3. SITE SELECTION AND REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU (the EIA Directive) requires that the Environmental Impact Assessment Report (EIAR) prepared by the developer contains *"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."*

Annex IV of the EIA Directive states that the information provided in an EIAR should include 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 section of the EIAR contains a description of the reasonable alternatives that were studied by the developer, which are relevant to the Proposed Development and its specific characteristics, in terms of site layout and transport route options to the site. This section also outlines the design considerations in relation to the Proposed Development. It provides an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

The consideration of alternatives is an effective means of avoiding environmental impacts. As set out in the '*Guidelines on The Information to be Contained in Environmental Impact Assessment Reports' (Environmental Protection Agency, 2022),* the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

Hierarchy

EIA is concerned with projects. The Environmental Protection Agency (EPA) guidelines state that in some instances neither the applicant nor the competent authority can be realistically expected to examine options that have already been previously determined by a higher authority, such as a national plan or regional programme for infrastructure.

Non-environmental Factors

EIA is confined to the environmental effects that influence consideration of alternatives. However, other non-environmental factors may have equal or overriding importance to the developer of a project, for example project economics, land availability, engineering feasibility or planning policy.

Site-specific Issues

The EPA guidelines state that the consideration of alternatives also needs to be set within the parameters of the availability of the land, i.e., the site may be the only suitable land available to the

developer, or the need for the project to accommodate demands or opportunities that are site-specific. Such considerations should be on the basis of alternatives within a site, for example design and layout.

3.2 Principles for Selection of Optimum Proposed Development

The Proposed Development (which is outlined in detail in chapter 4) comprises the provision of a 110kV electrical substation with associated underground electrical cabling and access roads, and the provision of access road upgrade with some sections of new access road to facilitate delivery of turbine components to the Permitted Development. As outlined previously, the existing 220kV Ballyvouskill Substation in the townland of Caherdowney was nominated by Eirgrid as the grid connection node location for the Permitted Development, and the required connection voltage is 110kV. The process of identifying a suitable location for the proposed 110kV substation and associated underground cabling to facilitate the required grid connection to the existing 220kV Ballyvouskill Substation is influenced by a number of factors. The grid connection, or the method by which a renewable energy development is connected to the national grid to export electricity from the site is of critical importance. Without a viable grid connection option, a renewable energy development cannot operate. The Proposed Development is crucial as without a viable connection to the national grid and suitable access roads, the Permitted Development cannot operate. The distance from any renewable energy development site to the likely grid connection point, the extent and cost of grid upgrades required to facilitate the connection of the renewable energy development, the delay in having those reinforcement works undertaken, are all critical factors that could render a renewable energy development project commercially viable or unviable.

The layout and design for the Proposed Development was an iterative process which took account of site constraints and the distances to be maintained between various infrastructure elements, watercourses, etc. As information regarding the site of the Proposed Development was compiled and assessed, the proposed layout has been revised and amended to take account of the physical constraints of the site and the requirement for environmental buffer zones and other areas in which infrastructure could not be located. Further details on the site selection and design process, can be found in Section 3.3.

3.3 Consideration of Alternatives

3.3.1 Methodology

The EU Guidance Document (EU, 2017) on the preparation of EIAR outlines the requirements of the EIA Directive and states that, in order to address the assessment of reasonable alternatives, the Developer needs to provide the following:

- A description of the reasonable alternatives studied; and
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

There is limited European and National guidance on what constitutes a 'reasonable alternative' however the EU Guidance Document (EU, 2017) states that reasonable alternatives "*must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives*".

The guidance also acknowledges 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*".

The EPA Guidelines (EPA, 2022) 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 is deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.*"

Consequently, taking consideration of the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- 'Do Nothing' Option
- Alternative Locations;
- Alternative Layout Arrangement Options
- Alternative Road Layout Options; and
- Alternative Mitigation Measures.

Each of these is addressed in the following sections.

3.3.2 'Do-Nothing' Option

Annex IV, Part 3 of the EIA Directive states that the description of reasonable alternatives studied by the developer should include *"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. EU guidance (EU, 2017) states that this should involve the assessment of *"an outline of what is likely to happen to the environment should the Project not be implemented – the so-called 'do-nothing' scenario."*

The Proposed Development will facilitate the supply of electricity generated at the Permitted Development to the national grid via the 220kV Ballyvouskill Substation and facilitate access to the Permitted Development site. By providing the Permitted Development with a connection to the national grid and site access, the Proposed Development will contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. This is a long term positive effect on air and climate.

