

## **3 SITE SELECTION AND REASONABLE ALTERNATIVES**

### **3.1 Introduction**

This Chapter of the EIAR provides 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. This Chapter indicates the main reasons for selecting the option chosen based on a comparison of the various potential environmental effects. Accordingly, this Chapter sets out the justification for:

- The location of the wind farm in South Donegal;
- The selection of the proposed site location from a number of other sites that were considered as being the optimum location to fulfill the grid connection capacity for a large-scale wind farm, and
- The proposed development being the most appropriate design for the proposed site.

This Chapter provides a description of the site selection process and outlines the alternative site assessments that were carried out in order to identify the most appropriate site in South Donegal to accommodate the wind farm grid connection. This section discusses the principles for wind farm site selection in the context of the proposed development. Following this, the strategic site selection process that has been undertaken is outlined in detail.

The strategic site selection process has identified the proposed site at Meenbog and adjacent townlands as one of seven that would be capable, based on a strategic level assessment, of accommodating a significant wind farm development whilst also being consistent with the policies and objectives of Chapter 7 of the County Development Plan 2012 – 2018 (CDP) Natural Resource Development, which sets out the relevant renewable energy and wind energy policies and objectives of the Planning Authority. The site selection process follows the methodology of the previously proposed Carrickaduff Wind Farm, to identify the appropriate nature of the site. The site selection has been further refined to consider the set-back requirements of Variation no. 2 of the County Development plan and the requirements imposed by the EIA Directive as amended by Directive 2014/52/EU.

An Alternative Site Assessment has been carried out on the seven identified sites reviewing in greater detail the alternative sites and ranking them in terms of the potential for adverse impacts to arise. Through the alternative site assessment process, the optimum site for the delivery of a wind farm of the scale proposed and which has the least impact on the environment, human beings and landscape has been identified. The Alternative Site Assessment points to the site at Meenbog and Croaghanagh as being the optimum site to bring forward for consideration, having regard to the set-back requirements of the 2<sup>nd</sup> Variation to the County Development Plan.

Having identified the site at Meenbog/Croaghanagh as the most appropriate site for the provision of additional wind energy generating capacity, an overview is provided of the evolution of the layout of the proposed wind farm which references the adopted design constraints and provides details of refinements made to the proposed layout.

## 3.2 Principles of Wind Farm Site Selection

The process of identifying a suitable wind farm site is influenced by a number of factors. While wind speeds, the area of suitable or available land, and planning policy are all very important, a wind farm project must be commercially viable, to ensure it will attract the necessary project finance required to progress to construction. The grid connection, or the method by which a proposed wind farm is connected to the national grid to export electricity from the site is of critical importance. The distance of any potential wind farm site to the likely grid connection point, the extent and cost of grid upgrades required to facilitate the connection of the wind farm, the delay in having those reinforcement works undertaken and also the process of securing a grid connection offer to allow a wind farm to connect to the grid, are all critical factors rendering a wind farm project commercially viable or unviable. With a viable grid connection potentially available in a reasonable timeframe, other site selection considerations can then be considered further.

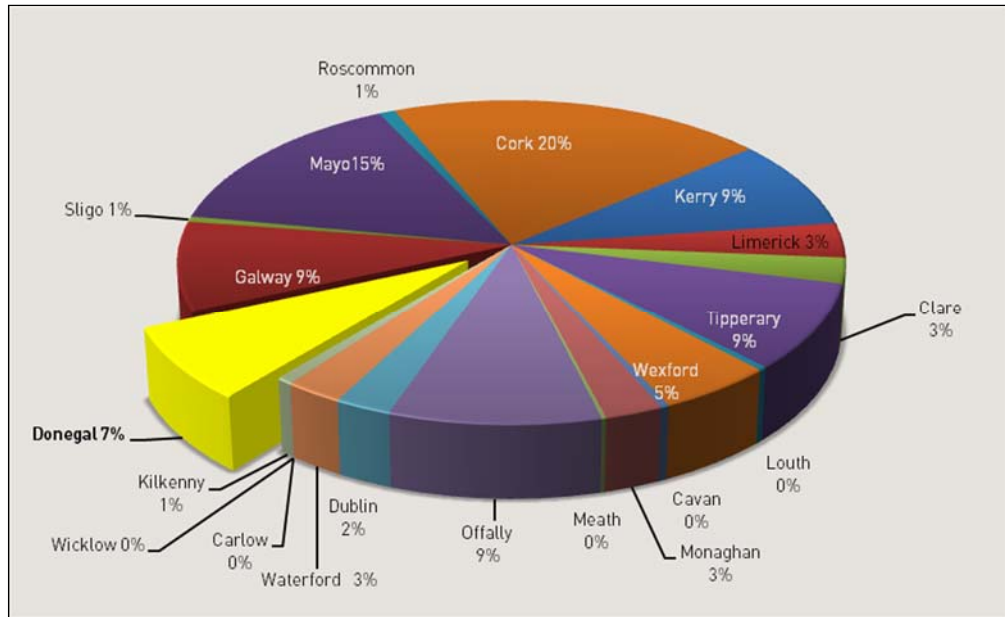
### 3.2.1 Grid Connection Offer Process

In order to connect to the national electricity grid that is operated by Eirgrid and ESB Networks, electricity generators require a grid connection offer. The grid connection process, including allocation of offers, is the statutory responsibility of the Commission for Regulation of Utilities (CRU) (formerly the Commission of Energy Regulation). Since 2004, all wind farm grid connection applications have been processed through a process known as “group processing”. Group processing involves connection applications being processed simultaneously in batches known as “gates”.

Since group processing was introduced in 2004, two batches of applications have been processed, Gate 1 and Gate 2. Gate 3 is the third tranche of offers made by the CER to renewable energy generators and the processing of applications under Gate 3 started in January 2009. The size of Gate 3 was mainly influenced by the additional capacity of renewable electricity required to meet the government’s target of generating 40% of all the State’s electricity from renewable sources by 2020. Gate 3 therefore, provides the mechanism for delivering on the Government’s national targets for renewable energy and electricity generation, and divides the national target between multiple wind farm projects assigned to identifiable connection nodes within the electricity transmission network. The applicant (Planree Ltd.) controls the grid connection offer P133 and the allocated grid connection node to the national grid for the Gate 3 offer is the existing Clogher Substation in the townland of Cullionboy.

### 3.2.2 County Donegal Gate 3 Grid Connection Allocations

The wind energy element of Gate 3 amounts to 3,931MW, of which County Donegal has been assigned 278.71MW, or approximately 7%. This is a relatively small percentage considering the extent of the wind resource available to the County, the county’s size and its location on the Atlantic seaboard. As a comparison, County Mayo has been assigned a capacity of 732MW under Gate 3. Figure 3.1 below shows the allocation of Gate 3 grid capacity to each county, with County Donegal’s 278.71MW slightly separated from the pie chart.



**Figure 3.1 Gate 3 wind farm grid connection allocations (MW) by County**

### 3.3 Site Selection

#### 3.3.1 Site Selection Criteria

The cost of building each megawatt (MW) of electricity-generating capacity in a wind farm is in the region of €1.8 million to €2.0 million. It is therefore critical for the applicants and their project team to ensure that the most suitable site for development of a proposed wind farm is identified and progressed through planning. The site selection process for the current proposal has been fully informed by national, regional and local policy constraints at a macro level as well as site specific constraints that influence the turbine layout on site at a micro level. The main policy, planning and environmental considerations for the selection of a potential wind farm site include:

- Access to the national electricity grid possible within a viable distance;
- Site location relative to the Donegal CDP’s classification of areas considered suitable for wind farm development from a planning policy perspective;
- Located outside areas designated for protection of ecological species and habitats;
- Located outside areas designated as Especially High Scenic Amenity (EHSA) in the CDP;
- Sufficient area of unconstrained lands that could potentially accommodate wind farm development and necessary turbine spacing requirements;
- Consistently high average annual wind speeds;

The criteria above will be explained further below in so far as they influenced the site selection exercise undertaken.

##### 3.3.1.1 Donegal County Development Plan 2012-2018

Section 7.2 of the Donegal CDP contains the relevant policies and objectives in relation to the development of energy resources. In the case of wind energy, the plan identifies Areas ‘Open to Consideration (OTC)’ for wind energy development and areas where such development is ‘Not Favoured’ (NF). These designations are primarily based on a number of key factors, including the wind energy potential, proposed and existing grid connections, natural heritage designations and landscape sensitivity. Map 9 of the CDP

displays wind energy designations for Donegal as seen in Figure 2.9 of Section 2 of this EIAR.

As the site selection process sought to identify the optimum site for a large-scale wind farm in Donegal to assist in the delivery of allocated Gate 3 grid capacity, the project team reviewed the description and guidance within Section 7.2 of the CDP in relation to the identified areas. The CDP states the following in relation to its identified areas:

- **Areas Open to Consideration:** *These areas are open to consideration for appropriate wind energy proposals. The areas have been identified having regard to a range of factors, including wind energy potential, existing grid connections, proposed grid connections, natural heritage designations, landscape sensitivity, adequate road infrastructure and natural heritage designations.*
- **Not favoured:** *Areas where wind energy proposals will not be favoured. These include; SAC and SPA (Natura 2000) Sites, NHAs, unspoiled areas of EHSAs, Areas of Fresh Water Pearl Mussel important views and prospects. It is considered that these areas have little or no capacity for wind energy development.*

Over 33% of land cover in Donegal holds an environmental designation rendering these lands unfavourable for development. Therefore, sourcing lands that hold the various characteristics suitable for wind development can be challenging. Lands designated as “Open to Consideration” are selected for holding the necessary wind energy potential and grid infrastructure whilst not detracting from scenic amenities and environmental protection. Due to the suitable nature of these lands, clustering of wind farms is likely to occur in these areas. The CDP supports this approach to minimise the spatial extent of environmental impacts stating in E-P-16:

*“It is a policy of the Council to support the clustering of wind farms within the vicinity of existing or proposed grid connections and existing operational and approved windfarms to achieve economies of scale and to minimise the spatial extent of environmental impacts.”*

The site is located within an area that currently accommodates a range of wind farm infrastructure, with 5 no. operational or permitted wind farms within a five kilometre radius, and the connection node to the national grid (Clogher Substation) being located within 6.2 kilometres of the proposed site. The proposed development will therefore be located within a reasonable proximity of other permitted wind farms and the existing grid connection node and accordingly it complies with the CDP’s policy of clustering wind farm infrastructure.

The geographical location of County Donegal, on the Country’s western seaboard, gives rise to an excellent wind resource, with very significant wind energy generation potential. In this regard, Donegal has the potential to play a significant role in Ireland meeting the EU and national renewable energy targets and the current application provides a valuable opportunity to help County Donegal fulfill this role.

### 3.3.1.2 Access to Electricity Grid Infrastructure

The applicants have secured a Gate 3 grid connection offer requiring the connection to be made to the existing 110kV Clogher substation. The distance from the proposed wind farm site to the grid connection point in Clogher will determine the extent and cost of grid upgrades required to facilitate the connection of the wind farm. Therefore, the site of the proposed wind farm utilising the Gate 3 connection at Clogher has to be located

within reasonable proximity to this substation. To ensure the proposed wind farm project is commercially viable, the project team focused the site selection search within a maximum of 20 kilometres from the connecting node. Figure 3.2 below shows the lands considered for the purpose of the site selection study.

