BARR CREGG WIND FARM

In the townlands of Barr Cregg, Ballymaclanigan and Slaghtmanus, near Claudy, County Londonderry

Environmental Statement

Volume 4 – Non-Technical Summary

power for good

RES UK & Ireland Ltd, Unit C1 & C2, Willowbank Business Park, Willowbank Road, Millbrook, Larne, County Antrim, BT40 2SF

Table of Contents

Preface

This Non Technical Summary (NTS) has been prepared in support of a planning application for the proposed Barr Cregg Wind Farm. The proposed wind farm is located in the townlands of Barr Cregg, Ballymaclanigan and Slaghtmanus, near Claudy in County Londonderry.

A planning application has been submitted to Planning Service 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 4** of the ES, which comprises:

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

The ES has been prepared by RES UK & Ireland Ltd (RES) in consultation with DOE Planning, 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	RPS
Fisheries Assessment	Paul Johnston Associates
Archaeology and Cultural Heritage Assessment	Gahan & Long
Geology and Hydrogeology Assessment	AECOM
Hydrology Assessment	McCloy Consulting
Peat Slide Hazard & Risk Assessment	SKM Enviros
Planning Policy; Acoustic Assessment; Transport Assessment; Shadow Flicker Assessment; Electromagnetic Interference & Aviation; Air, Climate and Renewable Energy; Health and Safety Assessment and Socio – Economic & Tourism Assessment.	RES

An electronic version of the NTS and other details about the project can be viewed at www.barrcregg-windfarm.co.uk.

Reference copies of the full ES and planning application may be viewed and / or purchased during normal opening hours at the following location:

Diamond Centre
630 Baranailt Road
Claudy
County Londonderry
BT47 4EA
028 7133 8005

Paper Copies of the NTS 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[1] from the address above or by contacting RES. Cheques should be made payable to RES UK & Ireland Ltd.

RES UK & Ireland Ltd
Willowbank Business Park
Willowbank Road
Millbrook
Larne
County Antrim
BT 40 2SF
028 2826 3321

[1]RES has an Environmental Management System which actively encourages the reduction of paper consumption and recycling where possible. Volumes 1 - 4 of this ES are Certified Carbon Neutral publications. RES encourages the viewing of this ES via CD where possible to reduce paper use. Volumes 1, 3 and 4 are intended for printing double sided. Please do so where appropriate.

1 Introduction

The Application

1.1 RES UK and Ireland Limited, hereafter referred to as 'RES', is applying to the Northern Ireland Department of the Environment (DOE) Planning for permission to construct, operate and decommission a wind farm known as Barr Cregg 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 Barr Cregg Wind Farm is located on rough grazing farmland, approximately 4.5 km north of Claudy and 9 km south/southeast of Eglinton, in the townland of Barr Cregg, County Londonderry. The centre of the site is located at Irish Grid Reference (IGR) 254870, 411500. 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 1.8 – 2.5MW range with a maximum height to blade tip of 125 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 90.0m. The dimensions are illustrated in **Figure 1.2.**

