

Volume I – Non-Technical Summary

for a 13 Turbine Wind Farm

at Garracummer, Hollyford, Co. Tipperary (South Riding), Ireland

Report Compiled For
Garracummer Wind Farm Ltd

September 2004



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OSNI License No.: 703
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Project Ref: 2343

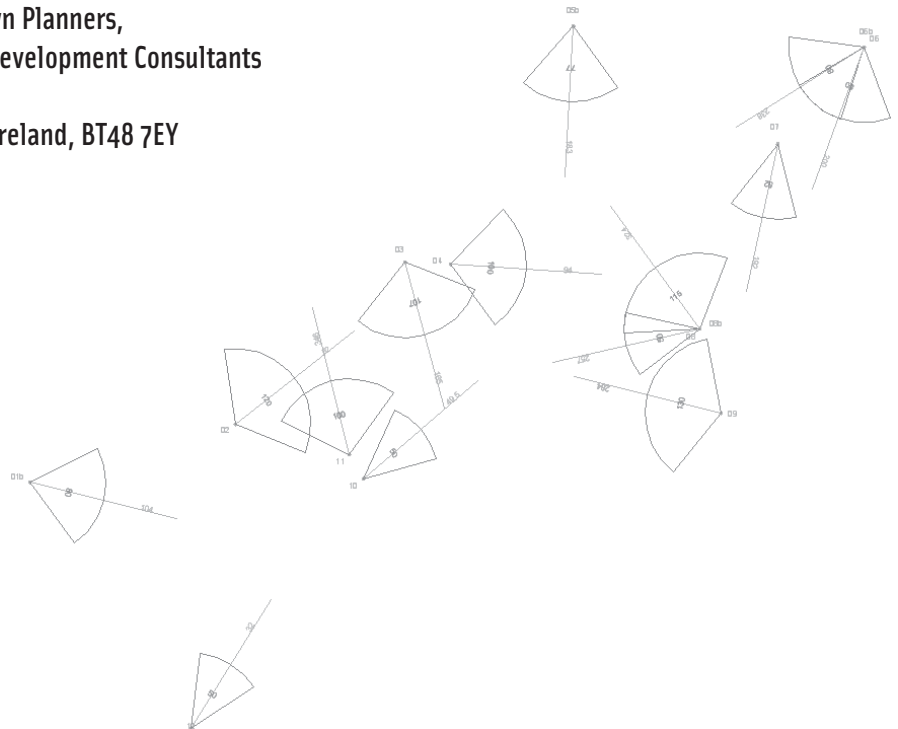




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1 INTRODUCTION

This is the Non-Technical Summary of the Environmental Impact Statement (EIS) carried out according to National and European statutory requirements. This Summary should be read in conjunction with the full Environmental Impact Statement, which is contained in Volume II Main EIS Report, and Volume III Annexe. This summary outlines in non-technical language the steps taken in preparing the Environmental Impact Statement to accompany the planning application for a proposed 13 turbine wind farm. The information has been prepared to help the Planning Authority assess the environmental impacts of the proposed wind farm development in a clear and ordered way. Supplementary figures include: Figure I Location Map; Figure II proposed Wind Farm Site Layout; Figure III Atypical Wind Turbine Elevations and Plan. An impacts summary table is included.

The proposed wind farm proposal would accord in principle with national policies including, The National Development Plan 2000 – 2006; Sustainable Development Strategy for Ireland (1997); Green Paper on Sustainable Energy (1999); National Climate Change Strategy (2000); Strategy for Intensifying Wind Farm Development (2000) and the Draft Planning Guidelines for Wind Farm Development (2004 – Department of the Environment, Heritage and Local Government); and as expressed in the South Tipperary County Development Plan, 2003.

Several expert consultants have assisted in preparation this statement including environmental managers, an ecologist, archaeologists, an ornithologist, geotechnical experts, noise specialists, wind energy specialists, town planners and architects.

2 SITE DESCRIPTION

The development site is located on high lands approximately 2kms to the northwest of the settlement of Hollyford (Ath an Chuilinn), in County Tipperary (South Riding). This site is located in an upland region, part of the Slieve Felim mountains, adjacent to the county boundary between Co. Tipperary and Co. Limerick. Large portions of the land here is intensely forested under commercially planted pine. There are a number of existing tracks on the site that have been used for forestry management activities, these will facilitate the construction and operation of the proposed wind farm. Parts of the site are steeply sloping. The maximum altitude of the peaks at this location ranges from 394metres to 457metres close to Tooreen townland. The site is approximately 45 hectares. There is an operational wind turbine in the central site area at Moanvaun, and two approved wind farms in the locality. The proposed site for the turbines would encompass the townlands of Curraghmarky, Birchgrove, Moanvaun, Garracummer, Cumber More, and Cumber Beg. The site will be located on both sides of a local road that connects Foilycleary and Lough Doula with Birchgrove and Losset.

The proposed wind farm site has not been assigned any conservational designations. There are no tourism accommodation facilities in the area. There are however several way-marked walks, including the 'Redhill Losset Walk' and the 'Rapparee Way' and also the 'Sarsfield Way.' Part of Anglesey Road through Hollyford is a designated road with

views. There is a viewpoint also marked near Redhill. Archaeological sites in the area are of importance. The routes of some of these walks and items of tourist interest are featured in tourist guides for the Tipperary South Riding area. The area is proposed to be a preferred area for wind farms.