If the Proposed Development were not to proceed the Permitted Development would not be in a position to supply the electricity generated to the national grid which is a long term negative effect. The opportunity to generate renewable energy and electrical supply to the national grid would be lost. Should the Proposed Development not proceed the site would remain as it is, with no changes made to the current land-use practices of commercial forestry, wind farm development, localised peat extraction and low intensity agriculture. In doing so, the environmental effects in terms of emissions are likely to be neutral, however, the opportunity to capture a significant part of County Cork's valuable renewable energy resource would be lost. The opportunity to generate local employment and investment would also be lost, and the local economy would continue to rely primarily on agriculture and commercial forestry as the main source of income. It is likely that the trends of population decline and rural deprivation that have been recorded within the Study Area would continue in the absence of investment, as discussed in Chapter 5 of this EIAR on Population and Human Health. Overall, the potential impact of doing nothing is considered to be long term, negative and slight.

The existing land uses can and will continue in conjunction with the Proposed Development. A comparison of the potential environmental effects of the 'Do-Nothing' Alternative when compared against the chosen option of facilitating the development of a renewable energy project at this site are presented in Table 3-1 below.

Table 3-1 Comparison of environmental effects when compared against the chosen option (connecting the Permitted Development to the national grid)

Environmental Consideration	Do Nothing Alternative	Chosen Option of facilitating the Permitted Development
Population & Human Health	No increase in local employment and no long-term financial contributions towards the local community.	Together with the Permitted Development, up to approximately 70 jobs could be created during the construction, operation, and maintenance phases of the Proposed Development.
Biodiversity (including Birds)	No habitat loss	The development has been designed to avoid or mitigate impacts on biodiversity.
Land, Soils & Geology	Neutral	There is no loss of peat, subsoil or bedrock as a result of the Proposed Development. Peat, subsoil and bedrock will be relocated within the site.
Geotechnical	Neutral	There is a low risk of peat failure (at the site) as a result of the Proposed Development.
Water	Neutral	No significant effects on surface water or groundwater quality will occur.
Air & Climate	Will not provide the opportunity for an overall increase in air quality or reduction of greenhouse gasses. Will not assist in achieving the renewable energy targets set out in the Climate Action Plan.	Over the proposed twenty five year lifetime of the Permitted Development, 1,097,310 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation.
Noise & Vibration	No potential for noise impacts on nearby sensitive receptors.	There will be a short-term imperceptible negative residual impact due to an increase in noise levels during the construction phase of the Proposed Development.

Environmental Consideration	Do Nothing Alternative	Chosen Option of facilitating the Permitted Development
Landscape & Visual	No potential for landscape and visual impacts on nearby sensitive receptors.	The lack of highly sensitive landscape and visual receptors, the likely limited visibility of the Proposed Development within the landscape and the strategic siting of infrastructure will mitigate any potential for significant landscape and visual effects.
Cultural Heritage & Archaeology	No potential for impacts on unrecorded, subsurface archaeology.	No residual direct impacts or direct cumulative impacts as a result of the Proposed Development will occur. All potential direct effects are dealt with through mitigation to alleviate or remove the impacts.
Material Assets	Neutral	There will be short term negative imperceptible to slight impact on traffic volumes during the construction phase of the Proposed Development. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on site.

3.3.3 Alternative Locations

The Proposed Development is necessary to facilitate the Permitted Development with road access and connection to the national electricity grid. The available Eirgrid node has been confirmed to be the existing 220kV Ballyvouskill substation and so there are no feasible alternative locations for the Proposed Development. The various alternative arrangement of the Proposed Development is addressed in Section 3.3.4 below.

The only alternative to the use of the proposed location for the Proposed Development and Permitted Development is to develop a greenfield wind farm site at an alternative location which would require a significant period of time to acquire land and prepare a planning application and accompanying EIAR. Furthermore, the use of a greenfield site could theoretically have a greater potential to give rise to environmental impacts or impacts on Natura 2000 sites.

When assessing the alternatives available, the site is the most suitable for a number of reasons. It has access to the national electricity grid within a viable distance, is currently used for commercial forestry,

wind farm development and agriculture, therefore a certain level of industrial activity and traffic movements are associated with the site, which will assist in the assimilation of the Proposed Development into the receiving environment. The site also benefits from close proximity to the N22 and the presence of existing access roads and forestry tracks which will be utilised as much as possible.

Further to this, the environmental assessments undertaken as part of this EIAR have proved that there will be no demonstratable harm to the environment, built or archaeological heritage or human health that cannot be prevented or controlled by mitigation measures. Developing on a new site would likely lead to the potential for more environmental effects, would require the acquisition of new land, potentially constructing supporting infrastructure and the provision of new services.

In conclusion, the Proposed Development location is the preferred/optimum site.

3.3.4 Alternative Layout Arrangement Options

The design of the Proposed Development was constraints-led, thereby avoiding the most environmentally sensitive parts of the site. Constraints are restrictions that inform the design of a project by highlighting onsite sensitivities and providing appropriate setback buffers.

