# MURLEY WIND FARM

## Environmental Statement



## Volume 1 – Non-Technical Summary

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# Preface

This Non Technical Summary (NTS) has been prepared in support of a planning application for the proposed Murley Wind Farm. The proposed wind farm is located in the townlands of Glengesh Lower Forest, Killygordon, Tattenafinnell, Edergole and Cole Glen Forest in the counties of Tyrone and Fermanagh.

A planning application has been submitted to Northern Ireland Planning Service (NIPS) in accordance with the Planning (Environmental Impact Assessment) Regulations, 2012. The regulations require an Environmental Impact Assessment (EIA) to be carried out and the results of the EIA to be included in an Environmental Statement (ES) to accompany the planning application.

This document is **Volume 1** of the ES, which comprises:

- **Volume 1** – Non Technical Summary,
- **Volume 2** – Environmental Statement (main text);
- **Volume 3** – Figures; and
- **Volume 4** – Appendices.

The ES has been prepared by RES Ltd (RES) in consultation with Northern Ireland Planning Service, various consultees, interest groups and in collaboration with the various specialists outlined below.

**ES Technical Support**

| Technical Specialism | Organisation |
|---|---|
| Landscape and Visual Impact Assessment | Shanti McAllister Landscape Planning & Design. |
| Ornithology Assessment | David Steele. |
| Ecology Assessment | Blackstaff Wildlife Consultants.<br>RPS. |
| Fisheries Assessment | Paul Johnston Associates. |
| Archaeology and Cultural Heritage Assessment | Gahan & Long. |
| Geology and Water Environment Assessment | McCloy Consulting. |
| Planning Policy; Acoustic Assessment; Transport Assessment; Shadow Flicker Assessment; Electromagnetic Interference & Aviation; and Socio – Economic & Tourism Assessment. | RES. |

An electronic version of the Non Technical Summary and other details about the project can be viewed at: http://www.Murley-windfarm.co.uk/

Reference copies of the ES may be viewed and / or purchased during normal opening hours at the following locations:

Fivemiletown Library
67 Main Street,
Fivemiletown,
Tyrone,
BT75 0PG

And

Ecclesville Centre,
11 Ecclesville Road,
Fintona,
Omagh,
Co Tyrone

Paper Copies of the Non Technical Summary are available free of charge, the Main Report, Figures and Technical Appendices can be purchased on CD for £10 each or in paper form at a cost of £50 each from the address above or by contacting RES. Cheques should be made payable to RES Ltd.

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# Introduction

## The Application

1.1 Renewable Energy Systems hereafter referred to as 'RES', is applying to the Northern Ireland Planning Service (NIPS) for permission to construct, operate and decommission a wind farm known as Murley Wind Farm. The application follows a detailed assessment of the environmental and technical aspects of the site's suitability for development.

1.2 The proposed Murley Wind Farm is located within the vicinity of the following townlands - Glengesh Lower Forest, Moysnaght, Killygordon, Tattanafinnell, Edergole and Cole Glen Forest, near Fivemiletown in the Counties of Tyrone and Fermanagh. The site is approximately 6 km north of Fivemiletown in Co. Tyrone. The centre of the site is located at Irish Grid Reference (IGR) 242685, 353209. The location of the proposed wind farm is shown in **Figure 1.1.**

1.3 The site has been designed to accommodate turbines in the 2.3 – 3.0 MW range with a maximum height to blade tip of 126.5 m above ground level. The turbines will be of the horizontal axis type, with a rotor consisting of three blades with a maximum rotor diameter of 93.0 m. The dimensions are illustrated in **Figure 1.2.**

1.4 The proposal comprises the construction of nine turbines (each with an overall maximum height of up to 126.5 m above ground level) and associated infrastructure including upgraded site entrances, new and upgraded onsite access tracks, an onsite substation and control building, underground cables, overhead grid line, two temporary monitoring masts, temporary construction compounds, enabling works compounds, permanent crane hardstandings and road widening and improvement works on sections of the transport route (road improvement works) within the planning application boundary. The proposed Infrastructure Layout is illustrated in **Figure 1.3**.

1.5 Based on nominal 2.3 MW capacity turbines the wind farm would be capable of 20.7 MW total capacity and would produce electrical energy equivalent to the average requirements of approximately 14,500 homes every year.

### The Applicant

1.6 RES is one of the world's leading wind energy developers. It has constructed or developed medium-large scale wind farms around the world with a combined capacity of over 7 GW and has a large portfolio under construction and development. RES has been developing wind farms in Ireland since the early 1990s. It has developed 18 operational wind farms in Ireland to date, totalling over 241 MW (Corkey, Elliott's Hill, Wolf Bog and Gruig in County Antrim; Rigged Hill, Altahullion Phase 1 & 2, and Curryfree in County Londonderry; Lendrum's Bridge Phase 1 & 2, Lough Hill, Slieve Divena Phase 1, and Hunter's Hill in County Tyrone, Callagheen in County Fermanagh, Cark in County Donegal, Beenageeha in County Kerry and Milane Hill and Taurbeg in County Cork).

# Rationale for the Scheme

## Combating Climate Change

1.7 Change in global and regional temperatures and precipitation patterns is a natural phenomenon and there have been a number of cooling and warming periods recorded over the last millennium. However, in the late 1980s a growing concern emerged that climate change was being influenced by anthropogenic activity beyond the normal fluctuations. The main contributing activities include emissions of the so-called greenhouse gases in particular carbon dioxide ($CO_2$), sulphur dioxide ($SO_2$) and oxides of nitrogen (NOx) into the atmosphere and other effects such as land use changes, which reduce the ability of the natural environment to recycle these gases. A significant proportion of the increased greenhouse gas emissions arise from the burning of traditional fossil fuels such as coal, oil and gas for energy generation and transportation.

1.8 The EU is responsible for about 14% of the world's greenhouse gas emissions, but has only 5% of its population (EU, 2009). The EU recognises that it must take a lead in reducing emissions and has responded to the threat of climate change. The European targets for greenhouse gas reductions under the Kyoto Protocol are set at an 8% decrease in greenhouse gas emissions by 2012 compared to 1990 levels of 14%. Furthermore, all countries will need to make an additional effort, including cuts of 80-95% by 2050 by developed countries. An EU target of 20% by 2020 is just the first step to put emissions onto this path (EU, 2010).

1.9 The need to promote electricity produced from renewable energy sources within the internal electricity market of the EU was established in September 2001 within Directive 2001/77/EC. Article 3 of this Directive required Member States to "take appropriate steps to encourage greater consumption of electricity produced from renewable energy sources in conformity with…national indicative targets".

1.10 Power from the wind can be harnessed and used to generate electricity. Wind farms offer important advantages. Firstly, the carbon cost of wind power is significantly smaller than that of other forms of conventional and renewable energy production. Secondly, they contribute to a reduction in our dependence on finite reserves of fossil fuels, which are being rapidly depleted and the costs of which are escalating. Thirdly, they reduce our dependence on oil and gas imports and increase our self-sufficiency in energy production. Additionally, wind farm developments are reversible and a site can be decommissioned to the extent that no visible trace of them existing is apparent.