3 THE PROPOSAL

The developers of this proposal are Garracummer Wind Farm Limited (named after one of the townlands within the development site). It is proposed to construct a 26 MW wind farm on lands at Birchgrove, Moanvaun, Garracummer, Cummer More, Cummer Beg townlands, 2kms northwest of Hollyford town, Co. Tipperary (South Riding). The majority of the site land is owned by Coillte Teoranta, with one turbine site and a new access track on lands belonging to other landowners. The proposal principally consists of the construction of 13 no. 2 MW wind turbines, which will be three bladed and each with an electrical transformer inside the turbine tower, at their base (see Figure 2). An electrical control building and compound, up-grades to forestry access tracks are also necessary. This will all be within this site of just under 45 hectares.

Each turbine will have a:

- Maximum base to blade tip height of 107 metres;
- Steel tower, with a maximum hub height of up to 67 metres;
- Rotor blade diameter of 80 metres maximum, or radius of 40 metres maximum; and
- Power output of 2 MW each, or 26 MW total for the 13 turbines.

Ancillary development will include:

- Turbine bases, foundations and hardstands, for turbine erection and maintenance;
- Underground communication and electrical cabling to connect the turbines with the electrical sub-station;
- Drainage management features, including silt traps and sedimentation ponds
- An electrical sub-station; and
- Minor extensions to existing forestry management tracks and a new section of track of 580m length

The completed wind farm will have an installed capacity of 26 MW. The approximate project cost of the project will be approximately €34 million. The construction phase is likely to last up to 24-30 weeks, under favourable weather conditions. The proposed development will involve actual disturbance, including the areas for upgrading of existing tracks, of approximately 6% of the estimated 45hectare development area.

4 ENVIRONMENTAL IMPACT AND AVOIDANCE, REMEDIAL AND REDUCTIVE MEASURES

The full environmental statement covers a wide range of issues, addressing the likely significant effects, direct and indirect, on the environment of the development. The report assesses the Environmental Impacts under the following headings :

- Ecological, Flora, Ornithology and other Fauna

- Geotechnical and Hydrogeological Impacts
- Soils and Geology
- Water and Hydrology
- Air and Climate
- Human Beings and the Socio-Economic Context
- Visual Impacts and Landscape Considerations
- Noise
- Material Assets
- Archaeology
- Cultural
- Architecture
- Electromagnetic Production and Communication Interference

Additional information for inclusion in this Study has included desk top research, field studies and individual assessments of the potential effects on existing natural and man-made resources. The full Environmental Impact Statement comprises the following:

- A non-technical summary;
- A description of the development proposals, including alternatives considered;
- A description of potential impacts (direct and indirect);
- An assessment of the quality and significance of impacts and interactions between impacts;
- A description of mitigation measures to avoid, ameliorate or reduce such effects;
- A description of monitoring requirements;
- A description of any reinstatement measures that may be required.

In order to fully explore potential issues in relation to these environmental aspects consultation was undertaken with a considerable number of public and private bodies. A consultation day, with press advertisements, has held in Hollyford community hall on the 28th of June 2004 to address the concerns of members of the public and provide information. The following sections offer brief comment on the findings of environmental impact assessment. The overall quality and significance of environmental impacts are given in the extended table at the end of this report.

4.1 Human Beings and Socio-Economic Context

Historically the area has had a low and declining rural population and employment base. Farmland in the area has below average productivity, owing to fragile upland soil of low agricultural quality. Processes of urbanization have caused economic decline in this disadvantaged rural district.

The project will create and support jobs, giving a boost to the local economy, creating employment opportunities and the initiation of a local multiplier effect, especially during the construction period. The landowners will receive annual rental for the use of their land and Tipperary (South Riding) County Council will benefit from rates levies during wind farm operation.

The delivery of turbine components and construction materials to the site has the potential to cause some traffic disruption. This can be planned and minimised with a traffic management plan.

Shadow flicker impacts have been predicted using wind farmer software. These suggest that negligible impacts may be expected. The nearest dwelling (H19), is 449m from the nearest turbine (wind turbine 06). Analysis has shown that that house could experience slight shadow flicker effects from the turbines, if conditions were suitable. This residence could receive shadow flicker during approximately 40 minutes, on a maximum of 52 days during the year. This would amount to a total of 27 hours per year. However, residents will only experience this during waking hours. The shadow flicker effects are likely to occur in the early hours of the morning, or in the evening when the sun is low in the sky.

4.2 Ecology, Ornithology, Flora and other Fauna

A very large proportion of the site is under dense commercial coniferous forest cover, which is not of conservational importance. The forest stands are typical of modern commercial forest in design and tree species composition. Such stands are even-aged, uniform and dense. They are regarded in Ireland as having low biodiversity. There are a number of sites in the locality with conservation value including bog, semi-natural scrub or woodland and riverside habitat.

There is also a proposal for a possible extension to the existing Slieve Felim Special Protection Area. This proposed extension is close to the eastern part of the site. An ornithologist confirmed that the mature forestry habitat is not a useful breeding or foraging area for this species. This development area is unlikely to be designated within this proposed extension. The proposed wind farm has therefore not been amended to take cognisance of this. The wind farm proposal will not impact on any designated lands. No Impacts on protected species are anticipated to result from the proposed development.

Impacts from the proposed development could include an increase in suspended matter in run-off flows during the construction period. This is likely to be insignificant when compared with the great scale of habitat disturbance caused by felling and replanting operations normal in commercial forest practice. The populations of established species are not likely to be significantly impacted by the proposal.

4.3 Hydrogeological and Geotechnical

The northern part of the site near turbine No. 10 experienced a relatively small landslide due to road building works by Coillte Teoranta in the 1980's. The highest hill occurs at the north of the site. Steep slopes, stream valleys and deeper peat are coincident with this part of the site. Appropriate geotechnical measures will be undertaken to stabilise this area for construction.