The design of the Proposed Development has also been an informed and collaborative process from the outset, involving the designers, developers, engineers, landowners, environmental, ecological, hydrological, geotechnical, and archaeological specialists and traffic consultants. The aim was to reduce the potential for environmental effects while designing a project capable of being constructed and viable.

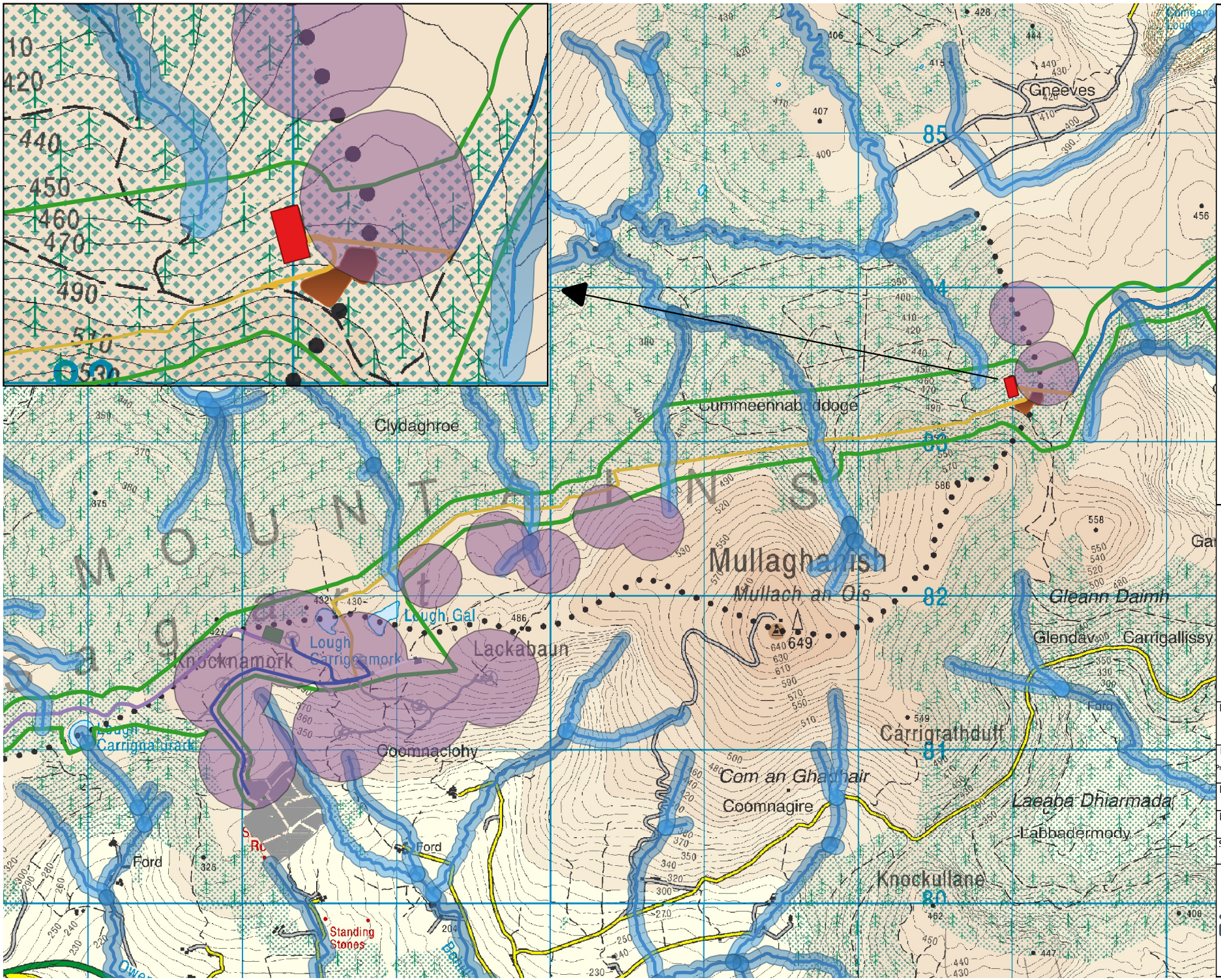
Throughout the preparation of the EIAR, the layout of the Proposed Development has been revised and refined to take account of the findings of all site investigations, which have brought the design from its first initial layout to the current proposed layout that is the subject of the relevant applications for planning permission. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory consultees and local authorities, as detailed in Sections 2.4 and 2.5 of Chapter 2.