1.11 In recent years, the UK Government has undertaken a number of studies designed to inform its renewable energy policies. Key policies to emerge from these studies include:

### Meeting the Energy Challenge: UK White Paper on Energy 2007

1.12 The UK Government's Energy White Paper, 'Meeting the Energy Challenge' sets out a framework for action to address the energy challenges facing the UK. It sets out four key energy policy goals:

- to put the UK on a path to cutting CO2 emissions by 60% by 2050, with real progress by 2020;
- to maintain the reliability of energy supplies;
- to promote competitive markets in the UK and beyond; and
- to ensure that every home is adequately and affordably heated.

1.13 This Paper states that renewables are key to the UK strategy to tackle climate change and deploy cleaner sources of energy. It also highlights the importance of lowering practical barriers to renewables investment, such as improved planning inquiry rules.

**UK Renewable Energy Strategy (Action Plan) 2009**

1.14 The UK Renewable Energy Strategy provides an action plan to ensure 15% of energy comes from renewable sources by 2020, in implementation of Directive 2009/28/EC. It aims to tackle climate change, reducing the UK's emissions of $CO_2$ by over 750 million tonnes between now and 2030. It also promotes increasing the security of energy supplies, reducing overall fossil fuel demand by around 10% and gas imports by 20–30%, against what they would have been in 2020.

1.15 The strategy recognises that acceleration of the uptake of renewable energy will help meet the goal of decarbonising energy production in the UK, while ensuring secure and safe energy supplies and exploiting the significant economic opportunities of the move to a low-carbon economy. The strategy will enable the UK to meet its EU renewable energy target to source 15% of energy from renewables by 2020. Renewable energy is therefore a key part of the overall UK Low Carbon Transition Plan, which outlines how the UK will meet the 34% cut in emissions on 1990 levels by 2020.

1.16 The strategy identifies Northern Ireland's potential to make significant progress in increasing the amount of energy from renewable sources in order to contribute to policy goals on security of supply, reduction of greenhouse gases, as well as contributing to business competitiveness, increasing competition in power generation and presenting opportunities for enterprise activity.

**The Challenge for Northern Ireland**

1.17 A key policy driver for the development of renewable energy in Northern Ireland is the need to increase security of supply. There are also potential adverse impacts on local populations and the economy through high volatile fuel costs, contributing to fuel poverty and high energy costs for businesses and industry. In addition, increasing focus on renewable energy can deliver environmental and climate change gains, reductions in carbon emissions, as well as investment and employment opportunities. With a lack of indigenous fossil fuel and no nuclear power stations, Northern Ireland is keen to develop the full range of its available renewable energy resources to optimise the contribution that renewables make to the overall energy mix.

1.18 Northern Ireland's current renewable energy target is that 40% of electricity consumption should be met from renewable sources by 2020 (DETI 2010). The 40% target is the equivalent of 1600MW. Wind energy will be the main focus of

renewable electricity development on the island of Ireland, and certainly in Northern Ireland, through to 2020.

1.19 If approved, the proposed Murley Wind Farm could account for between 20.7 and 22.5 MW, a material contribution to achieving the 40% renewable energy target for 2020.

# Project Description

## Site Selection and History

1.20 RES undertook a Geographical Information System (GIS) search of Northern Ireland as a first step towards identifying areas of land with the potential to accommodate wind farm development. The search identified land which:

- Expected wind speeds would allow the development to be commercially viable;
- Lands which are not located within a designated landscape e.g. Area of Outstanding Natural Beauty (AONB);

1.21 Feasibility investigations were undertaken to determine the compatibility with Planning Policy Statement 18 – Renewable Energy (PPS18). This included an assessment of proximity to land designations and dwellings.

1.22 The wind farm layout evolved through a series of design reviews whereby environmental and technical constraints identified during the EIA were taken into account in the design. The proposed layout for the Murley Wind Farm has evolved in response to a number of policy recommendations, environmental, technical, engineering and landscape design considerations and as a result of feedback from key consultees.

## Land Take

1.23 The land take for a wind farm development is relatively small. The wind turbines have a necessity to be spaced apart, so as to not interfere aerodynamically with one another (array losses). The actual land developed is limited to the substation, wind turbine towers, permanent crane hardstandings and the access tracks, which account collectively for about 4 % of the total area within the site boundary. The area of land expected to be utilised by the development is approximately 4.82 ha.

## The Turbines

1.24 Turbines begin generating automatically at a wind speed of around 3 to 4 metres per second (m/s) and have a shut down wind speed of about 25 m/s. Each turbine would have a transformer and switchgear. The transformer's function is to raise the generation voltage from approximately 690 volts to the higher transmission level of 33 kV that is required to transport the electricity into the grid. Depending on the turbine supplier, the transformer and switchgear may be located inside or outside each turbine.

## Grid Connection

1.25 The offsite grid connection will be provided by Northern Ireland Electricity (NIE). NIE will be responsible for the design, acquisition of planning permission, way

leaving, construction and operation of the grid connection line and it will remain in their ownership.

## Construction

1.26 It is anticipated that the construction phase will take between 12 - 18 months approximately; from starting on site to commissioning the wind turbines and electrical system. However the programme is weather dependant and may vary accordingly. HGV traffic movements will only occur between Mondays and Saturdays (i.e. none on Sundays) from 07.00 to 20.00. However during turbine erection and commissioning, and construction of concrete foundations, site working could extend outside these times but at all times in accordance with the terms of any planning permission granted for the proposed development.

1.27 The civil engineering works will comprise:

- 9 three-bladed horizontal axis wind turbines of up to 126.5 m tip-height;
- turbine foundations;
- hardstanding areas at each turbine location for use by cranes erecting and maintaining the turbine;
- approximately 4500m of access track
- two temporary meteorological ('met') masts;
- a wind farm substation compound containing a control building;
- an on-site electrical and control network of underground (buried) and overhead cables;
- a connection from the substation to the local grid network
- a temporary construction compound;
- a temporary welfare compound;
- a temporary gatehouse compound;
- drainage works;
- associated ancillary works; and
- upgraded site entrances.

1.28 A Construction and Decommissioning Method Statement (CMS) will be prepared once planning consent has been gained. This will be submitted to Planning Service prior to any construction works taking place. This will describe the detailed methods of construction and working practices, work to reinstate the site following completion of construction activities, and methods to reinstate the site post operation.

## Operation and Maintenance

1.29 Wind turbines and wind farms are designed to operate largely unattended. Each turbine at the proposed wind farm would be fitted with an automatic system designed to supervise and control a number of parameters to ensure proper performance (e.g. start-up, shut-down, rotor direction, blade angles etc.) and to monitor condition (e.g. generator temperature). The control system would

automatically shut the turbine down should the need arise. Sometimes the turbines would re-start automatically (if the shut-down had been for high winds, or if the grid voltage had fluctuated out of range), but other shut-downs (e.g. generator over temperature) would require investigation and manual restart.