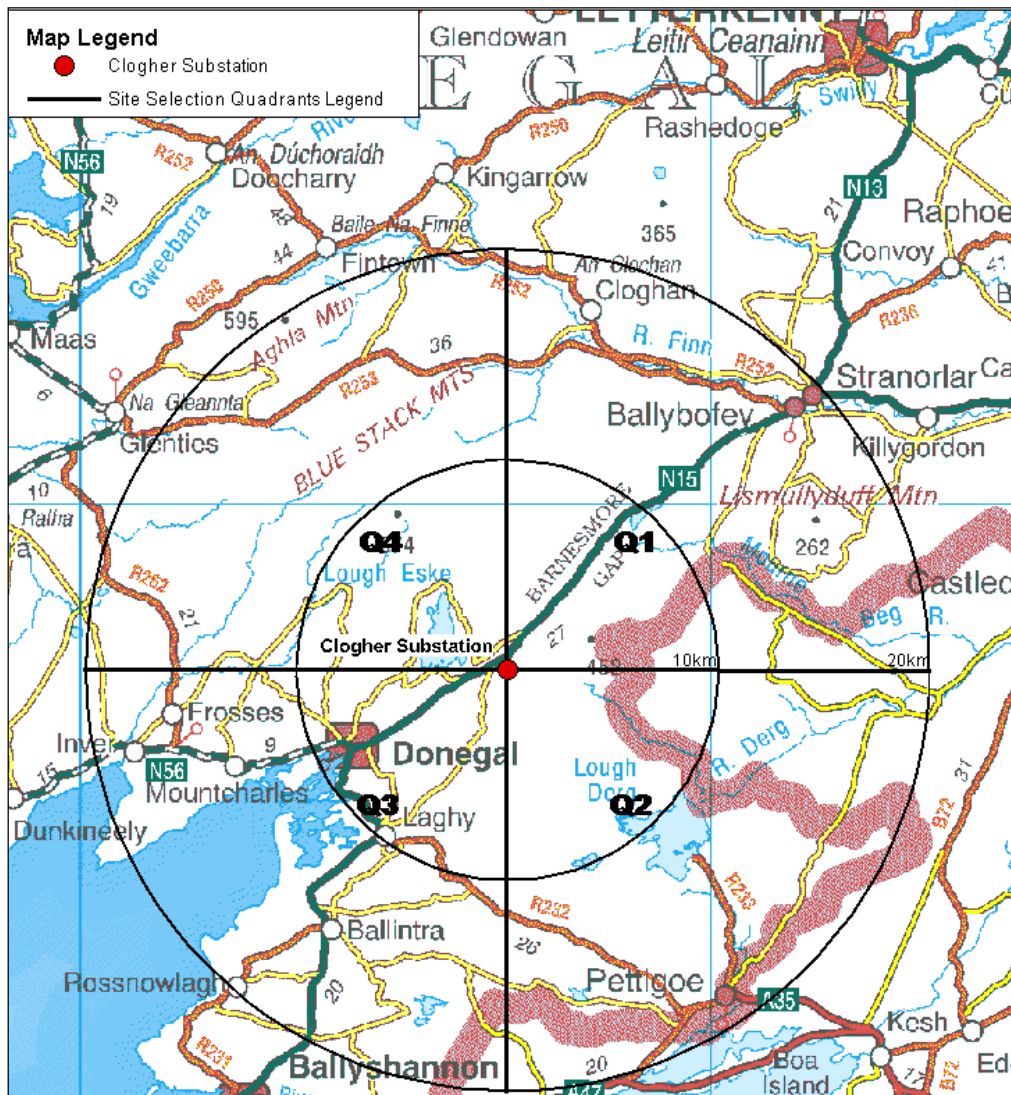


Figure 3.2 Lands Considered within 20km of Clogher Substation

### 3.3.1.3 Wind Speeds

The Irish Wind Atlas produced by The Sustainable Energy Authority (SEAI) of Ireland shows average annual wind speeds for the country. South East Donegal has average annual wind speeds above the 7m/s (metres per second) minimum considered necessary to make a potential wind farm site viable and suitable for wind energy generation. More importantly, the average annual wind speeds on a particular site would inform what size and type of wind turbine would be required in order to extract the maximum energy yield from the wind resource blowing across the site. On-site monitoring of the wind resource, which is ongoing, will further verify that with a sufficient turbine height and blade diameter, the wind resource of the site is commercially viable.

### 3.3.1.4 Designated Sites

There are extensive areas of Donegal designated for ecological protection as either Natura 2000 Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or

Natural Heritage Areas (NHAs). In many cases, multiple designations overlap the same lands. All designated sites in Donegal were already included as Map 9 of the CDP and therefore have already been ruled out as being potentially suitable as wind farm development sites.

### **3.3.1.5 Especially High Scenic Amenity Areas**

There are also extensive areas of Donegal designated as Especially High Scenic Amenity Areas (EHSA). There are of the highest landscape quality characterised by wilderness and few, if any, man-made structures. These areas are identified in Map 8 of the CDP in addition to Views and Prospects in Donegal though are also included in Map 9 of the CDP showing these areas as “Not Favoured” areas for wind energy and therefore have also been ruled out as being potentially suitable as wind farm development sites.

### **3.3.2 Project Site Requirements**

From an early stage in the design process, it was considered optimal to seek a site capable of accommodating a large number of turbines within reasonable proximity to each other. This would limit the geographical spread of the turbines, consolidate supporting infrastructure and also reduce the number of different clusters of turbines that may be required.

The decision to seek to select a single wind farm location also complies with Section E-P-16 of the CDP to support the clustering of wind farms within the vicinity of grid connections and existing operational and approved wind farms to achieve economies of scale and to minimise the spatial extent of environmental impacts.

Whilst smaller suitable sites were also considered, the development of multiple separate wind farm sites spread throughout a wider area would require supporting infrastructure (i.e. roads and cabling etc.) to run from each wind farm site to the connecting substation thereby increasing the amount of infrastructure required for development and increasing the potential for environmental impacts to occur.

While smaller suitable sites may be available, the development of a number of separate wind farm sites in the vicinity to accommodate the grid connection would, it is suggested, give rise to a greater potential for cumulative impacts arising from wind farms in the area rather than optimising the use of a single wind farm cluster at a single location.

### **3.3.3 Methodology**

A rigorous site selection process has been undertaken to identify the optimum site to accommodate a large-scale wind farm in South Donegal. In determining the viability of any wind farm site, the proximity to the grid connection point, the size of the scheme and the nature of the terrain are essential factors. Applying these criteria to the South Donegal context and based on industry experience, it was decided to carry out a strategic site selection search within 20 kilometres of the 110kV substation at Clogher. The distance required to the grid connection point is an important consideration from both an economic and environmental perspective as closer development to the assigned node will require less infrastructural works for connection and accordingly lead to reduced potential for impacts and less disruption. The total area of a land within the 20 kilometre study area radius of Clogher substation, the Strategic Site Search Area (SSSA), amounts to 126,122 hectares.



### 3.3.3.1 Donegal Wind Energy Designations

The CDP has already been subject to Strategic Environmental Assessment (SEA) and therefore, the “Open to Consideration” areas designated have avoided areas where significant adverse environmental impacts could arise. For the purpose of the strategic site search, “Not Favourable” areas were discounted from further consideration under the guidance of the CDP. The areas regarded as “Not Favourable” within 20 kilometres of Clogher accounted for 33,814 ha, (26.8% of total area) and are shown below in Figure 3.3 below. For reference purposes, the SSSA has been divided into four quadrants, Q1, Q2, Q3 and Q4.

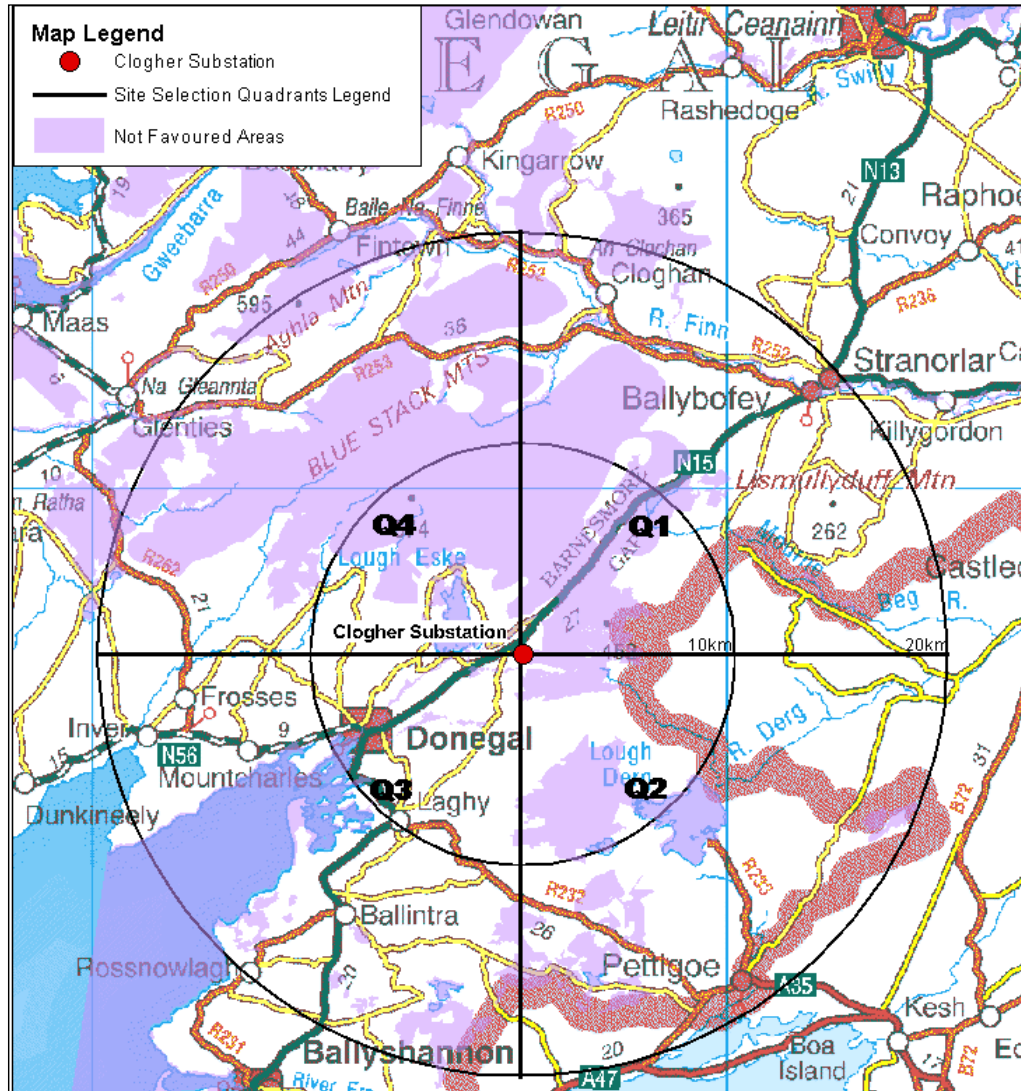
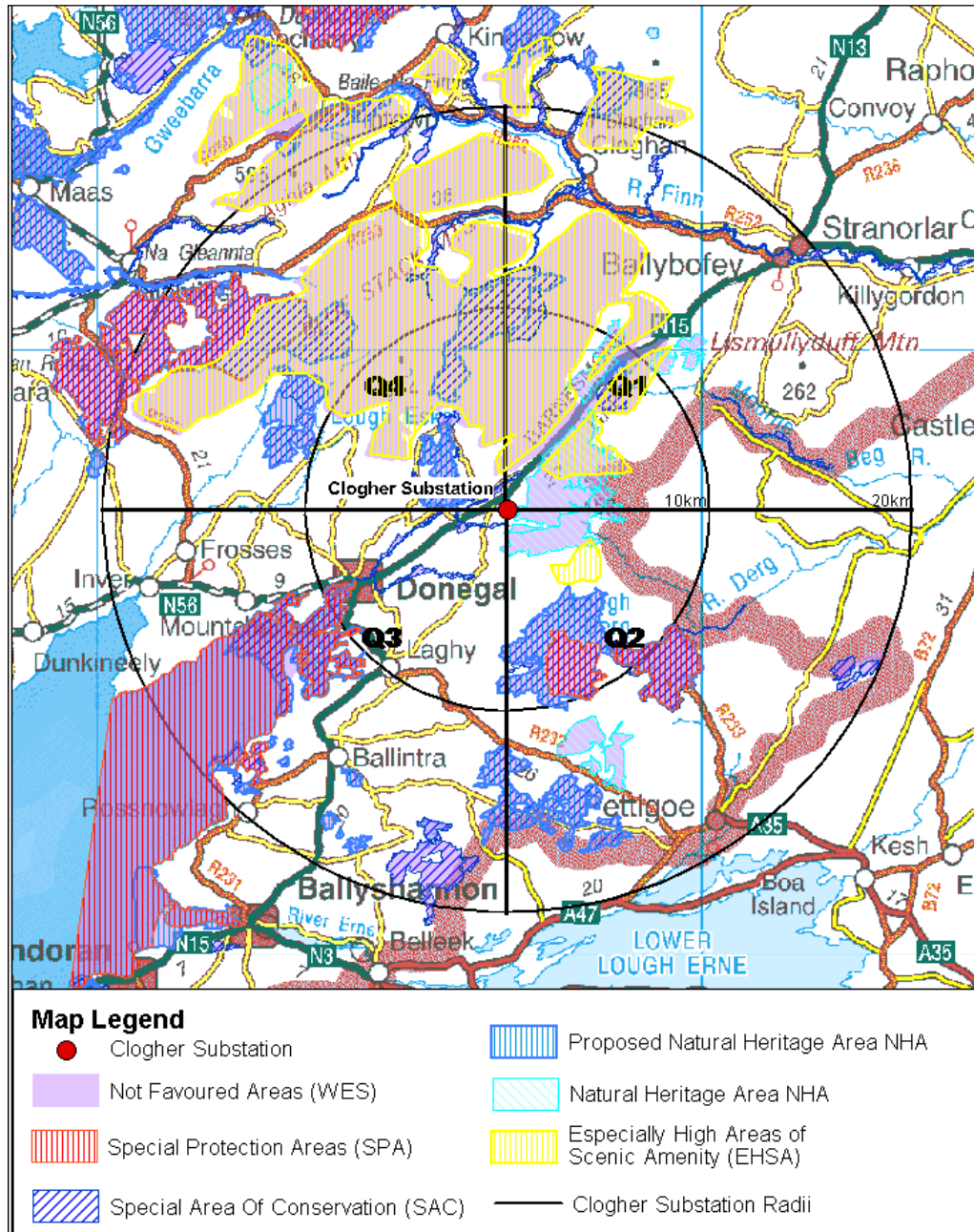


Figure 3.3 Donegal Wind Energy Strategy Designations for South Donegal

### 3.3.3.2 Environmental and Landscape Sensitivity Designations

The Wind Energy Designation Map within the CDP takes a high-level approach to the identification of suitable sites for wind energy developments and does not provide detailed site-specific analysis. Ecologically constrained areas and designated areas including Natural Heritage Areas, Special Protection Areas, Special Area of Conservation (SACs) and Especially High Areas of Scenic Amenity (EHSAs) are included within the Not Favoured areas of the CDP. Designated Areas within Not Favoured areas of the CDP are shown below in Figure 3.4.