3.3.4.1 Alternative Grid Connection Options

The EIAR for the Permitted Development assessed 2 no. underground grid connection options located in the townlands of Clydaghroe and Cummeennabuddoge, Co. Kerry. It was intended that the Permitted Development would be connected to the National Grid via an on-site 38kV substation with underground cabling connection to the existing Garrow 110kV substation in the townland of Cummeennabuddoge. The grid connection offer that was received from Eirgrid in September 2021 is to connect the Permitted Development into the existing 220kV Ballyvouskill Substation, via a new 110kV substation. This assessment outlines a number of routes from the Permitted Development site to that connection point, which were considered during the iterative design process.

3.3.4.2 Proposed 110kV Substation

In consideration of the distance required between existing/permitted turbines and the proposed 110kV substation, and the area required for a 110 kV substation, sufficient space was not available to accommodate the 110 kV substation within the Permitted Development site. Please see Figure 3-1 which shows the lack of available options for the proposed 110kV substation within the Permitted Development. Following detailed consideration of available land between the Permitted Development and the assigned connection point at Ballyvouskill, the location selected was considered the optimum location for the substation. The proposed substation is sited within an area of forestry and is set into a north facing slope, which assist in screening it from view in the surrounding area. The location selected for the proposed 110kV substation has had regard to the constraints of the site.



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Drawing Title
Susbtation Clearance from Nearest Turbines

Project Title
Proposed Substation, Underground Cabling & Access Roads to Knocknamork Renewable Energy Development

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NMcH	EOS
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3.3.4.2.1 *Proposed 110kV Underground Cable*

The route of the 110kV underground cable went through 5 separate iterations. All design iterations have not been included, but Figure 3-2 and Figure 3-3 below gives an indication of how the route of the grid connection evolved during the design process.

The final underground cable route as presented in Figure 3-3 largely takes account of all site environmental constraints (e.g., ecology, archaeology, hydrology, peat depths etc.) and design constraints (e.g., third party lands). The final underground cable route also takes account of the findings from the site investigations and baseline assessments that have been carried out during the EIAR process.

The Permitted Development will connect to the national grid via underground cabling, located along existing forest roads / land and agricultural land. Whereas overhead lines are less expensive and allow for easier repairs when required, underground cables will have no visual impact. For this reason, it was considered that underground cabling would be a preferable alternative to overhead lines. The underground cabling will follow, insofar as possible, the route of existing and proposed access tracks on existing forestry and agricultural land, thereby minimising the amount of ground disturbance required.

Option no. 1 as shown in Figure 3-2, runs entirely along forestry and public roads. The cabling route measures approximately 5.7 km in length.

Option no. 2 as shown in Figure 3-3 follows existing forest roads / land and agricultural land. The cabling route measures approximately 3.6 km in length.

As can be observed from Figure 3-2 and Figure 3-3 both Option 1 and Option 2 share the same route before diverging at a road bend approximately 900 m to the northwest of the existing 220kV Ballyvouskill Substation. The shared route covers a distance of approximately 2.5 km.

The hydrological, environmental and ecological investigations undertaken at the site examined the proposed 110kV underground electrical cabling Option 1 and Option 2.

A comparison of the potential environmental effects of the 110kV grid connection Option 1 when compared against the chosen option (Option 2) is presented in Table 3-2 below.

Table 3-2 Comparison of environmental effects when compared against the chosen option (Option 2)

Environmental Consideration	Option 1	Option 2
Population & Human Health	Option 1 follows a section of public road with 5 no. residential dwellings. Option 1 has the potential for increased noise and dust impacts and disturbance to residential receptors in the vicinity of this route.	There are no residential dwellings in the vicinity of Option 2 and therefore this option will have potentially less of an impact on population and human health.
Biodiversity (including Birds)	There is an existing cable in the public road section of Option 1 for 1.8km and therefore this section of cable will need to be positioned in the area to the north or south of the public road. Habitats along this section of the road include	There is an existing cable located within an existing track where Option 2 leaves the forest road with Option 1. The habitats surrounding the track comprise a mosaic of Upland blanket bog and Wet heath that have been cut over and