1.30 The proposed wind farm itself would have a sophisticated overall Supervisory Control and Data Acquisition system (SCADA) that would continually interrogate each of the turbines and the high voltage (HV) connection. If a fault were to develop which required an operator to intervene then the SCADA system would make contact with duty staff via a mobile messaging system. The supervisory control system can be interrogated remotely. The SCADA system would have a feature to allow a remote operator to shut down one or all of the wind turbines. This is monitored 24 hours a day, 7 days a week.

1.31 An operator would be employed to operate and maintain the turbines, largely through remote routine interrogation of the SCADA system. The operator would also look after the day-to-day logistical supervision of the proposed wind farm and would be on-site intermittently.

1.32 Routine maintenance of the turbines would be undertaken approximately twice yearly to ensure the turbines are maintained to Industry Standard. This would not involve any large vehicles or machinery.

1.33 If a fault should occur, the operator would diagnose the cause. If the repair warranted the proposed wind farm being disconnected from the grid then the operator would make contact with NIE. However, this is a highly unlikely occurrence as most fault repairs can be rectified without reference to the network utility. If the fault was in the electrical system then the faulty part or the entire proposed wind farm would be automatically disconnected until the fault is rectified.

1.34 Signs would be placed on the proposed wind farm giving details of emergency contacts. This information would also be made available to the local emergency services and NIE.

## Decommissioning

1.35 One of the main advantages of wind power generation over other forms of energy production is the ease of decommissioning and the simple removal of components from the site. The residual impact on the site is limited to the continued presence of the foundations and access tracks. All above ground structures can be removed from the site.

1.36 At the end of the wind farms operational life RES propose to decommission the scheme. If the proposed wind farm obtains planning approval it is expected that a planning condition would be set to provide for the decommissioning of the site in accordance with a scheme agreed in writing with Planning Service.

1.37 The wind farm will be decommissioned in accordance with best practice and/or in compliance with any planning conditions. Current best practice includes the removal of all above ground structures; the removal of all underground structures

where required; and reinstatement of disturbed areas all of which will be subject to any necessary consents. Landowners will be given the option to retain the access tracks for their own purposes.

# Environmental Assessments

## EIA and the Design Process

1.38 In accordance with EIA process and best practice the project team employed an iterative approach to the design of Murley Wind Farm. The design evolved throughout the EIA process as different constraints and adverse/ beneficial effects were identified and evaluated. This approach allowed mitigation measures to be integrated into the design in order to alleviate or remove significant effects of the proposed development. It also allowed measures to enhance beneficial effects of the proposed development to be incorporated into the design. The table below shows how known constraints influenced the layout design process.

**Key Design Evolution**

| Drawing | Constraints identified |
|---|---|
| Figure 1.3 (NTS) | • An initial site selection wind turbine layout was established to determine whether the scheme, within the land under the applicant's control, had potential for development. The layout was based on 9 turbines each of which had a 93m rotor diameter and 126.5m tip height and was designed avoiding the following constraints:<br>• An occupied residential property separation distance of 930m. None of the turbines fell within the indicative buffer;<br>• Avoidance of watercourses identified by the Hydrological Consultant; a 50m buffer zone was applied to major watercourses and a 10m buffer zone was applied to minor watercourses;<br>• Areas identified as 'potentially ecologically sensitive' for example blanket bog and diverse grassland (Succisa Pratensis) were avoided;<br>• A 22m geological fault buffer was applied;<br>• Areas of deep peat and moderate peat slide risk;<br>• Bat buffers as provided by the Ecological Consultant;<br>• EMI links; &<br>• A 176.5m road buffer. |

1.39 The following sections provide summaries of the findings of the technical investigations of the EIA.

## Landscape and Visual Impact Assessment (LVIA)

1.40 An LVIA has been carried out to establish the full extent of likely landscape and visual effects arising from the proposed wind farm at all stages of its development within a Study Area that extends in a 30 km radius from the site. Following detailed baseline assessment and field survey, where the nature of the existing landscape and visual character was established and the potential impacts of the proposed development analysed, conclusions on landscape and visual impacts have been reached.

**Summary of Effects on Landscape Character**

1.41 The proposed wind farm would have direct physical effects on the landscape character of a small part of the Brougher Mountain LCA but its location in close proximity to the Lendrum's cluster of wind farms within the same part of the LCA means that it would not alter the existing baseline character. Furthermore, the summit of Brougher Mountain serves to screen views of the proposed wind farm from the western end of this LCA, and other summits have a similar effect on views to the east where visibility of the proposed wind farm from within the LCA would also be patchy. The overall Magnitude of Landscape Effects on the Brougher Mountain LCA is judged to be Low. There would be no Significant Effect on Landscape Character because the proposed wind farm would maintain the current land uses for commercial forestry and wind energy development, and the majority of landscape character elements would remain unchanged.

1.42 The other LCAs within the Study Area would experience Low to Negligible Magnitude of effects on their character caused by the proposed wind farm which is judged to have No Significant Effects overall. Its location adjacent to an existing cluster of wind farms, and the fact that many of the surrounding lowlands are well-vegetated with a complex drumlin topography means that any perceived changes to the existing landscape character would be slight and occur over limited parts of the Study Area. Overall there would be no fundamental change and the proposed wind farm would integrate into the existing landscape with no loss to key landscape character elements or attributes.

**Summary of Effects on Visual Character**

1.43 The proposed wind farm would be clearly visible from upland parts of the Study Area at close range to the site, although in some parts it would be screened by forestry. However, levels of visibility from settlements and the lowlands at close range to the proposed wind farm would often be limited by complex variations in the drumlin topography, tree and hedgerow cover, and also built development within settlements. Levels of visibility would become patchier in parts of the Study Area within 5 - 15 km of the proposed wind farm because most of it also comprises lowland agricultural landscapes with a large amount of tree cover, well-kept hedgerows and undulating drumlin topography which combine to limit long range views in many locations. Consequently there are few viewpoints in these parts of the Study Area.

1.44 Elevated views of the proposed wind farm would often be obtained from viewpoints on rising ground between upland and lowland landscapes. From these locations views across the lowlands would be framed by views of the Brougher Mountain range of uplands. Some of these Viewpoints have medium range views of the proposed wind farm and some have long range and distant views where the proposed wind farm would appear as a more minor feature. In all cases the proposed wind farm would be seen alongside the existing wind Lendrum's cluster.

1.45 In the wider Study Area, the impact of the proposed wind farm from areas where the ZTVs indicate potentially clear views would, in practice, be reduced by the sheer distance of the proposed wind farm from the views in question. In addition,

elevated distant viewpoints often encompass very wide open views where individual elements become subordinate. The presence of existing wind farms in the same area as the proposed wind farm mean that it would be not always be an individually distinguishable feature, particularly in longer range views.

1.46 None of the 20 representative Viewpoints are judged to experience substantially Significant visual effects. Eight would experience Moderately Significant visual effects and most of these Viewpoints would be located at close range from the proposed wind farm. Two of these 8 Viewpoints would be located at medium range to the proposed wind farm and would experience Moderately Significant visual effects by virtue of their elevated positions and because the proposed wind farm would be prominently located within the view and would increase the extent of the existing Lendrum's cluster. The remaining 12 Viewpoints would be located at medium range, long range, or at some distance from the proposed wind farm (approximately 10 – 30 km) and would experience No Significant Visual Effects.