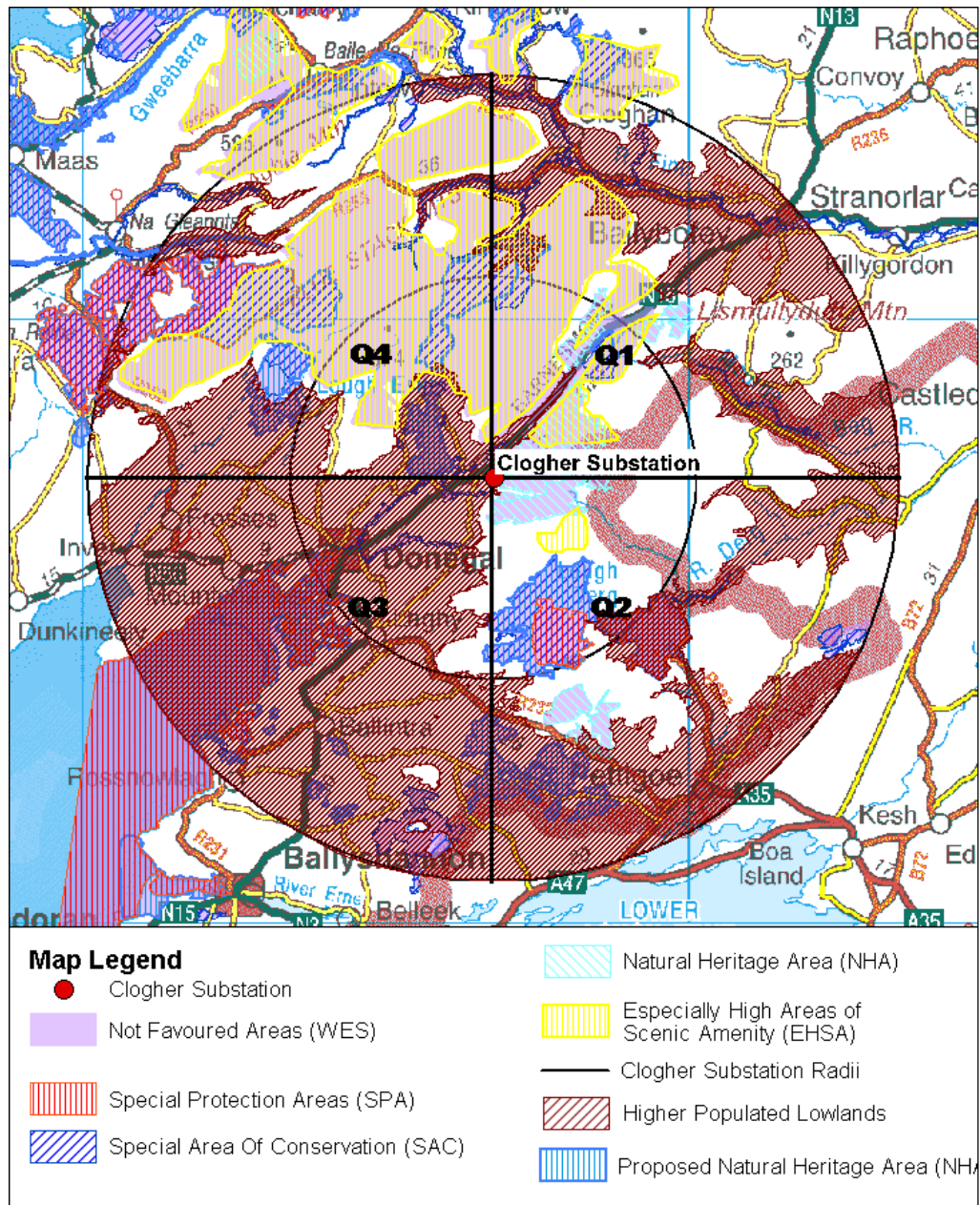
**Figure 3.4 Breakdown of Designated Areas within the Wind Energy Designation Map**

### 3.3.3.3 Higher Populated Lowlands

Throughout Ireland, areas below 150 metres tend to have a higher concentration of population and settlements and frequently are subject to lower average wind speeds. The lower lying landscape also tends to generally accommodate the main traffic routes, towns and higher quality farmlands. In the case of the SSSA, the lower lying landscape (under 150m contour line) also includes a broad coastal area around Donegal Bay which tends to be more visually sensitive and open than lands further from the coast and set within more variable topography. Donegal Bay itself also takes up a significant portion of Q3 (although the bay has been designated as “Not Favourable” for wind farm development).



In the interests of minimising potential impacts on more populated areas and main traffic routes, and in order to maximise the wind resource available at higher elevations, the areas below the 150 metre contour level were discounted from consideration in this instance. The area under 150 metres O.D. amounted to approximately 58,845 hectares. Higher populated lowlands are shown in Figure 3.5 below.

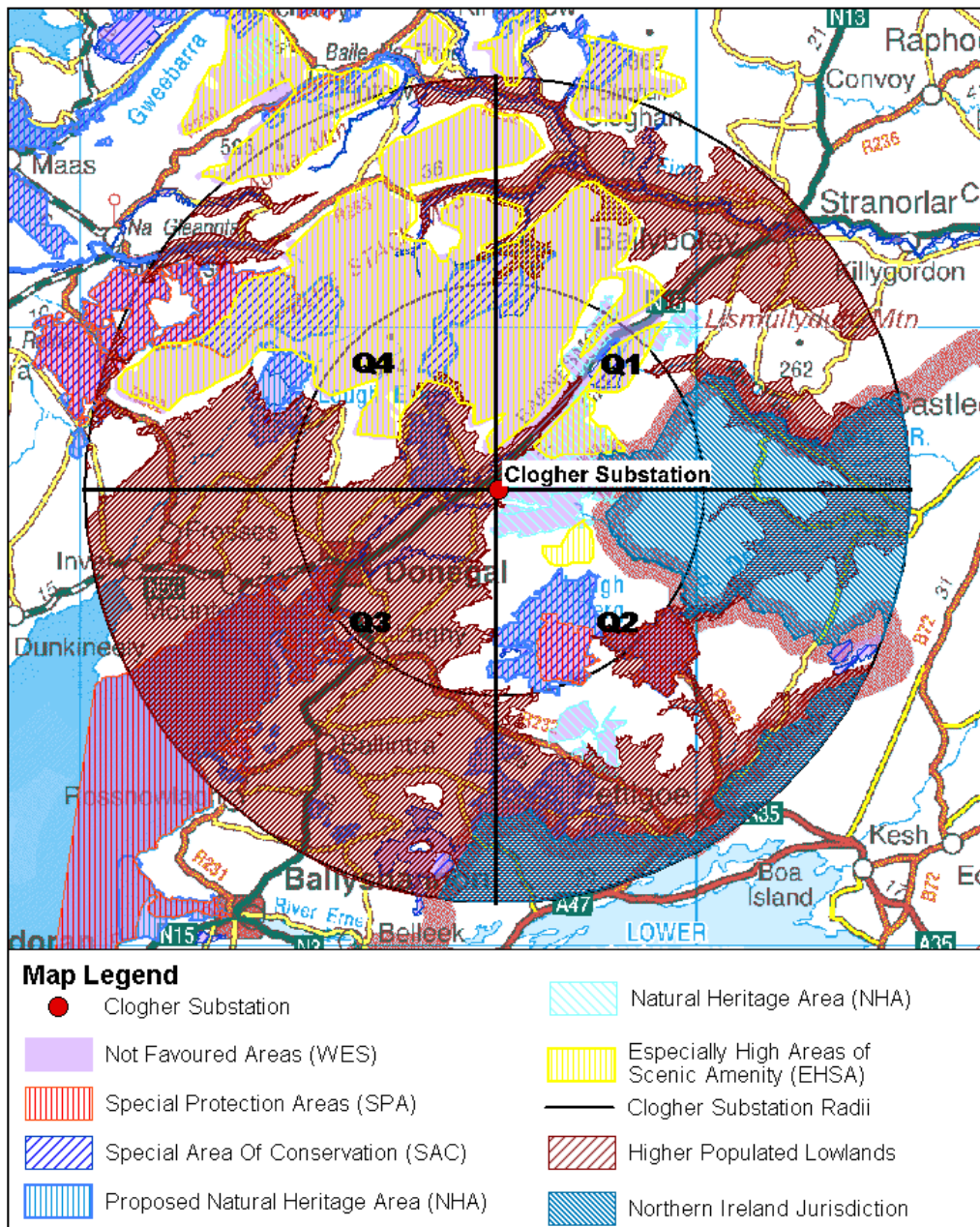


**Figure 3.5 South Donegal including Higher Populated Lowlands as a constraint**

### 3.3.3.4 Northern Ireland Jurisdiction

The Gate 3 Offer Programme is the third round of connection offers issued to generators by the Commission of Energy Regulation (CER) to achieve the government’s 40% target for all electricity consumption within the Republic of Ireland. For this Gate 3 offer, it was necessary to locate the wind farm in the Republic of Ireland. The relevant authorities within Northern Ireland have been consulted in relation to transboundary

issues and the preparation of the EIAR. The Northern Ireland jurisdiction is highlighted in Figure 3.6 below.



**Figure 3.6 South Donegal including Northern Ireland Jurisdiction as a constraint**

### 3.3.3.5 Other Wind Farms

The next constraint which must be applied to the remaining viable area is to remove the sites of other wind farms that have either been granted permission or which are currently going through the planning assessment process. In this regard, there are twelve sites to take into account. These are listed in Table 3.1 and 3.2 below and their extent and locations in the context of the 20 kilometres radius of the connection node is shown in Figure 3.7.

While it is acknowledged that the previous SID application for the Carrickaduff wind farm was refused permission by An Bord Pleanála, it is noted that this refusal reason was not due to there being any issue in relation to the principle of a wind farm at this



location. The refusal reason related entirely to the nature, extent, and scope of the ecological surveying methods carried out to inform the AA and EIA process. Arising from the detailed surveying and intimate knowledge built up by the design team in relation to the site of the proposed development and the outcome of the robust assessments and surveying carried out to complete this EIAR, the previous refusal reason on the Carrickaduff wind farm was not considered as a significant constraint in relation to the principle of providing a wind farm at Meenbog and its surrounding townlands.

**Table 3.1 List of existing, permitted and proposed wind farms within the Strategic Site Search Area (SSSA)**

Donegal Wind farms			
Planning Ref.	County	Name	Status
95/914	Donegal	Lough Golagh	25 Turbines Constructed
96/1342 and 03/103	Donegal	Anarget Wind farm	6 Turbines Constructed
04/1462	Donegal	Meenadreen Wind farm and Meendreen Extension	5 Turbines Constructed
04/1526 and 12/50109	Donegal	Straness	28 Turbines Granted
12/50866	Donegal	Lough Cuill	Permission Granted for 8 turbines

Several wind farms within the SSSA are located within the Northern Ireland jurisdiction. As it has been decided to locate the project within the Republic of Ireland jurisdiction, wind farms in Northern Ireland are not considered a constraint as the lands on which they are located have already been discounted for jurisdictional reasons. However, clusters of Northern Ireland wind farms within 20 kilometres of Clogher Substation are listed below for information.

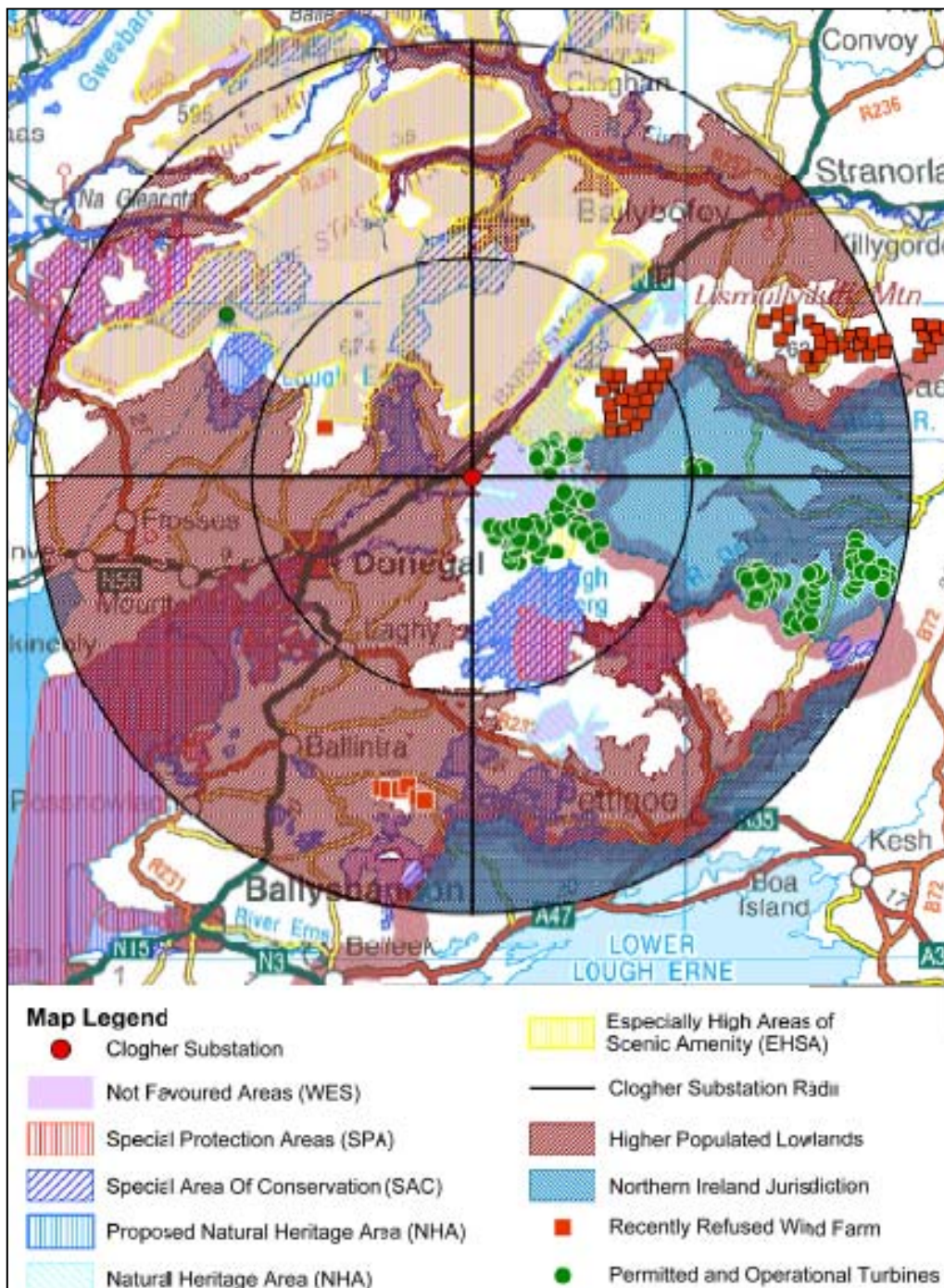
**Table 3.2 Northern Ireland list of Existing, Permitted and Proposed Wind Farms within the Strategic Site Search Area (SSSA)**