Environmental Consideration	Option 1	Option 2
	improved agricultural grassland, mixed broadleaf/conifer woodland, conifer plantation, scrub, scattered trees and parkland and eroding upland rivers and therefore this option will result in some loss of this habitat type.	drained in the past. Whilst these habitats are degraded by historic peat cutting and the presence of the existing track and cable they are assigned County Importance as per Table 1 of *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA 2009) as they represent degraded examples of Annex I Habitats. Whilst no significant habitat loss or deterioration is predicted, mitigation will be employed to minimise the impact of the proposed works on peatland habitats. It is also proposed to enhance 5,900m^2 of peatland habitat which will result in an overall net gain in peatland habitat area resulting from the proposed works.
Land, Soils & Geology	Neutral	Neutral - There is no material environmental effect difference between both options considered.
Geotechnical	Neutral	Neutral - There is no material environmental effect difference between both options considered.
Water	Where the cable routes diverge, Option 1 has 5 no. watercourse/drain/culvert crossings, 2 no. more than Option 2.	Where the route diverges, Option 2 has 3 no. watercourse/drain/culvert crossings compared to 5 no. for Option 1. There is no material environmental effect difference between both options considered.
Air & Climate	Given the length of Option 1 is 5.7 km which is 2.1 km greater than Option 2, there is the potential for greater dust emissions and vehicle emissions impacts associated with Option 1 when compared to Option 2.	Given the length of Option 1 is 5.7 km which is 2.1 km greater than Option 2, there is the potential for less dust emissions and vehicle emissions impacts associated with Option 2.
Noise & Vibration	Potential for increased noise impacts on nearby sensitive receptors during the construction of the new roads.	Potential for less noise impacts on nearby sensitive receptors during the construction of the new roads.

Environmental Consideration	Option 1	Option 2
Landscape & Visual	Neutral	Neutral - There is no material environmental effect difference between both options considered.
Cultural Heritage & Archaeology	Neutral	Neutral - There is no material environmental effect difference between both options considered.
Material Assets	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials and works required along the public road.	Potential for less traffic volumes during construction phase of Option 2 given the shorter length of cable and avoidance of the public road when compared to Option 1.

The final chosen Option 2 110kV cable route is considered the optimal route given it has the least potential for environmental effects when compared to Option 1.

Gneeves
Curragh
Ford
Cairn
401
Stone Circle
456
Caherdowney
Megalithic Tomb
Glantane W
281
Garrane Br.
Garraneycarney
558
333
304
Garrane Riv
85
84
83
82
430
420
410
400
390
450
440
370
350
330
320
310
300
290
280
270
260
250
230
490
470
460
586
570
550
540
520
500
480

Map Legend

- EIAR Study Boundary
- Proposed 110kV Underground Cable Route - Option 1
- Existing Grid Connection Rou
- 33kV Underground Cabling and Access Roads
- County Boundary
- Proposed110kV Substation Locaction
- Ballyvouskill 220kV Substation
- Proposed Borrow Pit

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Drawing Title
Proposed 100kV Cable Option No. 1

Project Title
Proposed Substation, Underground Cabling & Access Roads to Knocknamork Renewable Energy Development

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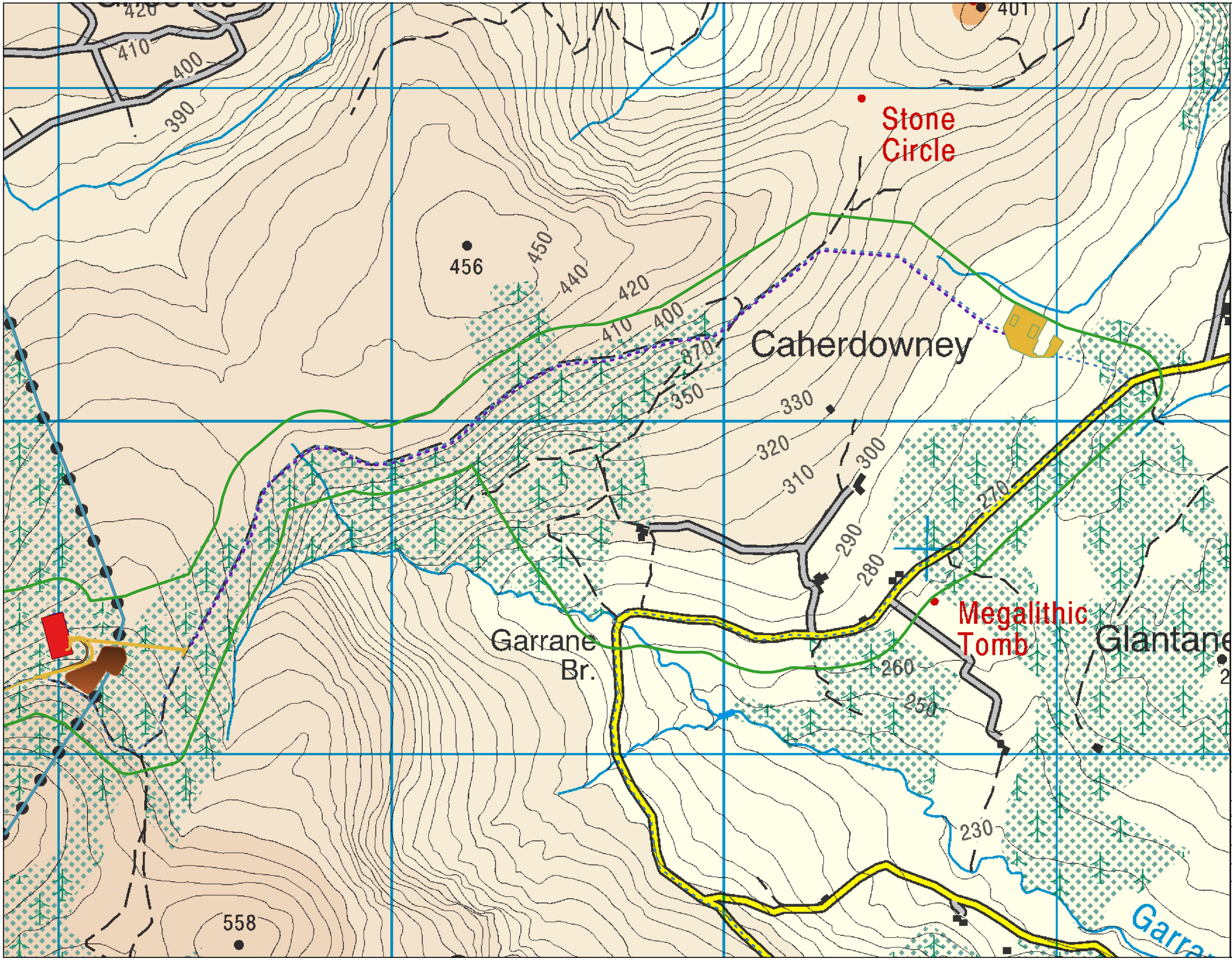

