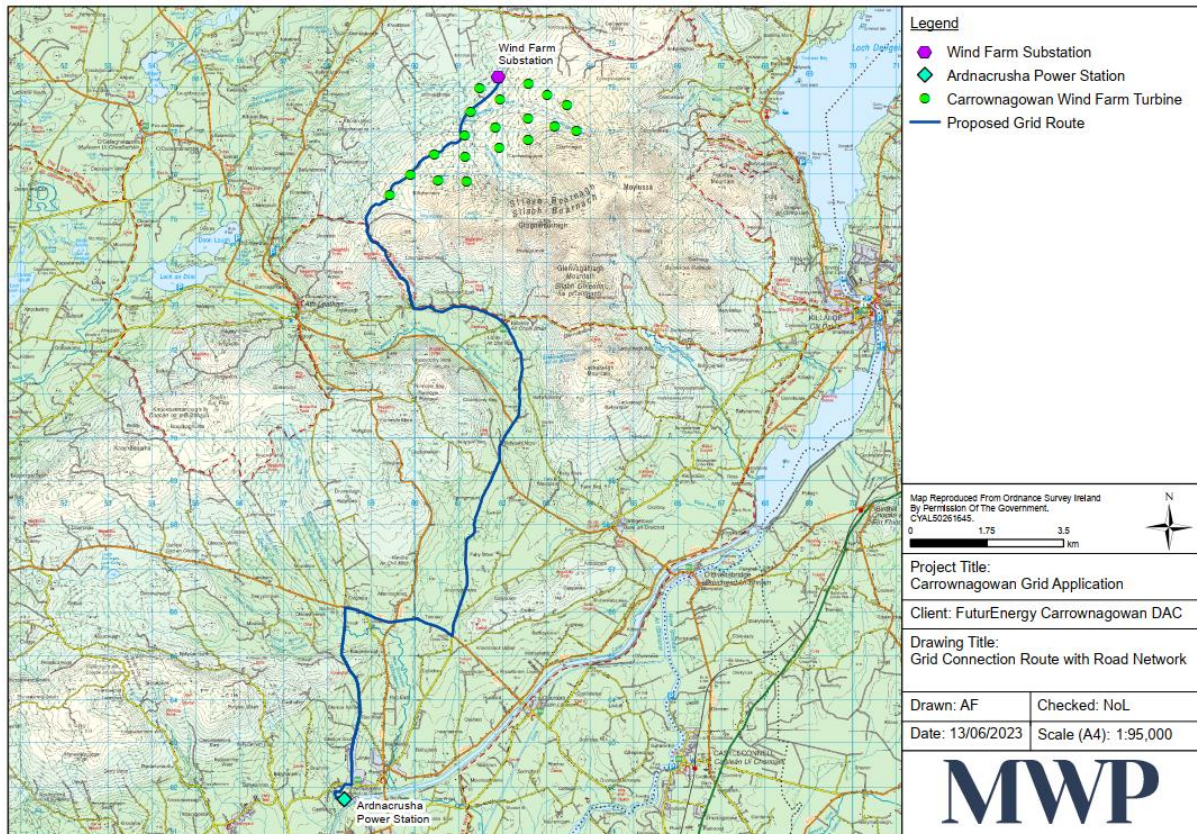


Figure 4-3 Chosen Option for Grid Connection

### 4.3.3 Alternative Grid Connection Designs

For this planning application, a number of alternative designs along the route of the preferred grid connection were considered.

Initially, sections of the Proposed Development were located on the public road north of Kilbane. This section was altered in order to preserve access and egress from a traffic management perspective. An ecological survey was conducted in the third-party lands where the grid connection is proposed to traverse. No ecological sensitive receptors were found during this survey and no significant effects from the habitat loss were identified. Please see **Chapter 6** Biodiversity for additional information.



Figure 4-4 Section of the proposed grid connection (on right) and original layout on left

