ELEMENT POWER IRELAND LTD.

ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED MAIGHNE WIND FARM IN NORTH COUNTY KILDARE AND SOUTH COUNTY MEATH

VOLUME 2 – MAIN EIS

CHAPTER 1 - INTRODUCTION

MARCH 2015

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1 INTRODUCTION

Element Power Ireland Ltd. (Element Power) wishes to construct the proposed Maighne Wind Farm development in County Kildare and County Meath. The location of the development is shown on Figures 1.1 and 1.2.

Fehily Timoney & Company (FTC) has prepared this environmental impact statement (EIS) on behalf of Element Power Ireland Ltd. to accompany an application for consent to An Bord Pleanála for the proposed Maighne Wind Farm development An Bord Pleanála in relation to the proposed development of Maighne Wind Farm in the townlands of:

County Kildare - Moyvally, Calf field, Ballyonan, Tanderagee, Royaloak, Ballynakill, Drumsru, Cappanargid, Barnaran, Cloncurry, Glenaree, Derrybrennan, Lullymore West, Kilpatrick, Drummond, Ballybrack, Lullymore East, Nurney, Haggard, Ballyshannon, Coonagh, Ballinderry, Williamstown, Freagh, Cadamstown, Knockcor, Collinstown, Calfstown, Dreenan, Ballina, Ballynadrumny, Feighcullen, Cloncumber, Ballynakill Lower, Ballyteige North, Allenwood South, Ballynakill Upper, Derryvarroge, Clonagh, Ballynamullagh, Parsonstown, Kilmurry, Loughnacush, Killyon, Mucklon, Dysart, Clonkeeran, Coolree, Mulgeeth, Drehid, Hortland, Dunfierth, Kilshanchoe, Kilkeaskin, Johnstown, Gorteen, Donadea, Donadea Demesne, Dunmurraghill, Baltracey, Kilnamoragh North, Derrycrib, Knockanally, Painestown, Hodgestown, Newtownmoneenluggagh, Loughtown, Killickaweeny, Nicholastown, Pitchfordstown, Cappagh, Killbrook, Killeighter, Cloncurry, Boycetown, Taghadoe, Donaghstown, Barreen, Derrinstown, Bryanstown, Kealstown, Graiguelin.

County Meath - Boolykeagh, Johnstown, Ballycarn, Dolanstown, Balfeaghan, Calgath, Kemmins Mill, Martinstown, Milltown, Phepotstown, Barstown, Mulhussey, Longtown, Jenkinstown, Warrenstown, Collistown, Cullendragh, Culcommon, Ballynare, Ribstown, Portan.

1.1 Applicant – Element Power Ireland Ltd

Element Power Ireland Ltd. is owned by Element Power, a global renewable energy company that develops, acquires, builds and operates utility-scale wind and solar power projects. Element Power is present in 16 countries and has 71 megawatt (MW) of renewable energy generation in operation and approximately 9,000MW of energy generation projects in development.

Element Power Ireland Ltd. (Element Power) has an established track record in wind energy in Ireland, with its Irish team based in Tullamore, Co. Offaly and Cork. This team has developed 15 wind farms in Counties Clare, Cork, Kerry, Donegal, Limerick, Waterford and Tipperary.

1.2 Outline of Proposed Development

It is proposed to construct a wind farm comprising of up to 47 no. wind turbines with a maximum tip height of up to 169m to be developed and connected to the Irish grid for domestic purposes. The exact output cannot be specified at this stage as the turbine model has not been chosen. The energy produced from the wind farm will be connected to the Irish National Grid. However, throughout the EIA process, consideration of environmental impacts of the proposed development is based on the largest possible size of development (125MW). The choice of turbine model will not affect the assessment of impacts outlined. The exact make and model of the turbine will be dictated by the economics and energy production efficiencies of various turbines on the market at the procurement stage, but will not exceed the maximum size envelope set out within the development description.

The proposed development will also include access tracks, a sub-station, a permanent metrological mast, borrow pits and associated works, temporary compounds as well as temporary minor alterations to the public road for the delivery of turbines to the site (turbine delivery route). The turbines are arranged in five wind farm clusters. The clusters are Ballynakill (10 turbines), Windmill (3 turbines), Drehid-Hortland (21 turbines), Derrybrennan (2 turbines) and Cloncumber (11 turbines). All clusters are connected via associated underground medium voltage cables which run predominately along the public road network linking back to a proposed sub-station on-site at Drehid.

Here the power will be converted to AC for export to the Irish national grid via high voltage underground cables to either one of two existing substations located at Woodland, Co. Meath or Maynooth, Co. Kildare.

While both of the routes are assessed in this EIS, only one of these routes will be constructed following the identification of the preferred connection point by Eirgrid.

The proposed development will primarily consist of the following:

- Erection of up to 47 no. wind turbines with an overall tip height of up to 169m
- Construction of foundations and hardstanding areas in respect of each turbine
- Construction/upgrade of 9 no. site entrances from public roads
- Construction of approximately 31km of new site access tracks and associated drainage
- Upgrade of approximately 10km of existing access tracks and, where required, upgrade of associated drainage
- Excavation of 3 no. borrow pits
- Establishment of 4 no. temporary construction site compounds and associated parking areas
- Construction of drainage and sediment control systems
- Construction of 1 no. electricity substation (which will operate at a voltage up to 220kV) including:
    - 2 no. control buildings containing worker welfare facilities
    - electrical infrastructure
    - parking
    - fencing
    - appropriate landscaping
- Installation of approximately 75km of medium voltage (MV) underground cabling (which will operate at a voltage up to 33kV) between the proposed turbines and proposed on-site substation. Approximately 36km will be laid within the public roadway
- Installation of high voltage (HV) underground cabling (which will operate at a voltage up to 220kV) between the proposed on-site substation and either the existing substation at Woodland, Co. Meath (totalling approximately 29km, of which approximately 28km will be laid within the public roadway) or the existing substation at Maynooth, Co. Kildare (totalling approximately 23km, of which approximately 17km will be laid in the public roadway)
- Installation of joint bays along the cable route
- Installation of underground communication cables
- Installation of a permanent meteorological mast up to 100m in height
- Temporary alterations to the public road at identified locations to accommodate the delivery of turbines
- Associated site works including landscaping
- Tree felling
- Peat excavation.

Whether the connection point to the national electricity transmission grid will be located at the Woodland or Maynooth substations will be determined by EirGrid plc, which is the statutory Transmission System Operator. Accordingly, the documentation submitted with this application for permission identified and evaluates 2 no. HV grid connection routes (which will operate at a voltage up to 220kV). The 2 no. HV grid connection cable routes included in this application will connect the proposed Maighne Wind Farm substation at Drehid to either one of two existing substations located at Woodlands, Co. Meath or Maynooth, Co. Kildare. However, only one of these routes will be constructed following the identification of the preferred connection point by the Transmission System Operator. All associated cabling for the proposed development will be underground and predominately located within the public road.

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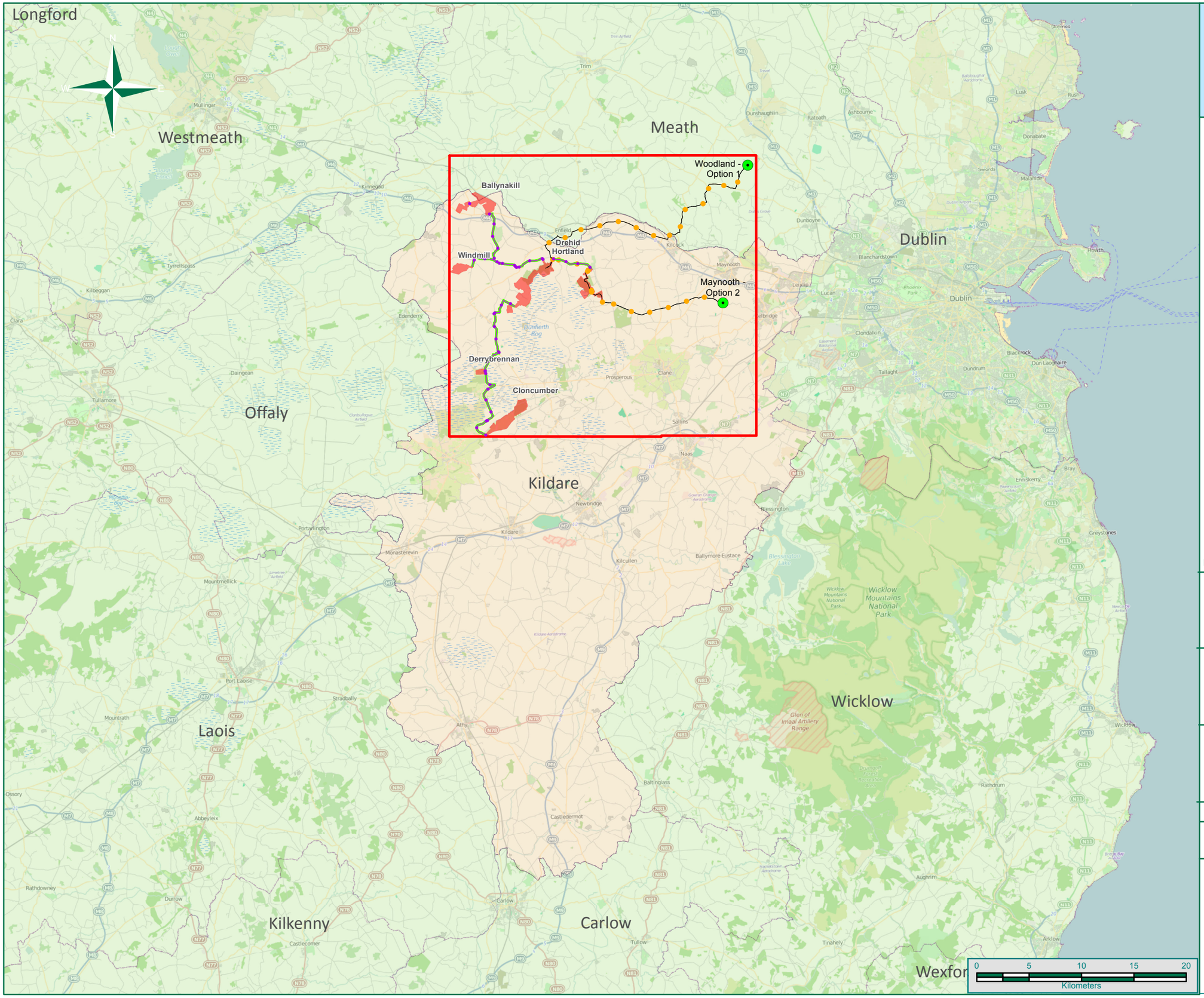

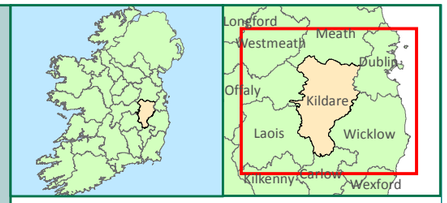

Legend

- Wind Farm Cluster Boundary
- MV Cable Route
- HV Cable Route
- Irish Grid Connection Points

Date 13/03/2015

Name Of Client

Element Power Ireland

Name Of Job

Maighne Wind Farm

Title Of Figure

Site Location with Bordering Counties Map

Scale Used 1:350,000 @ A3

Figure No. 1.1

Rev A

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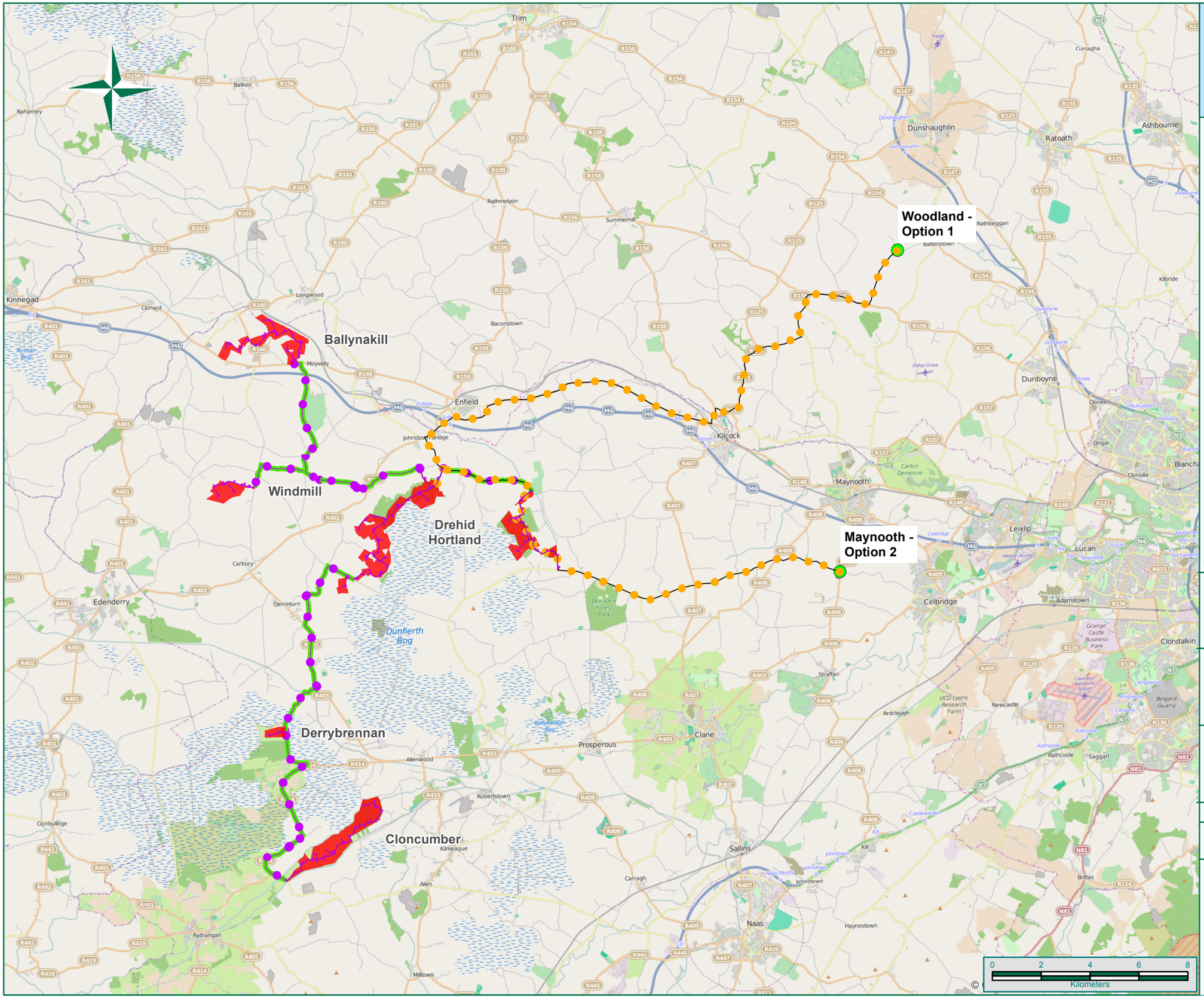

Legend

- Wind Farm Cluster Boundary
- MV Cable Route (Internal to Clusters)
- MV Cable Routes
- HV Cable Route
- Irish Grid Connection Points

Date	25/03/2015
Name Of Client	Element Power Ireland
Name Of Job	Maighne Wind Farm
Title Of Figure	Site Location Map
Scale Used	1:150,000 @ A3
Figure No.	1.2
Rev	A

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1.3 The Need for the Project

The need for the proposed development is driven by the following:

The Maighne Wind Farm project provides a great opportunity to address each of these critical issues in a sustainable manner.

Ireland is one of the most energy import-dependent countries in the European Union, importing 85% of its fuel in 2012[i]. This makes Ireland particularly vulnerable to future energy crises and fluctuations given its location on the periphery of Europe. The international fossil fuel market is growing increasingly expensive and is increasingly affected by international politics. Any steps to reduce dependence on imported fossil fuels will add to financial autonomy and stability in Ireland.

The burning of fossil fuels for energy creates greenhouse gases, which contributes significantly to climate change. These and other emissions also give rise to acid rain and air pollution. Sources of renewable energy that are utilised locally with minimal impact on the environment are necessary to meet the challenges of the future.

The EU has adopted a Directive (2009/28/EC)[ii] on the Promotion of the Use of Energy from Renewable Sources in April 2009 which includes a common EU framework for the promotion of energy from renewable sources. The Directive sets a mandatory national target for the overall share of energy from renewable sources for each Member State. This package is designed to achieve the EU's overall 20:20:20 environmental target, which consists of a 20% reduction in greenhouse gases, a 20% share of renewable energy in the EU's total energy consumption and a 20% increase in energy efficiency by 2020. To ensure that the mandatory national targets are achieved, Member States must follow an indicative trajectory towards the achievement of their target as outlined in Ireland's National Renewable Energy Action Plan (NREAP)[1].

Ireland's mandatory national target is to supply 16% of its overall energy needs from renewable sources by 2020. This target covers energy in the form of electricity, heat and transport fuels. For electricity alone, Ireland has set a national target of 40% by 2020 as outlined in NREAP. Government policies identify the development of renewable energy, including wind energy, as a primary strategy in implementing national energy policy.

Currently over 2,647MW of installed wind generating capacity is connected to the system in the Republic of Ireland[iii]. It is estimated that approximately 3,500MW to 4,000MW of installed wind generating capacity will be required to meet the 40% target[iv]. In addition it is expected that wind generating capacity will also be required to offset against the heat and transport targets, both of which are expected, based on latest figures released by Sustainable Energy Authority of Ireland, to be short of their respective targets.

So, in order to meet Ireland's overall 2020 target, there is likely to be a requirement to add up to an additional 1,500MW of renewable energy from electricity generation to offset this shortfall or Ireland will incur significant fines.

SEAI suggests the cost to Ireland of missing the 2020 target may be in the range of €70 million to €140 million per percentage point shortfall (equivalent to €50 to €100 per MWh)[v].

If Ireland was penalised for not meeting targets, the Maighne Wind Farm would reduce those fines by around €41m per annum (based on the annual production of Maighne wind farm multiplied by €100 per MWh).

With a capacity of approximately 125MW, the proposed Maighne Wind Farm will help to meet this target by contributing approximately 3 - 3.5% of the total wind generating capacity required to meet the national RES – E target.

[1] Submitted under Article 4 of Directive 2009/28/EC.

Economic Impact of Maighne Wind Farm

National Benefits:

In addition to helping Ireland avoid significant fines and reducing Irelands environmentally damaging emissions Maighne Wind Farm would also contribute economically.

SEAI in its report Renewable Energy In Ireland[2] indicated that renewable electricity (mostly wind energy) in the past five years:

- has saved over €1 billion in fossil fuel imports;
- has reduced CO2 emissions by 12 million tonnes and
- has not added to consumers' bills

A cost benefit study[vi] conducted by international energy specialists Poyry and Cambridge Econometrics concluded that Ireland's renewable energy policy will reduce fossil fuel imports by nearly €700m by 2030, reducing CO2 emissions by 5.5million tonnes per annum. This will actually lead to an increase in household disposable income

An IWEA member survey in 2014 indicated that 3,400 people are employed in the sector in Ireland. A report published in 2014 by the ESRI and Trinity College Dublin[vii], estimated direct and indirect employment under various realistic scenarios. The report, which estimates multiple thousands of jobs depending on the scenario, shows that there will be 8,355 jobs in the sector by 2020 if Ireland meets the 4,000MW wind energy target.