**Summary of Cumulative Landscape & Visual Effects**

1.47 In all cases the proposed wind farm would have a close relationship with the Lendrum's cluster and would therefore not be a prominent additional feature in all but very close range views where the visual baseline is already defined by wind farms. These existing wind farms are also visible in all views in which the proposed wind farm would appear and the proposed wind farm would appear to be a contiguous part of this cluster. Differences in turbine scales are already a characteristic feature of the Lendrum's cluster - there is a difference of 31.5 m between the tip heights of Lendrum's Bridge and Hunter's Hill wind farms – and therefore the difference of 26.5 m between Hunter's Hill and Murley turbines would not be incongruous in this context.

1.48 In long range and distant views the proposed wind farm would not be closely related to other clusters of wind farms in the Study Area. With the exception of the proposed Glengeen and Garranbane wind farms, other wind farms and clusters of wind farms would be located at least 12 km from the proposed wind farm, with the main clusters being located in excess of 15 km. In views from the wider landscape where other clusters of wind farms are also visible the proposed wind farm would generally appear as a relatively small element within much wider panoramic views or be difficult to discern with the naked eye because of its distance.

**Acceptability of the Proposed Wind Farm**

1.49 In relation to both landscape and visual effects, the proposed wind farm's significant effects are limited to its immediate surroundings and would be of no more than Moderate Significance in any instance. Views from other close range viewpoints are often screened by a combination of complex drumlin topography in lowland areas and high levels of tree and hedgerow cover. Furthermore, large clusters of wind farms are already a defining feature in several parts of the Study Area and the proposed wind farm would represent a relatively small addition to the Lendrum's cluster which consists of 36 turbines. The development of this site for a wind farm cluster serves to focus effects on one part of the Study Area and limit

the cumulative effects on undeveloped parts of the Study Area. On this basis the proposed wind farm is deemed to be acceptable.

## Ecology

1.55 An assessment has been undertaken to assess the potential impacts on ecology within the site and the wider landscape. Detailed surveys were undertaken to establish the baseline conditions for the various habitats and for the species groups that are likely to occur in the area of the proposed scheme. The purpose of an ecological survey is to identify 'valued ecological receptors', those species and habitats that are valued in some way for their ecological function, their contribution to biodiversity or are protected by specific legislation.

1.56 The following specialist surveys were undertaken:

- JNCC Phase 1 Habitat Survey.
- NVC Phase 2 Survey.
- Bat (Chiroptera spp) Survey.
- Otter (*Lutra lutra)* Survey.
- Badger (*Meles meles)* Survey.
- Pine Marten *Martes martes* Survey.
- Red Squirrel (*Sciurus vulgaris)* Survey.
- Common Lizard (*Zootoca vivipara*) Survey.
- Smooth Newt (*Lissotriton vulgaris*) Survey.
- Marsh Fritillary (*Euphydryas aurinia*) Survey.
- Argent & Sable (*Rheumaptera hastata*) habitat Survey

1.57 The turbine and infrastructure layouts have been carefully designed to ensure that the integrity of habitats of higher conservation value is maintained.

1.58 The wind farm development at Murley will result in a loss of low and moderate quality habitats. The habitats affected are widespread both locally and regionally, and are of lower conservation value. All areas of habitat of higher conservation value have been avoided, and their interest maintained. The greatest potential impact on the ecological interest of the site and beyond is on watercourses and their associated wildlife, although these will be mitigated through the implementation of appropriate mitigation practices (including a 50 m buffer to all watercourses) which will result in a neutral impact on fish and aquatic invertebrates.

1.59 The potential effects of the proposed wind farm on ecological receptors have been assessed and it is concluded that with the implementation of appropriate mitigation measures the effects would be reduced to either a Slight Adverse Effect or a Neutral Effect that would not adversely affect the ecological integrity of the site and the wider area.

1.60 Overall the cumulative impacts on the ecology of the area are considered to be of minor significance.

## Fisheries Assessment

1.61 An assessment has been undertaken to assess the potential effects of the proposed wind farm development on the fish stocks and fish habitats of the receiving watercourses in the Colebrooke and Blackwater catchments. It provides relevant baseline information on fisheries enabling the potential effects to be identified and evaluated.

1.62 It has been determined that potential impacts are primarily related to the run-off of silt and suspended solids to the receiving watercourses with related effects on fish stocks and their habitats. Without mitigation it is considered that these impacts have the potential to be of moderate adverse magnitude and of moderate adverse to large/very large adverse significance depending of the sensitivity of individual watercourses.

1.63 A series of specific mitigation measures have been designed to avoid adverse effects on fisheries with regard to both construction and operational phases of the project.

1.64 Hydrology and site drainage issues have been considered in detail in Chapter 9 which outlines a surface water management system and drainage (SuDS) designed to control drainage and silt management on the site.

1.65 It is concluded that, provided the mitigation measures are implemented as specified, construction and operation of the proposed wind farm development will have a neutral impact on the fish stocks and aquatic biology of the Blackwater and Colebrooke rivers.

1.66 The development will also have a neutral impact on fish and other aquatic species listed in Annexe II of the EC Habitats Directive and resident in the Blackwater and Colebrooke rivers i.e. Atlantic salmon, White-clawed crayfish and River/Brook lamprey.

## Ornithology Assessment

1.67 An assessment has been undertaken to assess the potential impacts on bird species utilising the proposed Murley Wind Farm site. The bird communities occurring in the vicinity of the proposed Murley Wind Farm have been surveyed using standard methodologies and possible effects of the proposed wind farm on birds have then been assessed in line with the current published guidance of SNH and with reference to other sources of relevant information on the effects of wind farms on birds.

1.68 For all except two species (curlew and meadow pipit), possible adverse effects have been assessed as negligible or slight and for all species bar curlew any effects are restricted to the possible impact of construction disturbance - the implementation of the suggested mitigation measures in relation to construction should mean that the risk of construction disturbance is negligible (highly unlikely to occur) for all species including curlew.

1.69 For curlew there is the possibility of a moderate adverse effect during the operational phase of the wind farm, with a worse-case scenario of the displacement of one pair of breeding curlews (50% of the baseline population of two curlew

pairs). In this instance mitigation is suggested by way of a suitable amount of compensatory habitat for curlews, and it is expected that this should result in negligible adverse effects for curlew.

1.70 Collision risk modelling has been completed for peregrine and hen harrier and in both cases the risk of a collision occurring during the life of the proposed wind farm is negligible.

## Acoustic Assessment

1.71 An assessment of the acoustic impact from both the construction and operation of the proposed Murley Wind Farm was undertaken taking into account the identified most sensitive receptors.

1.72 The acoustic impact for the operation of the proposed Murley Wind Farm on nearby residential properties has been assessed in accordance with the guidance on wind farm noise as issued in the DTI publication "The Assessment and Rating of Noise from Wind Farms", otherwise known as ETSU-R-97, and Institute of Acoustics Good Practice Guide (IoA GPG), as recommended for use by relevant planning policy.