Northern Ireland Wind farms			
J/2005/0133/F	Tyrone	Crighshane Wind farm and Crighshane Ext.	14 Turbines Constructed, 5 Turbines Pending
J/2005/0104/F	Tyrone	Tievenameeta	Permission Granted for 15 Turbines.
J/2005/0358/F and J/2013/0183/F	Tyrone	Churchill Wind farm	Permission granted for 8 turbines. Decision pending for one turbine.
J/2006/0883/F	Tyrone	Seegronan	Permission Granted for 6 Turbines. Three turbines pending.
J/2007/0667/F	Tyrone	Gronan Wind farm	4 Turbines Pending
J/2008/0240/F	Tyrone	Meenakeeran	4 Turbines pending a decision
J/2011/0148/F	Tyrone	Meenablugh	11 Turbines under appeal.

Recently refused wind farm applications within the SSSA have also been considered to inform the site selection process. The refusal reasons of relevant wind farms have been reviewed and considered in the site selection assessment. The relevant wind farms are listed in Table 3.3 below and their extent and location in the context of the SSSA are also shown in Figure 3.7.

**Table 3.3 List of Recently refused Wind Farms within the Strategic Site Search Area (SSSA)**

Recently Refused Donegal Wind farms			
Planning Ref.	County	Name	Date Refused
14/50326	Donegal	Altilow	6 Turbines Refused (May 2014)
12/50652 and PL.242411	Donegal	Derries and Tievebrack, Ballintra	7 Turbines Refused in January 2014
PL05.PA0040	Donegal	Carrickaduff	49 Turbines Refused in March 2016



**Figure 3.7 Other wind farm sites in the context of the Strategic Site Search Area.**

### 3.3.4 Strategic Site Assessment Results

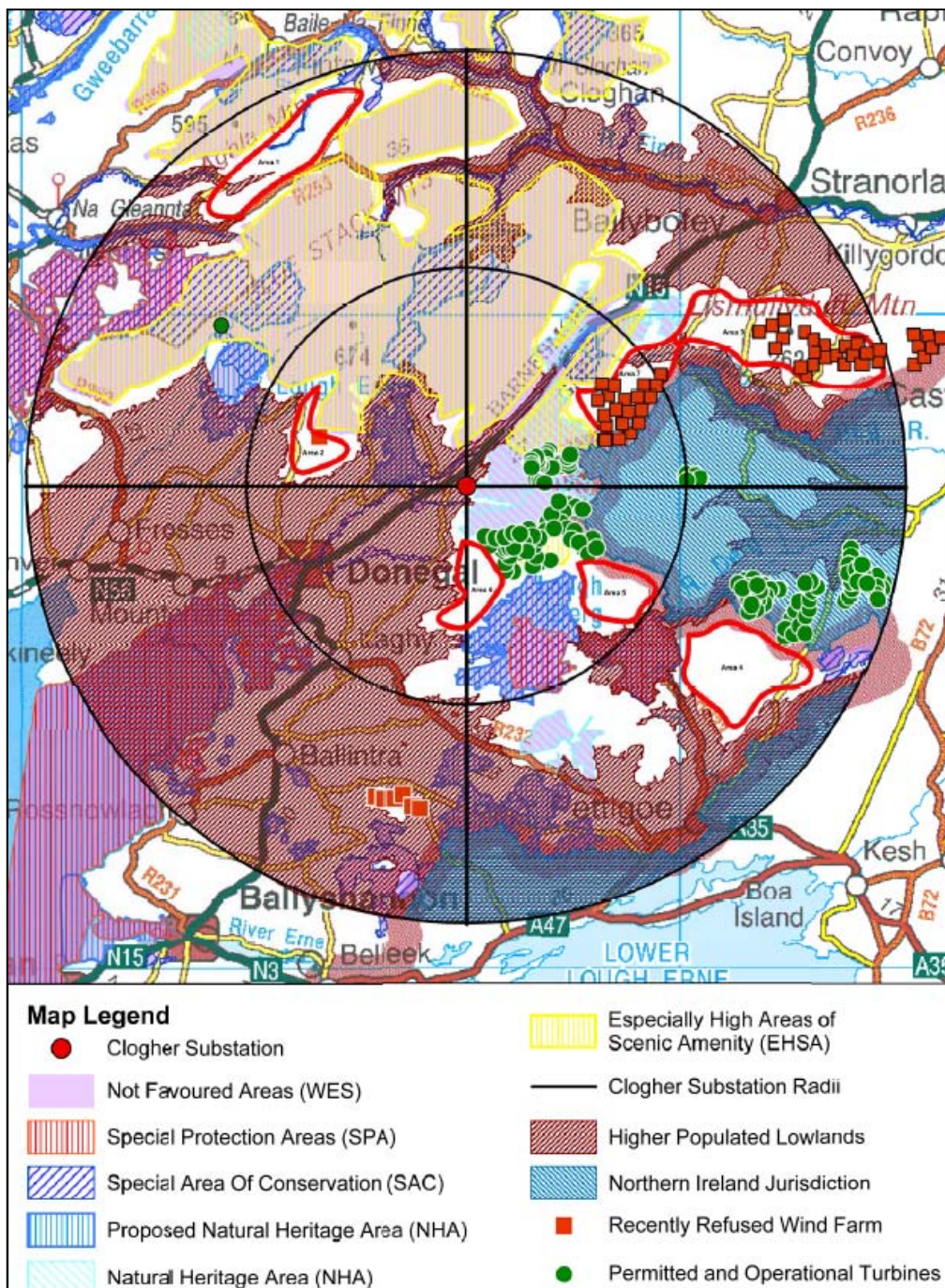
Within the SSSA, the CDP has identified approximately 874km<sup>2</sup> as Open to Consideration and 387km<sup>2</sup> as Not Favourable for wind farm development. Once the strategic, physical and environmental constraints identified above have been applied to the lands designated as being Open to Consideration, the remaining lands available for development fall to less than 370km<sup>2</sup>, (29.3% of the total lands within 20 kilometres of Clogher Substation).

After applying these constraints, the remaining lands provide a range of alternative site locations, shapes and sizes within the 20 kilometre radius of Clogher Substation. These lands are all classified as “Open to Consideration” in the CDP. As the site selection process sought to identify the optimum wind farm site for a large-scale wind farm to accommodate the Gate 3 grid capacity that has been secured, the project team were guided by the land’s capacity to accommodate a wind farm of a significant scale in one area. The provision of a single location to cater for the secured grid was considered optimum because:

- The provision of a single location would concentrate the necessary infrastructure into a single geographic area;
- A single location would negate the need to identify several different disparate sites;
- Concentrating the proposed development would comply with the CDP objective to support the clustering of wind farms within vicinity of proposed grid connections and;
- Consolidate site and grid connection infrastructure and therefore, minimise potential impacts arising from accommodating the grid connection capacity.

Having applied the strategic and physical constraints detailed above to the areas within 20 kilometres of the grid connection node, the residual areas as shown in Figure 3.8 are those that remain available to cater for wind farm development.





**Figure 3.8 Residual Strategic Site Search areas potentially suitable for wind farm development.**

The final strategic site selection constraint to be applied was site size. As the purpose of this exercise is to identify a suitable location for the installation of the Gate 3 grid capacity in South Donegal, smaller residual areas had to be assessed in terms of their capacity to accommodate the number of turbines that would be required. Though certain areas remain appropriate for wind farm development, due to their size and shape, they would only be suitable for the provision smaller scale wind farms.

From experience an area in the range of 20-25 square kilometers is required to accommodate a viable site to cater for a wind farm of the size required once site-specific and local constraints are taken into account. The site selection process has

revealed two medium to large areas in Q4, one large area in Q1 and three medium sized areas of land in Q2 which were considered in greater detail within the site selection assessment. These seven areas are shown in Figure 3.8 and listed in Table 3.4 below.

**Table 3.4 List of Potential Site Options arising from Strategic Site Selection process**

Site Ref.	Name and Description
Area 1	<p><b>Knockletteragh</b></p> <p>The alternative site at Knockletteragh is located in Quadrant 4 of the radius of the SSSA approximately 16 kilometres northwest of Clogher substation. The site runs in a northeast-southwest direction with and encompasses approximately 17 square kilometres of land at this location. The site is located along the R253 between Glenties and Ballybofey with an established linear rural settlement pattern.</p>
Area 2	<p><b>Leagan Hill</b></p> <p>The alternative site at Leagan Hill is also located in Quadrant 4 and lies approximately 6 kilometres west of Clogher substation. The site is currently under commercial forestry and the topography varies in height from 190 metres to a maximum of 278 metres and the site encompasses approximately 4.5 square kilometres of land.</p>
Area 3	<p><b>Carrickaduff Hill and Lismullyduff</b> (Previous SID Application site)</p> <p>Area 3 is located in Quadrant 1 and comprises the largest site (encompassing approximately 33 square kilometres) identified within a 20 kilometre radius of the substation. The site consists of two areas of unconstrained lands separated by an intervening stretch of higher populated lowlands (a constraint applied by the project team and not any official ecological or scenic CDP designation). Due to the sparsely populated nature and small extent of the “higher populated lowland” at this location and the proximity of the two unconstrained areas, both areas were amalgamated for further consideration. The area generally comprises an east to west stretch of upland forestry area running just north of Co. Tyrone. The elevation of the site ranges between approximately 180 and 300 O.D. with the majority of the site sloping in a north-westerly direction.</p>
Area 4	<p><b>Tievemore and Groushall Hill</b></p> <p>The fourth alternative site lies in Quadrant 2 and lies approximately 12 kilometres south east of Clogher substation. The identified site encompasses approximately 17 square kilometres of land and is generally mountainous with its topography ranging from 170 to 363m O.D. at Crockinnagoe. The area is located directly east of Lough Derg and is partially forested and traversed by several lakes and the Ominey River.</p>
Area 5	<p><b>Binna Hill and Crockmore</b></p> <p>This site shares many of the same characteristics as the site at Tievemore and Groushall Hill. The site also lies in Quadrant 2 and lies approximately six kilometres south east of Clogher Substation. The area is generally mountainous ranging from 170m to 315m and 324m O.D. at Binna Hill. The lands are partially forested and the site is traversed by several rivers. The area is located directly north of Lough Derg and the identified lands extend over approximately 7 square kilometres.</p>
Area 6	<p><b>Finmore Hill</b></p> <p>The site at Finmore Hill is primarily located within Quadrant 2 of the study area radius and is located approximately 3 kilometres south from Clogher Substation. The area is generally mountainous to the east and gradually slopes downward to approximately 180 metres O.D. to the west of the area. The identified site encompasses approximately 5 square kilometres of land.</p>

## **3.4 Alternative Site Assessment**

Having identified the residual areas listed in Table 3.4 as having potential to accommodate wind farm sites capable of delivering a significant amount of the remaining Gate 3 capacity in South Donegal, each was then subjected to a finer detailed review to identify any further constraints that may exist.

### **3.4.1 Alternative Sites Comparison**

It is acknowledged that the CDP has identified all of the sites as being suitable for wind farm development at a strategic level. The purpose of the site selection process undertaken was to identify the most appropriate and least environmentally sensitive site in South Donegal that could accommodate a large-scale wind farm and the Gate 3 grid connection that has been secured for this project. Table 3.5 below summarises the main characteristics of the seven sites identified from the strategic site selection process and assesses the contrasting potential for adverse impacts from the provision of a significant wind farm development. The general assessment and comparison criteria are discussed below.

#### **3.4.1.1 County Development Plan Policy**

All of the seven sites have been identified as being appropriate locations for the provision of wind farms. i.e. “Open to Consideration” in the CDP. Equally, all areas contain some degree of a close proximity to ecologically designated areas or Especially High Scenic Amenity areas. Furthermore, the recent adoption of Variation no. 2 of the County Development Plan which requires a ten times tip-height separation distance to be provided between a proposed turbine and residential properties or other centre’s of human habitation has had a significant impact on the suitability of the identified sites in terms of being able to comply with policy requirements

Though “Open to Consideration”, Area One is effectively surrounded by a large EHSA that is considered “Not Favourable” for development. This “Not Favourable” area is located adjacent to the north, south and east of Area One. It would be difficult to achieve the ten times tip height separation distance (as set out in the CDP Variation No. 2) from residential properties due to the proximity to dwellings along the regional road and the linear pattern in which they have developed. Therefore, it was determined that Area 1 could not comply with the CDP policy requirements.