Map Legend

- EIAR Study Boundary
- Proposed 110kV Underground Cable Route - Option 2
- 33kV Underground Cabling and Access Roads
- Existing Grid Connection Rou
- County Boundaries
- Proposed 110kV Substation Location
- Ballyvouskill 220kV Substation
- Proposed Borrow Pit

Drawing Title
Proposed 110kV Cable Option No 2

Project Title
Proposed Substation, Underground Cabling & Access Roads to the Knocknamork Renewable Energy Development

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3.3.4.3 Proposed 33kV Underground Cable

Two potential 33kV underground cable routes were identified and considered during the design process. Route options A and B are shown on Figure 3-4.

Option A - The route of Option A is along existing farm tracks/ permitted roads in the area of the Permitted Development and then goes off-road (within new access road) until it connects to the proposed 110kV substation.

Option B – The route of Option B, leaves the Permitted Development and continues in an easterly direction along a combination of existing roads within the adjacent wind farm site and existing forestry tracks.

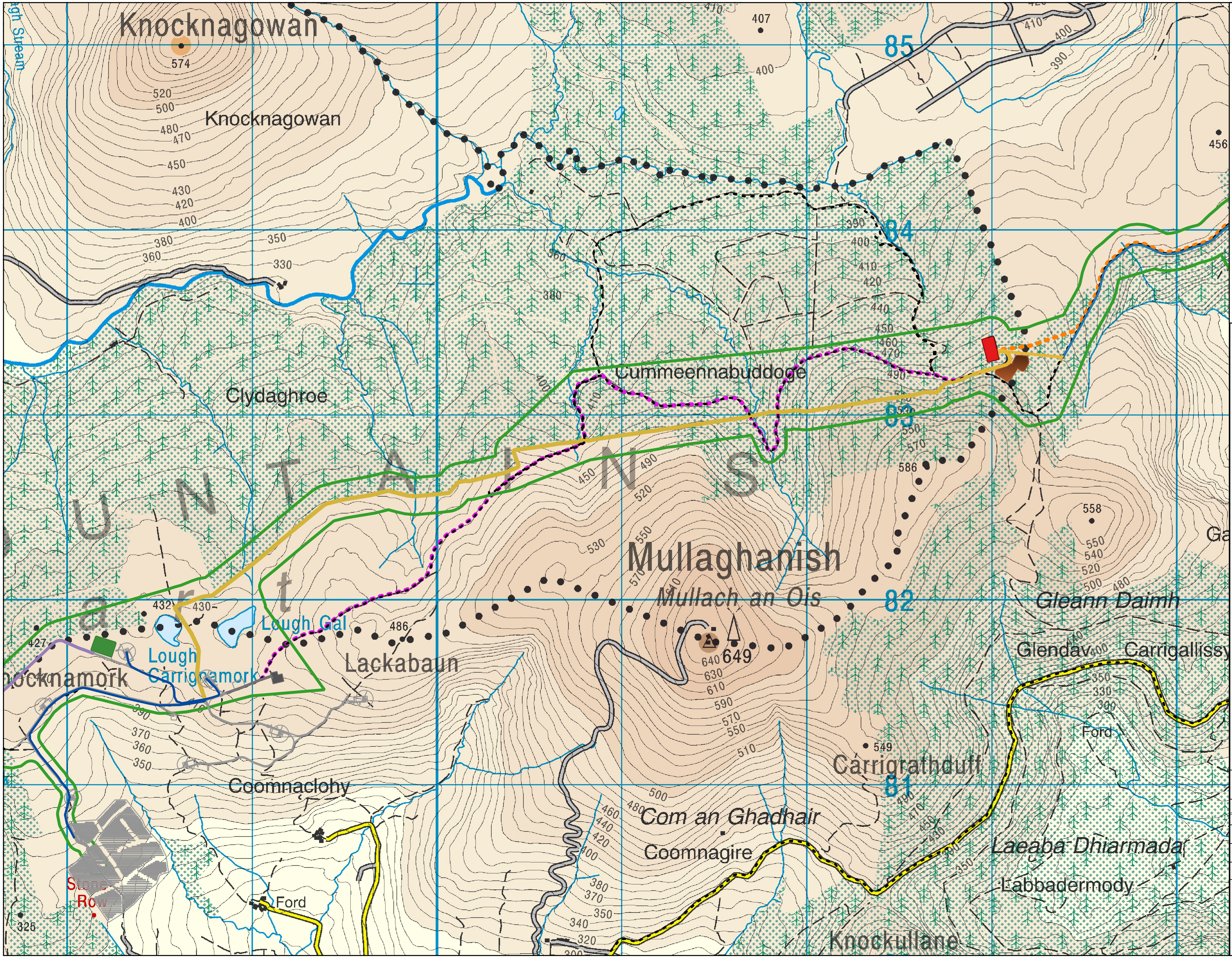
A comparison of the potential environmental effects of the 33kV underground cable route Option A (chosen option) when compared against Option B is presented in Table 3-3 below.