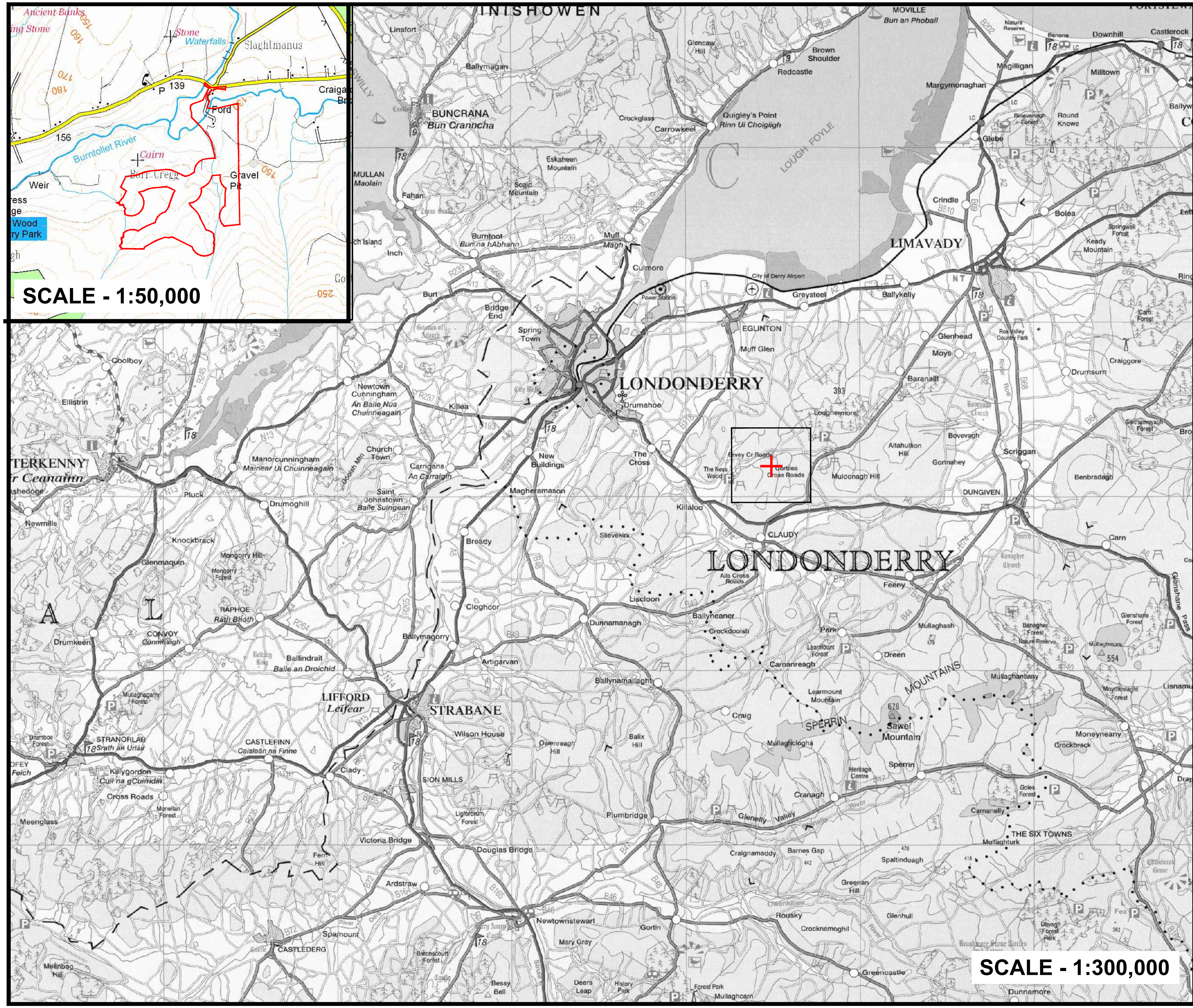
1.4 The proposal comprises the construction of seven turbines (each with an overall maximum height of 125 m above ground level) and associated infrastructure including a hardstanding pad at each turbine for crane erection, an upgraded site entrance, new and upgraded onsite access tracks, an onsite substation and control building, underground cables, two temporary monitoring masts, a permanent meteorological mast, a temporary construction compound, a temporary enabling works compound and road widening and improvement works on sections of the transport route (road improvement works). The proposed Infrastructure Layout is illustrated in **Figure 1.3**.

1.5 Based on nominal 1.8 MW capacity turbines the wind farm would be capable of 12.6 MW total capacity and would produce electrical energy equivalent to the average requirements of approximately 7,045 homes every year. This would be the equivalent electricity demand of approximately 19% of the households in the Local Government District of Derry.

1.6 The wind farm would also prevent an estimated 355,962 tonnes of carbon dioxide (CO_2) emissions from entering the atmosphere annually that would otherwise be produced by conventional fossil fuelled generators.