The northern boundary of Area 2 straddles the EHSA and is located approximately 1.3 kilometres from Lough Eske and Ardnamona Wood pNHA and SAC to the east of the site. With regard to Variation No. 2 of the County Development Plan and the dispersed rural settlement pattern in this area it would be difficult to achieve the appropriate set back distances from the residential properties. Due to a significant portion of the area being bordered by a Natura 2000 designations, the proximity to dwellings and Scenic Amenity designations, Area 2 was not regarded as the optimal location for a wind farm development.

To the west of Area 3 lies an EHSA area and a small NHA pocket known as Lough Hill Bog (000122). Due to the size of Area 3, a large portion of the area remains surrounded by lands designated as “Open to Consideration” to the north and south of the area and the site is of a significant scale to accommodate adequate buffers between sensitive landscapes and features in the vicinity. In relation to the provisions of Variation no. 2 of the County Development Plan it became apparent on review that there were different settlement patterns throughout the Lissmullyduff/Carrickaduff Hill site. While there is a dispersed rural settlement pattern throughout the overall site, in terms of the spatial extent of dwellings these are concentrated in the eastern (Lissmullyduff) portion of the

site. The western portion of the site (that centred on Carrickaduff Hill) in the townlands of Meenbog and Croaghonagh, was much more remote in terms of dwellings and therefore it could accommodate the separation distances required under Variation no. 2.

The southern boundary of Area 5 straddles Lough Derg SPA (002301) and pNHA (000162) and is also located adjacent to Dunragh Lough/Pettigo Plateau pNHA to the west of the area which is partially designated as an SPA. Area 4 equally borders Lough Derg SPA and pNHA to the west whilst the eastern boundary of Area 4 borders Lough Nageage SAC. With regard to Variation No. 2 of the County Development Plan and the dispersed rural settlement pattern in Area 4 once the separation distances required under variation no. 2 of the CDP are applied there is not sufficient land to accommodate a wind farm of the required scale. Due to the small number of isolated residences proximate to Area 5 and its smaller size to begin with the separation distances as set out in Variation No. 2 completely reduce its capacity to cater for a wind farm of the scale required.

Area 6 is also located adjacent to Dunragh Lough/Pettigo Plateau pNHA and SPA and borders Barnesmore Bog NHA to the north. With regard to Variation No. 2 of the County Development Plan and the dispersed rural settlement pattern in this area it would be difficult to achieve the appropriate set back distances (ten times tip height) from residential properties.

#### **3.4.1.2 Proximity to Grid Connection Substation**

The proximity to the grid connection point, the size of the scheme and its capacity to absorb the costs of underground cabling is an essential factor in determining site suitability. In addition to this, underground cabling to the substation (national grid connection) tends to follow the public and local road network which further extends the amount/length of cabling required between a proposed development and the substation leading to potentially greater environmental disruption and costs.

The grid connection offer that has been secured for the current proposal is located at the existing Clogher substation. The location of the Clogher substation relative to the various areas can be seen on Figure 3.8. Area one is the furthest away, located approximately 16.5 kilometres (direct line) from the substation. Areas 2, 3, 5, 6 and 7 are the more optimal locations in terms of proximity to the connecting substation.

#### **3.4.1.3 Landscape and Visual Impact**

One of the key considerations in relation to wind farm development is the potential visibility and visual impact of proposed turbines. In this regard, the alternative site assessment focused on the potential for turbines at the various locations to give rise to significant visual impacts. Area one is located adjacent to an EHSA to the north and south of the site whilst Area 2 adjoins an ESHA to the north of the site. The proximity of the sites from EHSA designations under the County Development Plan provisions were taken into consideration as closer proximity to these EHSAs would give rise to greater potential for impacts as these represent the most sensitive landscape areas of the County. They also represent the main tourist landscape features and natural recreational areas within the County. Area no's 1 and 2 are located immediately adjacent to significant EHSA's so may have potential to give rise to visual impacts.

Coastal views such as Donegal Bay, and views of significant lake features such as Lough Eske and Lough Derg were also considered in the strategic assessment of visual impacts as such areas may hold higher levels of sensitivity to development and are considered strong amenity/focal points. Area no's 2 and 6 are located on the edge of

lower lying lands thereby increasing their potential for visual dominance from coastal plains. The proximity of Area no. 2 to Lough Eske and the proximity of Area no. 4 and 5 to Lough Derg also may have potential to give rise to visual impacts due to their recognised lake views and strong amenity attractions.

The proximity of areas 1, 2, 4, 5 and 6 to either significant areas of Especially High Scenic Amenity or areas of visual sensitivity (coastal plain, large lake feature) lead to these areas not being considered as optimal locations for the proposed wind farm development. Area 3 has been assessed by An Bord Pleanála in 2016, as part of the previous SID application under ABP Ref. PL05.PA0040. In its consideration, the Board considered that the principle of a wind farm at this location was acceptable from a landscape and visual impact perspective.

#### **3.4.1.4 Delivery and Site Access**

The suitability of each site in terms of delivery and access was also considered. To construct the proposed wind farm development, it is essential that roads accessing the site can accommodate oversized loads for turbine blade deliveries. This requires careful consideration and planning in the delivery of the turbines to ensure that the existing road network can accommodate turbine delivery vehicles. Access to Area One can be gained directly from the N56 primary route and R253 regional road and is therefore suitably located for the delivery of turbines. The proximity of Area Three to the N15 and R235 also makes the area preferable for the delivery of turbines

Area 2, 4 and 5 would require extensive use of local roads for construction access. Due to the vertical and horizontal alignment and condition of junctions on the existing local road network, a greater amount of road and junction improvements would be required making these areas less suitable than other areas for access and turbine delivery.

#### **3.4.1.5 Site Capacity**

Size was also assessed in the context on the scale of the proposed wind farm. Though all six sites contain lands appropriate for wind farm development, due to their size and shape, Area 6 and Area 2 would only be suitable for the provision smaller scale or medium sized wind farms. Areas 1, 3, 4, and 5 were considered more suitable for large developments. Of the six sites considered, site specific constraints and setback buffers resulting from dwellings, watercourses, telecommunications links, ecological constraints and national monuments will further refine the size of the areas to reduce the amount of lands available for development. Of these site-specific constraints by far the most significant is the separation distance required under Variation no. 2 of the County Development plan. Once the ten times tip height separation distance was considered with the other constraints it became clear that area 3 emerged as the only area that contains sufficient residual/viable land capable of accommodating a wind farm of the scale required to accommodate the grid connection.

Table 3.5 below summarises and ranks the sites comparatively to identify the site with the least impacts arising from a wind farm development. The purpose of the Alternative Site Analysis table below is to identify the optimum location to accommodate the proposed wind farm through a comparative study. Table 3.5 provides a row for each of the six areas and ranks each site in terms of their suitability to accommodate the proposed project based on the various strategic, visual and physical constraints. The lowest scoring area shows the optimum and most resilient site after the various constraints set out above have been applied.



**Table 3.5 Summary of Comparative Site Analysis**

Site Ref.	Name	Planning Policy	Strategic Visual Impact Analysis		Project Specific Suitability Criteria			
		Wind Energy Strategy Designation	Proximity to Coastal Attractions/Lake Amenities and EHSAs	Proximity to closest Population Centres and Settlement Patterns - CDP Variation No. 2		Site Capacity	Proximity to Grid Connection Substation	Delivery and Site Access
1	<b>Knockletteragh</b>	Open to Consideration	Surrounded by significant area of EHSAs to north, south and east of the area. No visual impact from large inland lakes or coastal plains	Glenties approx. 6.5km to west. Low density residential pattern centrally located within the site. Linear residential development along R253 on the south of the site. Unable to achieve ten times tip height separation distance as set out in CDP Variation No. 2.		Reasonable site capacity though shape of site may restrict number of turbines and layout.	Minimum of 17 kilometres from grid connecting substation.	Direct access via the N56 primary route and R253 Regional Road
		Considered Impact Weighting	Low (1)	High (3)	High (3)	Medium (1)	High (3)	Low (1)
2	<b>Leagan Hill</b>	Open to Consideration	Proximate to and visible from large inland lake and open to views from coastal plain. Moderate to High visual impact from EHSAs due to views from the north and previous ABP decision.	Approx. 3.7 km from Donegal Town. Approx. 9 km North of Laghy. Low density linear residential pattern along the west of the site. Unable to achieve ten times tip height separation distance as set out in CDP Variation No. 2.		Minimal site capacity to accommodate entire grid connection.	Minimum of 6 kilometres from connecting substation.	Long access via local roads
		Considered Impact Weighting	Low (1)	Medium (2)	High (3)	High (3)	Medium (2)	High (3)
3	<b>Carrickaduff Hill and Lismullyduff</b>	Open to Consideration	Minimal visibility from Coastal plains and strong amenity attractions. Moderate to Low Visual Impact from partial proximity to EHSAs from part of site. Previously considered visually acceptable by ABP.	Approx. 3.5 kilometres south of Ballybofey and Stranorlar. Very low density residential development in the western portion of the site with relatively more dwellings located in the eastern portion. While western portion (centred on Meenbog Townland) can achieve separation distances overall the site is unable to achieve ten times tip height separation distance as set out in CDP Variation No. 2.		Extensive site capacity to accommodate entire grid connection	Minimum of 6.5 kilometres from connecting substation.	Direct access to part of site via N15 National Road. Access gained to eastern side of site though R235 regional road to Castlefinn and local roads towards the entrance.
		Considered Impact Weighting	Low (1)	Low (1)	Entire Site – Medium (2)	Western Portion of Site Low (1)	Low (1)	Medium (2)
4	<b>Tievemore and Groushall Hill</b>	Open to Consideration	Proximate to and visible from large inland lake. No visual impact from EHSAs or coastal plain.	Approx. 4.5 km from Pettigo. Low density residential development along local road to the east of the site. Unable to achieve ten times tip height separation distance as set out in CDP Variation No. 2.		Reasonable site capacity to accommodate entire grid connection	Minimum of 13 kilometres from connecting substation.	Long access via Local Road Network
		Considered Impact Weighting	Low (1)	Medium (2)	High (3)	Medium (2)	High (3)	High (3)
5	<b>Binna Hill and Crockmore</b>	Open to Consideration	Proximate to and visible from large inland lake. Low visual impact from EHSAs and open to views from coastal plain.	Approx. 9.7 km from Pettigo. Only one house located within area therefore very low density residential. This site appears capable of achieving ten times tip height separation distance as set out in CDP - Variation No. 2.		Capacity to accommodate part of grid connection. Other sites will need to be considered for remaining grid.	Minimum of 6.5 kilometres from connecting substation.	Long access via Local Road Network
		Considered Impact Weighting	Low (1)	Medium (2)	Low (1)	High (3)	Medium (2)	High (3)
6	<b>Finmore Hill</b>	Open to Consideration	Moderate visibility from coastal plain. Low visual impact from EHSAs	Approx. 6.7km from Donegal Town. Approx. 8.5km from Laghy. Low Density residential development in west of area with more medium density towards coastal plain to west. Unable to achieve ten times tip height separation distance as set out in CDP Variation No. 2.		Capacity to accommodate part of grid connection. Other sites will need to be considered for remaining grid.	Minimum of 3 kilometres from connecting substation.	Approximately 3 km directly from N15. Medium proximity from National Road
		Considered Impact Weighting	Low (1)	Low (1)	High (3)	High (3)	Low (1)	Medium (2)

### 3.4.2 Alternative Site Assessment Conclusion

All six identified sites have potential to accommodate wind farm development as evidenced by the findings and designations within the CDP. The purpose of the strategic site selection process was to identify the optimum location to accommodate a large-scale wind farm and the Gate 3 grid capacity secured for the project in South Donegal. Table 3.5 above provides a summary of the potential for impacts to arise across the range of criteria assessed. The potential for impacts have been identified as low, medium and high, and each of these is given a weighting score of 1, 2 or 3 respectively and applied across the six criteria for each site. The site with the lowest score emerges as the least sensitive and most appropriate to bring forward for the project. The results of the site assessment comparison are summarised in Table 3.6 below.

**Table 3.6 Results of the Alternative Site Assessment Comparison**

Site Reference	Name	Total Impact Weighting	Sequential Ranking
Area 1	Knockletteragh	12	= 3
Area 2	Leagan Hill	14	= 5
Area 3	Carrickaduff Hill and Lismullyduff	7 – 8	1
Area 4	Tievemore and Groushall Hill	14	= 5
Area 5	Binna Hill and Crockmore	12	= 3
Area 6	Finmore Hill	11	2

As evidenced in Table 3.6 above, and in the preceding analysis Area 3 (Carrickaduff Hill and Lismullyduff) has clearly emerged as the optimum location for the proposed development. The total impact weighting of (7 – 8) is dependent on whether the entirety of the area or a subset of the area (centered on the townlands of Meenbog/Croaghonagh in the western portion of Area 3) is considered. The more favourable weighting (i.e. lower potential impact) applied to the western portion of the site emerges from the low number of dwellings in its vicinity and its ability to accommodate the ten times tip-height separation distances required by the County Development Plan under the provisions of Variation no. 2.