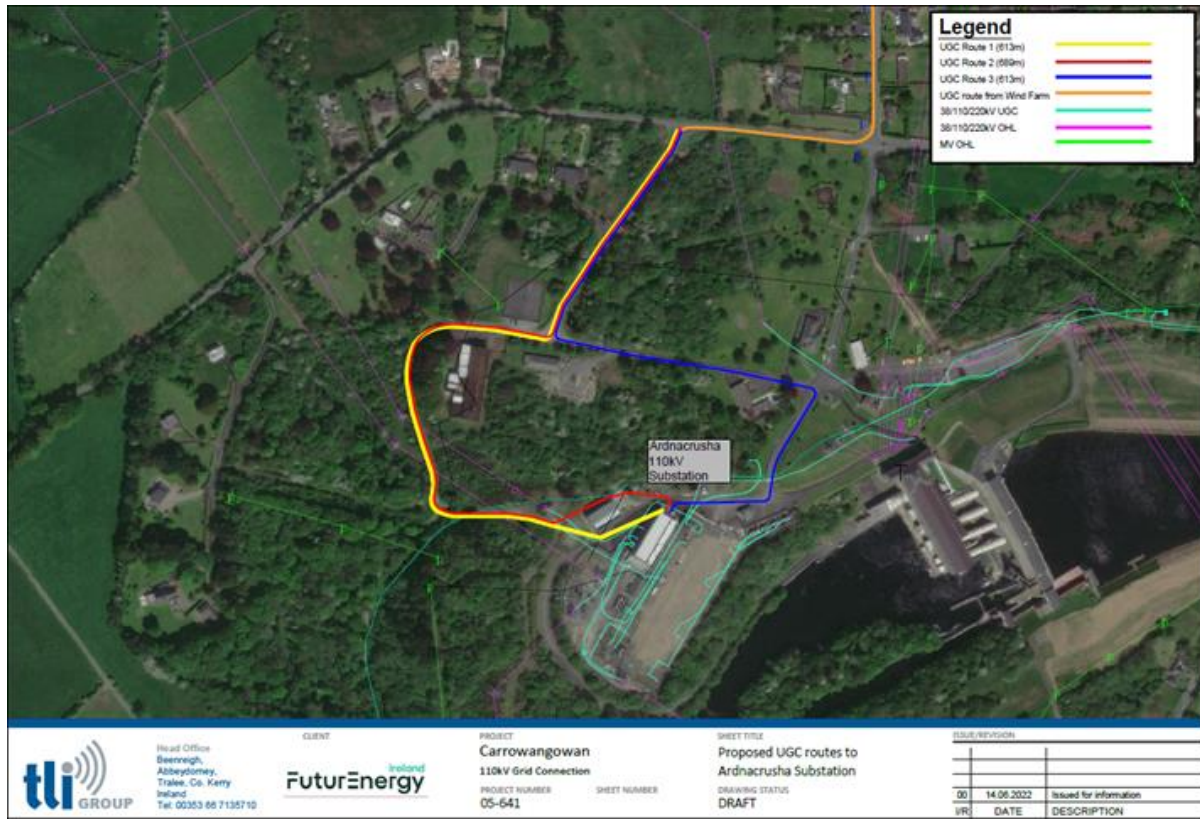


Figure 4-5 Alternative Designs Considered for connection into Ardnacrusha Substation

Alternative designs for connecting into Ardnacrusha substation were considered in conjunction with ESB.

There were two routes considered for the Proposed Development when leaving the public road network and entering the ESB lands within Ardnacrusha (Figure 4-5). One of the routes considered had a slight variation depending on what side of the ESB substation building. Desk top studies and on site investigation was carried out in September and October of 2022 and the preferred route entering the ESB substation building from the West was confirmed by the project design team.

Following discussion and on site engagement with the station manager and other ESB personnel, the preferred route entering the ESB substation building to the West was chosen. This route avoided encountering existing and future cable infrastructure and utilised the existing ESB entrance avenue and ESB tracks.

#### 4.3.3.1 Preferred Grid Connection Layout

The preferred grid connection layout (i.e. the Proposed Development) will consist of the UGC utilising public local road networks, existing Coillte access tracks and private forestry access tracks, with the majority of the UGC to be installed within the public road network (25km). Sections of the Proposed Development will be located on third party agricultural lands in the northern section of the Proposed Development site as it approaches the permitted wind farm.

## 4.4 Do-Nothing Alternative

The Do-Nothing alternative does not involve any construction works, therefore temporary potential adverse effects of the Proposed Development on the existing environment will be avoided.

Should the Proposed Development not be constructed, it would not facilitate the export of green electricity from the permitted Carrownagowan Wind Farm to the National Grid; thereby indirectly contributing to Ireland’s renewable energy infrastructure and it will not contribute to Ireland’s renewable energy targets and adding to the national grid infrastructure. In a do-nothing alternative, this site would not contribute to Ireland’s commitment to meet its EU and national emissions targets.

See **Table 4-2** for likely environmental impacts of the Do-Nothing Alternative relative to the Proposed Development.

**Table 4-2 Environmental Impacts of the Do-Nothing Alternative relative to the Chosen Option**

Environmental Factor	Do-Nothing Alternative
Population and Human Health	No increase in employment as a result of the Proposed Development.
Biodiversity	Forestry in the wider area would continue to be clear-felled as part of the ongoing forestry growth cycle and that the grassland habitats in the wider environment will continue to be farmed. No potential for construction/operation phase impacts.
Water	Forestry works will be carried out as required in the wider area. No potential for construction phase impacts.
Land and Soils	Forestry works will be carried out as required in the wider area. No potential for construction phase impacts.
Noise	No potential for additional noise nearby sensitive receptors.
Cultural Heritage	No potential impacts on archaeology or local cultural heritage.
Air and Climate	Missed opportunity to contribute to the reduction of carbon and greenhouse gas emissions.
Material Assets	No potential increased traffic volumes on local roads No additional construction waste will be generated No potential service suspension

## 4.5 Summary

Alternative Substation Locations (grid nodes) and alternative grid connection options (technology and routes) were studied. In addition, alternative grid connection layouts along the preferred grid connection option were considered as was the do-nothing scenario.

An indication of the main reasons for selecting the preferred grid node, grid route and the detailed layout, including a comparison of likely environmental effects of the different options studied is provided in this chapter.

The Proposed Development evaluated in this EIAR and described in **Chapter 2** Description of the Proposed Development, is based on an underground cable from the permitted wind farm sub-station to the Ardnacrusha grid node (Option 5). This has been found to achieve the best balance between the avoidance of any likely significant environmental effects and achievement of the objectives of the Proposed Development.

## 4.6 References

EU. (2014). Directive 2014/52/EU. Directive 2014/92/EU of the European Parliament and of the Council.  
 EC. (2017). Guidance on the preparation of the Environmental Impact Assessment Report, European Commission.  
 Government of Ireland. (2019). DRAFT Wind Energy Development Guidelines