The Applicant

1.7 RES is one of the world's leading wind energy developers. It has constructed or developed wind farms around the world with a combined capacity of over 6.5 GW and has a large portfolio under construction and development. RES has been developing wind farms in Northern Ireland since the early 1990s and has developed 14 operational wind farms in Northern Ireland to date, totalling over 190 MW: Corkey, Elliott's Hill, Wolf Bog, and Gruig in County Antrim; Rigged Hill, Altahullion Phases 1 and 2, and Curryfree in County Londonderry; Lendrum's Bridge Phases 1



BARR CREGG
WIND FARM

FIGURE 1.1

SITE LOCATION MAP

REPRODUCED FROM THE 2012 ORDNANCE SURVEY OF NORTHERN IRELAND 1:50,0000 MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, @ CROWN COPYRIGHT 2012. LICENCE NO. 242.

KEY:

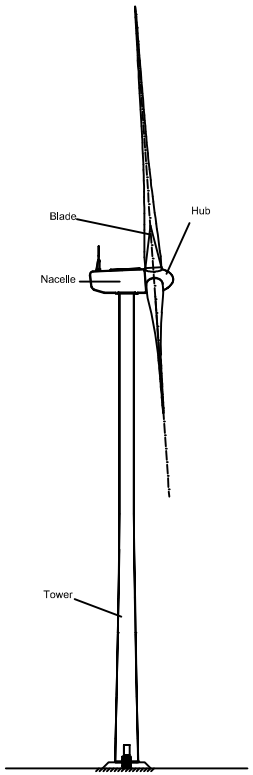
- PLANNING APPLICATION BOUNDARY
- SITE CENTRE