There is likely to be permanent changes to the way water flows at the site resulting from the development. However, these changes are minor as the site has already been impacted significantly during development for commercial forestry.

Following implementation of the mitigation measures outlined for the soils, water and ground stability components of the site, the resultant predicted impact of the development is that there will be a change in ground conditions with the replacement of a small area of natural materials with concrete, and road construction sands and gravels. This will cause local changes to how water flows at the site. During the construction phase it is likely that some sediment and pollutants may enter the streams that cross the site. However, the effect will be minimal by the time the water exits from the site. Detailed monitoring of both ground conditions and water quality during the construction phase and regular monitoring at an agreed frequency during the operation phase will be carried out. In addition more detailed geotechnical investigations will be undertaken pre-construction to ensure that instability is minimised.

4.4 Geology

Geologically the study area is dominated by the Hollyford, which consists of greywackes, siltstone and grit. Copper mining was carried out locally during the 1800s. Un-weathered rocks in the Hollyford Formation are mainly bluish or greenish-grey, but can be reddened to perhaps 24metres below the Old Redstone and are commonly brownish from modern weathering. The proposed development will involve the excavation of a proportionally small quantity of rocks. This will not present a significant impact to the geology of the area.

4.5 Soils

The dominant soil types in the study area are mountain peat bog and peaty podzols. Land use capacity here is extremely limited. This soil type is concurrent with areas of high rainfall and acid waterlogged parent material.

Commercial afforestation has resulted in the large-scale disturbance of surface vegetation, the removal of peat and the disturbance of sub-soil and existing drainage patterns. Implementation of the proposed development will have additional unavoidable impacts on the peat soils of the site within the proposed development areas, particularly during the construction phase. The development would involve removal of ground in areas where the wind turbines and ancillary development would be constructed. The removal of volumes of peat soil would have a moderate impact on the site and the surrounding land. Detailed mitigation measures and safeguards are itemised to minimise erosion. Silt traps and other drainage management measures will minimise the migration of fugitive silt. Where necessary, bunding and screening will be employed. There will be a cessation of site works in wet weather. Native seeding of disturbed soils will be carried out post-construction.

4.6 Water and Hydrology

There are no standing water features on the site. Some small natural small streams have created deeply cut gullies on the down-slopes. Other small streams are completely vegetated. The primary mountain streams that occur at the site of the proposed development are:

- Mountain Tributaries to Aughvaria River (NW)
- Mountain Tributaries to Multeen River (NE)
- Mountain Tributary to Cahernahallia River (SE)
- Mountain Tributary to Gortnageragh River (SW)
- Mountain Tributary to Aughsullish River (W)

No groundwater abstractions occur at the site or within 1km of the boundary of the site. Water quality in surface streams is likely to be of good quality. Geology at the site acts as a poor aquifer.

The construction of roads and digging of foundations can be expected to release a large amount of suspended solids, nutrients and toxic ions into free flowing water. This may affect water quality for fish and aquatic life in the streams on the site and in the tributaries. A comprehensive drainage management plan will prevent large quantities of sediment getting into the streams and drains, making the actual risk to fish and aquatic life further downstream. Surface run-off would take place at low velocities and controlled discharge should have no adverse impact on the site or its surrounds. The development has responded to observations and comments raised by the Southern Regional Fisheries Board including the installation of sediment settlement ponds, silt traps, fuel, soil and concrete storage provisions and stream crossings. Mitigation measures for the construction phase include the use of stockpiling of soil and excavated material at least 20m from water courses, refuelling and fuel storage tanks within bunded areas, sedimentation lagoons for lorry washing, use of square, not round culverts and preparation of a works method statement encompassing the foregoing.

When all specified measures are properly implemented there will be negligible risks of impact from the construction of the proposed development on the watercourses draining the site or on deeper groundwater. The current land use of tree planting and harvesting under commercial forestry presents significantly greater risks to aquatic ecosystems.

4.7 Air and Climate

No specific tests on air quality have been carried out at the site, however it is likely that the air at this location is of good quality, given its isolated rural location. The proposal will not have significant negative impacts on the local air quality. Any negative impacts on local air quality will be short term and very minor during the construction phase, which is likely to last 6 to 7 months, with the operation of on-site traffic and machinery during this time.

The proposal will offer significant positive benefits to local and national air quality by contributing to national and international targets of reduction in atmospheric gases and savings in fossil fuel imports. The proposed development will save at least 60,171 tonnes

of Carbon dioxide, 115 tonnes of Nitrous oxide , 1,300 tonnes of Ash and 115 tonnes of Sulfur Dioxide that would have been produced by the generation of this energy by the burning of fossil fuels. The development will make significant contributions to international agreements to reduce the emissions of green house gases and achieving the commitments of the Kyoto Protocol.

4.8 Noise

The noise emission from wind farms tends to be steady broadband noise with significant energy in the inaudible low frequency spectrum once commissioned and functional. Noise emissions from within 300 metres of wind farms tend to equate to natural (non-manmade) sounds. The noise emission impact from the wind farm should be no more than one of marginal significance at the nearest residence when wind is towards residence. When wind is away from residence (or in the prevailing winds) the noise emission should be indiscernible. In elevated areas (and most rural areas) the ambient noise environment is controlled in the main by the wind speed influences / interaction on wind on foliage / vegetation – the higher the wind speed the higher the noise levels generated. Level for level, wind turbine generated noise is less objectionable than industrial or road traffic noise. In elevated wind speeds, above 8m/s, the noise emissions from the wind farm will be masked either partially or totally by the sound of the wind, at distances greater than 300 metres from the turbines. In periods of low wind speed the turbines will not operate as the cut-in speed will be fixed at above 2metres/second. There should be no tonal or impulsive sounds contained in the wind farm noise emissions.