Local Benefits

Maighne Wind Farm will bring significant local benefits to the local community:

- Jobs (225 construction jobs with a further 30 direct and 30 indirect jobs once operational)
- Landowner payments to landowners in the local area
- Commercial rates (approx €1m in rates to Kildare Co Co per annum. Rates would also be payable to Meath Co Co for the two proposed turbines in Co Meath)
- Community benefit scheme (commitment to over €3.5m over the lifetime of the wind farm)

Further details of the local benefits from this project as explained in Appendix B of EIS

[2] 'Renewable Energy in Ireland' SEAI February 2014

1.4 Alternatives

1.4.1 Introduction

The following extract is provided from the EPA's '*Guidelines on the Information to be contained in Environmental Impact Statements*' (March 2002) in relation to the assessment of alternatives:

> *2.4.3 ALTERNATIVES*
>
> *"The consideration of alternative routes, sites, alignments, layouts, processes, designs or strategies, is the single most effective means of avoiding environmental impacts. The acceptability and credibility of EIA findings can be significantly affected by the extent to which this issue is addressed. For linear projects, such as roads and power lines, alternative routes may be the most important and effective mitigation strategy while for major infrastructure projects the intrinsic suitability of the site is the principal amelioration strategy. However, it is important, from the outset, to acknowledge the existence of difficulties and limitations when considering alternatives. These include:-*
>
> *Hierarchy*
>
> *EIA is only concerned with projects. Many projects, especially in the area of public infrastructure, arise on account of plans, strategies and policies which have previously been decided upon.*
>
> *It is important to acknowledge that in some instances neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority (such as a national plan or regional programme for infrastructure or a spatial plan).*
>
> *Non-Environmental Factors*
>
> *EIA is confined to the environmental effects which influence the consideration of alternatives. It is important to acknowledge that other non-environmental factors may have equal or overriding importance to the developer, e.g. project economics, land availability, engineering feasibility, planning considerations.*
>
> *Site Specific Issues*
>
> *The consideration of alternatives also needs to be set within the parameters of the availability of land (it may be the only suitable land available to the developer) or the need for the project to accommodate demands or opportunities which are site specific. Such considerations should be on the basis of alternatives within a site e.g. design, layout."*

This section justifies the location of a wind farm development in the area of Kildare and Meath and also addresses the alternatives. Accordingly, this section of the EIS describes the alternatives considered and the main design considerations for the proposed development. Article 5 of the EIA Directive requires:

> *'an outline of the main alternatives studied by the developer and an indication of the main reasons for his choice, taking into account the environmental effects'*

Alternative wind farm layouts and configurations were considered as part of the design process for Maighne Wind Farm in order to optimise the development while ensuring the least environmental impact.

1.1 Site Selection for the Wind Farm

Initially a macro level nationwide review for areas suitable for wind farm development was undertaken by Element Power. This search was originally carried out for the Greenwire Wind Energy Export Project. However there has been a delay in policy for the export of wind energy from Ireland to UK. Since the development of wind farms in Ireland has not progressed as rapidly over the last 3 years there is now a clear need for more viable wind farm sites in Ireland. It is therefore now proposed to supply the power from the proposed Maighne Wind Farm to the Irish electricity transmission via underground cables.

The results identified significant constraints in many parts of the west, southwest and northwest of Irelands, including the following significant constraints:

- Environmental designations (see Figure 1.1 below)
- Cumulative Impacts (see Figure 1.2 below)
- Lack of access to grid
- Visually protected areas

As can be seen from Figure 1.1 there is a concentration of environmental designations in the coastal areas of the northwest, west and south west of Ireland. These coastal areas tend also to be high sensitivity landscapes.

When these areas are then considered in conjunction with the built wind farm developments as shown in Figure 1.2 this greatly reduces the amount of available lands for wind development in these regions.

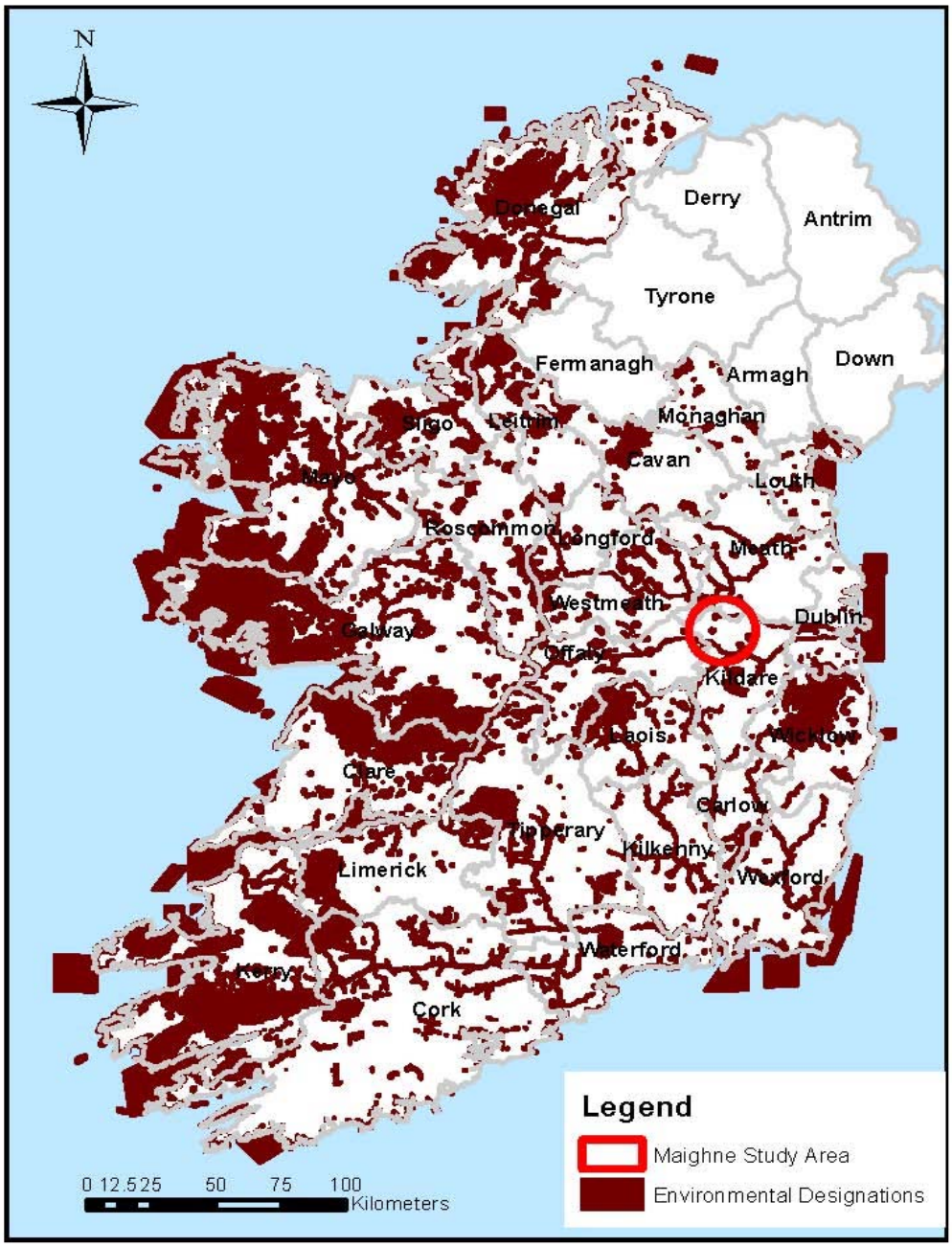


Figure 1.3: Environmental Designations in Ireland

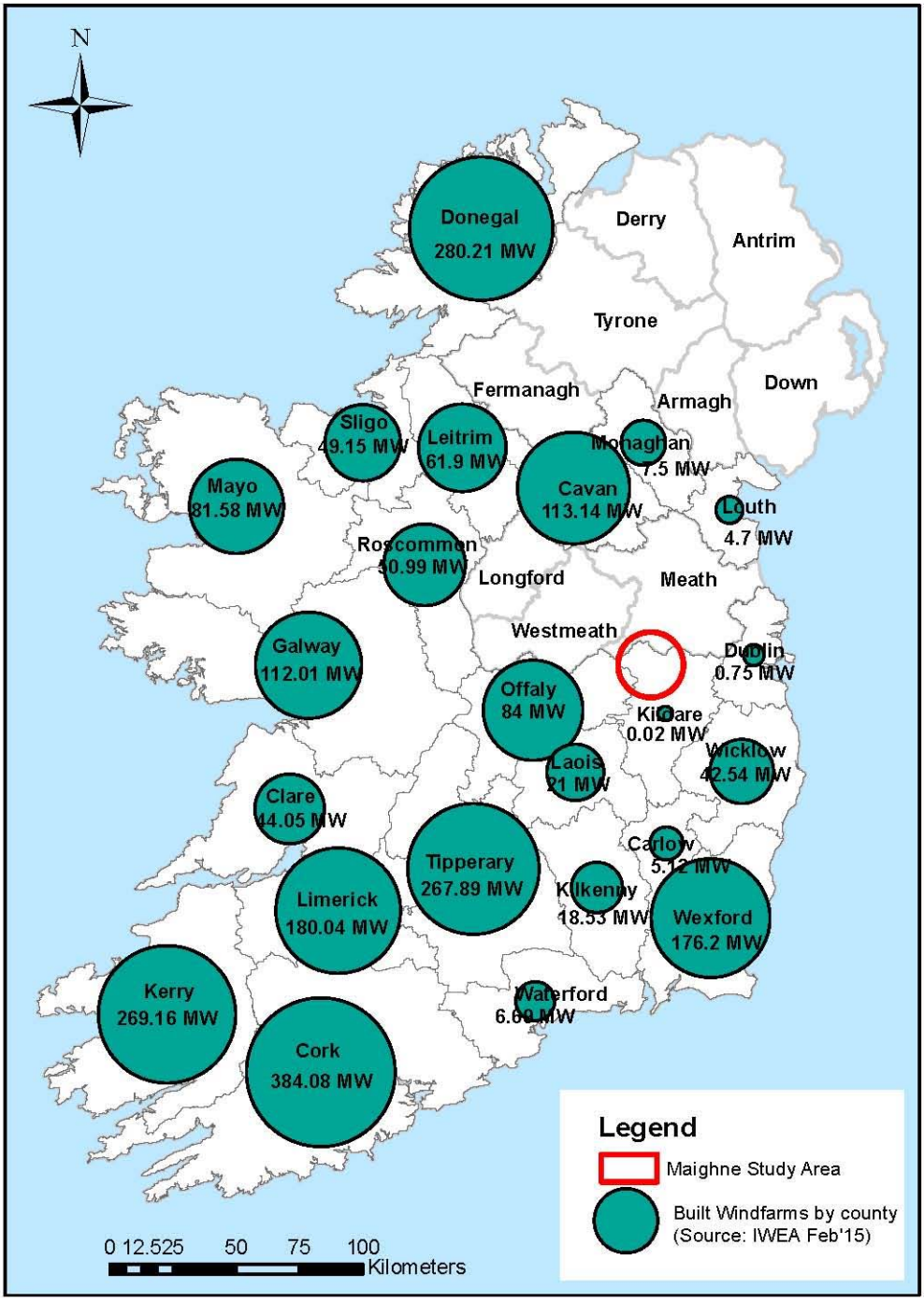


Figure 1.4: Built Wind Farms in Ireland

A key driver in identifying a suitable location for a wind farm is grid capacity. Figure 1.3 below demonstrates the status of the grid capacity in Ireland. This clearly indicates a lack of sufficient grid capacity along the western section of Ireland. An area of average grid capacity is to the north of the mid lands and the southern section of Ireland. It is only the mid-eastern section of Ireland which is identified as having the highest capacity for wind farm grid connections.

Siting a wind farm in the midlands area where there is a stronger existing grid network which has capacity to connect wind farms will also mean less constraint for a wind farm and therefore less network upgrades by the transmission operator to facilitate the development, making this area the most ideal location for connecting to the national grid.

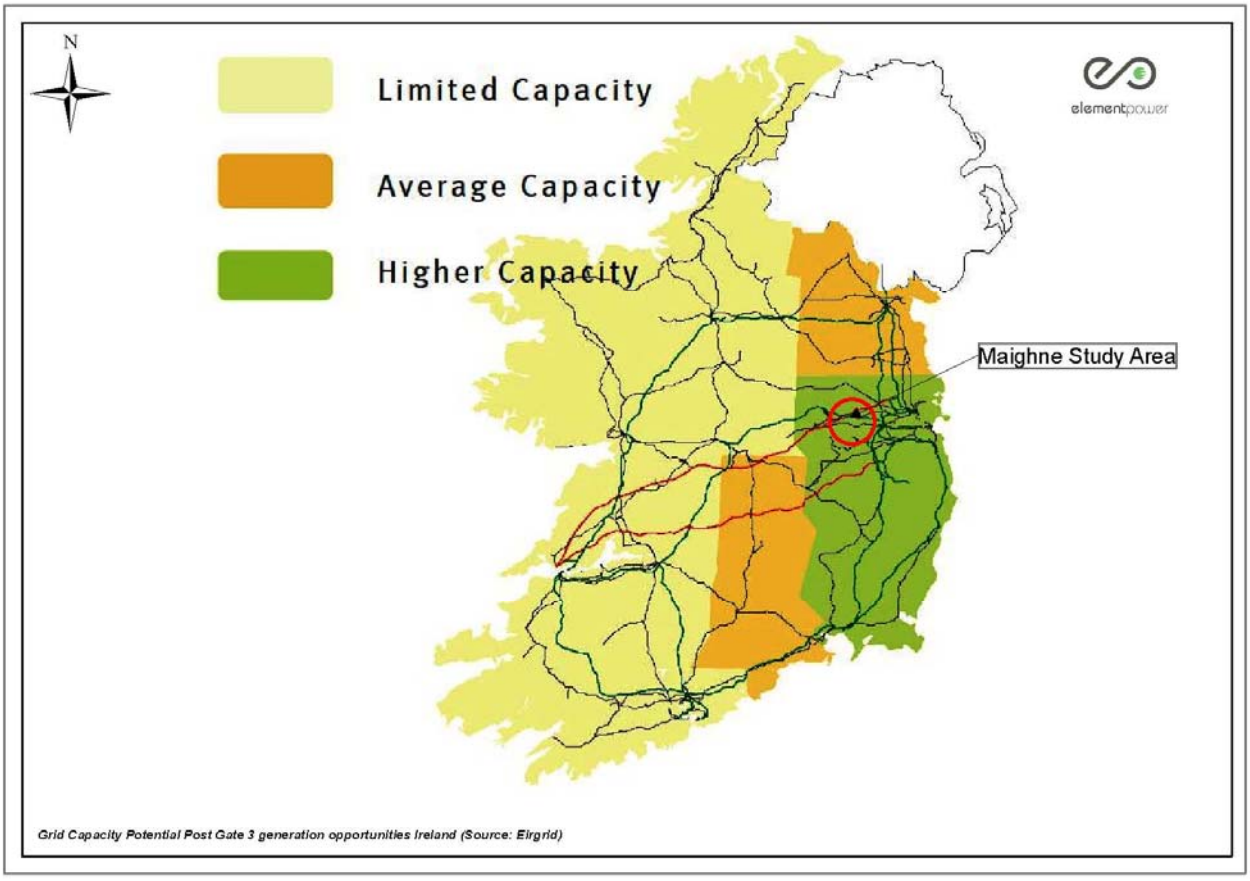


Figure 1.5: EirGrid Capacity Map[3]

To date, most of the wind farms developed in Ireland are located on elevated coastal regions. As demonstrated above, these more traditional, elevated, coastal areas are becoming less available for the development of wind farm projects due to reasons as outlined including, environmental designated areas, visually protected areas, issues with cumulative impacts and grid capacity.

In addition to this, due to improvements in wind turbine technology, possibilities have arisen to develop commercial scale wind farms in lower lying areas with lower wind speeds which were not previously considered economically viable for commercial wind farm development in Ireland. In particular turbines with larger rotors and bigger swept areas which have been commonly in use in other European countries for the last number of years have opened up lands in the midlands and the east of Ireland for wind farm development.

There are further benefits to locating a wind farm in the midlands and this includes the proximity to major motorways which provides a suitable means to deliver wind farm components to the region.

As a result of the national search and due to the constraints identified above, counties Kildare, Meath and Offaly were considered for further investigation for wind farm development.

[3] Map source from EirGrid and SONI report on *All-Island Transmission Capacity Statement 2012-2018*

Having identified these counties, the key considerations in selecting a suitable site in these counties was:

- Areas open to consideration under County Development Plans
- Avoidance of environmentally designated areas
- Population density
- Proximity to the Irish grid system of high capacity
- Access to the site
- Wind Speeds
- Constructability
- Available land banks

1.1.1 County Development Plans

Within Chapter 3 Policy of Volume 2 of the EIS, a review of the policies and legislation is carried out, at International, European, national and local levels, which relate to the proposed Maighne Wind Farm development. Extracts from the relevant County Developments Plans are also referenced within this section to demonstrate the site selection process and include the following:

- Kildare County Development Plan (2011-2017)
- Meath County Development Plan (2013-2019)
- Offaly County Development Plan (2014-2020)

Kildare County Development Plan (2011-2017)

Kildare County Council does not have a specific Renewable Energy Strategy for Wind. The County's Energy policies are dealt with in Chapter 8 of Kildare County Council County Development Plan 2011-2017, which states that its aim is to:

To encourage and support energy and communications efficiency and to achieve a reasonable balance between responding to central Government policy on renewable energy and communications and enabling resources to be harnessed in a manner consistent with the proper planning and sustainable development of the area.

Section 8.11.2 of the Plan sets out the following policies:

***WE 2**: To encourage the development of wind energy in suitable locations in an environmentally sustainable manner and in accordance with Government policy.*

***WE 3**: To ensure that the assessment of wind energy development proposals will have regard to:*

- *the sensitivity of the landscape;*
- *the visual impact on protected views, prospects, scenic routes, as well as local visual impacts;*
- *the impacts on nature conservation designations, archaeological areas and historic structures, public rights of way and walking routes;*
- *local environmental impacts, including noise and shadow flicker;*
- *the visual and environmental impacts of associated development such as access roads, plant and grid connections; the scale, size and layout of the project, any cumulative effects due to other projects;*
- *the impact of the proposed development on protected bird and mammal species*

Landscape sensitivity is a measure of the ability of the landscape to accommodate change or intervention without suffering unacceptable effects to its character and values. Figure 1.4 below highlights the areas of high, medium and low sensitivity as designated in the Kildare County Development Plan. Low sensitivity landscapes are robust landscapes which are tolerant to change, and which have the ability to accommodate development pressure. Medium sensitivity landscapes can accommodate development pressure but with limitations in the scale and magnitude. In this rank of sensitivity, landscape elements can accept some changes while others are more vulnerable to change. High sensitivity landscapes are vulnerable landscapes with the ability to accommodate limited development pressure. In this rank of sensitivity, landscape quality is at a high level and landscape elements are highly sensitive to certain types of change.