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

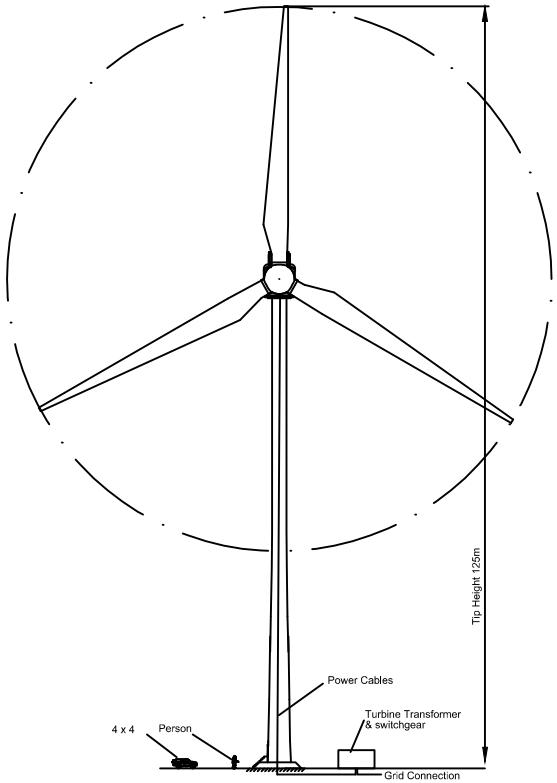
DRAWING NUMBER 02381D2219-03

SCALE - AS SHOWN @ A4

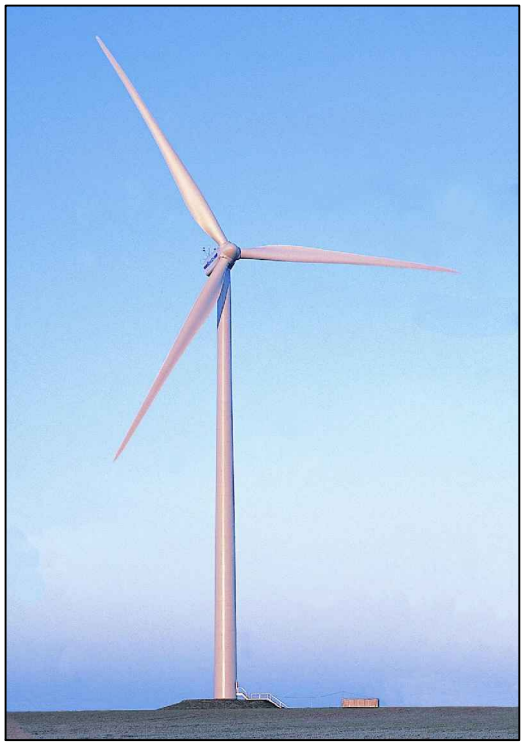
NON-TECHNICAL SUMMARY



SIDE VIEW



FRONT VIEW



PHOTOGRAPH OF TURBINE

BARR CREGG WIND FARM

FIGURE 1.2

TURBINE ELEVATION

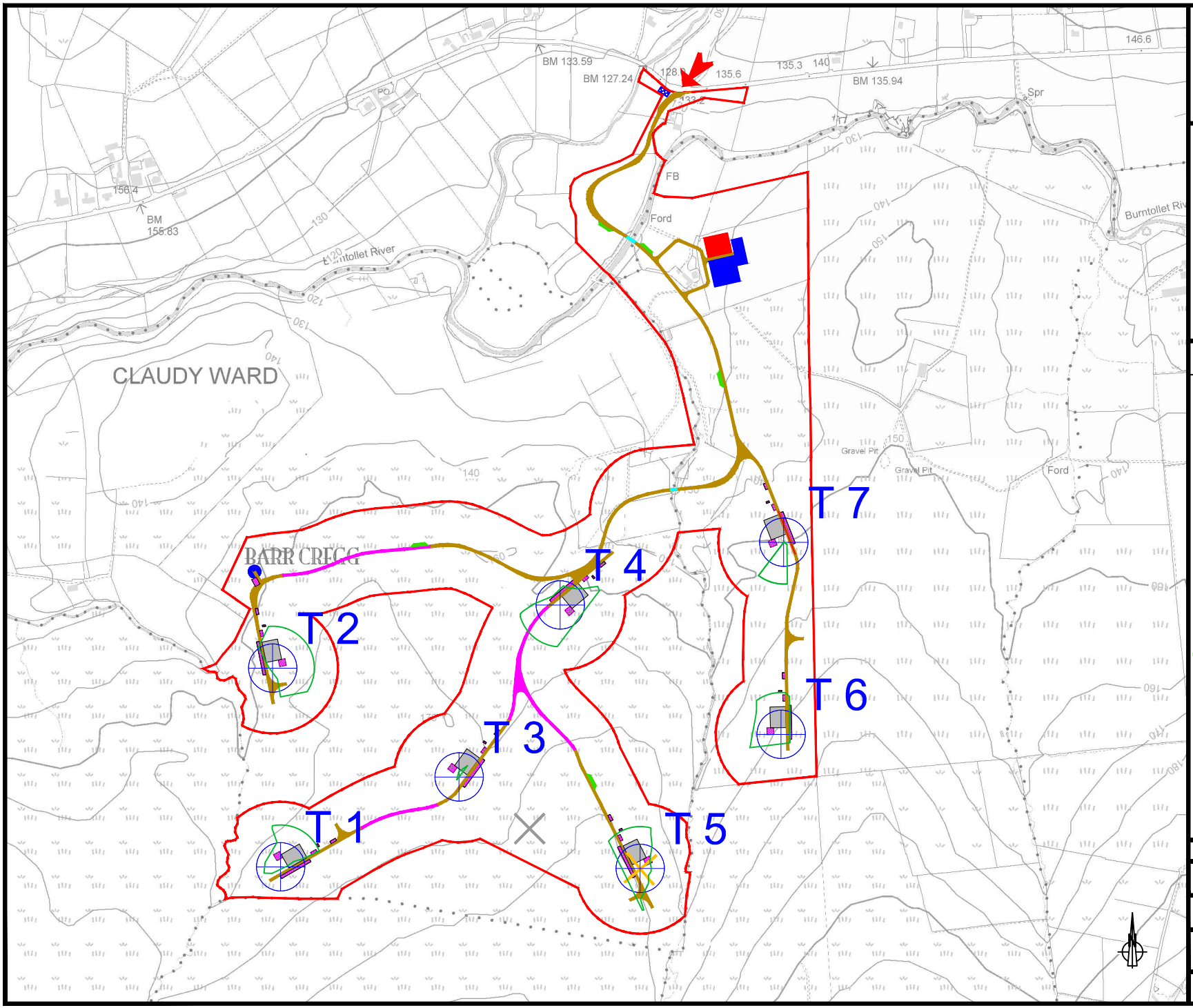
LAYOUT DWG	T-LAYOUT NO.
N/A	N/A

DRAWING NUMBER

02381D2208-04

SCALE - 1:1,250 @ A4

NON-TECHNICAL SUMMARY



BARR CREGG WIND FARM

FIGURE 1.3

INFRASTRUCTURE LAYOUT

Key

- Wind Turbine Location
- Micrositing Buffer (80m)
- Planning Application Boundary
- Site Tracks (New Excavated)
- Site Tracks (New Floated)
- Control Building & Substation Compound
- Meteorological Mast Location (Permanent Lattice Type)
- Clear Span Watercourse Crossing
- Crane Hard Standing Area
  - Permanent
  - Temporary
- Temporary Passing Places & Turning Heads
- Temporary Construction Compound
- Temporary Enabling Works Compound
- Meteorological Calibration Reference Mast Location
- Meteorological Calibration Mast Location
- Site Entrance Location

LAYOUT DWG	02381D0001-12	T-LAYOUT NO.	pNIRbrc034

DRAWING NUMBER **02381D1001-10**

SCALE - 1:10,000 @ A4

NON-TECHNICAL SUMMARY

and 2, Lough Hill, Slieve Divena, and Hunter's Hill in County Tyrone; and Callagheen in County Fermanagh.

Rationale for the Scheme

Combating Climate Change

1.8 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 (56%) 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.

1.9 One of the principal contributors to the build-up of greenhouse gasses is the use of fossil fuels in electricity generation. In the UK, 66% of CO_2 emissions are attributable to electricity and heat production. Reducing the extent to which electricity is produced by burning fossil fuels will reduce the amount of harmful greenhouse gases released into the atmosphere. (RenewableUK 2008).

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 states that renewables are central 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, and sets out four key energy policy goals:

- to put the UK on a path to cutting CO_2 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 by 2012, 12% of electricity consumption should be met from renewable sources, and further 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 to 2020.