The predicted noise levels are within the acceptable noise range at dwellings according to the guidance offered in the recently published Draft Planning Guidelines on Wind Energy Development (August 2004).

4.9 Electromagnetic Production and Communications Interference

A communication mast is located on a hill to the east of Barna at the northern end of the proposed development site. All major communication providers have been consulted and have received a responses only from Eircom and O2. We have acted on their recommendations. We have not received any other responses and are therefore not aware of any other mobile phone masts or television masts in relevant vicinity to the site.

Mitigation in relation to this aspect will include sending similar notification will to the requisite bodies already consulted. Interference with communication signals, mobile phones and television services in the district, although unlikely, will be monitored. Remedial actions will apply if significant interference is detected. This could include modification of repeater stations, booster units, realignment of domestic aerials, installation of higher quality aerials, and/or installation of suppression equipment. In addition obstacle or aviation warning lighting on the turbines, as required by the Irish Aviation Authority to afford visibility of the turbines at night. The turbines will be marked on aviation charts and the Irish Aviation Authority will be notified when the turbines are being erected.

4.10 Visual and Landscape Assessment

Landscape and visual impact assessment of the proposal was carried out with reference to standard methodologies and guidelines for such impacts. This included reference to various methodologies and the 2004 Draft Wind Farm Planning Guidelines.

The wind farm was assessed in terms of siting and design; identification of landscape and receptor sensitivities, visual impact and visual presence in the landscape. Subsequent impacts were quantified. Computer generated visuals were utilised to assist in this assessment. These included Viewshed Reference Points (VRPs) photomontages, wire-frame visuals and Zones of Theoretical Visibility (ZTVs) based on hub height of 67 metres and blade tip height of 107 metres. These were also modelled for cumulative impacts.

The receiving environment does not have landscape amenity designations in either the current South Tipperary or Limerick Development Plans. Much of the Anglesley Road in the valley floor to the east of Garracummer is designated as having scenic views. A landscape appraisal study of South Tipperary is recommending that these uplands be classed as a preferred area for wind farms in its impending draft report. There is an operational wind turbine in the central site area, and two approved wind farms within 6 kilometres of the proposal west at Knockastanna, Co. Limerick and South at Cappagh White, Co. Tipperary, where respectively 5 and 11 wind turbines have received planning permission. The area is thus deemed as suitable for wind energy development. There are no landscape nor environmental designations on this site; nor presently adjacent. There are candidate areas of Natural Heritage and Conservation in the wider area.

The landscape type is categorised as having features of both mountain moorland and transitional marginal land. Landscape detractors would include extensive coniferous forestry blocks, sand and gravel quarries and forest harvesting effects.

The turbines will be visible theoretically within areas largely 6.5 kms north and 5.5 kms to the south. Given that much of the land effected is hill land afforested with a dispersed settlement pattern, this impact is not Significant.

From many of the VRPs, it was found that the wind farm would be effectively and attractively filtered or screened either by existing forestry and woodland, hedgerows or by local landform variations such as minor valleys. The valley topography provides a beneficial comparison of scale reducing the size and impact of turbines. Trees have the additional benefit of introducing wind-induced movement to a view, which reduces the potential unfamiliar effect of the rotating turbines in the landscape.

In terms of visual impact, and of the 14 Viewshed Reference Points assessed, an impact of None and Slight is adjudged for 6 of these with a Moderate impact for the 8 remaining. This is acceptable.

The visual impacts on landscape and receptors is deemed to be None, Slight and Moderate excepting a segment of a touring drive and a local walk where the impact would be Significant.

Ancillary development, such as the sub-station located within existing mature forestry, turbine hardstands and the new access track will only have a Slight negative impact. Almost all the turbines are located within mature coniferous forestry and the existing network of access tracks will be used for construction and service.

The Cumulative impacts of the proposed turbines and operational turbine are assessed through cumulative Zones of ZTVs and several VRPs. There will be inter-visibility with the other approved wind farms and of course the operational wind turbine which is in the mid-point of the proposed turbines. In several zones of the 10km theoretical visibility study area, the proposed 13 turbines and *one* of the approved wind farms will be inter-visible. The 2004 Draft Guidelines acknowledge that such inter-visibility can be acceptable, particularly in the landscape type of this area.

The siting and design of the turbines layout accord with recommendations of same for this type of landscape. No Significant impacts are predicted on the Anglesley Road with scenic views. There will be no turbine visibility from settlements such as Hollyford, Doon and Cappagh White. No significant negative visual impacts are predicted on candidate Special Areas of Conservation, proposed Natural Heritage Areas, nor archaeological sites. There will be Significant impacts on some stretches of the Sarsfield Way and combined Redhill-Losett walking Route. Tourism is undeveloped in the locality with much evidence suggesting that wind farms are a positive impact for tourists. There will be Significant visual impact at one house which belongs to one of the wind farm landowners. Other dwellinghouses at greater ranges from the turbines will have Moderate impacts.

Mitigation measures are proposed to reduce the visual impacts. The visual impacts, even though they are generally Slight to Moderate, will be long term but not permanent, based on the 25 year projected life span of the proposal. The landscape and visual negative impacts are reversible, and of a temporary 25 year duration. Opinion as to the negative-adverse or positive-beneficial landscape and visual effects of a wind farm is subjective to a great degree and cannot be absolutely defined. To many people the presence of a wind farm is a positive sight, representing function and sustainable energy in an attractive form with complementary effects on the landscape or views.