The development of a wind farm within the western portion of Area 3 in the townlands of Meenbog/Croaghonagh emerged as having the least potential to give rise to adverse impacts on the environment, human beings, and visual amenities of the South Donegal Area and has been selected by the CDP as “Open to Consideration” for wind farm development. Due to the small number of residential properties in the vicinity it is possible to achieve the 10 times tip height separation distance set out in the CDP Variation No. 2. Therefore, on the basis of the above alternative site assessment, the Meenbog/Croaghonagh site was selected to undergo a more detailed site-specific layout design, review and has been progressed as the most appropriate site for a large-scale wind farm development within a 20 kilometres radius of the existing Clogher 110kV substation.

### 3.5 Site Layout Design, Alternatives and Constraints Methodology

Having emerged from the alternative site selection process as the optimum location for wind farm development within a 20 kilometre radius of Clogher 110kV substation,

a detailed design and constraints assessment of Area 7 (which from here is referred to as Meenbog) had to be undertaken.

The design of Meenbog has been informed by a collaborative process from the outset, involving the designers, developers, engineers, landowners, environmental, hydrological and geotechnical, archaeological and traffic consultants. 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 including the previous reason for refusal on the Carrickaduff wind farm. Following the site selection process, a scoping procedure was carried out to inform further decisions on the proposed development. From this stage, the design process has taken account of the recommendations and comments of the relevant statutory and non-statutory organisations and individuals, as detailed in Section 2.6 of this EIAR. The site selection process detailed in Section 3.3 has informed the design process through the application of mitigation measures by avoidance of sites that may hold strategic, environmental or physical constraints. This hierarchical approach influenced the layout and design of the proposed wind farm by selecting the lands of Meenbog as having the least strategic, environmental and physical impacts of the lands in South East Donegal.

### **3.5.1 Constraints and Facilitators Mapping**

The constraints mapping process involves the identification and buffers of potential constraints to development so as to identify clearly the areas within which development works should be avoided or minimised. The size of the buffer zone for each constraint has been assigned using guidance presented in the Department of the Environment, Heritage and Local Government Wind Energy Guidelines (DoEHLG, 2006) where relevant, industry best practice or has been judged based on the professional experience of the project team.














The constraints and facilitators map for the site, as shown in Figure 3.9, has been produced following a desk study of all site constraints and facilitators. Constraints are project restrictions that inform the design layout of the proposal by highlighting on-site sensitivities and providing appropriate setback buffers. Facilitators are factors that give an advantage to a proposed design layout (e.g. existing road infrastructure within the site). Figure 3.9 encompasses the following constraints and associated buffers:

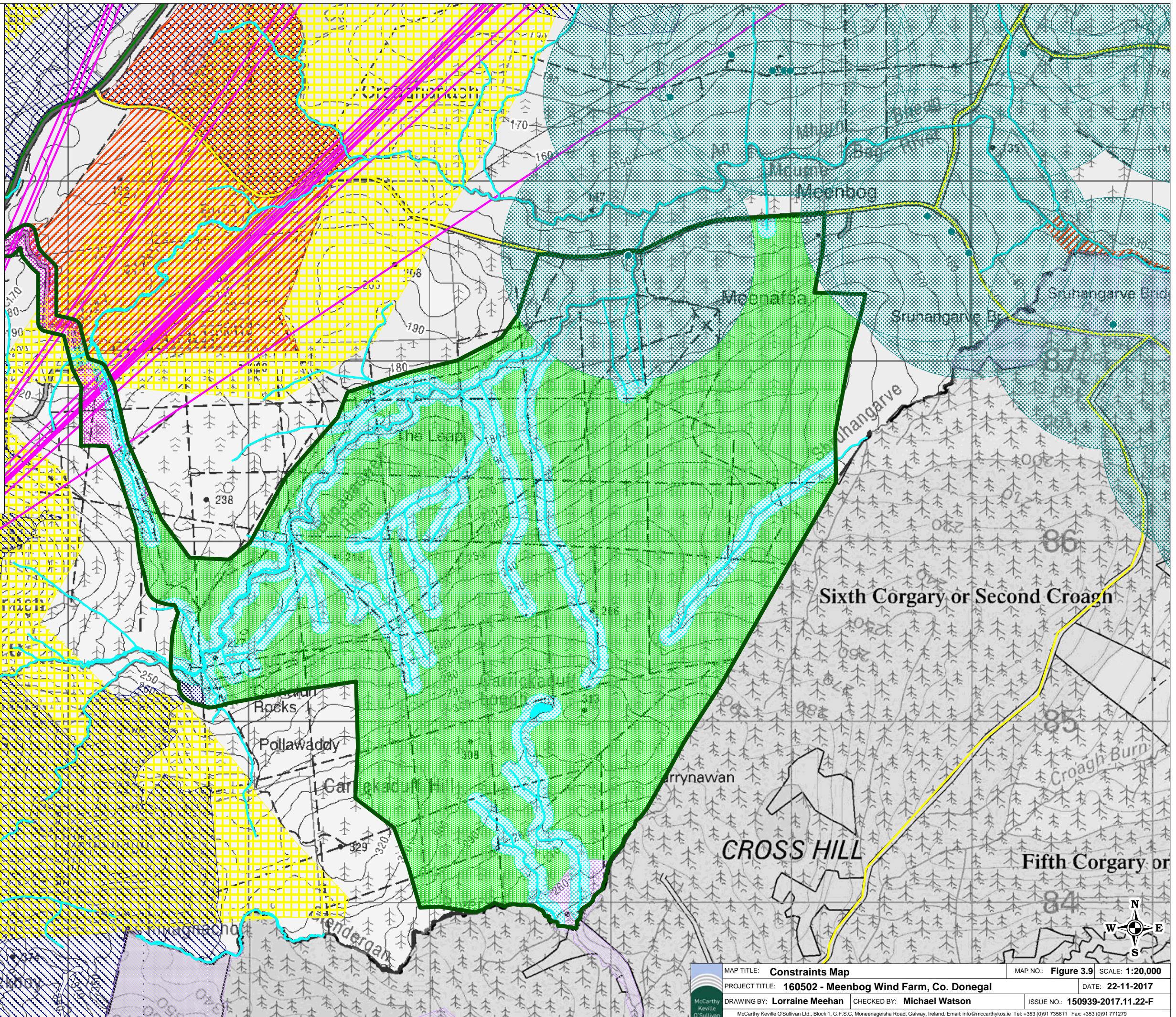
- Dwellings 700-metre buffer;
- Telecoms links buffer of a size requested by the relevant operator;
- Power Line with 300m recommended exclusion buffer;
- Designated areas: Special Protection Area (SPA), Special Area of Conservation (SAC), Areas of Especially High Scenic Amenity (EHSA), Areas of Special Scientific Interest (ASSI) 200-metre buffer; Natural Heritage Area (NHA) and proposed Natural Heritage Area (pNHA) 100-metre buffer;
- Hen Harrier Nest/Roost 500 metre buffer;
- Lakes 50-metre buffer;
- Watercourses 50-metre buffer;
- Archaeology 30-metre exclusion buffer; and
- Appropriate separation buffer from adjacent landholdings.

The initial constraints and facilitators map that was prepared for the proposed development site shows the viable area generated from the constraints study and also highlights the site facilitators for wind turbine development. These facilitators build on the existing advantages of the site arising from its location (within the Open to



**Map Legend**

-  EIAR Site Boundary
-  Dwelling Location
-  700m Dwelling Buffer
-  River / Stream
-  Lake
-  50m Watercourse / Lake Buffer
-  Special Area of Conservation (SAC)
-  200m SAC Buffer
-  Natural Heritage Area or proposed Natural Heritage Area (NHA or pNHA)
-  200m NHA / pNHA Buffer
-  Area of Significant Scientific Interest (ASSI)
-  200m ASSI Buffer
-  Telecommunications Link
-  300m Telecommunications Link Buffer
-  Especially High Scenic Amenity Areas (EHSA)
-  Viable Area
-  National Primary Road
-  Local Road



MAP TITLE: <b>Constraints Map</b>	MAP NO.: <b>Figure 3.9</b>	SCALE: <b>1:20,000</b>
PROJECT TITLE: <b>160502 - Meenbog Wind Farm, Co. Donegal</b>	DATE: <b>22-11-2017</b>	
DRAWING BY: <b>Lorraine Meehan</b>	CHECKED BY: <b>Michael Watson</b>	ISSUE NO.: <b>150939-2017-11.22-F</b>
<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenagasha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>		



Consideration Area) for wind farm development as set out in the County Development Plan, and its accessibility/proximity to the national road network (thus facilitating turbine delivery) and include the following:

- Available lands for development;
- Proximity to Clogher Substation;
- Existing roads and tracks within the site; and
- Limited extent of constraints.

Mapping the constraints and facilitators within the study area at Meenbog/Croaghanogh identified a viable area within which wind turbines could be accommodated. Once the viable area was established, the siting requirements of the wind turbines in terms of separation distances etc. were considered and a preliminary layout was developed for the site.

Following the mapping of all known constraints, detailed site investigations were carried out by the project team. The ecological assessment of the site encompassed habitat mapping and extensive surveying of birds and other fauna. This assessment, as described in Chapter 6 of this EIAR on Biodiversity, Flora and Fauna, optimised the decision on the siting of turbines and the carrying out of any development works, such as the construction of roads. The hydrological and geotechnical investigations of the site examined the proposed locations for turbines, roads and other components of the proposed development, such as the substation and the construction compound. Where specific areas were deemed as being unsuitable for the siting of turbines or roads, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out of consideration. The turbine layout for the proposed wind farm has also been informed by wind data and the results of noise assessments as they became available.

During the design and EIAR preparation processes, as the turbine layout was amended or updated, as required, the revised coordinates were circulated to all members of the project team in order to ensure that the most up to date layout was being assessed. The previous turbine layouts considered during the design process are described in Section 3.5.2 below.

## **3.5.2 Site Design Considerations and Alternatives**

### **3.5.2.1 Turbine Numbers and Model**

The proposed wind farm has been designed to cater for the grid connection capacity that has been secured by the applicant for connection into the Clogher Substation. Having regard to the available wind resource and the selected power output for the proposed wind farm, it is proposed to install 19 turbines with a maximum tip height of up to 156.5 metres which will have a generating capacity in excess of 50 MW to achieve the required output. The installation of smaller turbines at this location would not make efficient use of the wind resource available having regard to the nature of the site. A larger number of smaller turbines would result in the wind farm occupying a greater footprint within the site, with a larger amount of supporting infrastructure being required (i.e. roads, etc.) and increasing the potential for environmental impacts to occur. The proposed number of turbines takes account of all site constraints and the distances to be maintained between turbines and features such as roads and houses, while maximising the wind energy potential of the site. The turbine layout selected for the site has the smallest development footprint of the other alternatives considered, while still achieving the required output at a more consistent level than would be achievable using different turbines.



The turbine model to be installed on the site will be the subject of a competitive tendering process and wind energy yield analysis. The maximum height of the turbines that will be selected for construction on the site will not exceed 156.5 metres when measured from ground level to blade tip. Within this envelope, the Siemens S113, Nordex N117, Vestas 126 turbines are examples of the models which could make the most efficient use of the wind on-site (please note that this is a non-exhaustive list of turbine examples).

Typical heights for modern commercial turbines in Ireland are now in the region of 150 - 170 metres and windfarms of this height have been permitted in Ringaskiddy, Co. Cork, Monaincha Wind farm, Co. Tipperary, Ballingearry, Co. Cork and Yellow River Wind farm, Rhode, Co. Offaly, Meenwaun Wind Farm, Banagher, Co. Offaly, Oweninny Wind Farm Co. Mayo. Turbine models of 156.5 metres can be seen in operation on Monaincha Wind farm, Co. Tipperary (Pl. Ref. 11/510103) and Ringaskiddy Wind farm, Co. Cork. In Europe, tip heights of up to 200 metres are becoming standard in recent years. The use of smaller turbines at this site would not be appropriate as it would fail to make the most efficient use of the wind resource passing over the site by comparison to utilising larger, modern and more productive models.

### **3.5.2.2 Turbine layout**

The final proposed turbine layout takes account of all site constraints and the distances to be maintained between turbines and constraints such as houses and watercourses as well as considering the requirements of the County Development Plan. The layout is based on the results of all site investigations that have been carried out during the EIAR process. As information regarding the site of the proposed development was compiled and assessed, the number of turbines and the proposed layout have been revised and amended to take account of the physical constraints of the site as well as the requirement for buffer zones and other areas in which no turbines could be located.

During the project design, the project team adopted an approach of establishing that various areas of the site were viable, before moving on to consider other potential areas. For that reason, the number of turbines varied with the various iterations of the layout, and in addition to optimising the turbine locations, additional turbines were added and omitted to and from the proposed layout, until the final number of 19 turbines were located in what was considered to be their optimum locations.

The selection of turbine numbers and layout has also had regard to wind take, potential noise and shadow flicker impacts, the separation distance to be maintained between turbines and visual impacts. The EIAR and wind farm design process was an iterative process, where findings at each stage of the assessment were used to further refine and inform the design process, always with the intention of minimising the potential for environmental impacts.