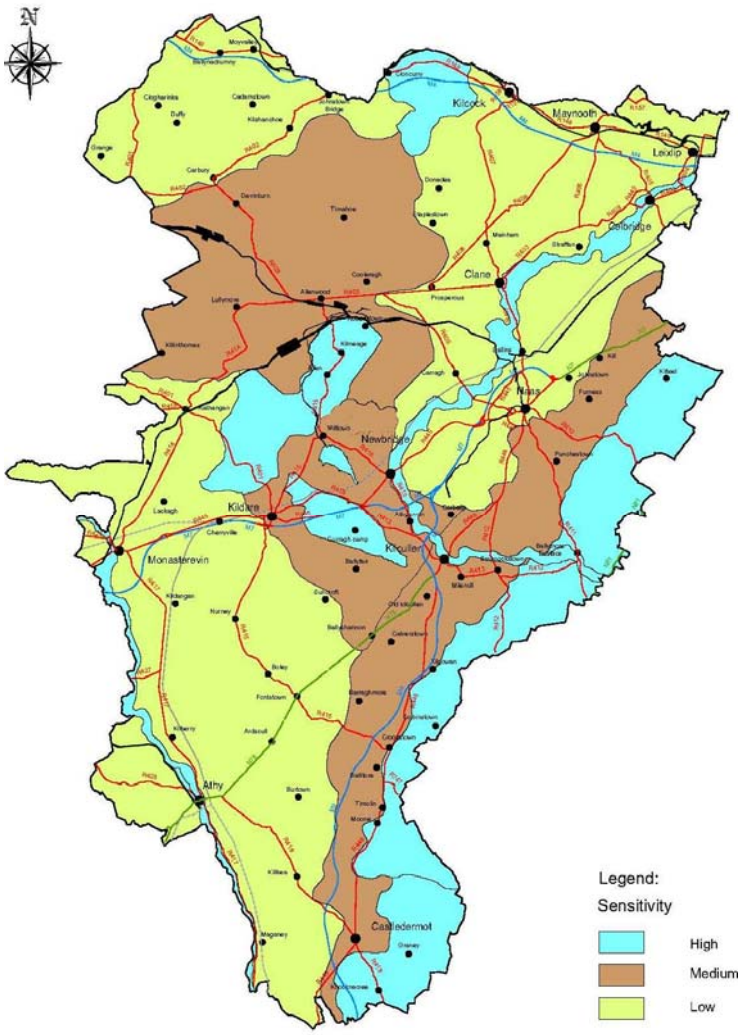


Figure 1.6: KCC County Development Plan showing relevant Landscape Character Areas

The northwest area of County Kildare has been defined as 'Most Sensitive' in Figure 3.45 Macro-Environmental Sensitivity Map from the Environmental Report of the Kildare County Development Plan 2011-2017 SEA Report. However the Landscape Character Assessment highlights this area as being **medium** and **low** in relation the landscape sensitivity. The area was defined in the SEA as 'most sensitive' to take account of the bogs and wetlands in the area. Any proposed wind farm development within the area would be outside areas of pristine bog. Industry best practice and appropriate mitigation measures would result in no significant impacts on the bogs and wetlands.

Furthermore the area is also considered sensitive as 'There is a lower proximity to and concentrations of quality transport and high capacity water services in these areas'[viii]. A wind farm development is not dependant on concentrations of quality transport and high capacity water services and therefore the development of a wind farm in this area is considered appropriate.

Meath County Development Plan (2013-2019)

The planning policies and objectives for County Meath are set out in the Meath County Development Plan (MCDP) 2013-2019. Meath County Council does not have a specific Renewable Energy Strategy for Wind. The policies and objectives of the Authority on renewable energy development are contained in Chapter 8 Energy and Communications. Section 8.1 Energy includes the County's Policies and Objectives in relation to Energy, with the most pertinent ones transposed in Table 1.1 over.
As outlined in Section 8.1.3 Renewable Energy:

'*Meath is committed to developing a more diverse range and combination of energy sources including wind energy, micro hydro power, solar energy, biofuels, geothermal (deep and shallow), anaerobic digestion and combined heat and power in order to deliver on the targets set down in the National Renewable Energy Action Plan (NREAP) IRELAND*.'

'*It will be an objective of the current plan that Meath County Council will investigate the potential of renewable energy identified in the initial assessment areas with a view to developing a renewable energy strategy for the County.'*

Table 1.1: Extracts from the Meath County Development Plan 2013 - 2019

Policy	Description
Policy EC POL 1	To facilitate energy infrastructure provision, including the development of renewable energy sources at suitable locations, so as to provide for the further physical and economic development of Meath.
Policy EC POL 2	To support international, national and county initiatives for limiting emissions of greenhouse gases through energy efficiency and the development of renewable energy sources which makes use of the natural resources of the county in an environmentally acceptable manner, where it is consistent with proper planning and sustainable development of the area.
Policy EC POL 3	To encourage the production of energy from renewable sources, such as from biomass, waste material, solar, wave, hydro, geothermal and wind energy, subject to normal proper planning considerations, including in particular, the potential impact on areas of environmental or landscape sensitivity and Natura 2000 sites.
Policy EC POL 4	To support the National Climate Change Strategy and, in general, to facilitate measures which seek to reduce emissions of greenhouse gases.
Policy EC POL 13	To ensure that energy transmission infrastructure follows best practice with regard to siting and design particularly to ensure the protection of all important recognised landscapes.
Policy EC POL 20	To encourage the development of wind energy, in accordance with Government policy and having regard to the Landscape Characterisation Assessment of the County and the Wind Energy Development Guidelines (2006).
Policy EC POL 21	To support the preparation of a study on wind energy potential by local authorities jointly in the GDA.
Objective EC OBJ 1	To ensure that all plans and projects associated with the generation or supply of energy or telecommunication networks will be subject to an Appropriate Assessment Screening and those plans or projects which could, either individually or in-combination with other plans and projects, have a significant effect on a Natura 2000 site (or sites) undergo a full Appropriate Assessment.

Map 04 Landscape Capacity, as shown below, has identified the suitability of certain developments with the designated landscapes within County Meath. Areas are ranked from high, medium to low.

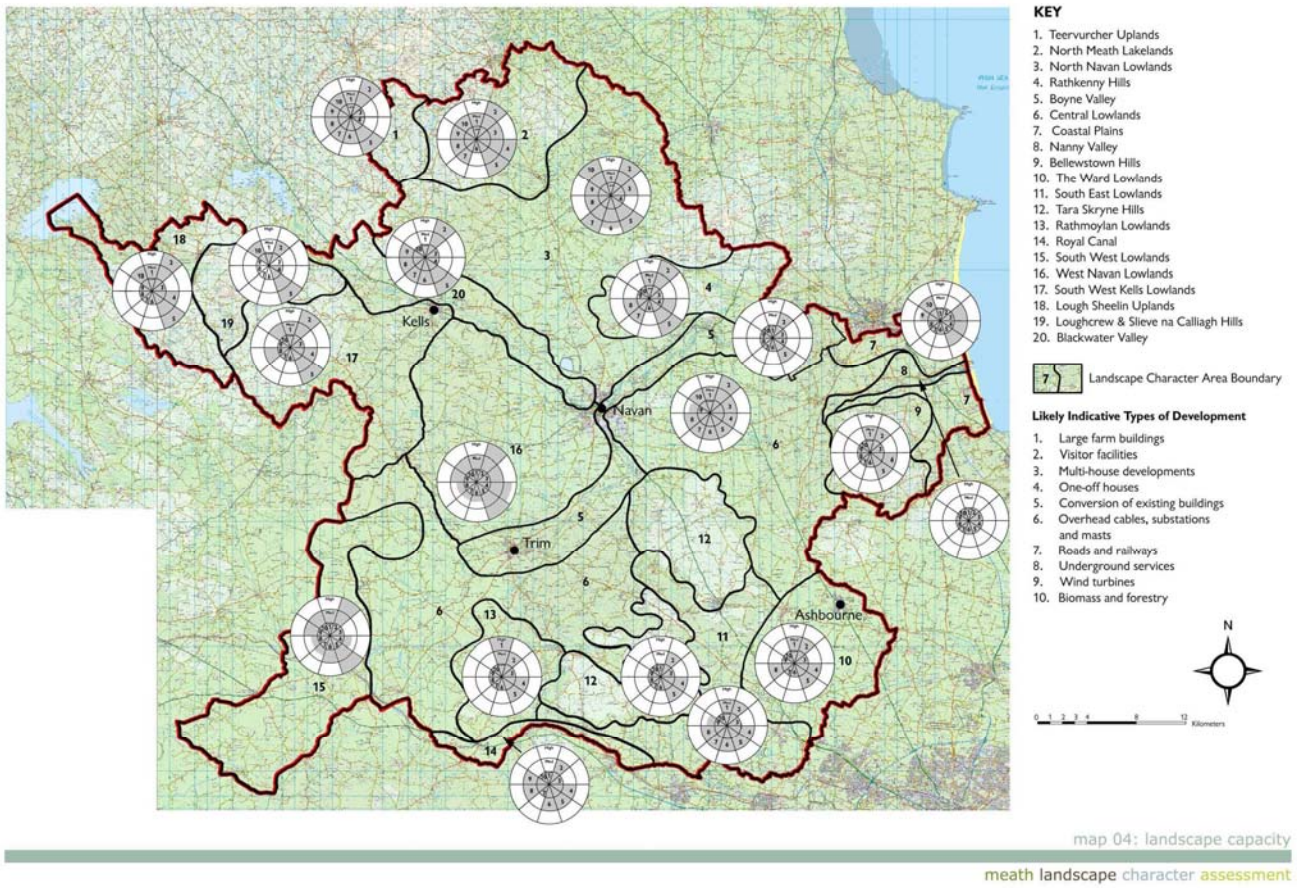


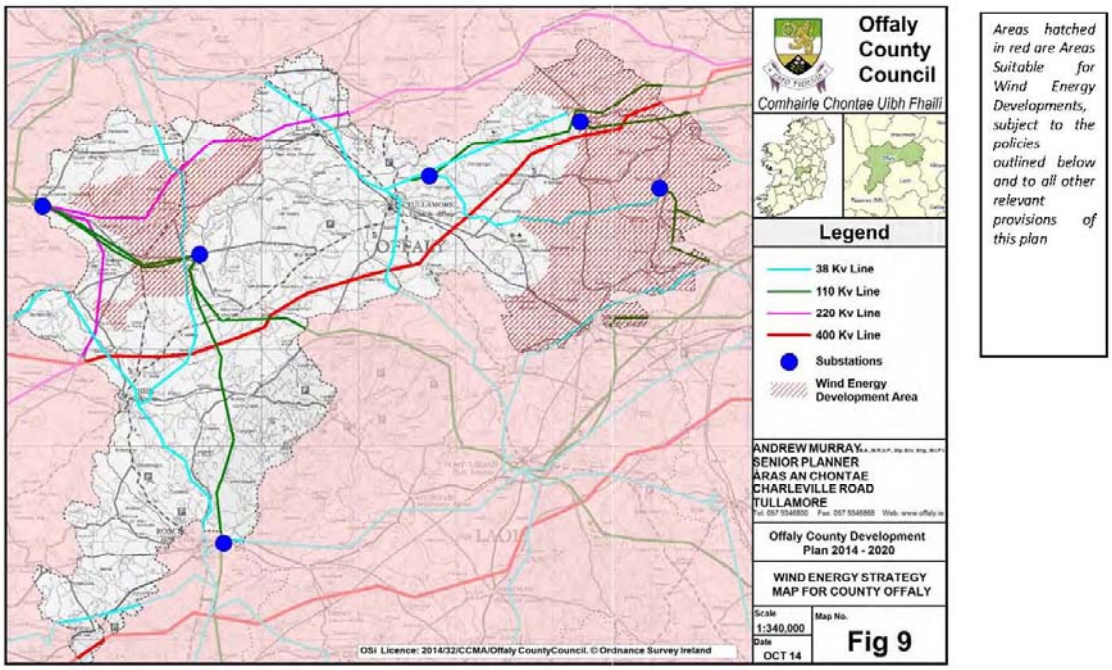
Figure 1.7: Wind Farm Development Suitability in County Meath

Offaly County Development Plan (2014 – 2020)

Offaly County Council have developed a Wind Energy Strategy (2014-2020) for the County. This strategy identifies areas within the county that are considered as suitable for wind energy development. There are two main areas identified as such within the county as seen in Figure 1.6 overleaf.

Wind Energy Strategy for Offaly
Offaly County Development Plan 2014-2020

Figure 9. Wind Energy Strategy for County Offaly[10]



[10] See Policies EP-03 & EP-04 (as adopted at OCC meeting on the 15/09/2014) and Objective EO-01

Offaly County Council October 2014 21

Figure 1.8: Figure 9 from OCC Wind Energy Strategy 2014-2020

1.1.2 Site Selection Conclusion

As can be seen from the County Development Plans, there are areas within Counties Meath, Kildare and Offaly that are deemed as suitable for consideration for wind farm development. All these counties are in favour of Renewable Energy projects, subject to proper and sustainable planning.

Offaly is the only County that has areas specifically designated for wind farm development within its County Development Plan. These areas include, regions to the west and east of County Offaly. Through its Landscape and Character Assessment, Meath County Development Plan has made recommendations as to the potential landscape areas to accommodate wind farm development. In the absence of a strategy for wind farm development in County Kildare, the appraisal of the areas within Kildare that are suitable for wind farm development are based on its Landscape Sensitivity as shown in the County Development Plan. Figure 1.7 below combines the areas in each of these counties which have the potential to accommodate wind farm development subject to further appraisal.

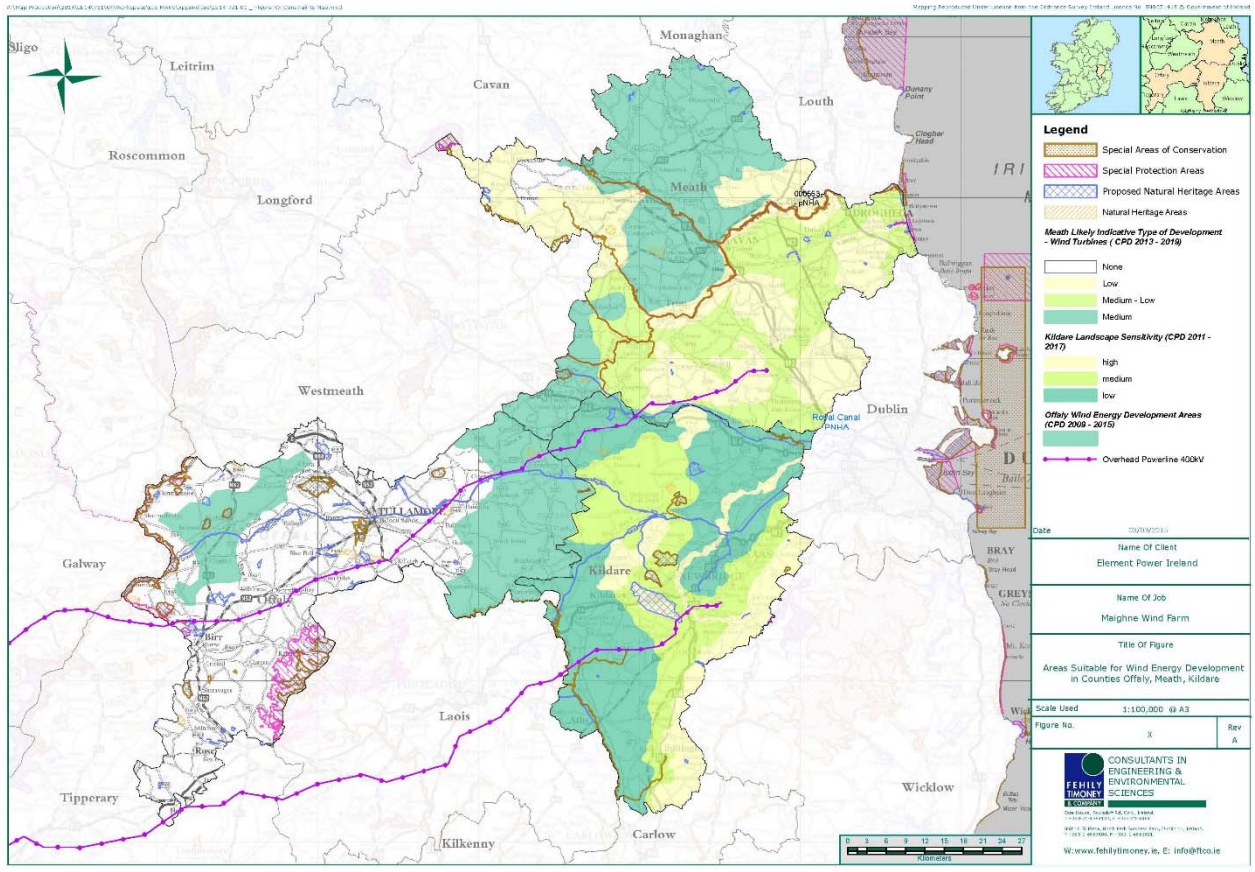


Figure 1.9: County Development Plans and EirGrid HV Lines

1.2 Alternatives

The following extract is provided from the EPA's '*Guidelines on the Information to be contained in Environmental Impact Statements*' (March 2002):

1.2.1 Alternatives

The consideration of alternative routes, sites, alignments, layouts, processes, designs or strategies, is the single most effective means of avoiding environmental impacts. The acceptability and credibility of EIA findings can be significantly affected by the extent to which this issue is addressed.

With reference to the guidelines provided above, alternatives in relation to the Maighne Wind Farm project are considered under the following headings:

- Alternative Sites & Design Considerations
- Alternative Turbine Layout/Locations & Alternative Cable Routes
- Alternative technology
- 'Do-nothing' alternative

Having taken into account all the constraints identified, the main study area proposed for development, was south County Meath, North County Kildare and the western region of Offaly. These areas were screened further and sets backs from houses, watercourses, roads, and environmentally sensitive areas was applied. This exercise produced a number of land banks which were presented for further consideration. These sites were further evaluated on a site by site basis which is discussed hereunder and are shown on Figure 1.8.

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Legend

- Wind Farm Scoping Sites
- Possible Alternative Sites

Landscape Sensitivity (Consolidated from Meath, Kildare & Offaly County Development Plans)

- Low to Moderate Sensitivty to Wind Turbines
- High Sensitivty to Wind Turbines

Designated Conservation Sites

- cSACs, SPA's, NHA's pNHA's

Peat Bogs

- Peat Bogs

Eirgrid Infrastructure

- Eirgrid Substation (110 - 220kV)
- Eirgrid Substation (38kV)

Population Centres (CSO 2011)

- Population Density > 250 persons /Km2
- Principal Settlements (Greater than 500 persons, CSO)

Road Network

- Motorway
- National Primary Route
- National Secondary Route
- Regional Roads

0 3 6 9
Kilometers

Date 31/03/2015

Name Of Client
Element Power Ireland

Name Of Job
Maighne Wind Farm

Title Of Figure
Alternative Sites

Scale Used 1:180,000 @ A3

Figure No. 1.8

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These potential sites consisted of private land banks and areas of Bord Na Mona bog. While the Bord Na Mona bog land banks would be potentially suitable for development, these areas were not however made available for development to the applicant by Bord Na Mona and could not be progressed further for consideration.

Other potential areas considered within the primary study area are shown in Figure 1.9 below. The scoping report for the proposed Maighne Wind Farm identified the potential at a number of locations within these areas as being suitable for wind farm development. Refer to the figure below which was issued with the scoping report in October 2014.

While the layout may appear dispersed a wind energy development such as this will be perceived as a series of small to medium sized developments rather than a sprawling singular one.