4.11 Material Assets

Material assets at the site include :

- The inexhaustible wind energy resource flowing over the site;
- The peat soil resource;
- The ecological resource (flora and fauna, natural processes);
- The geology;
- Hydrological patterns;
- Public roads;

- Coillte commercially planted forestry, and Coillte forestry tracks;
- Cultural assets;
- Place and townland names;

Impacts to the local natural assets and man-made material assets resulting from the proposed development could include:

- Traffic disruption and road damage during the construction phase
- Damage to commercial forest stock
- Impacts to Hydrology (water pollution / disruption to aquatic life / damage to watercourses)
- Soil pollution (Cement / oil and pollutants)
- Environmental impacts of inappropriate waste disposal

Only careful work practice, the employment of the best available technology not entailing excessive costs (BATNEEC) and thorough emergency preparedness can further minimise the above persisting impacts. A site procedures and Health and Safety plan will be drawn up at the pre construction stage.

The proposal will require felling of conifers to 29metres radius around the point of each turbine base. This will be a felling area of 0.264 hectares. This felled harvest will be of economic value, however the land on which this crop was grown will be out of production for a period of planning permission as associated with the proposed development (25 year period).

Existing forestry management tracks will be strengthened and upgraded with a new stretch of 580m track. They will be a useful asset to the site to facilitate the proposed development and then may be of some further use at some time following the decommissioning of the wind farm proposal. The proposal will avoid damage to roads during the course of the delivery of materials to the site. Where damage does occur repair measures will remediate. Traffic management plans will minimise disruption to traffic flow.

4.12 Archaeological Heritage

Field surveys have been carried out on the proposed development site and in the immediate hinterland, by experienced and licensed archaeologists. Research into the history of the area and into the archive files of all recorded archaeological sites within the immediate vicinity has been undertaken. The commercial forestry planting and ground preparation operations are expected to have damages or destroyed archaeological remains in such areas.

Two archaeological monuments are located close to proposed turbines. The wind farm layout allows for an exclusion zone was placed around both monuments to ensure preservation of potential archaeological remains within their immediate vicinity. The development will integrate the recommended measures for mitigation, endeavouring to negate and/or minimise the effects that the proposed development may have on any

archaeological features or monuments that may be unearthed. These measures generally call for the presence of a licensed archaeologist to monitor all ground works. The developer will work in close co-operation with Department of the Environment, Heritage and Local Government, The Heritage Service and the National Museum of Ireland in the event of archaeological discoveries being made during the course of the proposed project.

4.13 Architectural Heritage

No impacts to Architectural Heritage are anticipated since no items of architectural importance have been identified within the site or within sensitive proximity to the proposed development.

4.14 Cultural Heritage

Although the proposal will alter the cultural character of the area, it is not considered that there will be a significant adverse impact on local cultural heritage as a result of the proposed development. Within the general site area there are no known sites, features nor structures of significant cultural or historic importance aside from those already identified and in the archaeological and architectural surveys of the site.

4.15 Likely Significant Direct and Indirect Effects

The effects of the proposed development in this instance are net positive. Wind power is an abundant natural resource at this location and the proposal utilizes the un-fatigable power of the wind to generate electricity, with concomitant reductions in greenhouse gas emissions through displacing the need for fossil fuel combustion. There are no toxic or otherwise harmful emissions associated with the proposed development. The project proposal would help in Ireland's progress towards meeting international emissions reduction agreements and reduce fuel imports dependency. Failure to comply with international commitments would incur fines of €300 million per year.

Direct effects occur at or very close to the time of the action itself. Direct effects resulting from the implementation of the proposed development would include :

- Construction noise disturbance;
- Direct employment;
- Traffic disruption;
- Potential public road damage;
- Compaction of soil by passage of heavy vehicles;
- Removal of peat and rock;
- Importation of construction materials and proposed structures;
- Loss of habitat;
- Damage to watercourses;
- Temporary water pollution and sedimentation;
- Erosion;
- Visual impacts to the surrounding landscape and road network; and

- Loss of a portion of the forestry crop;