Table 3-3 Comparison of environmental effects of chosen Option A against Option B

Environmental Consideration	Option A (Chosen option)	Option B
Population & Human Health	Neutral	Neutral - There is no material difference between both options considered.
Biodiversity (including Birds)	Neutral	Neutral - There is no material difference between both options considered.
Land, Soils & Geology	Neutral	There are existing cables in sections of the road along route Option B which would require widening and upgrading along these sections of the route.
Geotechnical	Neutral	There are existing cables in sections of the road along route Option B which would require widening and upgrading along these sections of the route.
Water	Option A has 14 no. watercourse/drain/culvert crossings compared to 23 no. for Option B. The potential for environmental effect is lower with Option A.	Option B has 23 no. watercourse/drain/culvert crossings, 9 no. more than Option A.
Air & Climate	Neutral	Neutral - There is no material environmental effect difference between both options considered.
Noise & Vibration	Neutral	Neutral - There is no material environmental effect difference between both options considered.

Environmental Consideration	Option A (Chosen option)	Option B
Landscape & Visual	Neutral	Neutral - There is no material environmental effect difference between both options considered.
Cultural Heritage & Archaeology	Neutral	Neutral - There is no material environmental effect difference between both options considered.
Material Assets	Neutral	Neutral - There is no material environmental effect difference between both options considered.

Landowner consents for Option B were not available and therefore Option A was the most favoured option of those considered.



Map Legend

- EIAR Study Boundary
- Access Road (Upgrde and New)
- 33kV Grid Connection Option A
- 33kV Grid Connection Option B
- Existing Grid Connection Routes
- 33kV Underground Cabling in the Permitted Development
- 110kV Underground Cabling
- 110kV Underground Cabling
- Proposed 110kV Substation Location
- Proposed Borrow Pit
- Permitted Borrow Pit Extension
- Omitted 38kV Electrical Substation and Battery Compound

Drawing Title
Proposed 33kV Grid Option A and Option B

Project Title
Proposed Substation, Underground Cabling & Access Roads to Knocknamork Renewable Energy Development

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3.3.5 Road Layout

Access tracks are required onsite in order to enable transport of infrastructure and construction materials within the Proposed Development. Such tracks must be of a gradient and width sufficient to allow safe movement of equipment and vehicles. It was decided at an early stage during the design of the Proposed Development that maximum possible use would be made of existing roadways and tracks where available to minimise the potential for impacts by using new roads as an alternative.

As the overall site layout was finalised, the most suitable routes between each component of the development were identified, taking into account the existing roads and the physical constraints of the site. Locations were identified where upgrading of the existing road would be required and where new roads are to be constructed, in order to ensure suitable access to and linkages between the various project elements, and efficient movement around the site.

An alternative option to making maximum use of the existing road network within the site would be to construct a new road network, having no regard to existing roads or tracks. This approach was not favoured, as it would require unnecessary disturbance to the site and create the potential for additional environmental impacts to occur. It would also result in an unnecessary requirement for additional cut and fill material to be used in the construction of new roads.