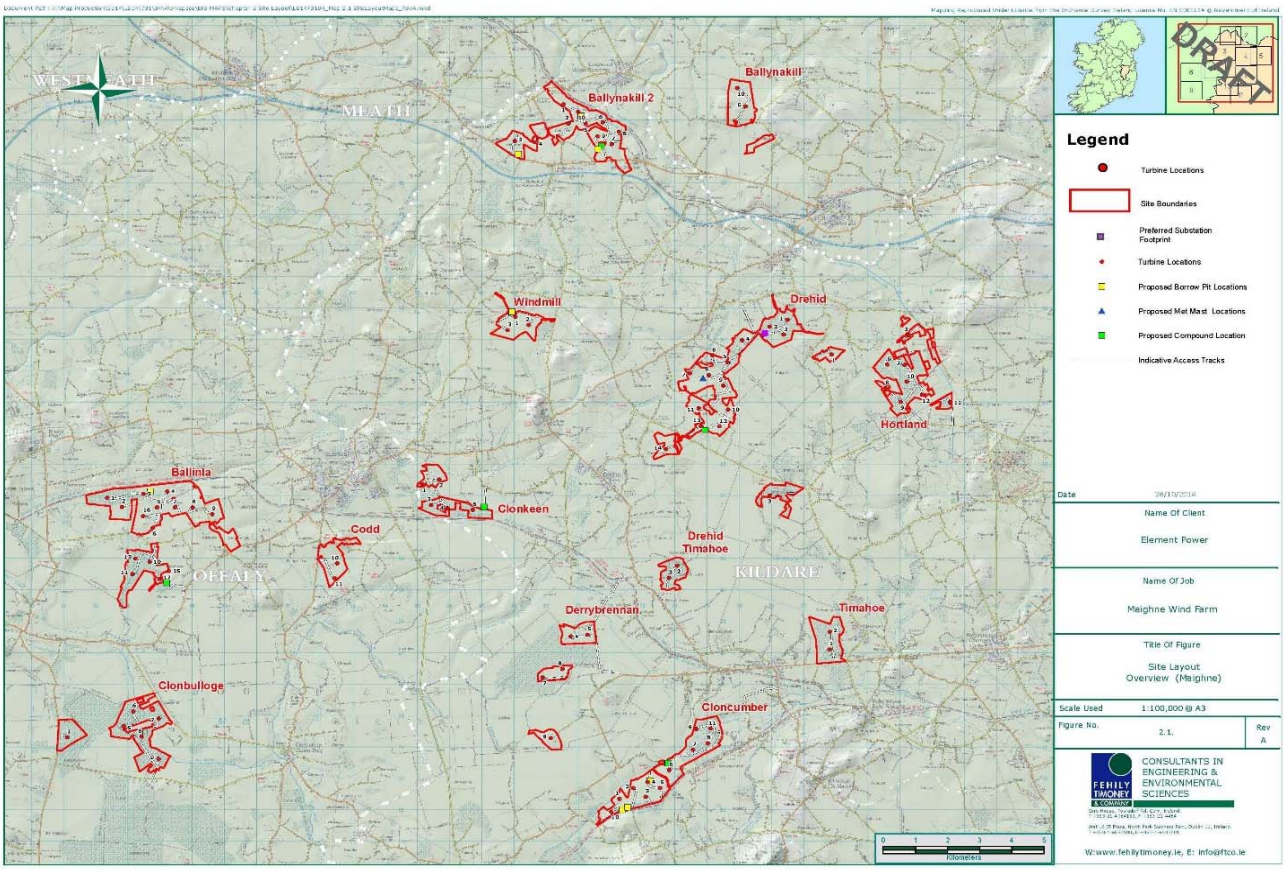

Figure 1.11: Extract from Scoping Report

The ultimate objective of the applicant was to identify environmentally suitable, available sites to accommodate up to 55 turbines. Therefore these potential sites were subjected to further screening refinement.

1.2.2 Refinement of the layout:

As part of the refinement process the clusters in County Offaly were omitted from further investigation as they were the furthest sites from the proposed EirGrid connection points in either Woodland in County Meath or Maynooth in County Kildare. Namely Ballinla, Codd, and Clonbulloge were not considered for further investigation for this wind farm development on this basis.

The proposed Ballynakill cluster (as referenced in the scoping document) was not brought forward for further study as access to the proposed cluster was proving difficult. The cluster referred to as Ballynakill 2 in the scoping document was then renamed Ballynakill.

In order to reduce the impact on the local road network, turbines were removed from the south of local road L-5025 and to the east of local road L—5013 thereby eliminating the need for significant cabling to connect these single turbines to the proposed cable system.

Significant consultation has been undertaken with the Department of Defence, as detailed in Chapter 4 and 16 of this EIS. Following this engagement, the applicant has sought to address potential concerns through design consideration. The proposed cluster layouts have evolved significantly in terms of a substantial reduction in turbine number (removed over 10 turbines and a number of entire clusters due to aviation considerations) and a lowering of turbine tip height (the project originally considered 185m tall turbines but are now proposed at 169m), with the aim to address all concerns raised by the DoD and minimise any possible cumulative effects to a minor significance and hence manageable level. For this reason turbines at Timahoe, Derrybrennan and Clonkeen sites were also removed from the site layout to allow significant distances between the individual site external boundaries providing adequate space for aircraft to safely operate between the proposed developments as confirmed by Osprey the aviation expert (see the Aviation Impact Assessment in Appendix Q).

On the basis of the above site study and selection process, the proposed remaining clusters were subjected to a more detailed site assessment which included:

- Set back from houses
- Set back from other constraints such as rivers, roads, railway and power lines
- Suitable Wind Speed
- Landscape and visual sensitivity
- Ecology
- Ornithology
- Soils & geology
- Hydrology
- Noise
- Archaeology
- Telecommunications

Industry standard best practices were followed in applying buffers for each of the constraints, which resulted in initial layouts and then these were adjusted as more detailed environmental assessment was undertaken. The environmental sensitivities of the proposed development included an analysis of the above listed topics. The analysis of these led to the production of the constraints mapping. The review of the constraints highlighted areas of potential environmental concern associated with the site. Buffers and set backs were then used to identify suitable areas within the site.

Table 1.2: Buffers and Setbacks Applied

Environmental Consideration	Required Setback / constraint
Impacts on amenity	500m set back from houses
Impacts on flora and fauna	Avoidance of designated sites sites. 0.84km from the nearest SPA & 0.8km from the nearest cSAC No overhead cables as part of the project.
Ornithology	Avoidance of designated sites No overhead cables as part of the project
Soils & geology	Avoid where possible areas of deep peat
Environmental Consideration	**Required Setback / constraint**
Water Quality	Minimum 50 m set back from rivers and streams
Noise & Vibration	500 m set back from houses
Shadow flicker	500 m set back from houses
Cultural heritage	Avoid direct impacts on cultural heritage
Hydrology	Minimum 50 m set back from rivers and streams

Following this screening process the layout as shown below was appraised further.

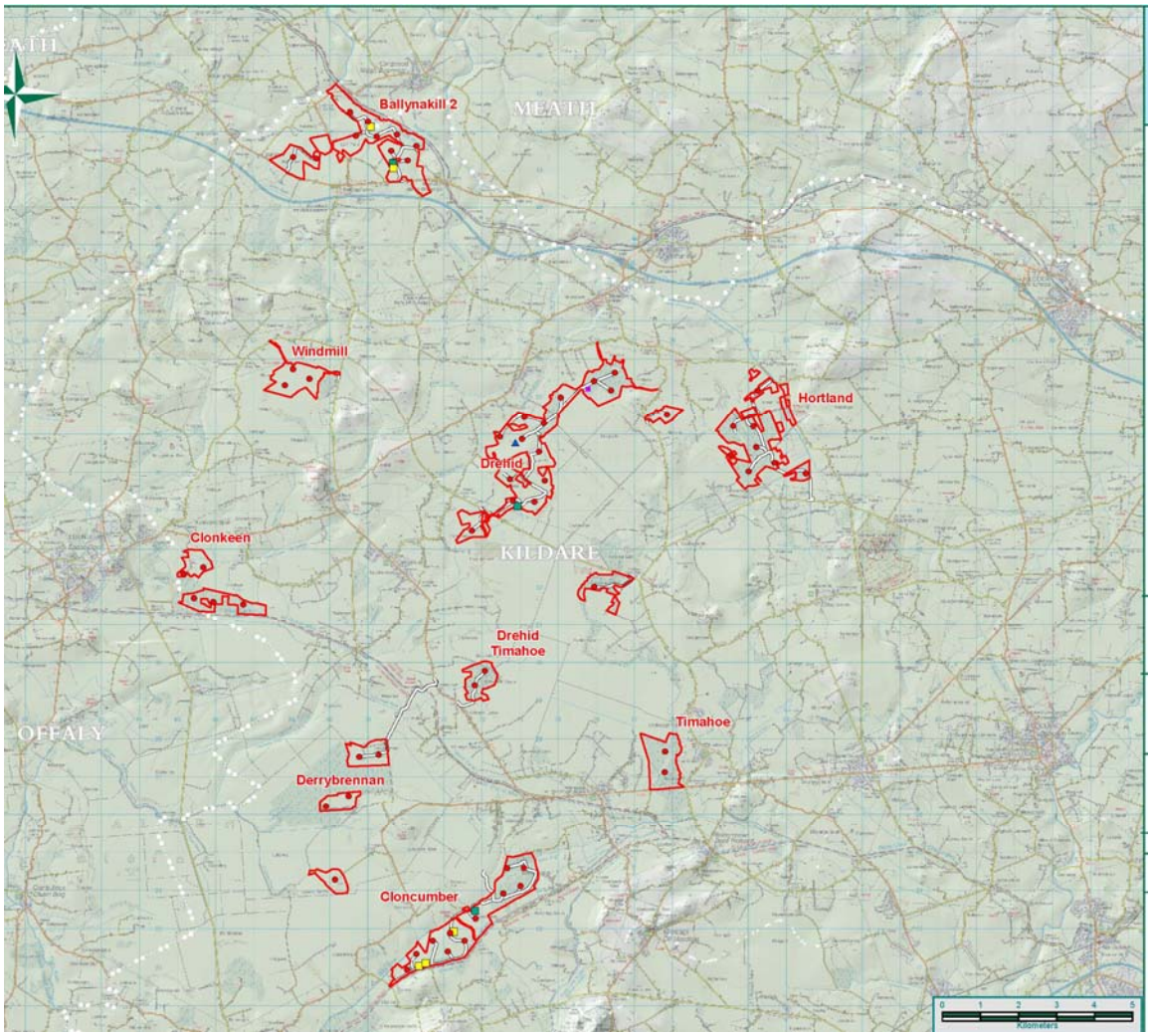

Figure 1.12: Proposed Layout

1.2.3 Public Engagement

Following initial assessments in the area, two public information/consultation days were held.

Overall the response to the project over the course of the day was mixed, with an emphasis on community benefit fund and the economic benefits that the development could bring to the area. At an early stage in the consultation process the public expressed a preference for undergrounding cables rather than overhead lines and a decision was made to underground all the cabling for the project even though it is significantly more expensive to do so.

Feedback from the public consultation showed preference for a turbine height less than 185m.

1.2.4 Optimisation and Final Design of the Turbine Layout

Following the desk top studies and the identification of the constraints, site visits were carried out by the environmental specialists to further determine the appropriateness of the site and to identify additional constraints that were not identified at the desktop study stage. On completion of the environmental appraisal any turbine locations that are not deemed as suitable locations were removed or relocated. The initial layout was an 87 Turbine layout as shown in Figure 1.9 above. Through the process of refinement and iteration this layout was further refined to the optimal layout of 47 turbines. Details of the alternative layouts are discussed further below.

Consultation with the landowners involved with the project as another key consideration. There are 57 landowners involved with this project and they are a key stakeholder. Landowners were consulted on an ongoing basis throughout the design process.

Another critical part of assessing sites at this early stage was to engage with the planning authority and statutory consultees (e.g. NPWS, IFI etc.). Details of the consultation process are contained in Chapter 4, EIA Scoping Consultation and Key Issues.

The following measures were undertaken to reduce environmental impacts through avoidance and design:

- The hard-standing area of the wind farm has been kept to the minimum necessary, including all site clearance works to minimise land take of habitats and flora.
- Site design and layout deliberately avoided Natura 2000 sites, NHA's, pNHA's in addition to other nature conservation designations. Internal road design has avoided hedgerow removal wherever possible. This is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by industry best practice
- All cabling for the project is to be placed underground; this significantly reduces collision risk to birds over the lifetime of the wind farm and is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended industry best practice.
- Care has been taken to ensure that adequate buffers are in place between wind farm infrastructure and hydrological features such as rivers, lakes and streams. Wherever possible, existing stream and river crossings have been utilised.
- Any works in or around watercourses will adhere to best practice as identified in the relevant chapters of the EIS.
- Borrow pits and material extraction locations were selected having considered species such as Sand Martin and Peregrine, which may occur in sand and gravel quarries as highlighted by NPWS during the consultation process. The use of borrow pits also significantly reduces the impacts on traffic on the local road network.
- Where feasible existing infrastructure such as roads has been used within the wind farm clusters.

1.2.5 Environmentally Designated Areas

While the initial screening process ensured that none of the proposed sites were located within designated areas, there still remains a potential for indirect impact. In total, there are 34 designated sites or proposed designated sites within 15km of the proposed development. Ten of these are Natura 2000 or 'European' sites. Of these 10 European sites, nine are candidate Special Areas of Conservation (cSACs) and one is designated as a Special Protected Area (SPA). It should be noted that a number of the cSAC sites are also designated as a Natural Heritage Areas (NHA). There are 20 proposed Natural Heritage Areas (pNHAs) and four additional, designated Natural Heritage Areas (NHAs) within 15km of the site. Figure 7.1, Volume 2a, shows the location and extent of the designated nature conservation sites within 15km of the study area.
As set out in considerable detail in both Chapter 7 Flora and Fauna and Chapter 9 Hydrology and Ecology chapters of the EIS, there are hydrological links between the proposed wind farm and a number of the designated sites, however any potential impact can be dealt with through mitigation during wind farm construction and operation as outlined in those chapters.

1.2.6 Proximity to the Irish Grid

Wind energy generated must be capable of a sustainable connection to the electricity transmission grid. Without a viable grid connection a wind farm will not be built. As previously stated, proximity to grid with high capacity was one of the key drivers in locating this project in the Counties Kildare and Meath. All cables will be constructed underground. Further details on the cables is provided in Chapter 2 of the EIS. .

1.2.7 Wind Speeds

A wind atlas for the area suggests an annual mean wind speed across the site of 7 - 7.5m/s for hub heights ranging from 100m – 110m. In addition EPI have two met masts recording in the area. One is approx. 7km northwest of Ballynakill and has been recording since Dec 2013, the second is located adjacent to Cloncumber and has been recording since July 2013. Wind data and analysis by in-house specialists supports this estimate. Based on the analysis to date, the site is suitable for a commercial wind farm and the analysis has confirmed the developers' decision to apply for planning permission for wind turbine generators with tip heights of up to 169m. Several large rotor turbines are suitable for the site which will allow competitive tendering before the start of construction. The turbine technology being considered for the site is all proven technology manufactured by mainstream turbine suppliers.

1.2.8 Access to the site

Turbine delivery within the midland area is easily accessible due to the motorway infrastructure and regional roads in the region. The M4 Motorway, which connects the N4 in west Dublin to the N6 west of Kinnegad gives good access from Dublin port to the midlands area. Leaving the motorway there is a good network of regional roads which can provide access to the proposed wind farm clusters.

1.2.9 Population Density

In terms of visual assessment or potential impacts the current Wind Farm Planning guidelines do not stipulate a minimum separation distance from turbines to dwellings. However, all turbines have been offset at a minimum separation distance of 500 m from dwellings not associated with the project. An objective of the layout was to locate the sites outside of areas of high population densities. Figure 1.11 shows the proposed clusters in relation to population densities (from the 2011 census) thereby showing that the clusters are located in low population densities.

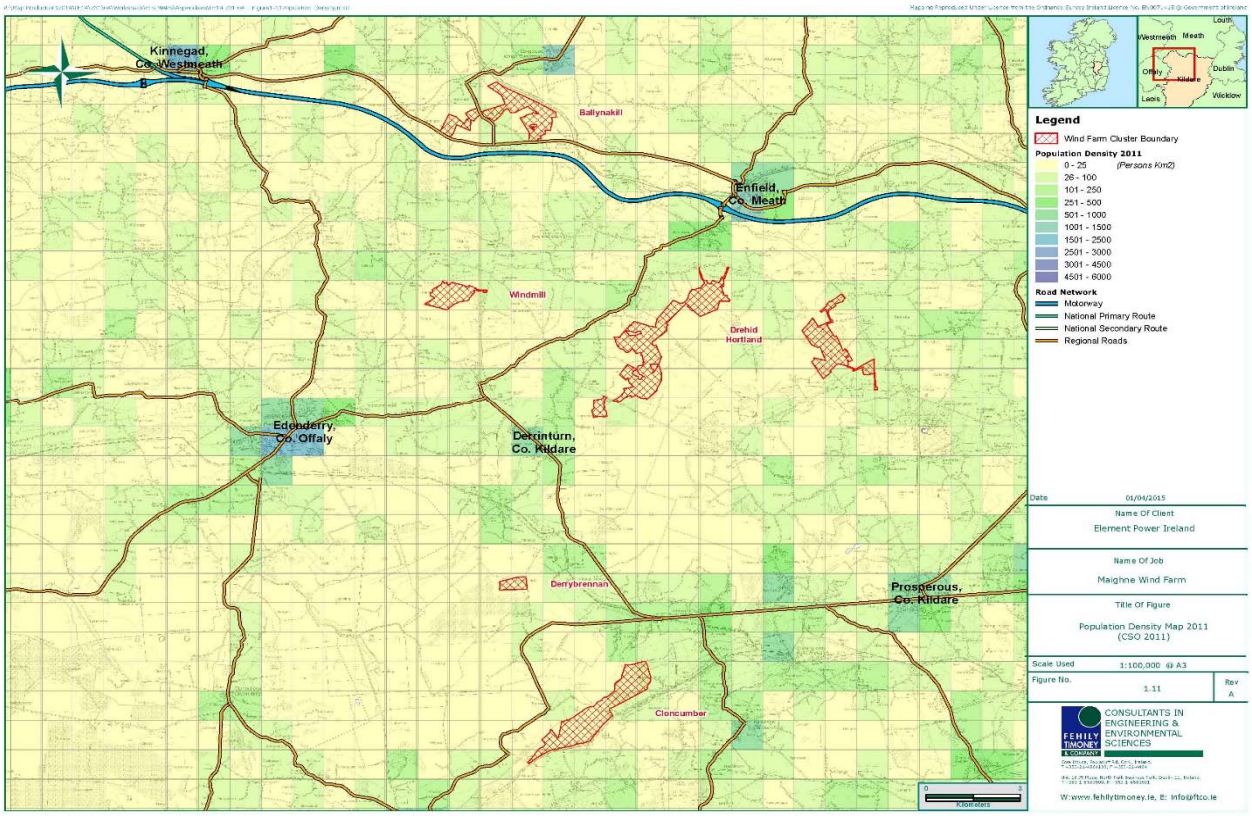

Figure 1.13: Population Densities

1.2.10 Optimal Spread of the Wind Farm Clusters

Although the initial impression of this wind farm development proposal is that a broad area of the North Kildare lowlands would be covered with tall wind turbines, which would dominate the landscape and surround its inhabitant, this landscape and visual appraisal reveals quite a different reality. That is, due to the dispersed nature of the proposal and the high degree of screening provided within the lowland landscape, the Maighne wind energy development will be perceived as a series of small to medium sized developments rather than a sprawling singular one. Rather than dominate the underlying landscape it is considered to integrate with it reflecting the organic and meandering pattern of the peatland areas that it occupies and abuts. The dispersed arrangement of the various clusters results in equally dispersed impacts. The magnitude of these impacts reflects the robustness of the receiving landscape and visual setting as well as the discretely portioned views of the scheme. The Landscape and Visual impact is dealt with in considerable detail in Chapter 15 Landscape and Visual Assessment of this EIS.