These are not considered to be significant

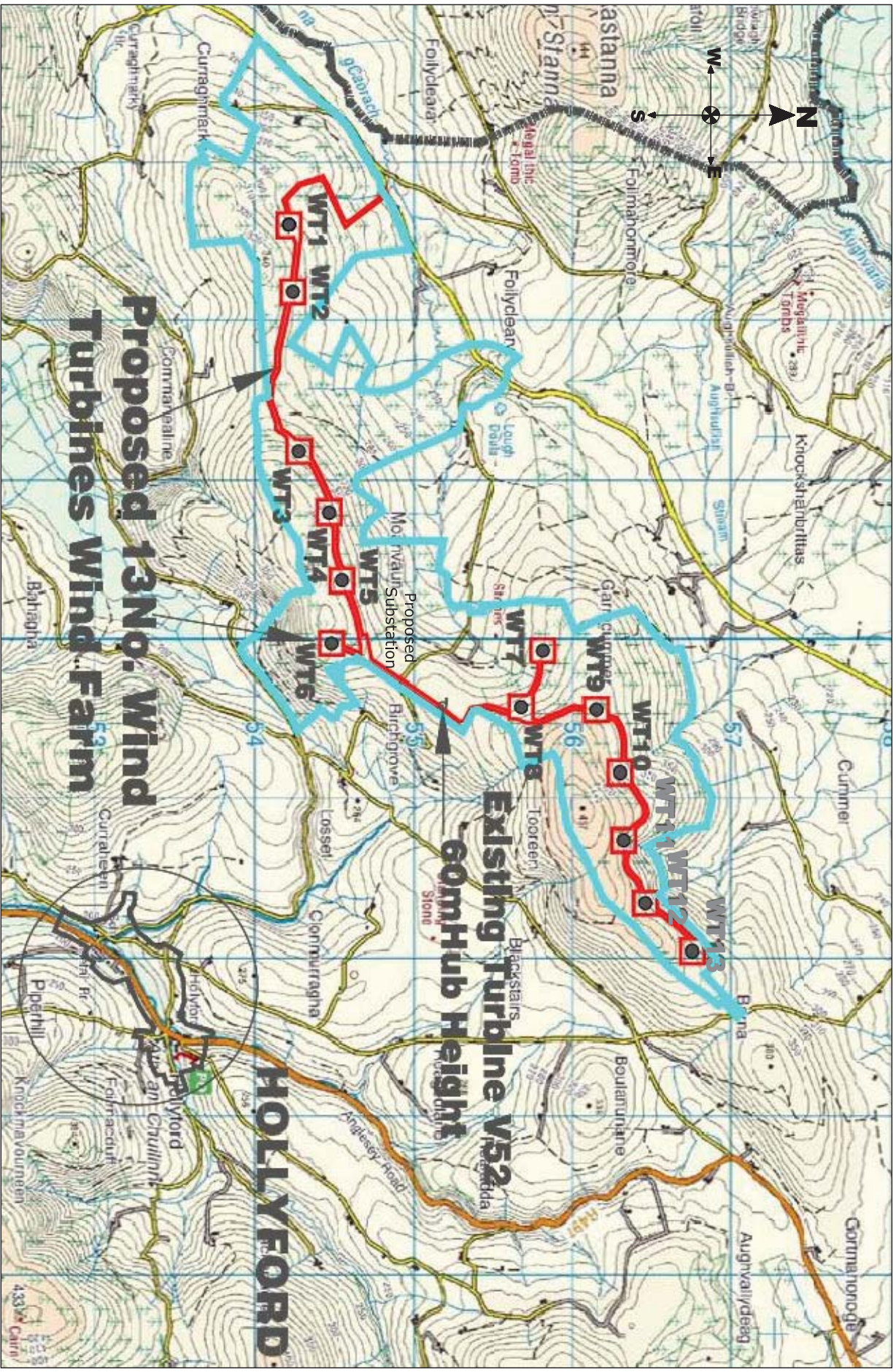
Indirect effects are those that are caused by the implementation of the proposed development and are later in time after the construction completed and operation commences, but are still reasonably certain to occur. Indirect effects of the proposed development could include :

- Indirect employment in the growing wind industry;
- Progress towards meeting government set targets for renewable energy production;
- Reduction in air pollution by the production of energy from non- fossil fuel source;
- Creation of local feature of tourist / educational interest;
- Potential operation noise;
- Changes to ecological systems such as bird/bat/hare (or other species) feeding and breeding habits;
- Longer term habitat changes;
- Changes to eco hydrology and soil chemistry;
- Alteration to established hydrological patterns;
- Anticipated changes in human activities including a change in land use; and
- Increased speed and volume of run off discharge from the site fixtures;

5 CONCLUSION

The Environmental Impact Statement (EIS) and associated Annexe provide, through formal assessment procedures full details of the assessment process, site and proposal description, anticipated impacts and impact mitigation measures for the construction, operation, decommissioning and reinstatement phases of the proposed 13 wind turbine and ancillary development.

Clearly any development will have a degree of environmental impact, whether positive or negative, direct or indirect. Assessments by recognized experts have allowed appropriate impact avoidance, remedial and reduction measures to be identified aimed to minimize negative environmental impact and optimise positive contributions. The negative impacts of the proposed development have been identified and comprehensive damage mitigation measures have been outlined for the construction, operation and reinstatement phases of the proposed site development. The quality and significance of these anticipated impacts are summarised in the detailed table which follows. The proposed development will make a substantive positive impact to local, national and international environmental quality and make a considerable contribution to Ireland's progress towards sustainability.



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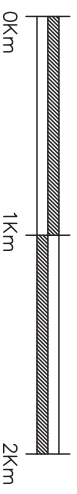
FIGURE II. PROPOSED WIND FARM SITE LAYOUT