1.19 As of July 2010 there were 297.6 MW of onshore wind farms operational and 305.4 MW with planning approval in Northern Ireland. This comprises 23 wind farms operational and 20 consented wind farms. Additionally, there are 736.4 MW proposed applications, comprising 46 applications (DETI 2010).

1.20 If approved, the proposed Barr Cregg Wind Farm could account for up to 17.5 MW, a material contribution to achieving the 40% renewable energy target for 2020.

Public Information Programme

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

1.22 In May 2012, RES undertook door-to-door visits to 53 houses along the Craigatoke, and Myrtle Roads and sections of the Slaghtmanus and Oughtagh Roads 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.

1.23 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.

1.24 RES also held a public exhibition in the Listress Primary School in May 2012, 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. Notification of the exhibitions was sent to over 500 people and organisations. They were further publicised through adverts and press releases in local newspapers.

Project Description

Site Selection and History

1.25 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.
- The site is not located within a designated landscape e.g. Area of Outstanding Natural Beauty (AONB);
- Identified that a significant area of land was potentially available for development, out with a preliminary separation distance of 800 m from occupied housing;

1.26 Feasibility investigations were undertaken to determine the compatibility with Planning Policy Statement 18 – Renewable Energy (PPS18). This included an assessment of proximity to road and railways, land designations and dwellings (in relation to noise and residential amenity).

1.27 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 Barr Cregg 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

1.28 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 permanent land take is limited to the area of the towers themselves, the access tracks leading to them, the crane hardstandings, control building, substation and permanent meteorological mast.