1.2.11 Constructability

Due to the relatively low lying nature of the site, its proximity to the national road network, shallow peat and the low risk of peat slippage would make construction feasible at all areas of the proposed clusters.

1.2.12 Conclusion

Following the assessment of the midland regions, the northern area of Kildare and southern area of Meath emerges as the most appropriate locations for wind farm development for the following reasons:

- County Development Plans suggest there areas may be suitable for wind farm development
- No direct impact on an environmentally designated site
- Access to high capacity grid
- Less Cumulative Impacts
- Ability to use national road network for access to the site
- Proximity to national transmission network
- Wind Speeds
- Distance from Large Settlements
- Constructability

1.2.13 Alternative Turbine Layout

As described previously the layout of the wind farm is an iterative process. There are varying constraints that decide the final layout of the wind farm. For Maighne Wind Farm, visual impact, cultural heritage and Department of Defence considerations were the principal considerations of the alternative wind farm layouts and ultimately the final layout. Relocating of turbines can also have a knock on effect on the turbines closest to them in order to maintain the required separation distance and to optimise for the wind regime of the site. While Figures below indicate all the alternative turbine locations, only the principal alterations/iterations are detailed.

One of the principal mitigations measures for the project was the development of the project into five separate wind farm clusters as opposed to one larger wind farm site. As stated previously due to the dispersed nature of the proposal and the high degree of screening provided within the lowland landscape, the Maighne wind development will be perceived as a series of small to medium sized developments rather than a sprawling singular one. Rather than dominate the underlying landscape it is considered to integrate with it reflecting the organic and meandering pattern of the peatland areas that it occupies and abuts.

The scheme went through numerous iterations before the optimal layout was finalised. Figure –1.12 to Figure 1.17 detail the various movements and removal of turbines during the course of the study. The main factors that contributed to the refining of the layout were:

- Archaeology and Cultural Heritage
- Ecology
- Set back from houses & water courses
- Optimal Turbine Spacing Generally the spacing between turbines is recommend to be not less than 3 times the rotor diameter and ideally up to 5 times the rotor diameter)
- Aviation considerations

These layout alterations are discussed on a site by site basis hereunder and a copy of the Figures is provided thereafter.

Turbine Layout at Ballynakill

Turbines were relocated within this cluster for the following reasons:

- To obtain the require set back distance from railway line
- To maintain a 50m buffer with the watercourse
- To provide optimal spacing between turbines
- To maintain a minimum set back of 500m from housing

Turbine Layout at Windmill

Turbines were relocated within this cluster for the following reasons:

- To provide optimal spacing between turbines
- To maintain a minimum set back of 500m from housing

Turbine Layout at Drehid Hortland

Turbines were relocated within this cluster for the following reasons:

- To maintain a 500m set back from houses
- To maintain a 50m buffer with the watercourse
- To provide optimal spacing between turbines
- A turbine was removed from the scheme as access to the turbine was not possible
- To maintain a minimum set back of 500m from housing

Turbine Layout at Derrybrennan

Turbines were removed within this cluster for the following reasons:

- Turbines removed due to the presence of breeding Lapwing & proximity to marsh fritillary
- Turbines removed as it was found to be dominant around Lullymore Monastic site
- To maintain a minimum set back of 500m from housing

Turbine Layout at Cloncumber

Turbines were relocated within this cluster for the following reasons:

- To maintain a 500m set back from houses
- To maintain a 50m buffer with the Slate river
- To provide optimal spacing between turbines
- To provide set back from the canal
- To maintain a minimum set back of 500m from housing

Drehid Timahoe

Turbines were dropped from the proposed development in the area around Timahoe as they were where they were found to distract from the view of Newberry Hall from Carbury Hill and the castle.

Alternative Access Tracks

Following consultation with Waterways Ireland the access tracks in the Cloncumber cluster were moved a minimum set back distance of 25m from the Grand canal.

Within the Windmill site, the access tracks were relocated to the edge of the field boundaries to allow for optimisation of the milling of the site to continue.

Access tracks within all the wind farm clusters were moved the edge of the field boundaries to allow agricultural practices to continue while the wind farm is in operation and to allow for the optimum use of the field.

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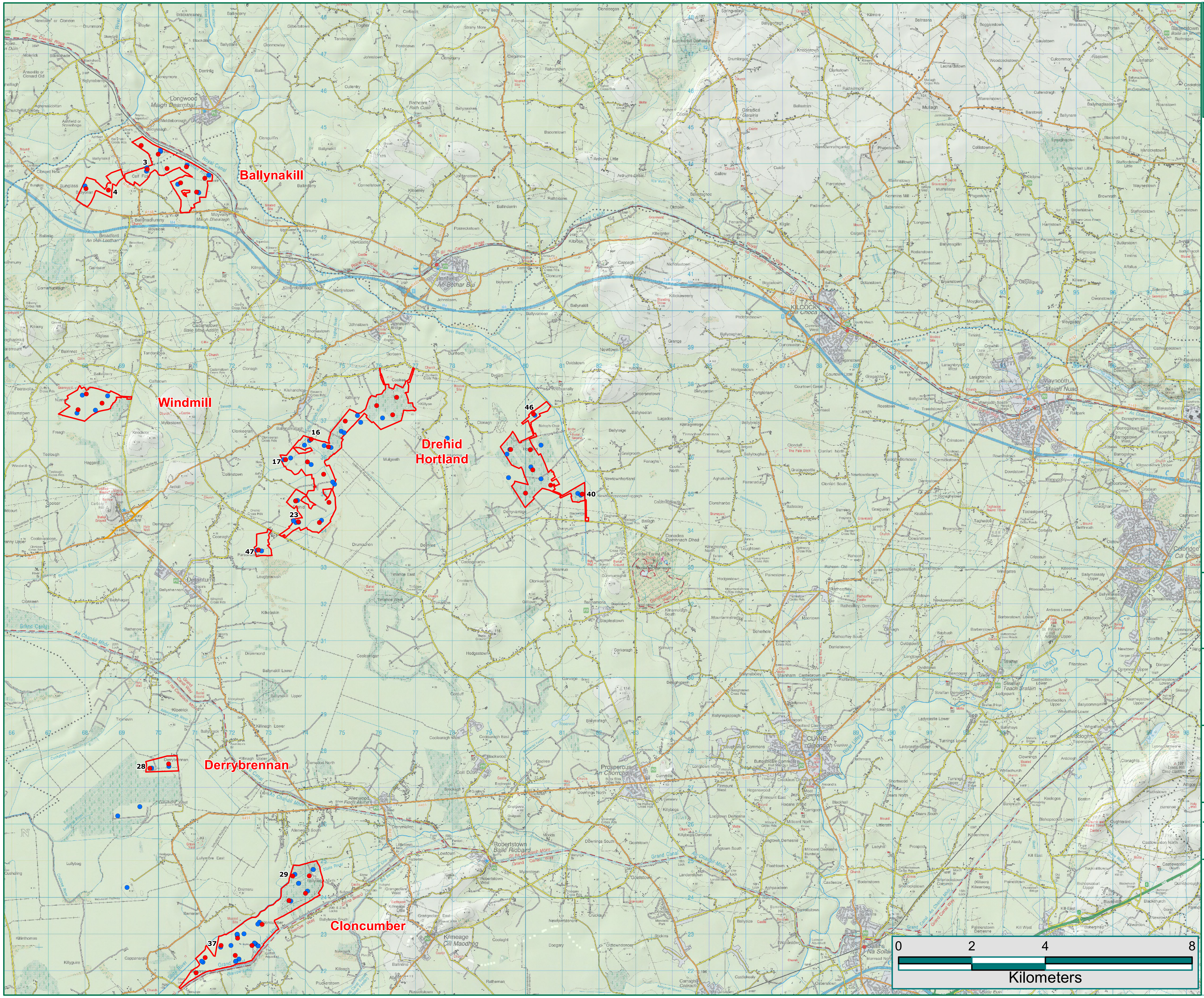

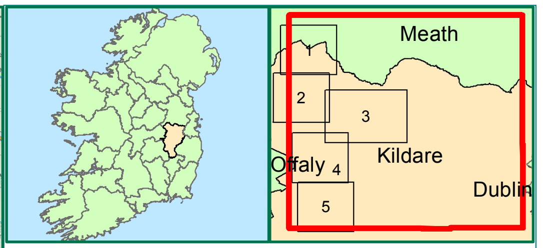

Legend

- Turbine Location
- Turbine Locations Considered
- Wind Farm Cluster Boundary

Date 01/04/2015

Name Of Client

Element Power Ireland

Name Of Job

Maighne Wind Farm

Title Of Figure

Alternative Turbine Layout
Maighne Overview

Scale Used 1:100,000 @ A3

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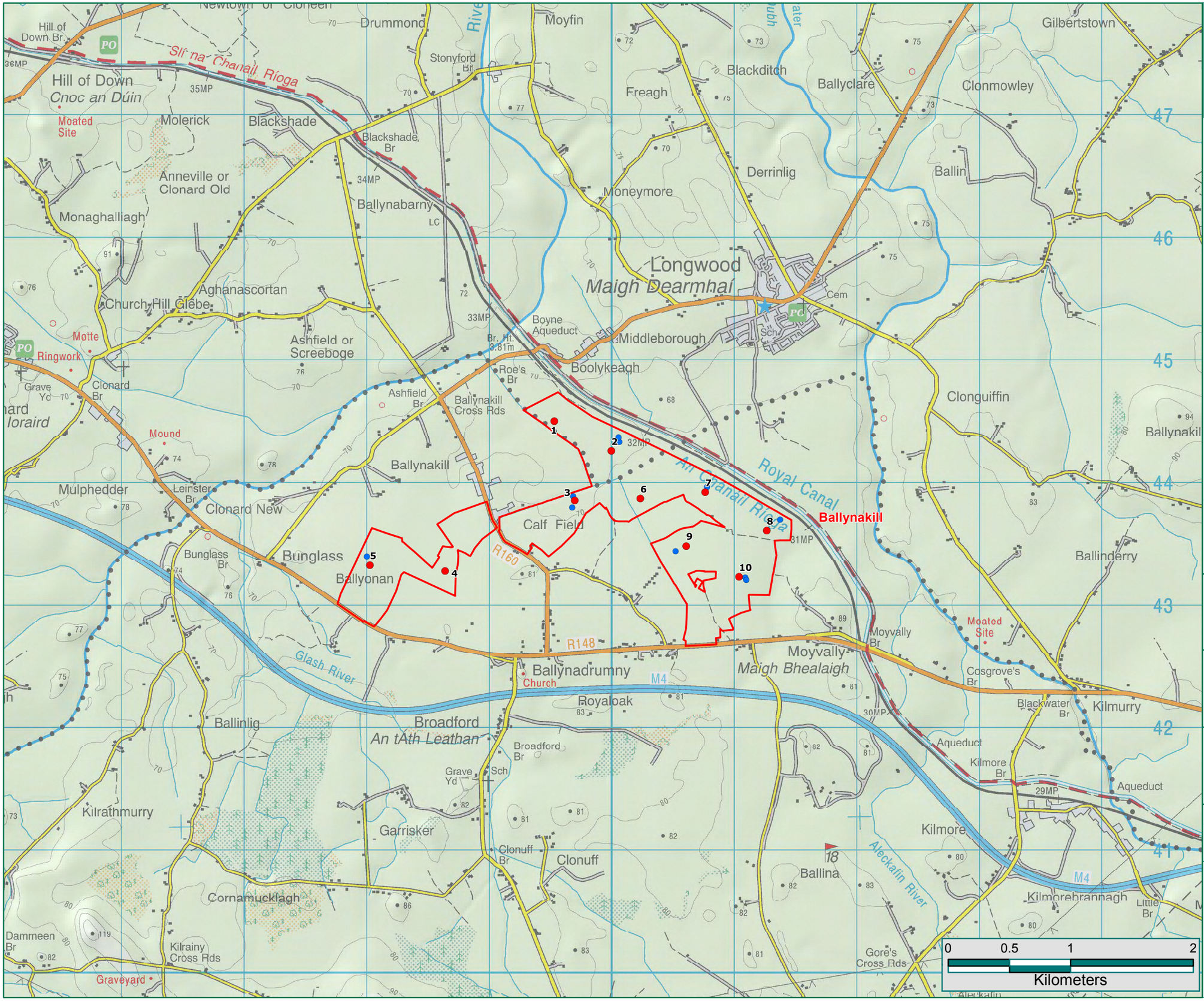

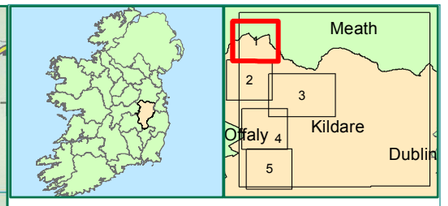

Legend

- Turbine Location
- Turbine Locations Considered
- Wind Farm Cluster Boundary

Date	01/04/2015
Name Of Client	Element Power Ireland
Name Of Job	Maighne Wind Farm
Title Of Figure	Alternative Turbine Layout Ballynakill Submap 1 of 5
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Figure No.	1.13
Rev	A

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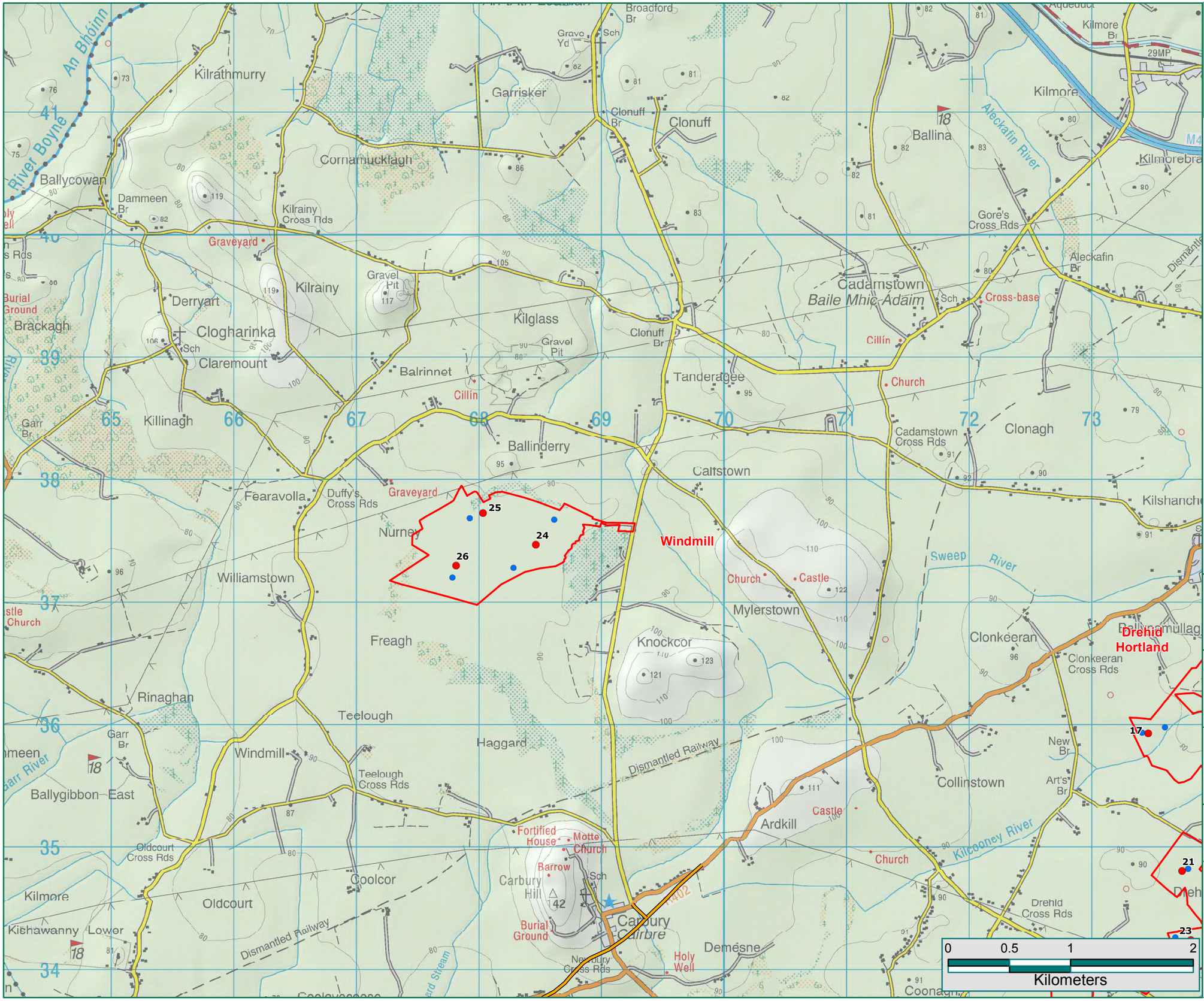

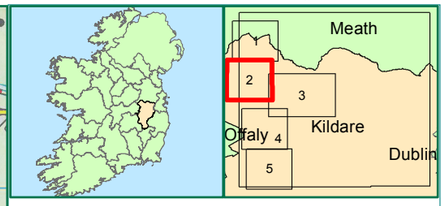

Legend

- Turbine Location
- Turbine Locations Considered
- Wind Farm Cluster Boundary

Date 01/04/2015

Name Of Client

Element Power Ireland

Name Of Job

Maighne Wind Farm

Title Of Figure

Alternative Turbine Layout
Windmill Submap 2 of 5

Scale Used 1:30,000 @ A3

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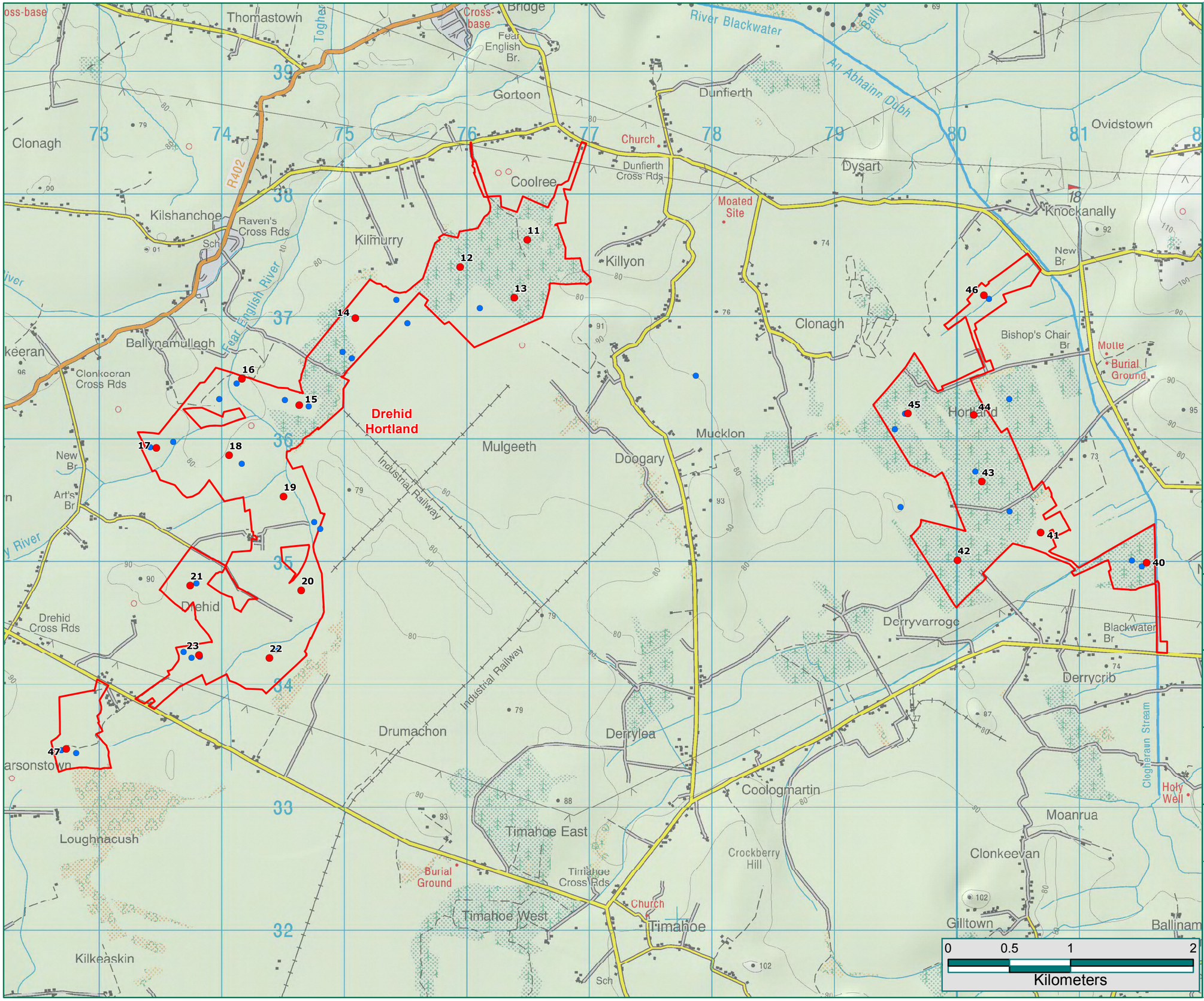