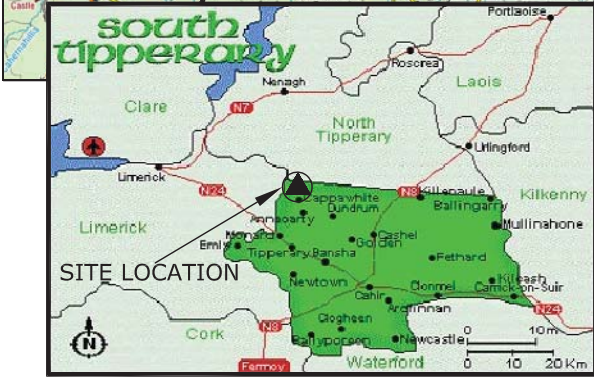
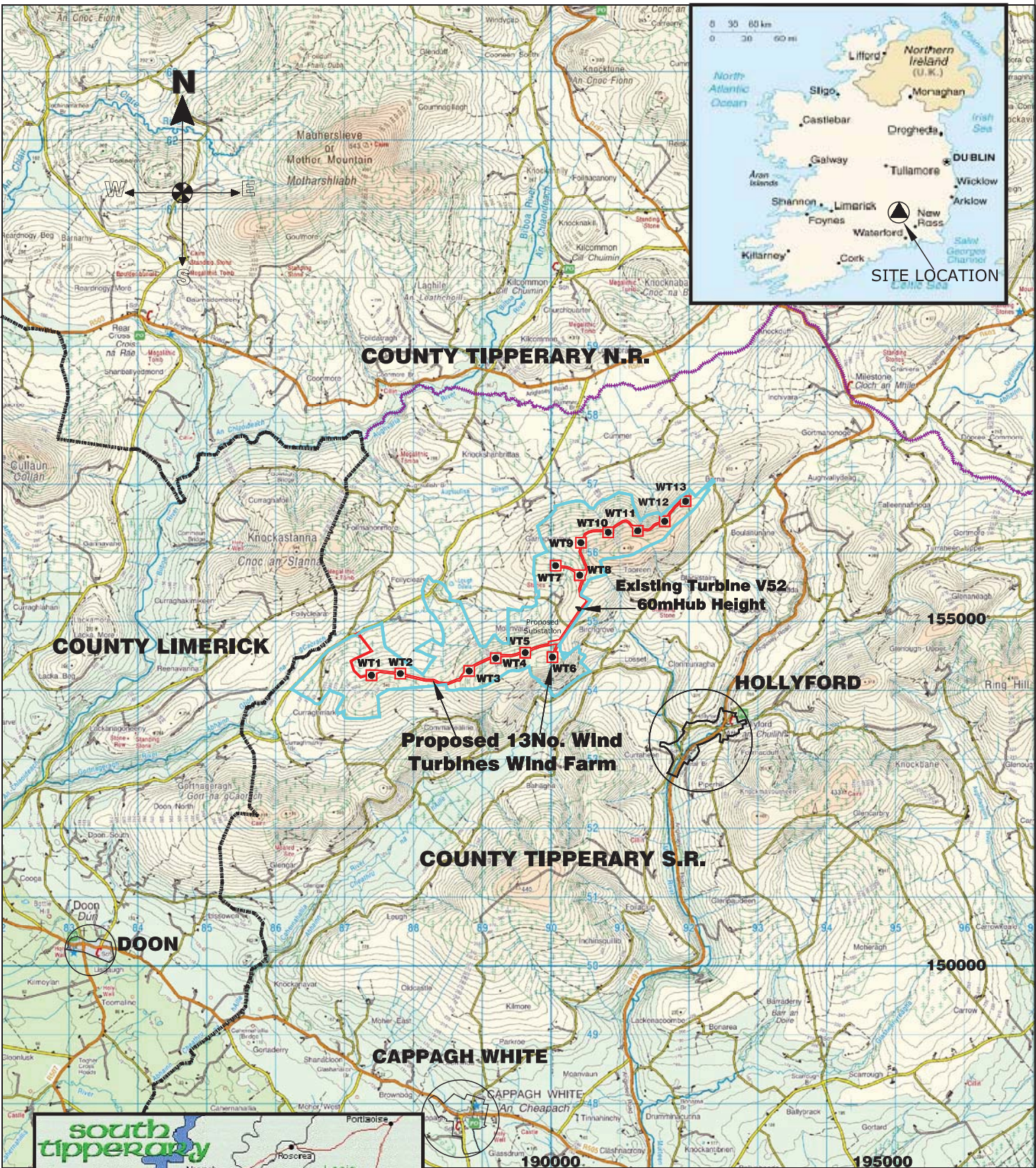
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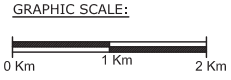
- Proposed Wind Turbine
- Overall Landholding
- Proposed Site Boundary
- County Border

GRAPHIC SCALE





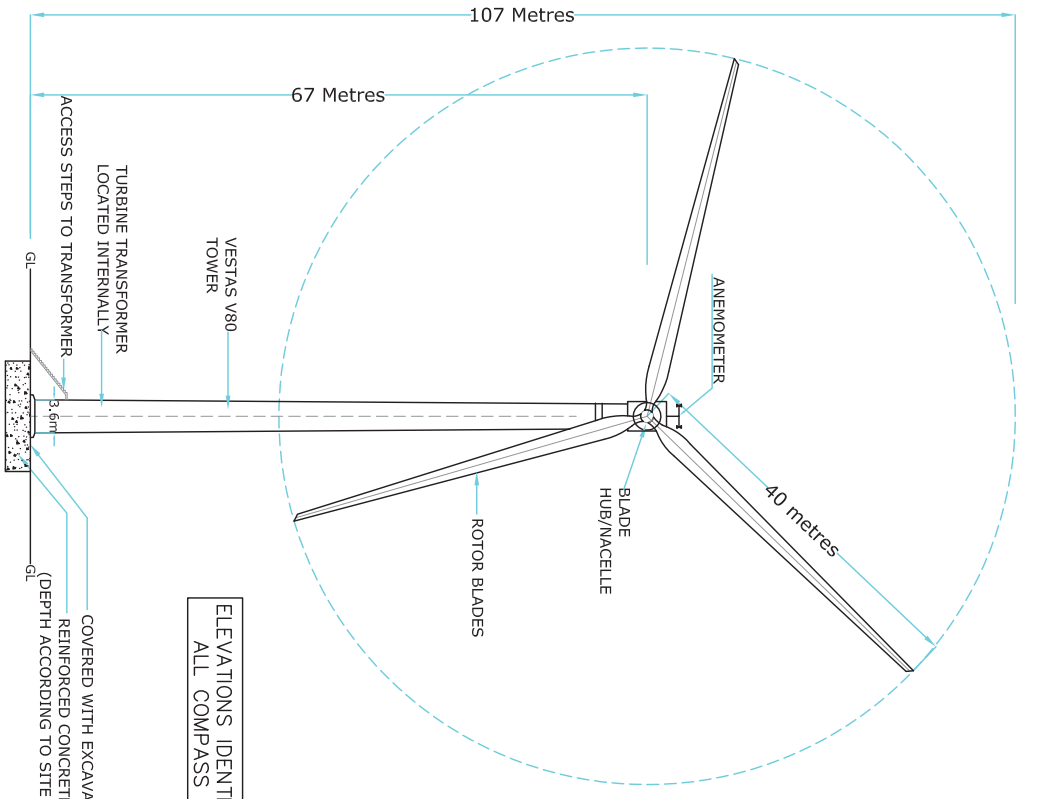
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	Proposed Site Boundary
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	County Border
	County Tipperary North Riding - South Riding Boundary