1.29 Only approximately 6.4% of the land within the planning application boundary will be utilised by the development due to the relatively small footprints of the infrastructure and the wind farm design criteria applied in the design process. The area of land expected to be utilised by the development is approximately 4.8 ha.

The Turbines

1.30 Each turbine would begin generating power automatically at a wind speed of around 3.0 ms^{-1} (6.75 mph) and would shut down at a wind speed of around 25 ms^{-1} (56 mph). A transformer unit would be located at the base of the turbine or within the turbine tower. It is proposed that the turbines will be a uniform light grey colour with a semi-matt finish to reduce their contrast with the background sky and minimise reflections. The turbines will be uniform in colour and will not feature any company logo.

Grid Connection

1.31 All electrical cabling between the turbines and the wind farm sub-station on the site would be underground. 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

1.32 It is anticipated that the construction phase will take approximately 12-18 months 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 19.00. 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.

1.33 The civil engineering works will comprise:

- the upgrading of the site entrance;
- the preparation and establishment of temporary site welfare facilities;
- construction of watercourse crossings;
- the provision of new access tracks to the turbine locations;
- construction of the on-site control room and substation;
- the preparation of hardstanding areas for cranes;
- the preparation and construction of the concrete foundation at each turbine location to support the turbine structure and the individual turbine transformer;
- foundations and hardstanding for permanent mast;
- the installation of all associated drainage & Sustainable Drainage System requirements;
- the erection of site fencing, stockproofing and security requirements, and;
- public road widening.

1.34 A Construction and Decommissioning Method Statement will be prepared in the event that planning consent is granted for the proposed development. This will be submitted to and agreed with 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.

Health and Safety Assessment

1.35 This assessment examined the potential impacts on health and safety during the construction and operation on the proposed Barr Cregg Wind Farm. It also assessed the potential impacts of health and safety on the environment and identified mitigation measures that can avoid or reduce impact.

1.36 The assessment has determined that if the appropriate legislation and guidance is adhered to during the design, construction and operation phases of the development, and the best available technology is utilised in the selection of the turbine design, there will be no risk to the safety of the operators during construction and maintenance of the wind farm, or to the general public during the construction or operation. RES will ensure that the appropriate legislation and guidance is followed through the different phases of the project.

Operation and Maintenance

1.37 Routine maintenance of the turbines will be carried out approximately twice a year. In addition regular site checks will be carried out twice a month, throughout the life of the project. This would not usually involve any large machinery and site traffic would be limited to small maintenance vehicles.

1.38 Wind turbines are designed to have a minimum operational life of 25 years and the design requirements are based on the local climatic conditions of a site. During the design life of a turbine it is anticipated that the replacement of a major component, typically a gear box or generator, will be required approximately

twice. If the replacement of a major component is required it would be necessary to use mobile cranes and heavy vehicles to repair the turbine or replace a major component, and it is these activities which are defined as Non-Routine Maintenance Works.

Decommissioning

1.39 One of the main advantages of wind power generation over other forms of electricity production is the ease of decommissioning and the simple removal of artefacts 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.

1.40 At the end of the wind farm's operational life RES proposes 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. 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 to one metre below ground level; and reinstatement of disturbed areas. Landowners will be given the option to retain the access tracks for their own purposes.

Environmental Assessments

EIA and the Design Process

1.41 In accordance with EIA process and best practice the project team employed an iterative approach to the design of Barr Cregg 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 illustration below shows how known constraints influenced the layout design process.