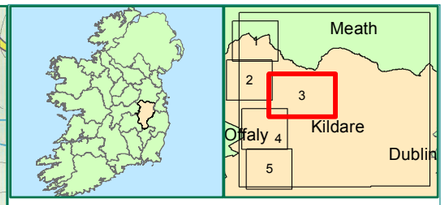

Legend

- Turbine Location
- Turbine Locations Considered
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Date	01/04/2015
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Name Of Job	Maighne Wind Farm
Title Of Figure	Alternative Turbine Layout Drehid Hortland Submap 3 of 5
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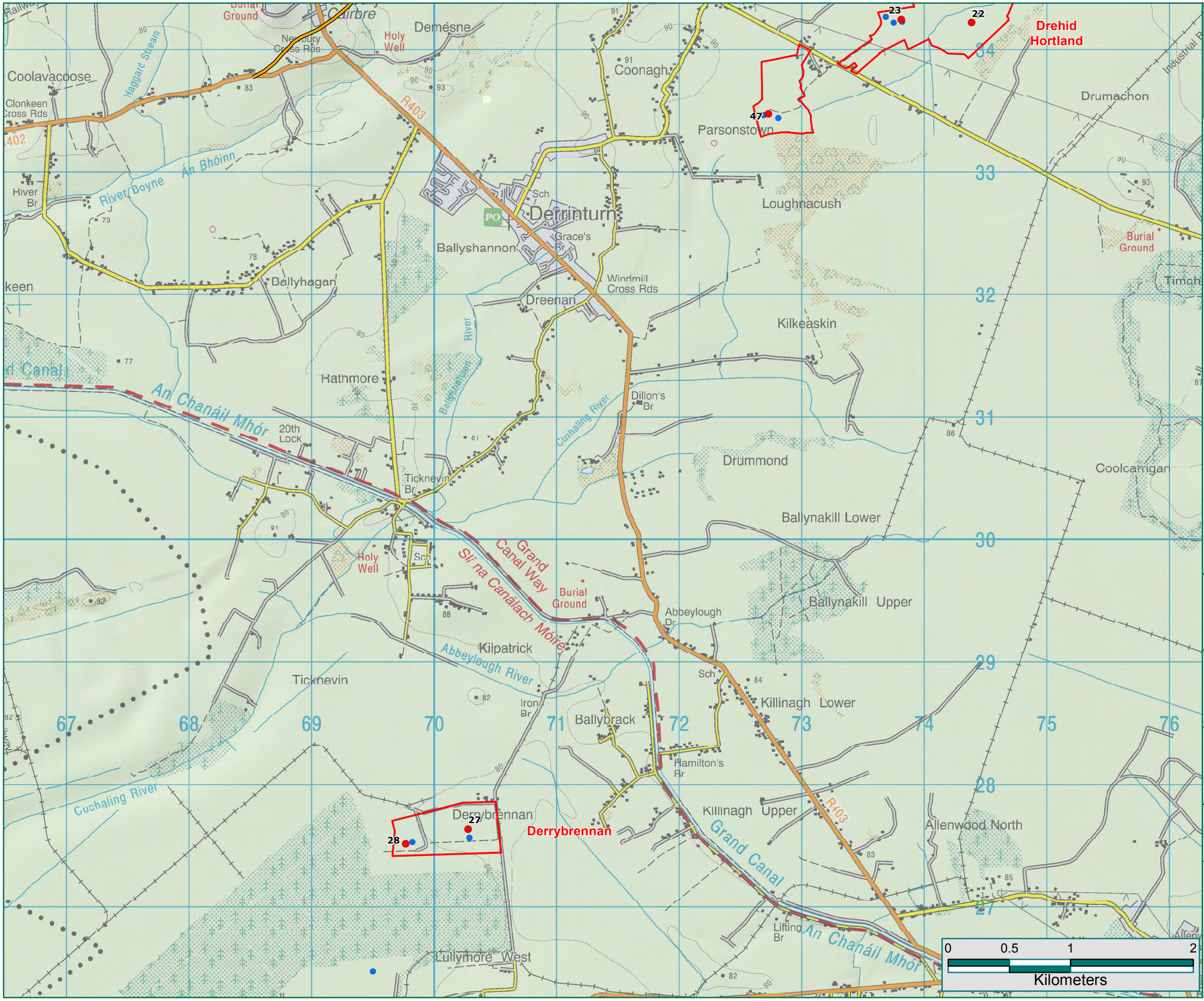

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- Turbine Location
- Turbine Locations Considered
- Wind Farm Cluster Boundary

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Date 01/04/2015

Name Of Client

Element Power Ireland

Name Of Job

Maighne Wind Farm

Title Of Figure

Alternative Turbine Layout
Derrybrennan Submap 4 of 5

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Figure No. 1.16

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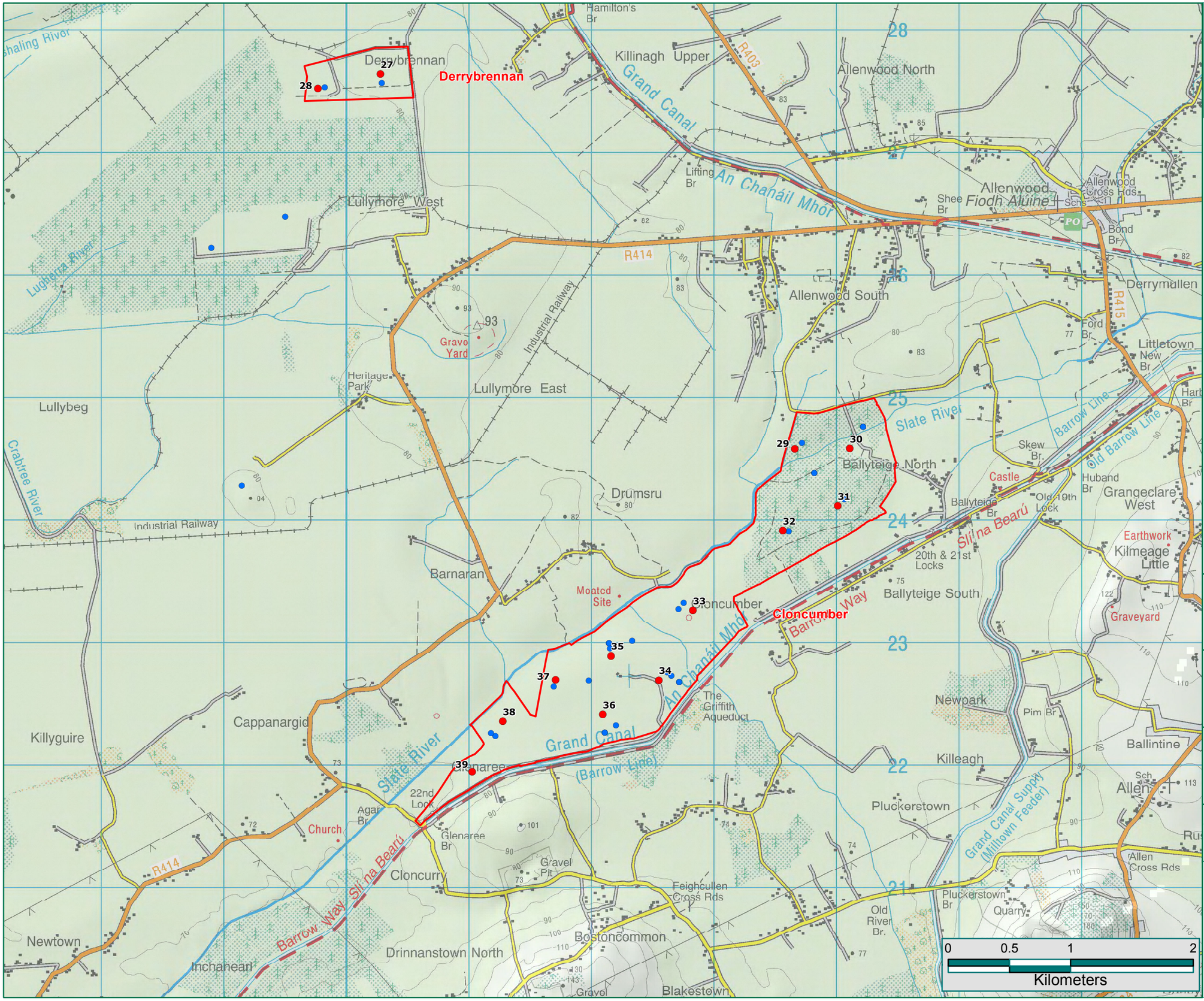

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- Turbine Locations Considered
- Wind Farm Cluster Boundary

Date 01/04/2015

Name Of Client

Element Power Ireland

Name Of Job

Maighne Wind Farm

Title Of Figure

Alternative Turbine Layout
Cloncumber Submap 5 of 5

Scale Used 1:30,000 @ A3

Figure No. 1.17

Rev A

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1.2.14 Turbine Height versus Density Relationship

As part of the design process, a number of different turbine heights were considered for Maighne Wind Farm. The relationship between the height and the density or number of turbines required to achieve a particular power output is a key design consideration.

Several case studies and surveys have highlighted that when given an option people tend to prefer a scenario of fewer larger turbines. One such study commissioned by Bord Failte in 2008 found that;

> "In terms of the size and composition of wind farms, tourists tended to prefer farms containing fewer turbines. If both produced the same amount of electricity, tourists also preferred wind farms containing a small group of large turbines (55%) to a large group of smaller turbines (18%)."

The plate below shows different layouts using different turbine heights and using the same output.

There is a balance to be struck between the visual and spatial dominance of turbines and the clutter and frequency of turbines within a view as both of these effects contribute towards the magnitude of visual impact. On the basis of these factors and through design stage analysis, it is considered that the slightly increased sense of visual dominance imparted by the proposed 169m turbines is preferable to the reduced level of permeability and increased visual clutter associated with a greater number of shorter turbines required to achieve the same output. This is illustrated in Figure 1.18 below, which compares a similar energy yield across three turbine heights within the same view. This is only intended as an illustrative diagram to show the balancing relationship between turbine height and density.

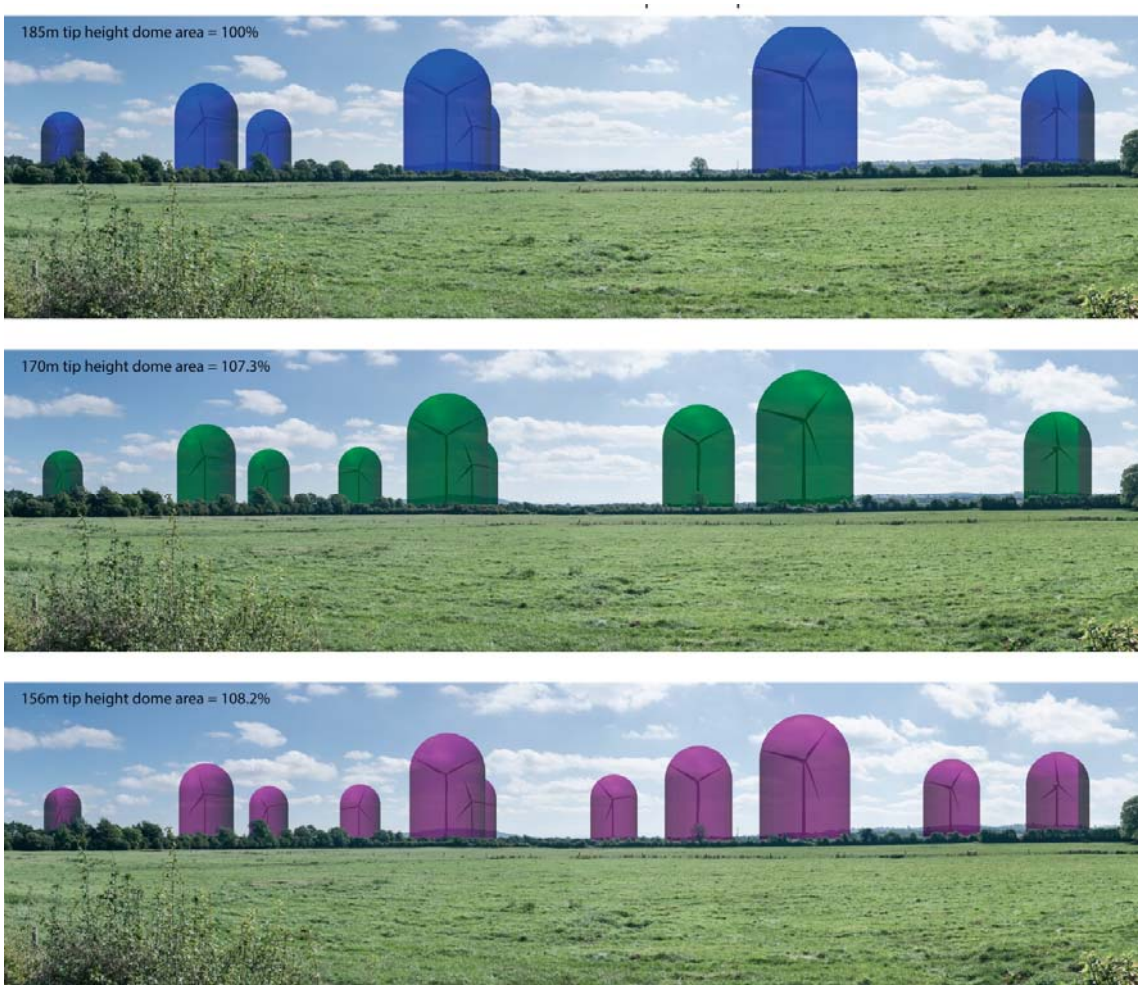

Figure 1.20: Turbine height versus density relationship (same power output within survey)

It is considered that the flat to mildly undulating nature of the site along with the large scale field pattern and extensive forest plantations that tall turbines can be accommodated. Turbines of 185m, 170m and 156m tip height were considered for this project and eventually it was decided to use a 169m tip height option as the optimal balance between turbine height and turbine density in this landscape setting.

Whilst this tip height is greater than most of the turbines currently in operation around the country, it is consistent with some of the latest applications and planning permissions.

Furthermore, feedback from the public at the public consultation showed preference for a turbine height less than 185m.

1.2.15 Alternative Access Tracks and Hardstandings Layouts

The construction of new access tracks was minimised by using existing tracks where feasible. Where possible turbines were located in an area preferred by the landowner to ensure minimal impact on the existing agricultural activities.

1.2.16 Alternative substations

There are broadly two types of substation being constructed in recent years. In cities, or places where space is at a premium, the Gas Insulated Switchgear is usually chosen, as this reduces the overall substation footprint. (The gas refers to SF6 gas, which is highly electrically insulating, and allows all the switchgear, busbar and breakers to be installed in much closer proximity than if air alone is used.) However while the footprint of a GIS station is smaller, all the equipment is housed internally, and requires a basement and overhead crane, requiring a tall steel clad building.

Air Insulated Switchgear is the more traditional technology, with each of the pieces of equipment (breakers, measurement transformers, disconnectors and busbar) all individually mounted on top of porcelain insulators on top of steel supports. A control building is still required to house ancillary equipment (protection relays, battery backups, SCADA and mimic panels, communications equipment), but this is typically a small single storey pitched roof building.

Given the relatively flat rural landscape in which the proposed wind farm substation is being installed, it was decided that an AIS substation, although having a larger footprint in plan view, would have a lower visual impact than the tall GIS building required, and that was the primary factor affecting the choice of AIS or GIS in this instance.

1.2.17 Alternative Cable Routes

General Considerations

The scope of cable route selection for the Maighne Wind Farm project involved the identification of cable routes to connect the individual wind-farm clusters to the sub-station at Drehid and then to connect the sub-station to inturn connect to the EirGrid network, either at the existing Maynooth or Woodland sub-stations.
In advance of detailed cable routing, consideration was given as to whether overhead power lines or underground cables should be used for the transmission of the power to be generated by the wind turbines. A number of factors were considered.

i. Overhead power lines would be much less expensive to construct in comparison to underground cables.
ii. Cognisance was given to the objectives included in Kildare's County Development Plan, which requires that proposed overhead lines should as far as possible seek to avoid areas of sensitivity (e.g. areas of high amenity, high sensitive landscape designations, scenic views, protected structures etc.). Where avoidance is not possible, the policy requires that full consideration should be given to undergrounding lines. Furthermore during the consultation process there was a strong preference for underground rather than over head cables.
iii. It appears from other projects that stakeholders generally have shown strong preferences for underground cables rather than overhead lines.

iv. If the Maighne cables were to be installed overhead, then without rights of access onto private property, the cable routes would generally follow the public road network. The overhead lines would have the potential to present significant visual impact as well possibly as physical conflicts with private housing and other buildings which exist along the public roads.

v. There were no electrical technology reasons militating against the undergrounding of the project's electric cables.

Having regard to the above considerations, it was decided to underground all cables even though the cost of undergrounding the cables is considerably greater than the overhead option.

Having decided to lay the cables underground, a number of other high-level decisions were then made which are discussed in the following sections

Specifications for Cable Laying

It was decided that the design and construction of electric cabling for the project would be in conformance with EirGrid specifications for the high voltage lines and ESB Networks specifications for the medium voltage lines. As such, the construction of the project's cable network will be consistent with the installation of such cables elsewhere in Ireland (and ultimately the cables will form a vital part of national electricity infrastructure).

Possible use of Bord na Móna Infrastructure (roads, rail lines) for accommodating the cable infrastructure

Bord na Móna has an extensive network of railways in the area of the Maighne site and consideration was given to laying the cables along their current railway network.