1.73 To establish baseline conditions, background noise surveys were carried out at three nearby properties and the measured background noise levels used to determine appropriate noise limits, as specified by ETSU-R-97 and the IoA GPG.

1.74 Operational noise levels were predicted using a noise propagation model, the proposed wind farm layout, terrain data and turbine emission data. The predicted noise levels are within derived appropriate noise limits at all considered wind speeds. The proposed wind farm therefore complies with the relevant guidance on wind farm noise and the impact on the amenity of all nearby residential properties would be regarded as acceptable.

1.75 A construction noise assessment carried out in accordance with BS 5228-1:2009 "Noise control on construction and open sites Part 1 - Noise" indicates that, with due regard to the mitigation outlined, the predicted noise levels likely to be experienced at representative critical residential properties are below relevant construction noise criteria.

1.76 A cumulative operational noise assessment was completed for the potential impact of the proposed Murley Wind Farm alongside the existing Hunters Hill, Lendrums Bridge and Screggagh wind farms and the proposed Crocknamona Wind Farm. A further cumulative operational noise assessment was completed considering a number of single wind turbine schemes. The predicted cumulative noise levels are within derived appropriate noise limits at all considered wind speeds. As such, the impact on the amenity of nearby residential properties would be regarded as acceptable.

## Archaeology & Heritage Assessment

1.77 An assessment of the potential impact on the known and potential archaeological and cultural sites within the sites itself and its wider landscape was undertaken. To facilitate the assessment of the wider landscape a 5 km search radius was utilised. The assessment of the proposed wind farm looked at both the potential physical impact upon any known or potential sub-surface archaeological features

within the development boundary further assessed the impact upon the setting of those monuments of regional importance within the 5 km search area.

1.78 The desktop survey and site inspection have determined that there are no known sites of archaeological interest located within the proposed development site. The desktop survey has however indicated that the development site is situated within a wider area of archaeological interest, with a total of 63 recorded archaeological sites situated within a 5km radius of the development site, 20 of which area of regional importance. The earliest of the known archaeology located within the 5km search radius dates to the Neolithic (4000BC to 2500BC) and Bronze Age (2500BC to 300BC) periods, whilst a significant number of sites are either known or thought to date to the Early Christian period (400AD to 1177AD). This illustrates that the area within which the development site is located has been experiencing human activity and settlement from around 4000BC, with an increase in activity from around 400AD to around 1177AD. This, coupled with the fact that the proposed wind farm site represents a large area of land which, gives rise to the potential for previously undiscovered, sub-surface archaeological remains to exist within the development site boundaries.

1.79 Given the nature of the proposed development, should such remains exist within the areas proposed for the wind turbines and associated infrastructure, they may be adversely impacted upon. A number of recommendations to mitigate such adverse effects has therefore been suggested.

1.80 An assessment was also made on the potential impact of the proposed wind farm on the setting of those monuments of Regional Importance which are intervisible with the wind farm. A total of 3 sites were identified in consultation with NIEA for full visual analysis. This concluded that the proposed wind farm will have no impact upon the setting of these monuments.

## Geology & Water Environment Assessment

1.81 This report assessed the effects of the proposed wind farm on hydrology and surface water quality, hydrogeology and groundwater quality and geological features. The assessment covers the construction, operation, maintenance, and decommissioning of the development. The report identifies and assesses the potential effects on the following:

- Existing natural and artificial drainage patterns;
- Runoff rates and volumes;
- Flooding and impediments to flows;
- Surface water dependant ecosystems including hydrological units of peat bog;
- Water quality of surface and groundwater including abstractions;
- Hydrogeological patterns across the site;
- Aquifer systems and their vulnerability;
- Quality of Groundwater;
- Groundwater usage;
- Existing solid geology and superficial geology.

1.82 Aspects of the design, construction and operation of a wind farm that may potentially impact on the receiving water environment have been identified and the pathways for adverse effects assessed.

1.83 The assessment concludes that with the implementation of the mitigation proposed the development would result in no significant residual effects to the receiving hydrological environment.

## Transport Assessment

1.81 An assessment of the potential traffic impacts associated with the construction of the proposed wind farm was undertaken. The assessment has been carried out in accordance with the IEMA - Guidelines for the Environmental Assessment of Road Traffic (IEMA Guidelines 1993), and other relevant documents.

1.82 Background information necessary for the completion of this assessment has been acquired through site visits, discussions with landowners and Transport NI, and by means of traffic and topographical surveys, and route assessments.

1.83 The proposed access route for large turbine components (abnormal loads) will be from Belfast, Killybegs or Lisahalley Port to join the A4 travelling towards Enniskillen. At Enniskillen the delivery would turn onto the B80 Tempo road. Travelling through Tempo and approximately 1.2 miles north of the village, the route bears right onto the B107 towards Clabby village. At the main roundabout in Clabby, the route takes the second exit onto the Aghintain road. Approximately 1.5 miles from Clabby, the route turns left off the Aghintain road onto the Killygordon Road which is a single track road. This road continues for approximately 0.8 miles to the first site entrance location at the end of the public road. This part of the site containing three of the nine turbines is known as ‘Killygordon’.

1.84 To reach the second site entrance location, from Clabby continue along the Aghintain road to the junction with the B122 Murley Road known as ‘Murley Cross’. Turn left at this junction and travel north along the B122 Murley Road for approximately 2.0 miles. The second site entrance will be on the right. This part of the site which will contain four of the nine turbines is known as ‘Cole Glen’.

1.85 To reach the third site entrance location, continue north along the B122 Murley road for approximately 0.5 miles. The entrance to the existing wind farms of Lendrums Bridge and Hunter’s Hill is on the left. The third part of the site, known as ‘Glengesh Lower’, containing two of the nine turbines is accessed via the existing wind farm infrastructure.

1.86 The proposed return route is similar to that of the proposed delivery route. Once the turbine components have been delivered, the vehicles will be shortened so they are no longer than a typical articulated HGV.

1.87 The main traffic impacts are associated with the increase in vehicle movements along the Killygordon, Aghintain and B122 Murley Roads during the construction stage of the project. These roads have relatively low levels of existing traffic and a small number of receptors will be affected. At worst, the frequency of vehicle movements is expected to be one vehicle every five minutes, on seven days in the third month of construction.

1.88 Consideration has been given to the effect of increased HGV traffic flow would have on Severance, Driver Delay, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation, Accidents and Safety and Cumulative Impacts.

1.89 A TMP will be developed and agreed with the relevant stakeholders in order to control and mitigate impacts associated with increased vehicles movements.

1.90 Taking into account the existing vehicle movements on the affected roads, and the proposed type and frequency of vehicle numbers, it is considered that with the appropriate mitigation measures as set out above, there will be '**no significant'** impacts.

## Socio - Economic and Tourism Assessment

1.91 An assessment has been undertaken to assess the potential social and economic impacts of the proposed development. It details the likely employment generation and business related opportunities which will result from the proposal, and predicted impacts on the current land use and recreational users of the site and the surrounding area.