Key Design Iterations

Iteration	Detail of Change
Layout 1: Initial Site Selection	An initial site selection wind turbine layout was established to determine whether the scheme had potential for development. The layout was based on 7 turbines of 80 metre (m) rotor diameter and 120 m tip height, and included the following constraints: - A preliminary residential property separation distance of 800 m; - Land out with the full control of the applicant (Turbary from Land Registry maps); - Identification of Environmental Designations (Faughan River & Tributaries SAC);

Iteration	Detail of Change
	- Preliminary avoidance buffer to mapped water courses (50 m buffer); - Preliminary consideration to known communications links (Orange). Although Turbine 5 (T5) encroached on an identified communication link, confirmation was sought from the link operator to determine whether aforementioned turbines would actually impact on link due to vertical separation distance.
Layout 2: Baseline Surveys Complete	Following completion of baseline surveys, advice was received from technical and environmental specialists on the main constraints to development, the likely significance of potential environmental impacts and possible mitigation that could reduce or alleviate detrimental impacts. As a result of additional lands being available for development we reviewed the turbine envelope and, in consultation with the landscape consultant, we increased the turbine rotor diameter from 80m to 93m, and overall tip height correspondingly from 120m to 126.5m. The additional lands allowed adequate inter turbine separation, in combination with an increased separation distance, between all turbines and residences on the Slaghtmanus Road to 10-times the rotor diameter (930m). The Landscape Consultant reviewed visualisations from shortlisted Viewpoints, and compared the Zones of Theoretical Visibility for the two turbine heights, and concluded that the increase in turbine height was unlikely to increase the significance of effects from any viewpoints, or significantly increase visibility of the wind farm within the 30km Study Area. The layout was revised to incorporate the following additional/amended considerations: - PPS18 best practice house to turbine separation distance of 10 rotor diameters was considered (930 m); - Buffer zones of 50 m around major watercourses including strategic flood extents confirmed by the hydrological consultant; - Additional communication link information (JRC); - Fence demarcating northern extent of turbary on ground; - Areas initially identified as potential blanket bog; - Peat depth greater than 3 m; - Badger sett 30 m buffer. Although turbines T3 & T6 now encroached on an identified communication link, confirmation was sought from the link operator to determine whether aforementioned turbines would actually impact on link or if alternative mitigation would be available to avoid impact.
Layout 3: Pre Layout Freeze	Prior to the turbine layout being finalised, further advice was received from technical, engineering environmental specialists as a result of ongoing survey work. The positioning of supporting turbine infrastructure such as crane pads and tracks was also considered. The turbine layout was revised to incorporate the following: - preliminary blanket bog areas were avoided as identified by the ecologist;

Iteration	Detail of Change
	- Avoidance of areas utilised by bats were avoided based on height of vegetation were provided by ecologist; - The approximate location of a geological fault was avoided with 25 m to turbine foundation edges; - Sand Martin colonies were avoided with a 98.5 m buffer; - In-house analysis showed that there was adequate vertical separation from the Orange communication link and that this constraint did not require further avoidance; - Scheduled Monument Registered locations were avoided. As a result of potential issue with communication links T6 moved east onto eastern portion of site and T3 moved north. The move of T6 to a new location meant that Turbine T7 needed to be moved to ensure adequate inter-turbine separation whilst T4 moved east to utilise space vacated resulting in a more even spacing.
Layout 4: Final layout	- Following the baseline noise surveys it was determined that a turbine with a smaller rotor diameter would be more suitable. The final layout was based on 7 turbines of 90 m rotor diameter and 125 m tip height. Whilst this reduction in size resulted in a reduced design guide distance from turbine to houses (of 10 rotor diameters, 900m) the decision was made not to move turbines further towards those houses in the prevailing wind direction along Slaghtmanus Road. - A final technical and engineering assessment was undertaken of the proposed layout including a site walk over to assess the impacts of the Infrastructure layout. As a result: - T1 moved marginally north to ensure adequate separation between areas identified as having 3rd party turbary rights and any earth works in the vicinity of the turbine; - T2 moved to the west to maximise inter-turbine spacing; - T3 moved north to avoid any impacts on the final identified sensitive blanket bog areas and the associated access track was placed on opposite side of crane pad to avoid conflict with badger sett. - T4 moved marginally north to increase inter-turbine separation; - T5 moved northeast to allow space for turning head and maximise separation to slopes near the eastern stream; - T6 moved east to create adequate inter-turbine separation and maximise separation to slopes near the eastern stream; & - T7 moved marginally to ensure adherence to identified buffer from bat foraging areas. The layout of the substation & associated compound and the temporary construction compound were rationalised to tie in with existing access tracks, farm buildings and field boundaries. Based on the final layout of turbines and associated infrastructure the extent of the Planning Application Boundary was determined.