Having investigated this further, it was not considered possible for the following reasons:

i. As BnM are still using the railway network they were unable to provide access to it for a third party.

ii. Furthermore, if the cable were to be laid along the rail lines, it would likely be necessary to construct new roads within the bogs, in parallel to the rail lines, to facilitate the cabling construction works and ongoing maintenance of the cables. Accordingly, this solution would also have significant environmental impacts in comparison with laying the cables on existing roads.

Accordingly, except for one location where it was possible to lay cables along an existing privately owned road within Bord na Móna and other private property in the area of Lullymore East and Derrybrennan, it was not possible to lay cables within Bord na Móna property.

Possible use of other 'off-road' locations for accommodating the cable infrastructure

'Off-road' underground transmission cables were used where land access was granted by landowners, both in the areas of the wind-farm clusters as well as in the Bord na Móna bog area of Lullymore East and Derrybrennan. This off road section through the Bord na Móna land removes approximately 4.5km off the public road network. Similarly, by bringing the cables through the wind farm cluster in Hortland this removes a further 5km of cabling from the public road network.

However, it was necessary in all other situations to route cables along the public roads where agreement(s) to route the cables cross-country was not reached with local landowners. Even when such agreement could possibly be reached, a key problem was that in a significant number of situations the land title was unclear. It was also noted that it is the policy of EirGrid and ESB Networks that, where possible, high voltage underground cables are to be installed under public roads.

Key Constraints

Key environmental constraints were identified in advance of route selection and an initial constraints study identified environmentally sensitive sites in the area of the wind farm. Possible impacts on such sites was considered carefully during the routing process.

Key geographical constraints were also considered which included the Grand Canal, the Royal Canal, the Dublin-Sligo rail line and the M4 motorway.

Selection of roads to accommodate cables

The road infrastructure in the area of Maighne wind farm includes a number of different road types. Some of the local roads are 'bog rampart' roads where there usually is a shallow road surface with little or no foundation. Other roads such as regional roads have significantly better foundations. Kildare County Council advised during consultation that it would prefer if the cables, where feasible, were to be routed along regional roads and with minimal routing along bog rampart roads; this preference was taken into account in selecting the cable routes. Cable routes and haul routes were chosen along the same public road network in so far as possible to minimise the impact on the public road network.

Cloncumber and Derrybrennan Cable Route Alternatives

The cable connection from the Cloncumber turbine cluster will run in a northerly direction from the south-east corner of the site along roads and Bord na Móna tracks along points A1-A2-A3-A4-A5-A6 and will connect with the Derrybrennan turbines between points A6 and A7. The cable route will then cross the Grand Canal at Point A7 and return to the public road at point A8. The route will then continue in a northerly direction along points A8-A9-A10-A11 until the route reaches the L5025 at Point A12. The route will then turn south-easterly until reaching the entrance to the Drehid site at Point A13 to proceed along internal access-tracks in a north-easterly to the sub-station.

This selected route south of Derrinturn matches the proposed turbine delivery and haul routes for the project in the bog areas in Derrybrennan and Lullymore, thereby minimising overall impacts by confining impacts to this corridor.

In selecting this route a number of alternatives were considered as follows:

i. Consideration was given to a route which would exit the wind-farm cluster at Point A14 and then be routed northwards on the L5081 to connect to the R414 at point A15. Two alternatives would then be available.

   The first alternative would be to lay the cable in a westerly direction along the R414 to re-join the previously selected cable route at Point A5 and then follow the selected route to Drehid. This route was unsuitable for use as a haul route or turbine delivery route due to the road layouts and restrictions on crossing the Grand Canal. While this route is shorter than the selected route its use for cable-laying would mean another road corridor would be impacted leading to increased overall impacts on bog roads. Therefore, this alternative route was not preferred.

   The second alternative considered would be to again exit the wind-farm cluster at point A14 and to route the cable northwards on the L5081 to connect to the R414 at point A15. In this alternative, the cable would cross the Grand Canal near Shee Bridge (Point A16) and then be laid along the R403 in a north-westerly direction to join the selected cable route at point A8, where the cable route from Derrybrennan would connect (the route would then continue to Drehid along the selected route A8-A9-A10-A11-A12-A13). However, the road and canal geometry imposes significant constraints on a crossing of the Grand Canal at this location. Importantly, Waterways Ireland indicated during consultation that they would be reluctant to allow a cable crossing of the Grand Canal near Shee Bridge as such a crossing might impact the integrity of the canal in this area. Accordingly, this route is not preferred.

ii. The third route alternative considered would be to again exit the Cloncumber cluster on the northerly side and then the cable would be routed to in a north and north-easterly direction to Drehid. The cable would either need to cross the Grand Canal in the vicinity of Shee Bridge (point A16) or alternatively at Bond Bridge between points A17 and A18. Waterways Ireland indicated during consultation that they would be reluctant to allow a cable crossing under the Grand Canal near Shee Bridge or Bond Bridge as such a crossing might impact the integrity of the Canal in this area. Assuming the canal could be crossed successfully, the cable route would continue through Allenwood along the points A18-A19-A20-A21-A22-A23-A13. The road through Allenwood has a high level of traffic and would not be conducive to cable laying. In any case, this route, along with a second separate route from Derrybrennan which would then be needed to connect the turbines to be located at Derrybrennan, would be significantly longer than the selected route. For these reasons, this alternative option is not preferred.

Ballynakill and Windmill Cable Route Alternatives

The cable route from the Ballynakill cluster runs along the R148 and L5006 (B1-B2-B3-B4-B8) and will cross under the M4 motorway near Moyvalley. The cable route from the Windmill cluster will be routed on the L1005 and L5010 (points B5-B6-B7-B8) to connect with the cable route coming from Ballynakill. The cable route will then continue in an easterly direction along the L5012 and L1004 (points B8-B14-B15) before it will enter the Drehid cluster near the location of the sub-station.

When selecting this route, a number of alternatives were considered:

i. It would be possible to route the cable at the exit point from the Ballynakill cluster along the R148 in an easterly direction and then adopt a south-easterly direction on the L5005 (B1-B2-B17-B18-B3). This route is longer and would also involve a double crossing of both the Royal Canal and Dublin-Sligo rail line and is therefore not preferred.

ii. Alternatively the cable could be routed westwards at point B1 until the cable would be routed southwards on the L1002 through the village of Broadford to connect to the cable route coming from Windmill (B1-B19-B20-B7). This route is loner that the selected route without offering any advantages and is not preferred.

iii. An alternative also considered would be to continue the Ballynakill cable cluster in a southerly direction along L5011 (points B8-B9) and also route the Windmill cable in a south-easterly direction on L5017 (points B6-B9). From point B9 the combined cable route would then continue southwards on L5025 (points B9-B10-A12-A13) before entering the Drehid cluster on the south-west side. Once the cable route would enter the Drehid site it would then need to be routed the entire length of the site in a north-easterly direction to reach the sub-station. While the length of cable to be laid on public road is approximately the same as for the selected option, the actual cable length would be significantly longer. Accordingly, this route option is not preferred.

Hortland Cable Route Alternatives

The cable-route will exit the Hortland turbine cluster at point C4 to join the L1004 and will be routed westwards along the L1004 and then on the L5012 before entering Drehid near the sub-station (points C4-C3-C2).

At early planning phases of the project consideration was given to installing additional wind turbines near Timahoe and in that scenario consideration was given to connecting the Hortland cluster along the L1017 to Timahoe and then on the L5025 to enter Drehid in the south-westerly point (D2-A23-A13). This route would be significantly longer than the selected route, is located along bog roads in poor condition and is not preferred.

Drehid sub-station to Woodland sub-station Route Alternatives

The cable route to Woodland sub-station will proceed from point C2 to point C1 and then will go in a northerly direction towards Johnstown Bridge (point E1). The route will then follow the R402 as far as the Enfield Bypass (points E1-E2-E4) and will cross beneath the M4 motorway. The cable route will then continue on the R148 between Enfield and Kilcock (points E4-E6-E8-E9-E14-E18-E19-E25). The cable route will pass over the Sligo-Dublin rail-line and Royal Canal immediately west of Kilcock. The cable will be routed around the north-west environs of Kilcock and will then continue, utilising local and regional roads, in a direct route to Woodland (points E26-E28-E29-E30-E31-E32-E35-E36-E37-E38-E39-E40-E41).

When selecting this route, a number of route alternatives were considered. Key constraints along the route, which are in close proximity to each other for the full extent of the study area, are the Sligo rail-line and the Royal Canal. All possible crossings of the rail-line and the Royal Canal between Enfield and Kilcock were considered. Some other crossings were considered to be feasible but the selected crossing point immediately west of Kilcock was preferred as it is feasible to cross over both the rail line and Royal Canal at that point and this location is on the shortest route between Drehid and Woodland. Other crossing points, given the road network north of the Canal, would have the effect of significantly increasing the length of route.

The crossing of the M4 motorway also represented a significant constraint. All crossing points were considered and the preferred crossing point was the selected location between Johnstown Bridge and Enfield. Routes associated with other crossing points are discussed below.

It would be possible to route the cable from point C2 in an easterly direction along the L5002 and L1004 to Knockanally (point C4), taking the benefit of laying the cable in a route parallel to the cable route coming to the sub-station from Hortland (points C2-C3-C4). From Knockanally a number of cable routes to Kilcock were considered, as follows:

i. The cable could be routed between points C4-D1-D3-E13-E12-E11-E10-E9. There would be a motorway crossing required between points E11 and E10 and the route would join the selected route on the R148 at Cloncurry cross roads. This route is longer than the selected route. Accordingly this route is not preferred.
ii. An alternative also considered would be to route the cable between the points C4-D1-D3-E13-E12-E16-E15-E14 to join the selected route on the R148 north of Nicholastown. This route is longer than the selected route. Importantly, the crossing of the M4 would be at a location where the motorway is in a cutting and the crossing would be very difficult to construct. Therefore this route option is not preferred.
iii. The third option considered would be to route the cables between Knockanally directly to Kilcock (C4-D1-D3-E13-E17-E20-E22-E23-E24-E25-E26). The route is of a similar length to the selected route. However, the crossing of the M4 immediately west of Kilcock would involve routing the cable immediately adjacent to a large roundabout which spans over the motorway. There is limited access in the area of the roundabout which would make a crossing difficult to construct and so this route is not preferred.

Drehid sub-station to Maynooth sub-station Route Alternatives

The cable route to Maynooth sub-station will exit the Drehid site at point C2 and will then be routed in an easterly direction along the L1004 to Knockanally (point C4), where the cable route will leave the public road to pass through the Hortland site, to exit on the L1017 at point D2. Thereafter the cable will be routed on local roads in an easterly direction to the Maynooth sub-station (points D2-D5-D6-D10-D11-D14-D16-D17-D18-D19-D20).

When selecting this route, a number of route alternatives were considered.

There is no viable alternative for the western part of the route along the L5002 and L1004 (points C1-C2-C3-C4).

However, from Knockanally (point C4) to Maynooth sub-station (point D19) there are a number of possible alternatives as follows:

i. The first alternative would be to route the cable southwards on the L1008 to join the selected route on the L1009 at point D5 (points C4-D1-D5-D6-D10-D11-D14-D16-D17-D18-D19). The northern section of the L1008 appears to be a bog road. The route is the shortest overall route but the length of cable laid on public road is longer than the selected route and so is not preferred.
ii. The second alternative would be to route the cable eastwards from Knockanally and then southwards on the L5029 and L5033 to join the selected route on the L1009 at point D6 (points C4-D1-D3-D4-D7-D6-D10-D11-D14-D16-D17-D18-D19). This route is longer than the selected route and so is not preferred.

The third alternative would be to again route the cable eastwards from Knockanally on the L5029 and L5032 until the route would reach the R407. The route would then go south on the R407 to join the selected route at point D14. Then, the cable route would proceed eastwards again to the Maynooth sub-station (points C4-D1-D3-D4-D7-D8-D9-D12-D13-D14-D16-D17-D18-D19). While this route is shorter than the selected route through the Hortland site the length of cable to be laid on public road is longer than the selected route and so is not preferred

0 1,250 2,500 5,000 7,500 10,000 Metres

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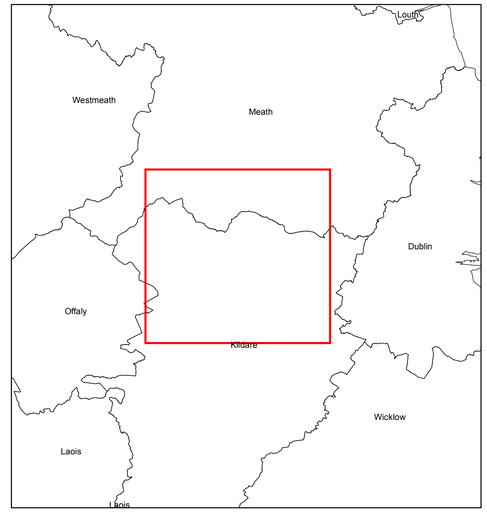
Legend

- Windfarm Site Boundaries
- Maighne Junction Nodes
- Indicative MV Cable Route On Road
- Indicative MV Cable Route Off Road
- Indicative HV Cable Route Maynooth/Woodland Off Road
- Indicative HV Cable Route Maynooth/Woodland On Road
- Maighne Route Alternatives

Keyplan



Rev.	Date	Description	Chk'd	App'd
P2	30/03/2015	Issue for EIS	CL	GB
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ARUP

Project Title:
Maighne Windfarm

Drawing Title:
Maighne Cable Routing
Alternative Routes

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Drawing No: **SKH-0042**

Rev.: P2

Document Path: J:\230000\230418-0414. Internal\4-02 Drawings\4-02-3 Civil Infrastructure\Maighne Windfarm Drawings\SKH-0042 - P2 Route Alternatives.mxd

1.2.18 Alternative Technology

Bioenergy Developments

Bioenergy presents an alternative to wind in assisting Ireland to meet its renewable energy targets. Bioenergy refers to the production of renewable energy from a variety of materials of a biodegradable nature and is generally considered under the headings of solid biomass, biogas and biofuels.

Biofuels refer to the production of transport fuels from material of biodegradable origin but are not supported by the REFIT scheme and as such are not discussed further in this assessment.

Solid biomass refers to the generation of heat and/or electricity from wood based materials (wood chips, pellets etc.) through thermal conversion of the material. Irish policy is currently focussed on the conversion of the 3 remaining peat fired power plants to 'co-fire' biomass with peat. To date, one power station (Edenderry Power owned by Bord na Móna Energy) has commenced co-firing with the 2 remaining ESB owned plants yet to begin accepting biomass, albeit having carried out trials on this material. Supply of biomass to the Edenderry plant has been, to date, on an approximate 50/50 basis of indigenous to imported biomass. While the recent merger of Coillte and Bord Na Móna PLC may 'free up' more of the domestic biomass supply for this plant, the current situation sees a lack of significant quantities of readily available domestic biomass to support co-firing at the peat fired power stations.

Biomass co-firing at the peat stations is supported under REFIT 3 up to a limit of 160MW at a rate of €85/MWh. This rate assumes no significant alteration to the specific combustion technology at the power plant. While the 'fluidised bed' technology employed at Edenderry Power can quite easily accept alternative fuel materials, technical difficulties at the two ESB plants have hampered plans for their acceptance of biomass material.

Bioenergy produced from biogas is achieved though the combustion of biogas in a boiler/combined heat and power unit, with biogas produced through the anaerobic digestion of biodegradable materials, typically, food waste, sludges, slurries etc. Compared to the UK, development of AD facilities in Ireland to date has been very limited, with only 5-6 facilities having been developed to date. Developers cite the low REFIT 3 support rate as the main barrier to the development of this sector, with the current rates of €100 - €150/MWh being lower than those offered in Europe, which are generally in range of €180 - €220/MWh.

Offshore Wind

Another form of renewable energy developments include off-shore wind farms. Currently there is no REFIT Tariff for Offshore Wind Farms. Therefore this option is commercially unviable for projects being developed to help Ireland meet its 2020 targets. In addition offshore wind is more expensive than onshore wind, the UK has a support scheme for offshore wind which is 40-50% higher than the tariff paid for onshore wind in the UK.

Wave and Tidal Development

Other forms of renewable energy developments include wave and tidal energy developments. The merits merits of these developments are seen as having less impact on communities. However, the technologies that support these are still at development stage and therefore the higher capital costs, maintenance issues, harsh marine environment and foreshore requirements currently make these options also commercially unviable at this time.

For these reasons on shore wind turbines are considered the most appropriate and cost effective technology for this development to help Ireland meet its 2020 targets.

1.2.19 Do-Nothing Alternative

Under the EU Directive on the Promotion of the Use of Renewable Energy (2009/28/EC), Ireland is obliged to ensure that 16% of the total energy consumed in heating, electricity and transport is generated from renewable resources by 2020 to help us reduce the nation's CO_2 emissions and to promote the use of indigenous sources of energy. Under the do-nothing scenario, Ireland is not helped to meet its 2020 targets and will incur significant financial penalties.

The target in electricity is to meet 40% of electricity consumption by renewable generation by 2020. The Department of Energy, Communications and Natural Resources 2012 update of the National Renewable Energy Action Plan (NREAP) estimates that approximately 4,000 (MW) of renewable generation will be required to meet the 40% electricity consumption target. At present approximately 85% of the electricity generated in Ireland is produced using imported fossil fuels. This dependency on energy imports leaves Irish consumers exposed to fluctuating international oil and gas prices. Harvesting renewable, indigenous resources such as wind will help diversify the Irish generation portfolio and reduce our dependency on imported fuel resources. Under the do-nothing scenario, Ireland's dependence on imported fossil fuels is continued and would also result in Ireland continuing to have one of the highest security of supply risks in Europe.

Furthermore, the do-nothing scenario would result in a failure to meet national and international requirements for the reduction and limiting of greenhouse gas emissions.

1.2.20 Summary

In the event that the Maighne wind farm is not developed, fossil fuel power stations will be the primary alternative to provide the required quantities of electricity. This will further contribute to greenhouse gas and other emissions, and hinder Ireland in its commitment to meet its target to increase electricity production from renewable sources and to reduce greenhouse gas emissions.

Ireland currently imports up to 85% of our energy. Maighne Wind Farm offers Ireland an indigenous and renewable electricity, Maighne Wind Farm also provides for security of supply.

While Biomass has a role to play in helping Ireland meet its targets there is no single form of renewable energy which is expected to meet the targets on its own. The large scale deployment of renewables required to meet targets can only be met by a large portion of the target being met by the development of onshore wind farms.

Furthermore, Maighne Wind Farm has a number of economic benefits to the local community. It will provide employment opportunities during the construction phase, and ongoing sustainable income for the maintenance and operation crew and the developer involved.

Rates paid by the developer will also contribute significant funds to the local authority which will be used to improve the services available to the people of the county. The proposed community benefit scheme will provide funding for local community schemes and accordingly, may enhance the local community interaction, refer to Appendix J1 for further details on the Community Benefit scheme.

National Policies such as the National Spatial Strategy for Ireland (NSS) 2002-2020 and the National Renewable Energy Action Plan (NREAP)[ix] support developments like Maighne wind farm which will assist in Ireland meeting its targets.