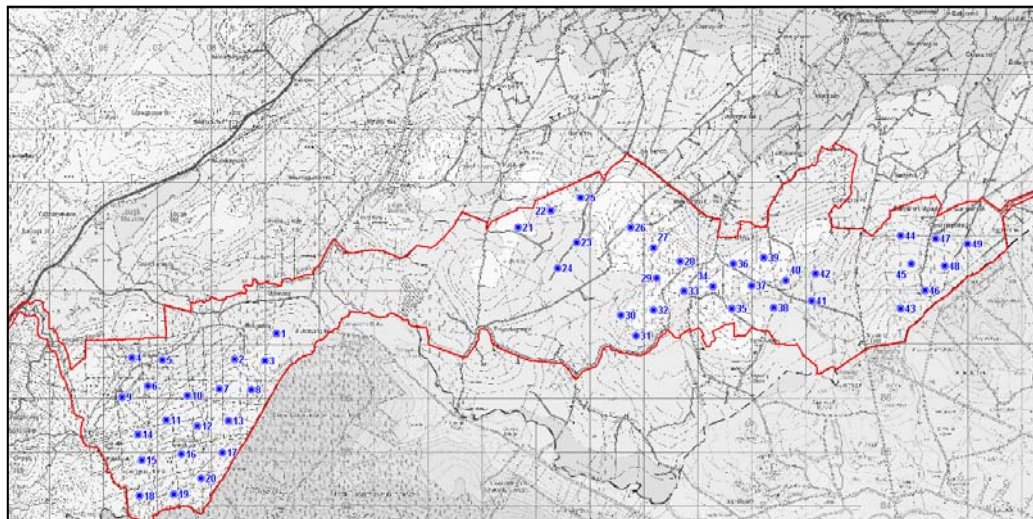
The development of the final proposed wind farm layout has resulted from feedback from the various studies and assessments carried out as well as ongoing negotiations with property owners. There were several reviews of the specific locations of the various turbines during the optimisation of the site layout. The adjustments made entailed placement changes to turbines following on-site geotechnical, archaeological, hydrological, ecological, visual and other studies.

The initial constraints study identified a significant viable area within the initial study area. However, the turbine layout was further refined before finalising the layout on the basis of the 19 turbine layout now proposed.

Figures 3.10 to 3.12 below show maps of some of the various iterations of the turbine layout that were developed leading up to the current proposal, these provide an indication of how the design of the turbine layout has evolved during the design of the project.

The previous design proposal brought forward for a wind farm proposal which included the current site (ABP Ref PL.05.0040) presented a 49 no. turbine layout spread out in two clusters across a much larger site as shown in Figure 3.10. This application was brought forward prior to the adoption of Variation no. 2 of the CDP. Turbine locations were determined for that layout by following a constraints and facilitators study carried out in the early stages of the design process.

Figure 3.10 below shows the layout of the previously proposed Carrickaduff Wind Farm which accommodated 49 turbines across two clusters over a larger geographical area than currently proposed. The eastern cluster (Lissmullyduff) provided 29 no. turbines, while the western cluster (Meenbog) provided 20 no. turbines.



**Figure 3.10 Layout 1 – 49 Turbines as proposed under PA0040**

During the pre-application consultation process with An Bord Pleanála (under PC 0228) further refinements to the previously proposed layout were carried out with the final project options provided for the consideration of the Board being a 36 turbine wind farm in two clusters (as set out in Figure 3.11 below) and a 19 turbine proposal (as set out in Figure 3.12 below). The 19-turbine layout was brought forward following the adoption of Variation no. 2 of the County Development Plan.

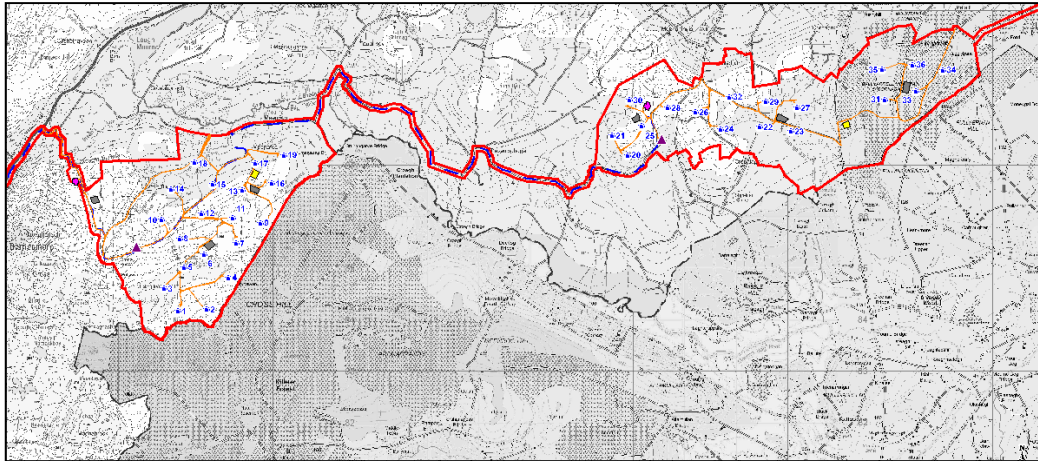


Figure 3.11 Layout 2 – 36 Turbines

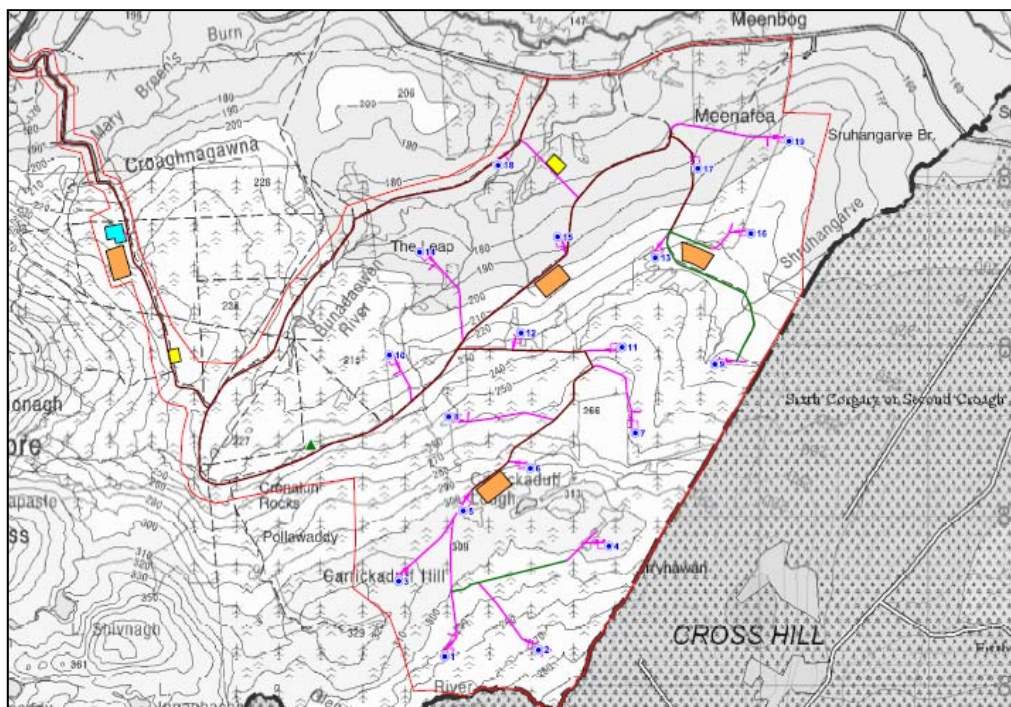


Figure 3.12 Layout 3 – 19 Turbines

The final proposal as presented in this application is shown in Figure 3.13. The final layout involved further refinement of the design elements as well as incorporating the amenity proposals as suggested by local residents.



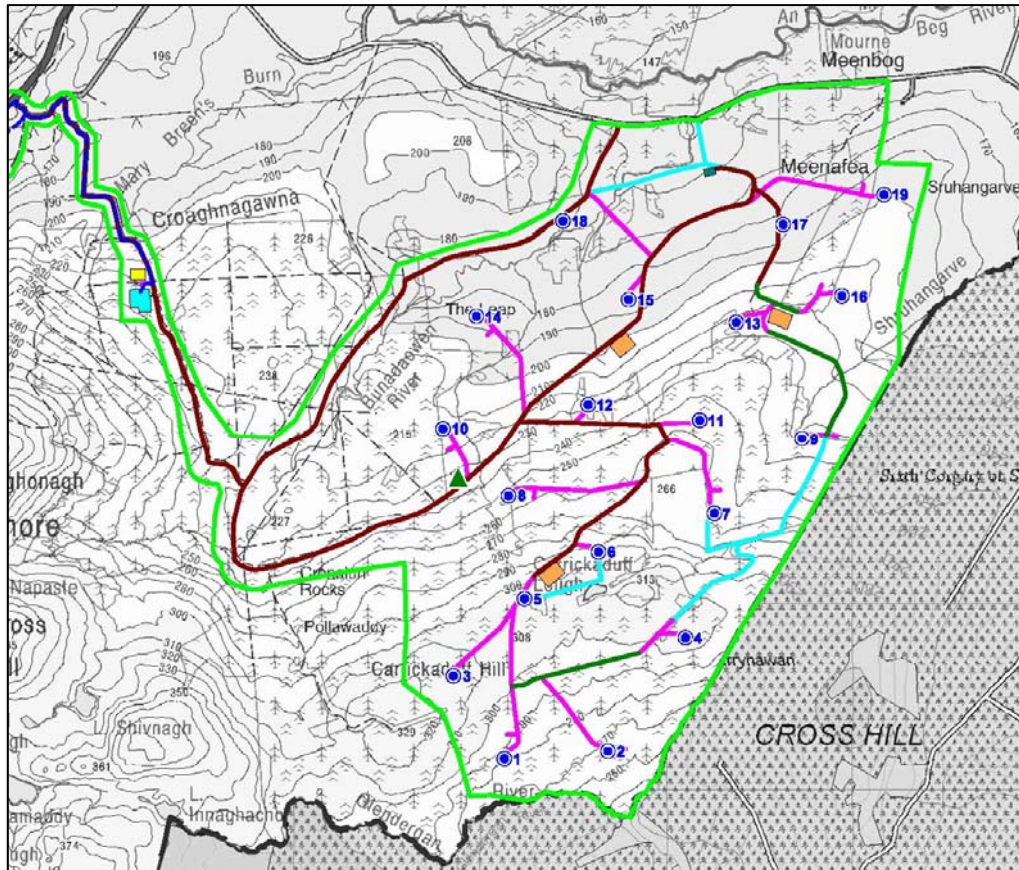


Figure 3.13 Final Layout

### 3.5.2.3 Road Layout

Access tracks are required on-site in order to enable transport of turbines and construction materials to each of the turbine locations. Such tracks must be of a gradient and width sufficient to allow safe movement of equipment and vehicles. The proposed development site is serviced by a network of existing tracks with access roads running through the site at Meenbog. 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. As turbine locations were finalised, the most suitable routes, 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 turbines, 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 an entirely 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.

### 3.5.2.4 Location of Ancillary Works

The ancillary structures required for the proposed development include construction compound, meteorological mast, electricity substations, borrow pits and peat disposal areas.

### **3.5.2.5 Construction Compounds**

The temporary construction compounds will be used for the storage of all construction materials and turbines. The construction compounds are accessed off the existing road network that runs throughout the site. The use of two construction compounds as opposed to a single larger compound on site will result in shorter traffic movements and a reduction in vehicular movements throughout the site. The construction compounds are located strategically within the site to facilitate the construction of the various infrastructure components.

### **3.5.2.6 Electricity Substation and Grid Connection**

Underground electrical cables will transmit the electricity generated from each wind turbine to the proposed onsite electricity substation. While overhead lines are less expensive and allow for easier repairs when required, underground lines have no visual impact. For this reason it was considered that underground lines would be a preferable alternative to overhead lines within the site.

The selection of the location for the substation has had regard to the constraints of the site. Ease of access and specific Eirgrid/ ESB Networks design requirements also informed the substation site selection process.

### **3.5.2.7 Grid Connection Route**

Underground electrical cables will transmit the power output from each wind turbine to the onsite substation and this will export electricity from the proposed wind farm to the national grid, connecting to the existing 110kV 'Clogher' substation (Pl. Ref. 11/20064). Consideration was given to various grid connection route alternatives looking at both overhead line and underground cable grid connection options which can be described as follows:

1. An overhead line was considered running from the proposed onsite substation to the Clogher substation. The route would run the overhead line south and west from the proposed substation in Croaghonagh and alongside the existing access road that joins the N15. The line would then run south west alongside the N15 and local road network until reaching the Clogher 110kV Substation.
2. An overhead line that would connect the proposed onsite substation to the existing overhead line infrastructure which currently runs through Barnesmore Gap (parallel and to the west of the N15), and from there connecting into the existing Clogher Substation.
3. An underground cable was considered running from the proposed substation in Croaghonagh north east towards the N15 before coming to the old disused railway line. It would then turn south west along the disused railway through the Barnesmore Gap before meeting the local public road network in the Townland of Keadew Lower. From there it would run along/under the local road network until reaching the Clogher 110kV Substation.
4. An underground connection was considered originating at the proposed substation and running north west along the existing forestry road within the study area and then running along the N15 and local road network to the existing Clogher substation.

In the case of the overhead line connection options, Option 1, considered providing a connection, which would provide a direct link between the proposed on-site substation and the existing Clogher substation along the N15 by the provision of an overhead line



predominantly parallel to the N15 through the Barnesmore Gap. It was decided that though this option provided a more direct route between the substations, that an additional overhead line in the vicinity of the N15 running through the Barnesmore Gap, would have greater potential to give rise to visual impacts, which would not present the optimal solution.