A comparison of the potential environmental effects of constructing an entirely new road network when compared against maximising the use of the existing road network is presented in Table 3-4 below.

Table 3-4 Comparison of environmental effects when compared against the chosen option (maximising the use of the existing road network)

Environmental Consideration	New Road Network	**Use and Upgrade of Existing Roads**
Population & Human Health	Potential for increased impacts on residential amenity due to increased disturbance during the construction stage.	The road upgrades will have potentially less of an impact on population and human health.
Biodiversity	Larger development footprint would result in greater habitat loss compared to the chosen option.	Smaller footprint due to road widening would result in less habitat being lost.
Land, Soils & Geology	Larger development footprint would result in greater volumes of peat and spoil to be excavated and stored. Larger volume of stone required from on-site borrow pit for road construction.	Smaller volume of soils to be excavated and managed.
Geotechnical	Potential increase in cut and fill volumes.	Neutral

Environmental Consideration	New Road Network	Use and Upgrade of Existing Roads
Water	Larger development footprint and increased number of new watercourse crossings, therefore, increasing the potential for silt laden runoff to enter receiving watercourses.	Less potential for silt-laden run-off to enter a watercourse.
Air & Climate	Potential for greater dust emissions due to the requirement of an increased volume of stone from the on-site borrow pit. Potential for greater vehicular emissions due to increased volume of construction traffic.	Potential for less dust and vehicle emissions during the construction of the road upgrades.
Noise & Vibration	Potential for increased noise impacts on nearby sensitive receptors during the construction of the new roads.	Potential for less noise impacts on nearby sensitive receptors during the construction of the road upgrades.
Landscape & Visual	Neutral	Neutral - There is no material environmental effect difference between both options considered.
Cultural Heritage & Archaeology	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.	Neutral
Material Assets	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials.	Less traffic volumes due to road upgrades.

The EIAR for the Permitted Development assessed 2 no. turbine delivery routes. For route Option 1 (chosen option) traffic would access the site from the west via the N22. For route Option 2, traffic would access the site from the east via the via the R582 and the L5226. Following examination of both routes, it was deemed that the route from the west was more suitable for abnormal loads due to the quality of the road structure and less upgrades required.

3.3.6 Location of Ancillary Structures

3.3.6.1 Borrow Pits

Material required for the construction of access roads and substation foundation will be obtained from a new onsite borrow pit which will be located to the southeast of the proposed 110kV substation and by extending the borrow pit within the Permitted Development. The use of borrow pits represents an efficient use of existing onsite resources and eliminates the need to transport large volumes of construction materials along the local public road network to the site. The location for the proposed new borrow pit was identified taking into account the site characteristics, including topography, ground conditions, habitat type and surface water features.

An alternative to using an onsite borrow pit was the option of sourcing stone and hardcore materials from a licensed quarry in the vicinity. The movement of such material would result in a significant increase in construction traffic and heavy loads and was therefore considered the least preferable option.

An alternative to extending the permitted borrow pit would be to construct a new borrow pit to provide material for the road upgrades and construction. The use of a greenfield site as a source for the aggregates could theoretically have a greater potential to give rise to environmental effects when considered in the context of extending the permitted borrow pit.

A comparison of the potential environmental effects of using onsite borrow pits in comparison to using an offsite quarry is presented in Table 3-5 below.

Table 3-5 Comparison of environmental effects when compared against the chosen option (onsite borrow pit)

Environmental Consideration	Off-site Quarry
Population & Human Health	Potential for increased vehicular and dust emissions from transporting material from offsite quarry locations to the site which could have adverse health effects.
Biodiversity (including Birds)	Neutral
Land, Soils & Geology	Neutral
Geotechnical	Neutral
Water	Neutral
Air & Climate	Potential increase in dust emissions and vehicle emissions associated with off-site vehicle movements.
Noise & Vibration	Whilst there would be less noise generated from site as a result of using an offsite source, there is still the potential for an increase in noise emissions from the transport of material from offsite quarry locations.
Landscape & Visual	Neutral

3.3.7 Alternative Mitigation Measures

Mitigation by avoidance has been a key aspect of the proposed project's evolution through the selection and design process. Avoidance of the most ecologically sensitive areas of the site limits the potential for environmental effects. As noted above, the site layout aims to avoid any environmentally sensitive areas. Where loss of habitat occurs in the site, this has been mitigated with the proposal of enhancement lands. Any forestry felled as part of the Proposed Development will be replaced offsite, with no net loss. The alternative to this approach is to encroach on the environmentally sensitive areas of the site and accept the potential environmental effects and risk associated with this.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the site and any identified environmental receptors. These mitigation measures are proven effective. The alternative is to either not propose these measures or propose measures which are not best practice and effective and neither of these options are feasible.