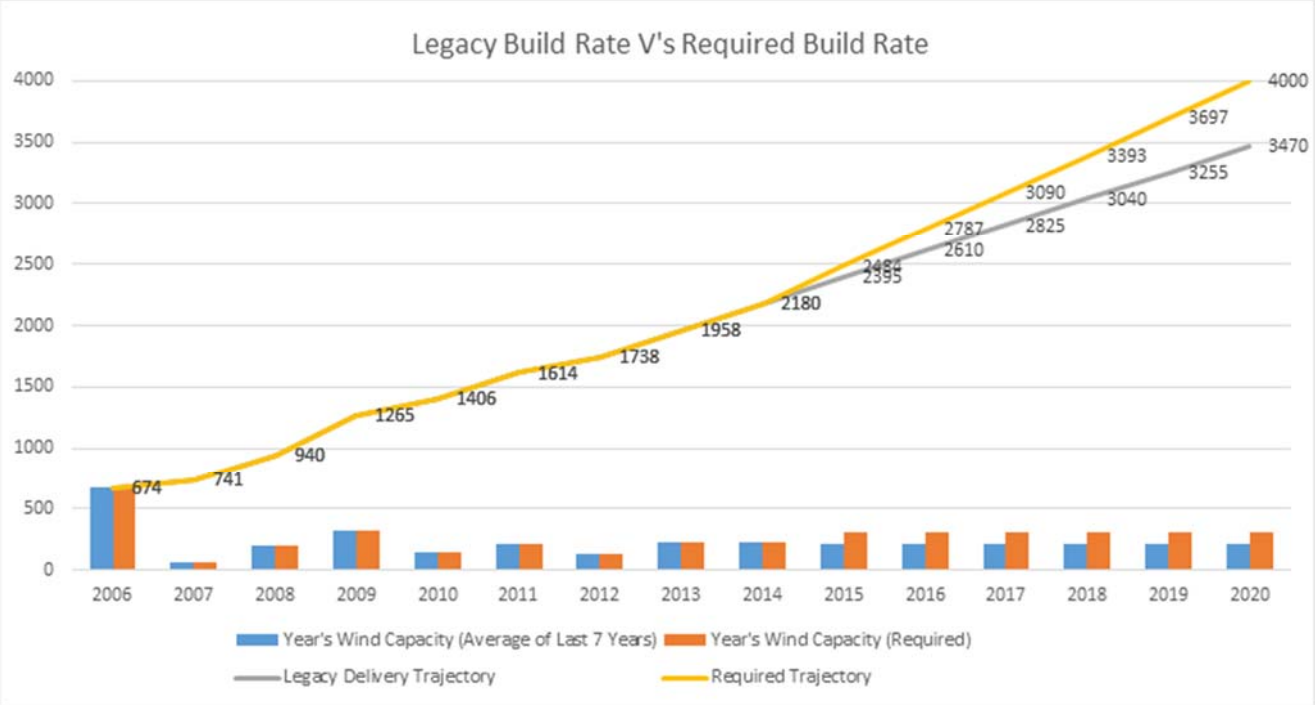

Figure 1.22: Legacy Build Rate V's Required Build Rate (supplied by IWEA)

IWEA's projections based on legacy delivery shows Ireland will miss its target by 13%. Maighne will contribute approximately 3% of Irelands 2020 target.

Maighne wind farm is suitable for the area in which it is proposed to be developed. The project is proposed to be developed at a time when there is a national and local need for such a renewable energy project which, if carried out, will make a substantial contribution (some 3% of Ireland's 2020 renewable electricity target can be provided by this project) to Ireland's ability to meet binding legal and environmental targets, as well as helping Ireland to move towards a low carbon economy that will benefit all Irish citizens.

1.5 Application and EIS Process

1.5.1 Strategic Infrastructure Development Planning Process

The Planning and Development Act 2000[x] was amended in 2006[xi] to require applications for planning permission for major infrastructure projects to be made directly to An Bord Pleanála rather than to the local planning authority, as would have previously been the case.

In order to fall within the Strategic Infrastructure provisions of the 2000 Act, as amended, a proposed development must be, inter alia, of a class specified in the Seventh Schedule to the Act.

Paragraph 1 of the Seventh Schedule, as amended in 2010[xii], specifies, inter alia, the following class of development:

> *"An installation for the harnessing of wind power for energy production (a wind farm) with more than 25 turbines or having a total output greater than 50 megawatts."*

The conditions in Section 37A (2) are that:

> 37A (2)… *"following consultations under Section 37B, the Board serves on the prospective applicant a notice in writing under that section stating that, in the opinion of the Board, the proposed development would, if carried out, fall within one or more of the following paragraphs, namely—*
>
> *(a) the development would be of strategic economic or social importance to the State or the region in which it would be situate,*
>
> *(b) the development would contribute substantially to the fulfilment of any of the objectives in the National Spatial Strategy or in any regional planning guidelines in force in respect of the area or areas in which it would be situate,*
>
> *(c) the development would have a significant effect on the area of more than one planning authority."*

Element Power commenced pre-application consultation with An Bord Pleanála in October 2014 (reference no 09.PC0186). Details of this pre-application consultation process are included in Chapter 4 - EIA Scoping, Consultation and Key Issues. At the conclusion of the process, by decision dated 31 March 2015, An Bord Pleanála determined that the proposed Maighne Wind Farm is a strategic infrastructure development.

1.5.2 Requirements to Submit an EIS

Under Section 37E of the Planning and Development Act, as amended, a planning application for a development which comes within the scope of Section 37A must be accompanied by an EIS. Accordingly, an EIS was submitted with the application for permission. In addition, a Natura Impact Statement (NIS) was also submitted to the Board.

1.6 EIS Methodology and Structure

The EIS is a statement of the effects, if any, which a proposed development, if carried out, would have on the environment. The EIS provides the competent authorities and the public with a comprehensive understanding of the project, the existing environment, the impacts and the mitigation measures proposed.

The Planning Board is obliged to carry out an environmental impact assessment (EIA). The obligations imposed on the Planning Board by the EIA Directive are set out in Part X of the Planning Acts. Section 171A(1) defines an EIA, for the purposes of Part X, as:

> '*An assessment which includes an examination, analysis and evaluation carried out by the Board in accordance with this Part and Regulations made thereunder, that shall identify, describe and assess in an appropriate manner, in light of each individual case and in accordance with Articles 4 to 11 of the Environmental Impact Assessment Directive, the direct and indirect effects of a proposed development on the following:*
> *(a) human beings, flora and fauna;*
> *(b) soil, water, air, climate and the landscape;*
> *(c) material assets and the cultural heritage and*
> *(d) the interaction between the factors mentioned in paragraphs (a), (b) and (c)*."

1.6.1 EIS Methodology

The EIS has been prepared in accordance with Schedule 6 of the Planning and Development Regulations 2001, as amended, which sets out the contents of an EIS. In addition, in the preparation of this EIS, the contents of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment were also considered (the 2014 EIA Directive).

An initial or informal scoping of possible impacts of the proposed development was carried out to identify impacts thought to be potentially significant, not significant or uncertain. Consultation with the relevant private and public agencies ensured that the most significant impacts and the areas of greatest concern were addressed during the EIA process. Details of the consultation carried out for the proposed development are outlined in Chapter 4 EIA Scoping, Consultation and Key Issues of this EIS.

The purpose of this EIS is to provide in particular:

(a) a description of the project comprising information on the site, design, size and other relevant features of the project;
(b) a description of the likely significant effects of the project on the environment;
(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
(d) 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;
(e) a non-technical summary of the information referred to in points (a) to (d); and
(f) any additional information relevant to the specific characteristics of the wind farm project proposed.

The EIA methodology has been undertaken in accordance with best practice EIA guidelines:

- *Guidelines on the Information to be contained in Environmental Impact Statements*, (EPA, 2002)
- *Advice notes on Current Practice (in the preparation of Environmental Impact Statements)* (EPA, 2003)
- *Directive 2011/92/EU Consolidation*
- *European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment, EU 2013*

Firstly, the planning context, the background to the project including the need for the development, the alternatives assessed and the proposed development is described.

This sets the reader in context as to the practical and dynamic process undertaken, in order to arrive at the layout and design of the proposed development that will cause least impact on the environment.

Subsequent chapters deal with specific environmental topics for example, traffic, air, hydrology, noise, etc. These assessments may involve specialist studies and evaluations. The methodology applied during these specific environmental assessments is a systematic analysis of the proposed development in relation to the existing environment.

The broad methodology framework for these assessments is outlined below and is designed to be clear and concise and allow the reader to logically follow the assessment process through each environmental topic. In some instances, more specific topic related methodologies are outlined in the relevant chapters of the EIS.

The broad methodology framework used in all chapters includes:

- Introduction
- Methodology
- Existing Environment
- Potential Impacts
- Mitigation Measures
- Residual Impacts

Introduction - This section generally introduces the environmental topic to be assessed and the areas to be examined with the assessment.

Methodology - Specific topic related methodologies are outlined in this section. This will include the methodology used in describing the existing environment and undertaking the impact assessment. It is important that the methodology is documented so that the reader understands how the assessment was undertaken. This can also be used as a reference if future studies are required.

Existing Environment - An accurate description of the existing environment is necessary to predict the likely significant impacts of a new development. Existing baseline environmental monitoring data can also be used as a valuable reference for the assessment of actual impacts from a development once it is in operation.

To describe the existing environment, desktop reviews of existing data sources were undertaken for each specialist area. This literature review relied on published reference reports and datasets to ensure the objectivity of the assessment. Desktop studies are also supplemented by specialised field walkovers or studies in order to confirm the accuracy of the desktop study or to gather more baseline environmental information for incorporation into the EIS.

The existing environment was evaluated to highlight the character of the existing environment that is distinctive and what the significance of this is. The significance of a specific environment can be derived from legislation, national policies, local plans and policies, guidelines or professional judgements. The sensitivity of the environment was also described.

Potential Impacts - In this section individual specialists predict how the receiving environment will interact with the proposed development. The full extent of the proposed development's effects and emissions before the proposed mitigation measures are introduced is outlined here.

Impacts from both the construction and operation phases of the proposed development are outlined. Interactions and cumulative impacts with other environmental topics are also included in this evaluation.

The evaluation of the significance of the impact is also undertaken. Where possible, pre-existing standardised criteria for the significance of impacts will be used. Such criteria can include Irish legislation, international standards, European Commission and Environmental Protection Agency (EPA) guidelines or good practice guidelines. Where appropriate criteria do not exist the assessment methodology section states the criteria used to evaluate the significance.

Mitigation Measures - If significant impacts are anticipated mitigation measures are devised to minimise impacts on the environment. Mitigation measures by avoidance, by reduction and by remedy can be outlined.

Residual Impacts - The assessment identifies the likely impact that will occur after the proposed mitigation measures have been put in place. These impacts are described in detail and assessment of their significance undertaken.

1.6.2 EIS Structure

The EIS has been prepared using the "grouped format structure" as outlined in EPA guidance documents[xiii]. Using this structure there is a separate chapter for each topic, e.g. air, flora and fauna, hydrology. The description of the existing environment, the proposed development and the potential impacts, mitigation measures and residual impacts are grouped in the chapter. The grouped format makes it easy to investigate topics of interest and facilitates cross-reference to specialist studies.

Given the extensive scale of Maighne Wind Farm and consciousness of the need to ensure that the EIS is readily accessible to the general public, as well as the statutory authorities, the EIS team has proposed to structure the EIS as described below.

The EIS will have a number of chapters, including:

- Introduction
- Description of the Proposed Development
- Policy
- EIA Scoping, Consultation and Key issues
- Air and Climate Change
- Noise and Vibration
- Ecology
- Soils and Geology
- Hydrology
- Water Quality
- Human Environment
- Shadow Flicker
- Traffic and Transportation
- Landscape and Visual
- Archaeology, Architecture and Cultural Heritage
- Telecommunications and Aviation
- Interactions, Interrelationships and Cumulative Impacts

The structure proposed for the EIS is as follows:

Volume 1 – Non technical summary (including figures)
Volume 2 – Main EIS
Volume 2a – Figures associated with the Main EIS chapters
Volume 3 – Appendices to the Main EIS
Volume 4a – Landscape and Visual Maps and Photomontages
Volume 4b - Landscape and Visual Maps and Photomontages
Volume 4c - Landscape and Visual Maps and Photomontages

It should also be noted, for the sake of completeness, that a separate Natura Impact Statement (NIS) has also been submitted with the application.

1.7 Contributors to the EIS

Fehily Timoney and Company (FTC) is a consultancy based in Cork and Dublin, specialising in civil and environmental engineering, and environmental science. FTC is well established as a leading consultancy in wind farm development in Ireland. The company has established a professional team specialising in wind farm development. This team has the support of many in-house engineers and scientists.

FTC was retained by the applicant to undertake the detailed environmental appraisal and prepare the EIS for the proposed development, as well as preparing a planning application to accompany this EIS for submission to An Bord Pleanála.

Specialist contributors involved in the preparation of the EIS are outlined in Table 1.1 below.

Table 1.3: Contributors to the EIS

EIS Topic	Company	Name and Qualifications
Chapter 1 – Introduction	FTC	Tina Raleigh, BE CEng MIEI Maeve English BSc, MSc, Dip Planning and Environmental Law, Cenv, Csci, MCIWM, MCIWEM
Chapter 2 – Description of the Proposed Development	FTC	Tina Raleigh, BE CEng MIEI Maeve English BSc, MSc, Dip Planning and Environmental Law, Cenv, Csci, MCIWM, MCIWEM
Chapter 3 – Policy	FTC	Tina Raleigh, BE CEng MIEI Maeve English BSc, MSc, Dip Planning and Environmental Law, Cenv, Csci, MCIWM, MCIWEM
Chapter 4 – EIA Scoping, Consultation and Key Issues	FTC	Tina Raleigh, BE CEng MIEI Maeve English BSc, MSc, Dip Planning and Environmental Law, Cenv, Csci, MCIWM, MCIWEM
Chapter 5 – Air and Climate Change	FTC	Maeve English, BSc, MSc, Dip Planning and Environmental Law, Cenv, Csci, MCIWM, MCIWEM
Chapter 6 – Noise and Vibration	Hayes McKenzie	Andy McKenzie, Phd BSc FIoA Mike Craven BSc MIOA
Chapter 7 –Ecology	FTC	Chris Cullen, Dip. In Field Ecology, HND Eng , ACIEEM; Dr. Derek McLoughlin, BSc, PhD, MCIEEM; Brian Porter, Dip, in Field Ecology; Ciaran Cronin, Postgraduate Diploma in Ecological Assessment, Diploma in Field Ecology; Ciara Hamilton, BSc, MSc, MCIEEM; Chris Benson; Elaine Dromey BSc, MSc, MIEEM Abi Brewer BA, MA, Dip Field Ecology, PG Dip Ecological Assessment, CIEEM Dr Patrick Crushell, BSc, MSc, PhD, MCIEEM Tom Gittings BSc PhD MCIEEM
Bat Assessment	Aardwolf Wildlife Surveys	Conor Kelleher, AMCQI, ACIEEM
Aquatic Ecology	Ecofact	Dr. William O' Connor, PhD, MSc, BSc, CBiol, CEnv, FSB, MIEEM, MIFM
Chapter 8 – Soils and Geology	FTC	Andrew Garne, Eur. Geol, B.Sc., M.Sc., MIGI, MIAH
Chapter 9 - Hydrology	FTC	Mary Creedon, BE CEng MIEI, MIHT
Chapter 10 - Water Quality	FTC	Tanya Ruddy, BA, MSc., MCIWM, CIWEM, CSci Andrew Garne, Eur. Geol, B.Sc, M.Sc, MIGI, MIAH
Chapter 11 - Human Environment	FTC	Tina Raleigh, BE CEng MIEI Sinéad Timoney, BE, MIEI, Grad. MICE
Chapter 12 - Shadow Flicker	FTC	Claire Curran, BE CEng MIEI
Chapter 13 - Traffic and Transportation	FTC	Aidan Sullivan, BE, Postgrad Dip (Construct. Law & Contract Admin), Dip. (Applied Project Management), CEng, MCIWM, IPMI;
Chapter 14 - Archaeology, Architecture and Cultural Heritage	Courtney Deery	Siobhan Deery, BA MA H.Dip (Ed.) MIAI, Lisa Courtney, BA MS (Ag) MIAI, Clare Crowley, BA PhD, Gil McLoughlin, BA, H.Dip (EIA Mgmt),

EIS Topic	Company	Name and Qualifications
		Kieron Goucher, MSc (Spatial Information Mgmt), Dip.Geo, FIIS
Chapter 15 - Landscape and Visual	Macroworks	Richard Barker, BA (Environmental), PGDip (Forestry), MLA, MILI Nik Hennessy, BSc
Chapter 16 -Telecommunications and Aviation	FTC	Tina Raleigh, BE CEng MIEI Richie Hinchcliffe, MBA, BSc (Aeronautical Eng) MoR: Management of Risk Foundation and Practitioner Sinéad Timoney, BE, MIEI, Grad. MICE
Chapter 17 – Interactions, Interrelationships & Cumulative Impacts	FTC	Tina Raleigh, BE CEng MIEI

1.8 Permission Period

A ten-year planning permission is being requested for this development. That is, planning consent would remain valid for ten years following the final grant. We note that the Planning Guidelines state that "*Planning Authorities may grant permission for a duration longer than 5 years if it is considered appropriate, for example, to ensure that the permission does not expire before a grid connection is granted. It is, however, the responsibility of the applicants in the first instance to request such longer durations in appropriate circumstances*"

A 10 year planning permission is considered appropriate for a development of this size to ensure all consents are in place. The expected physical lifetime of the turbine is approximately 30 years.

After this time, the developer will make a decision whether to replace or decommission the turbines. It should be noted that section 7.2 of the Planning Guidelines 2006[xiv] includes for the following:

> *'The inclusion of a condition which limits the life span of a wind energy development should be avoided, except in exceptional circumstances'*

In this respect, the applicant requests the grant of permission is on the basis of a 30 year operational period from the date of commissioning of the wind farm.

1.9 Difficulties Encountered

There were no technical difficulties encountered during the preparation of this environmental impact assessment.

1.10 Viewing and Purchasing of the EIS

This EIS is available for complimentary download at www.maighnewindfarm.ie.

Copies of this EIS including the Non-Technical Summary and the Natura Impact Statement (NIS) may be inspected free of charge or purchased by any member of the public during normal office hours at the following locations:

- The offices of An Bord Pleanála, 64 Marlborough Street, Dublin 1.
- Kildare County Council Planning Department, Áras Chill Dara, Devoy Park, Naas, Co. Kildare.
- Meath County Council Planning Department, Buvinda House, Dublin Road, Navan, County Meath.

1.11 References

[i] Sustainable Energy Authority of Ireland, Energy in Ireland Report 1990-2012, 2013.
[ii] Directive 2009/28/EC of the European Parliament and of the Council OF 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF.
[iii] Irish Wind Energy Association, http://www.iwea.com/windstatistics, September 2014.
[iv] EirGrid & SONI, All-Ireland Generation Capacity Statement 2012-2021, 2011.
[v] "Renewable Energy in Ireland" SEAI February 2014
[vi] "The Value of Wind Energy to Ireland" Cambridge Economics & Poyry on behalf of IWEA, March 2014
[vii] "An Enterprising Wind; An Economic Analysis Of the Job Creation Potential of the Wind Sector in Ireland" ESRI and Trinity College, February 2014
[viii] Extract from section 3.10.3 of the Environmental Report of the Kildare County Development Plan 2011-2016 SEA
[ix] http://www.dcenr.gov.ie/NR/rdonlyres/C71495BB-DB3C-4FE9-A725-0C094FE19BCA/0/2010NREAP.pdf

[x] Planning and Development Act 2000. Number 30 of 2000
[xi] Planning and Development (Strategic Infrastructure) Act 2006. Number 27 of 2006
[xii] Planning and Development (Amendment) Act 2010. Number 30 of 2010
[xiii] Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Statements, March 2002; and
EPA, Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, September 2003.
[xiv] http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownLoad,1633,en.pdf