Another alternative considered (Option 2 above) was to utilise the existing overhead line infrastructure running through Barnesmore Gap, this option was ruled out as unviable and electrically inappropriate on review of the nature of the connection required. In this regard please refer to Appendix 3.1 from Ionic Consulting confirming that there are capacity limitations on the existing overhead line which restricts the addition of the additional power generated by the proposed Meenbog Wind Farm. Therefore, the existing overhead line infrastructure cannot be used.

The provision of an overhead line running in a more direct line from the proposed substation to the existing substation at Clogher was also considered. This would necessitate the provision of additional visible infrastructure and construction works through and in the immediate vicinity of a landscape that has been designated as being of Especially High Scenic Amenity at locations where there was no existing linear infrastructure in place (e.g. existing roads or tracks) to facilitate construction activities. Such an alternative was therefore not considered an optimal solution.

The provision of an overhead line connection would also be contrary to the latest circulated preferred approach for the update of the Wind Energy guidelines which states that the preferred approach for connection of wind farm developments to the national grid is via underground cables. For these reasons, it was considered that underground cabling would be a preferable alternative to overhead lines to facilitate the connection to the National Grid.

In relation to underground cabling option 3 above would require the laying of an underground cable along the disused yet historic railway line. While this would present a viable option, it became clear on review that the existing structure of the disused railroad (which includes significant embankments and many old features which function as retaining structures), could not accommodate the works required. The structural and construction requirements for the provision of an underground electrical cable trench along the old railway line could not be accommodated without completely changing the character and structure of the existing railway features. It is noted that there are plans to re-purpose the railway as a walking/cycling amenity feature, which could have been facilitated by the proposed wind farm grid connection, however, the construction requirements and interventions required to provide the underground cable would result in the loss of the amenity of the existing railway and completely change the nature/character of this route. In this regard, it was considered that the required works could not be adequately accommodated and that there would be significant potential to generate unnecessary potential impacts on lands/structures not capable of accommodating works of the nature required. On these grounds, this option was ruled out.

The fourth option considered was the provision of an underground cable running predominantly along existing roads infrastructure (access tracks, public roads and the N15) to facilitate the connection to the National Grid. Under this option visual impacts would be mitigated, and the route would follow existing roads infrastructure insofar as possible, thereby minimising construction impacts. Various iterations of this route were considered. Initially it was proposed to run the underground cable from the proposed substation along the internal access road to the Proposed Development (off

the N15) which will be subject to improvements works generally for access and turbine delivery. The cable would then turn south west and run along the N15, and local road network to the existing Clogher substation. However, following discussions with the Roads Section in Donegal County Council it was clarified that consent for making a planning application which included underground cabling along the public road network would not be forthcoming nor would it be supported by the Roads Authority. As the provision of underground cabling was considered to represent the optimal method of facilitating a connection to the National Grid, amendments were made to avoid cabling works running along the N15.

Therefore, the current Proposed Development includes an underground cable link between the proposed Meenbog Wind Farm on-site substation and the Drumnahough Cable.

Following the feedback from the Roads Section of Donegal County Council, it is now proposed that the underground cabling link will originate from the proposed substation and run northwest along the existing forestry track (which will be upgraded as part of the Proposed Development), it will then turn south west (prior to reaching the junction between the access road and N15) running off-road before crossing under the N15 National Road corridor. The cabling link will then run in a south westerly direction parallel to the N15 where it will link into the Dromnahough cable route, which at time of writing is under the consideration of An Bord Pleanála. This route is described further in Chapter 4 of the EIAR and has been proposed to accommodate Donegal County Council's stated preference to minimise underground cabling under public roads.

Figure 3.14 shows the various grid connection routes considered for the proposed development.

#### **3.5.2.8 Borrow Pits**







All fill material required for the construction of access roads and turbine bases will be obtained from three borrow pits, located within the site of the proposed development. This approach entails an efficient use of existing on-site 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 borrow pits were identified considering the site constraints, including topography, habitat type and surface water features.

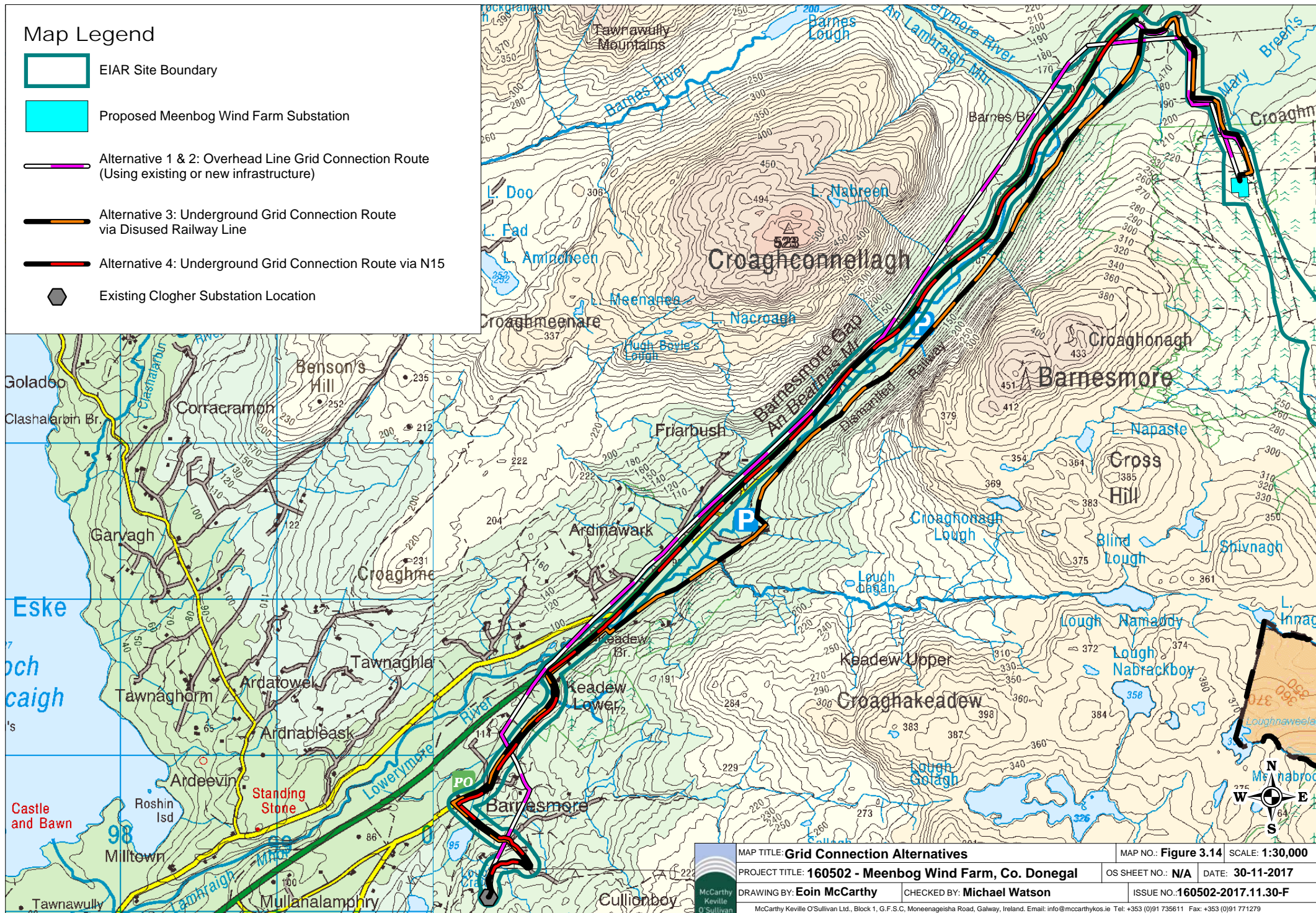
An alternative to using borrow pits was the option of sourcing stone and hardcore materials from a licensed quarry in the vicinity. The movement of such material would result in a significant increase in construction traffic and heavy loads and was therefore considered the least preferable option.

#### **3.5.3 Transport Route and Site Access**

The proposed turbine transport route runs northeast from Killybegs on the R263 Regional road. The route will then turn right onto the N56 National Secondary Road and continue east before turning left onto the N15 and continuing northeast towards the entrance to the site. The access road into the site from the N15 is an existing access which is proposed to be upgraded to cater for the construction traffic and the delivery of turbine components required by the proposed development. Currently the access road and junction onto the N15 serves as an access road to an existing quarry as well as functioning as a forestry access road. Utilising this route will minimise the impact on the local road network and its users. This access point will be upgraded as part of the project and it is intended that all construction and turbine delivery access will be via this route.

# Map Legend

-  EIAR Site Boundary
-  Proposed Meenbog Wind Farm Substation
-  Alternative 1 & 2: Overhead Line Grid Connection Route (Using existing or new infrastructure)
-  Alternative 3: Underground Grid Connection Route via Disused Railway Line
-  Alternative 4: Underground Grid Connection Route via N15
-  Existing Clogher Substation Location



MAP TITLE: <b>Grid Connection Alternatives</b>		MAP NO.: <b>Figure 3.14</b>	SCALE: <b>1:30,000</b>
PROJECT TITLE: <b>160502 - Meenbog Wind Farm, Co. Donegal</b>		OS SHEET NO.: <b>N/A</b>	DATE: <b>30-11-2017</b>
DRAWING BY: <b>Eoin McCarthy</b>	CHECKED BY: <b>Michael Watson</b>	ISSUE NO.: <b>160502-2017.11.30-F</b>	
<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>			

It must be noted that the access road into the proposed development off the N15 is in place and operational and while it is acknowledged that the use of this access during the construction period will be subject to more intensive use this will only be temporary in nature for the duration of the construction period, during which times traffic will be highly managed.

Section 2.5 of the *“Spatial Planning and National Roads Guidelines for Planning Authorities”* (Department of Environment, Community and Local Government, January 2012) requires Planning Authorities to avoid the creation of any additional access points onto National Roads, (outside 60kmh speed limits), as well as avoiding the generation of increased traffic from existing accesses. Section 2.6 of the same document allows for exceptional circumstances in terms of Developments of National and Regional Importance such as the current proposal.

The previous application for a SID Wind Farm development (PA0040) also provided for this access road. In their report on that application the Planning Authority stated the following in relation to the use of the existing quarry road access:

*“The Planning Authority is satisfied that the proposed development access onto the National Primary Road N-15 is not contrary to National Road Policy given that the development concerns Strategic Infrastructure in respect of which policy T-P-16 of the County Development Plan (as varied) allows for access in principle subject to consultation with the NRA. It is also considered that any period of traffic intensification of the junction will be temporary and can likely be managed to by an appropriate traffic management plan after which the proposal will not impact on the N15.”*

Policy T-P-16 of the County Development Plan, 2012-2018 states:

*“It is a policy of the Council not to permit developments requiring new accesses or which would result in the intensification of existing access points onto National Roads or roads treated to National Roads standards (Strategic Road Network) where the speed limit is greater than 60 kph. The Council may consider the creation of a new access point from an existing, authorized use which eliminates a traffic hazard on a strategic road, subject to the closure of the existing access. In exceptional circumstances, direct access may be considered, on a case by case basis, in consultation where appropriate with the NRA, to accommodate strategic infrastructure or regionally significant development”*

Following two pre-planning discussions in relation to the current proposal with the Roads Section in Donegal County Council there were no issues raised in relation to the proposal to access the proposed development via the existing quarry and forestry access. This access will be used for the construction phase only and any intensive movements will be temporary and highly managed. The access will be utilised for operational purposes, however, this will not constitute an intensive use of the entrance and will be for maintenance purposes only.

An existing local road to the north of the proposed site will be utilised for limited construction purposes (such as empty trucks leaving the site) operational maintenance and amenity access purposes for members of the public. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. The utilisation of the existing local road reduces the need to develop new access roads to facilitate maintenance vehicles

and amenity access while also minimising impact on the local road network during construction.

Various routes were considered for accessing the proposed development site prior to deciding on the optimal route set out above. Any other alternatives considered required additional road and junction improvements which would have had the potential to increase impacts that could arise from the proposed development and lead to longer trips being required to gain access to the site for maintenance and amenity/recreational purposes.

#### **3.5.4 Amenity Proposals**

The proposed development includes for the provision of recreation and amenity facilities consisting of a series of marked trails, complimented by waypoint signage, and visitor facilities in the form of a car park and toilet and shelter building. It is proposed to open the wind farm site roads as marked trails for walkers, cyclists, trail runners and general outdoor recreation. Three marked trails are proposed, consisting of two looped trails and one uphill section. The car park will act as a landing point or trailhead for recreation and amenity users arriving at the site.

These proposals were developed with the local community and represent a viable long term sustainable use of the infrastructure and the site of the proposed development. The alternative would be not to provide these which would fail to maximise the use of the on-site infrastructure and would be contrary to the local communities wishes.

The site and surrounding area has significant potential as a recreational and amenity resource. The proposed recreation and amenity proposals outlined above may be developed further, subject to planning permission being granted for the proposed wind farm development. It is acknowledged that any investment in the creation of recreation and amenity proposals on the proposed wind farm site will have to be matched by an ongoing commitment from the wind farm developer to maintain the recreation amenities once they are put in place.

#### **3.5.5 “Do Nothing” Alternative**

An alternative land-use option to developing a wind farm at the proposed development site would be to leave the site as it is, with no changes made to the current land-use practices of commercial forestry. In doing so, the opportunity to capture a significant part of County Donegal’s valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment would be lost, and the local economy would continue to rely primarily on agriculture and forestry as the main source of income.