1.92 RES tries to ensure that, wherever reasonably practicable, local contractors and employees are used in all aspects of wind farm development. The major opportunity lies during the construction phase when suitably qualified local firms are identified and invited to bid for different aspects of construction, such as foundation laying and electrical works. Construction materials are normally sourced locally (i.e. within the county) and local transport and plant hire companies used wherever possible. RES estimates that a temporary workforce of up to 28 Full Time Employees would be supported during the 12 - 18 month construction stage at Murley Wind Farm, with a proportion of these construction jobs being sourced locally**.** The wind farm would also support the equivalent of 1-2 part-time positions for the operation and maintenance of the wind farm.

1.93 RES accepts that economic benefits to the local community are largely indirect, whilst environmental benefits, in terms of combating climate change, can be perceived as somewhat intangible and of more regional or national consequence.

1.94 The total Community Benefit Package at Murley Wind Farm will be based on £5,000 per MW for the 25 year lifetime of the project. Based on a 20.7 MW project this equates to total a community benefit package of £103,500 per annum, with the total value of direct community benefits over the lifetime of the project equating to £2,587,500. The impact is therefore beneficial and considered to be of significance.

## Public Information Programme

1.95 A Public Information Programme was implemented for the proposed Murley Wind Farm to inform local residents, communities and their elected representatives about the proposal and to provide them with a contact point for information.

1.96 In November 2014, RES undertook door-to-door visits to 51 houses along sections of Murley Road, Ballyness Road, Legamaghery Road, Aghintain Road and the Ramaley Road to provide local residents with details of the project, to inform them of the

public exhibition dates and times, to provide people with the opportunity to respond, ask questions or provide feedback.

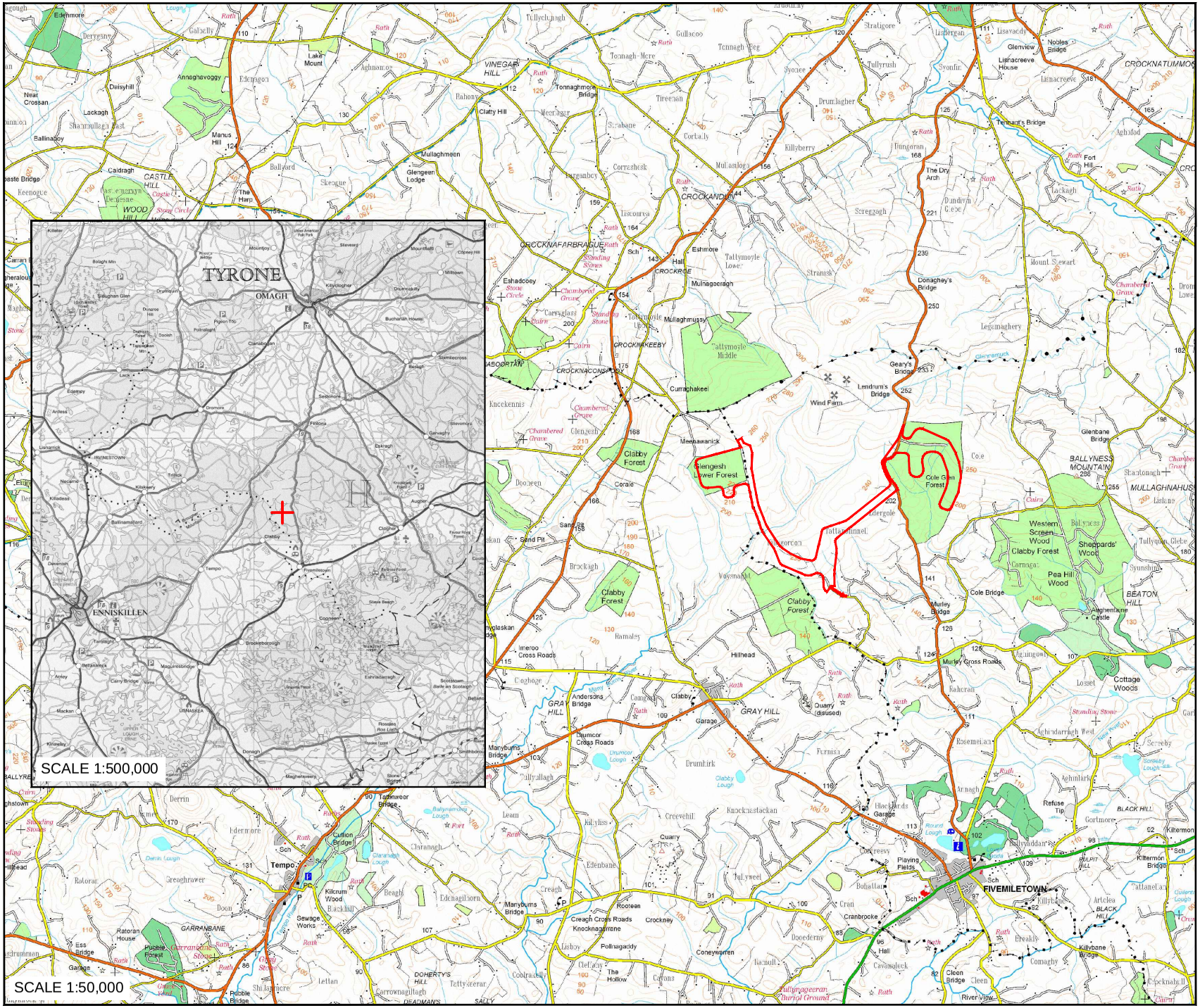
1.97 In addition to the door-to-door visits, information about the project was sent to the local community, including elected representatives, councils, community groups, schools and churches.

1.98 RES also held a public exhibition in the Valley Hotel, Fivemiletown, Co. Tyrone in November 2014, to provide detailed information, including maps and photomontages, to the local community. The exhibition provided visitors with an opportunity to discuss the proposals in detail, to ask questions and provide feedback. The exhibition was publicised through adverts in the local newspapers.

## Conclusion

1.99 The potential effects of the proposed Murley Wind Farm have been assessed in accordance with regulatory requirements and good practice. The ES incorporates technical assessments of the proposed development based on the requisite legislation and the relevant planning policy framework. The EIA has demonstrated that significant environmental effects associated with the construction, operation and decommissioning of the proposed wind farm have been avoided or minimised through the use of the iterative design process and with the application of mitigation measures.

1.100 The Murley Wind Farm will provide a number of benefits. The scheme will result in a reduction in greenhouse gas emissions from the electricity generating industry by harnessing wind as an alternative to the burning of fossil fuels, in line with the government's energy goals. It will also make a significant contribution to the Northern Ireland government target that 40% of electricity consumed should be sourced from renewable energy by 2020 (DETI).