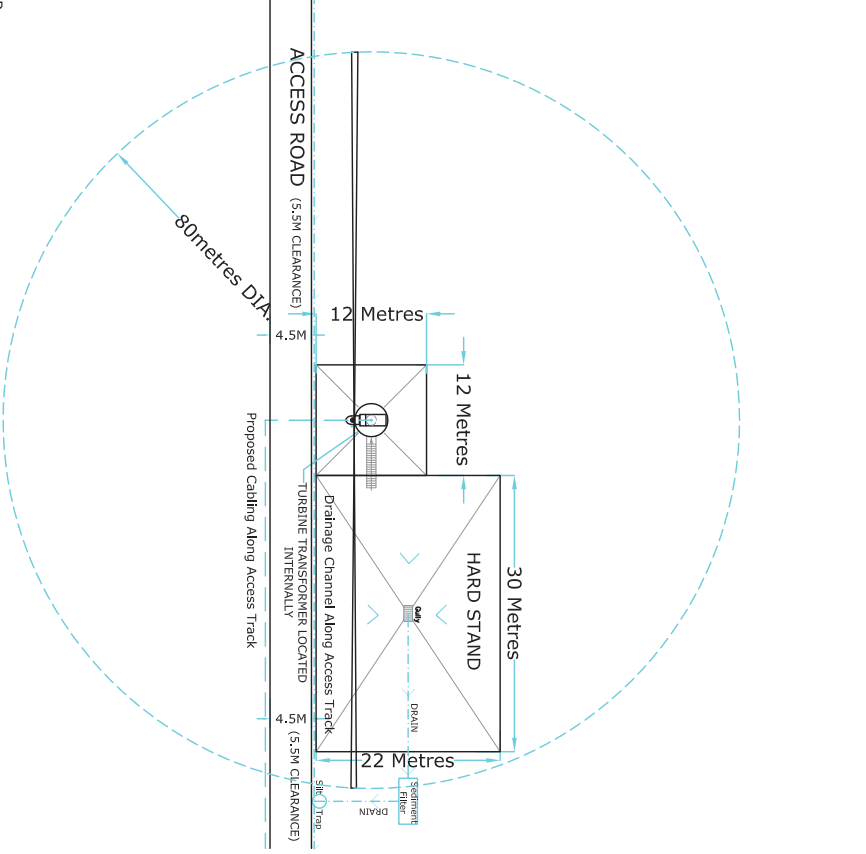
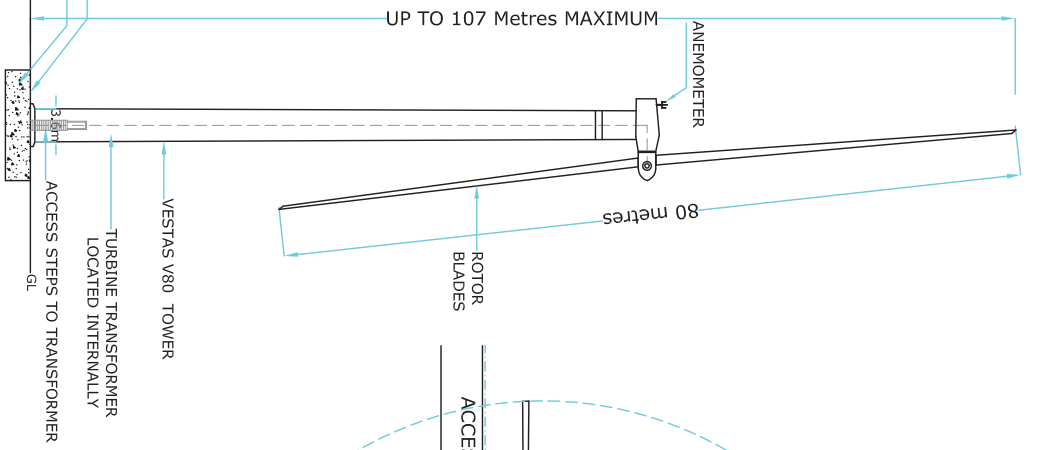
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FIGURE I. LOCATION MAP

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ELEVATIONS IDENTICAL FROM ALL COMPASS POINTS



ATYPICAL WIND TURBINE FRONT ELEVATION

ATYPICAL WIND TURBINE SIDE ELEVATION

ATYPICAL WINDTURBINE PLAN

CANAVAN ASSOCIATES LTD.

FIGURE III. ATYPICAL WIND TURBINE ELEVATIONS AND PLAN