# MURLEY WIND FARM

## FIGURE 1.1

## SITE LOCATION MAP



KEY:

- PLANNING APPLICATION BOUNDARY
- SITE CENTRE

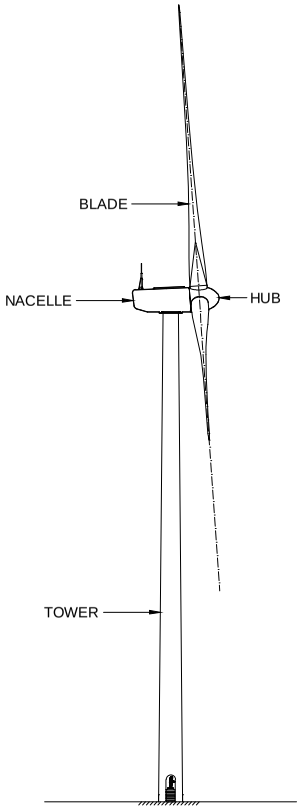
| | |
|---|---|
| LAYOUT DWG | N/A |
| T-LAYOUT NO. | N/A |

DRAWING NUMBER

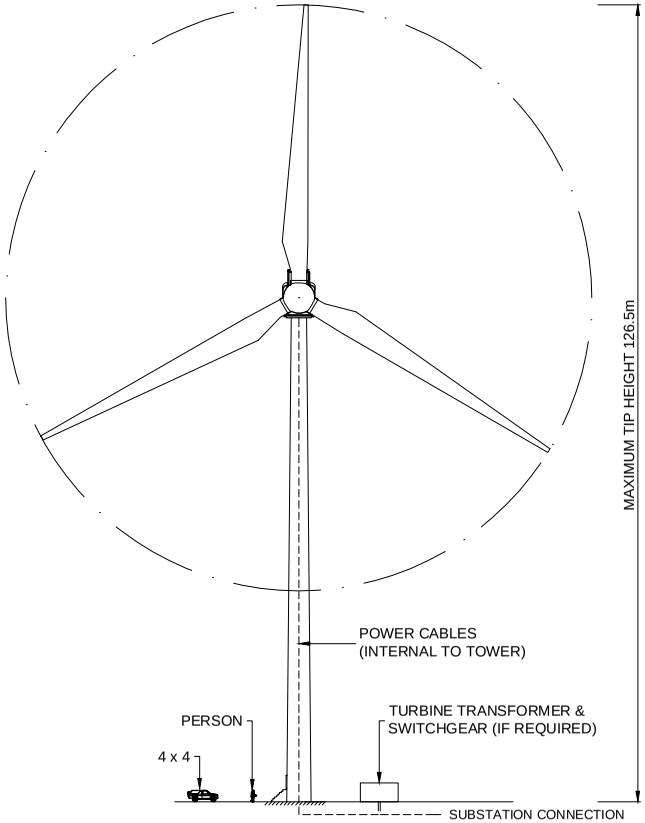
02876D2522-03

SCALE - AS SHOWN @ A4

NTS 2014




SIDE VIEW




FRONT VIEW

PHOTOGRAPH OF TYPICAL TURBINE

MURLEY WIND FARM

FIGURE 1.2

TURBINE ELEVATION

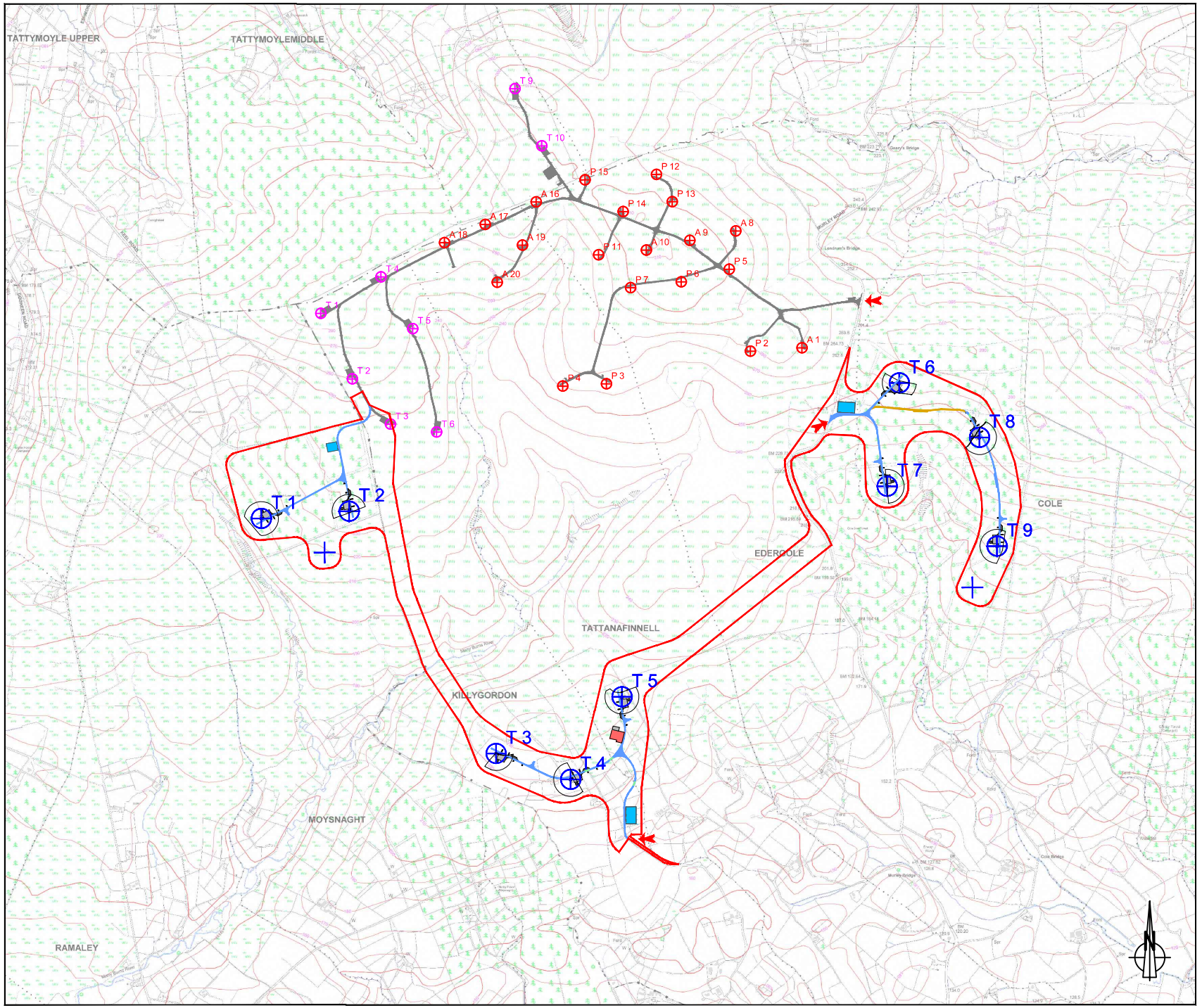
| | |
|---|---|
| LAYOUT DWG | N/A |
| T-LAYOUT NO. | N/A |

DRAWING NUMBER

02876D2901-03

SCALE - NOT TO SCALE

NTS 2014




res

# MURLEY WIND FARM

## FIGURE 1.3

## INFRASTRUCTURE LAYOUT



KEY - INFRASTRUCTURE LAYOUT:

- SITE BOUNDARY
- WIND TURBINE LOCATION
- WIND TURBINE MICROSITING
- CALIBRATION MASTS
- NEW SITE TRACKS
- UPGRADED SITE TRACKS
- WATERCOURSE CROSSING
- CRANE HARD STANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND WITH PARKING
- CONTROL BUILDING & SUBSTATION COMPOUND WITH PERMANENT HARDSTANDING AREA
- SITE ENTRANCE LOCATION

KEY - BUILT SITES:

- LENDRUMS BRIDGE
- HUNTERS HILL
- LENDRUMS BRIDGE & HUNTERS HILL WINDFARM INFRASTRUCTURE

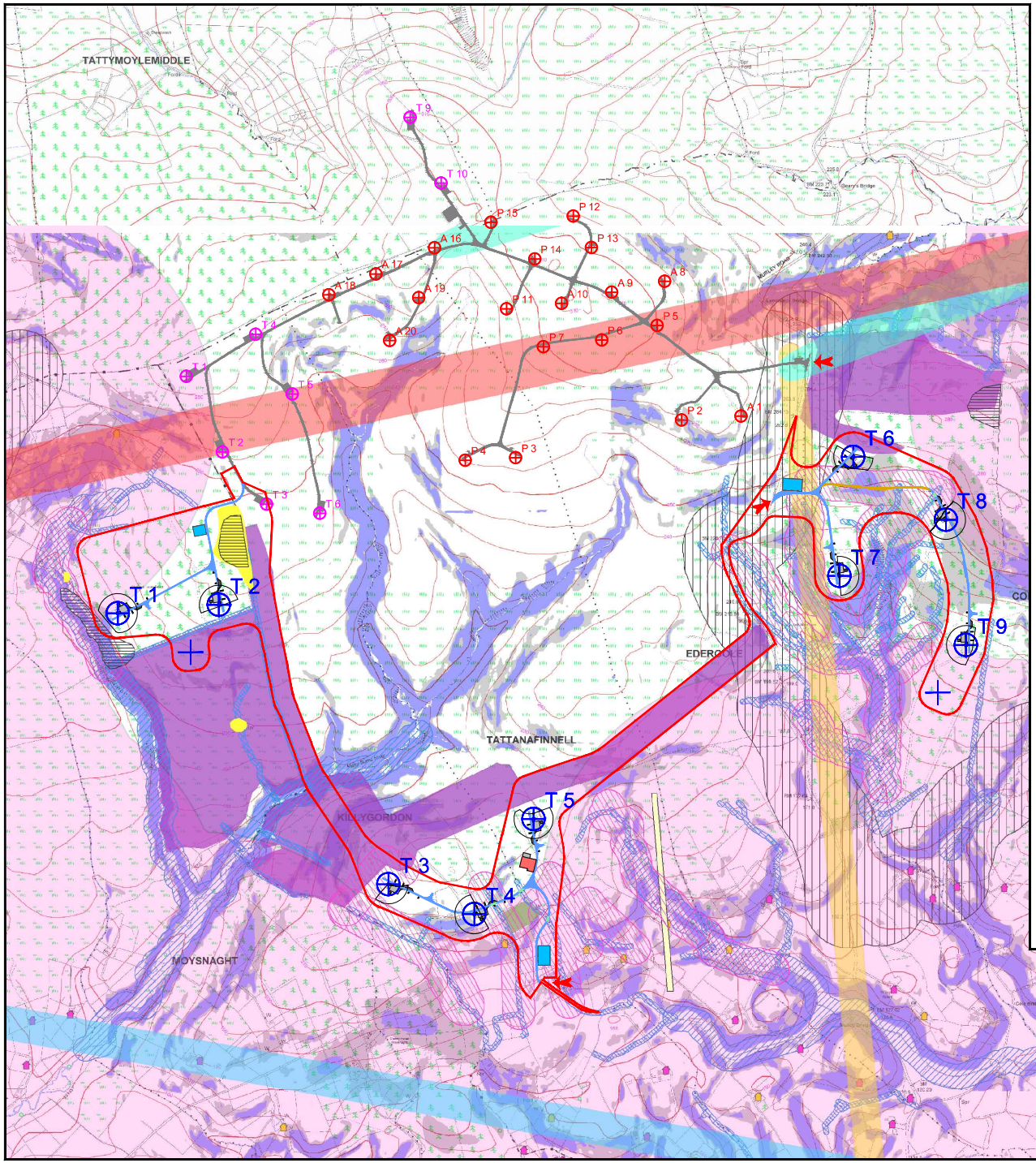
| LAYOUT DWG | 02876D0001-08 | T-LAYOUT NO. | pNIRkgn047 |
|---|---|---|---|

DRAWING NUMBER

02876D1001-04

SCALE - 1:25,000 @ A4

NTS 2014






KEY - CONSTRAINTS:

- HUNTERS HILL WIND FARM (BUILT) + 4D/5D BUFFER
- LENDRUM'S BRIDGE WIND FARM (BUILT) + 4D/5D BUFFER
- PEAT SLIDE MODERATE RISK
- PEAT DEPTH > 3m
- BAT BUFFERS
- ARQIVA LINK (100m REQUESTED CLEARANCE)
- BT LINK (2nd FRESNEL ZONE + 50m BUFFER)
- NIE LINKS (2nd FRESNEL ZONE + 50m BUFFER)
- ADELPHI NET1 LINK (2nd FRESNEL ZONE + 50m BUFFER)
- GEOLOGICAL FAULT
- UNOCCUPIED PROPERTIES
- OCCUPIED PROPERTIES
- 930m HABITATION BUFFER
- HYDROLOGY CLASS 1 50m BUFFER
- HYDROLOGY CLASS 2 10m BUFFER
- BLANKET BOG
- DIVERSE GRASSLAND
- ROADS 176.5m BUFFER *(TIP HEIGHT BUFFER + 50m)*

**SLOPE (BASED ON 5m DTM DATA)**

- 0-12%
- 12-15%
- 15-100%

# MURLEY WIND FARM

## FIGURE 1.4

## COMBINED CONSTRAINTS & INFRASTRUCTURE

KEY - INFRASTRUCTURE LAYOUT:

- SITE BOUNDARY
- WIND TURBINE LOCATION
- WIND TURBINE MICROSITING
- CALIBRATION MASTS
- NEW SITE TRACKS
- UPGRADED SITE TRACKS
- WATERCOURSE CROSSING
- CRANE HARD STANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND WITH PARKING
- CONTROL BUILDING & SUBSTATION COMPOUND WITH PERMANENT HARDSTANDING AREA
- SITE ENTRANCE LOCATION

KEY - BUILT SITES:

- LENDRUMS BRIDGE
- HUNTERS HILL
- LENDRUMS BRIDGE & HUNTERS HILL WINDFARM INFRASTRUCTURE

| LAYOUT DWG | 02876D0001-08 | T-LAYOUT NO. | pNIRkgn047 |
|---|---|---|---|

DRAWING NUMBER: 02876D2103-01

SCALE - 1:25,000 @ A4

NTS 2014