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

Landscape and Visual Impact Assessment (LVIA)

1.43 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 30km 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.

1.44 The LVIA process concludes that the significant impacts of this proposed development are limited to areas in relative proximity to it. In the wider study area overall visibility levels are low. Most notably, the proposed wind farm is not highly visible and will not have any significant effects on either of the Sperrins or Binevenagh Areas of Outstanding Natural Beauty (AONB) that are located within the study area.

Summary of Effects on Landscape Character

1.45 The proposed development is located within the Loughermore Hills Landscape Character Area, which is an area defined by the Northern Ireland Environment Agency, and which is judged to be of moderate to low sensitivity to wind energy development by the Supplementary Planning Guidance to PPS18. It is judged to have a moderately significant effect on the Loughermore Hills. However, field survey work indicates that proposed Barr Cregg wind farm would have limited visibility in the wider landscape and the significance of its effects on landscape character in the wider study area is deemed to be not significant because the development would not be highly visible, and there would be no loss of key landscape attributes as a result of the development.

Summary of Effects on Visual Character

1.46 The Zone of Theoretical Visibility Figures (ZTVs) illustrate that the location of the proposed development on a hill slope that is surrounded by higher summits limits its visibility – it is theoretically visible from less than 20% of the Study Area, and just over 10% of the Study Area would theoretically experience views of all seven turbines to blade tip.

1.47 Nineteen Viewpoints have been selected to represent typical and / or particularly sensitive views in the Study Area. Of these, only two Viewpoints would experience substantially significant visual effects, and only three would experience moderately significant visual effects. All 5 would be located between 0.98km and 3.2km from the proposed development, and it is therefore to be expected that they would experience clear views of the proposed development (although it is also noted that there are a relatively small number of visual receptors that are likely to be present at these Viewpoints).

1.48 The remaining Viewpoints, located between 1.4km and 22.5km from the proposed development would experience no significant visual effects. These Viewpoints are more representative of typical views that would be experienced by a greater

number of receptors. In most views the proposed development would appear as a relatively small element within much wider panoramic views.

Summary of Cumulative Landscape & Visual Effects

1.49 There are currently twenty seven other wind farms in this Study Area, of which the majority (20) are existing or consented. In general these wind farms tend to be located in large clusters on upland ranges to the east, north east, north west and west of the proposed development. There are few parts of the Study Area where the proposed development would be visible without visibility of another wind farm, and the cumulative ZTV diagrams indicate that there are very few parts of the Study Area where visibility of the proposed development would incrementally increase the overall visibility of wind farms in any significant way. Within 30km, the proposed development would be theoretically visible in just over 19% of the Study Area alongside other proposed wind farms, but it would only be visible in an additional 0.33% of the Study Area where there is not currently visibility of a wind farm.

1.50 The proposed development's location on a hill slope that is physically and visually contained by surrounding hills means that it is also physically well separated from other wind farms in the study. In all cases the magnitude of indirect incremental landscape effects would be negligible and the significance of cumulative landscape effects would be not significant

Acceptability of the Proposed Wind Farm

1.51 In relation to both landscape and visual effects, the proposed development's significant effects are limited to its immediate surroundings. This is due partly to its compact size and position on a hill slope rather than a summit, and also to the fact that it is surrounded by higher hills and summits which contain and screen many longer range views. Overall the wind farm is judged to be acceptable in landscape and visual terms taking into account transboundary, cumulative and residual impacts.

Ecology

1.52 An assessment has been undertaken to assess the potential impacts on ecology within the site and the wider landscape was undertaken. Surveys for bats were extended to 200 m outside the development area, as required by Northern Ireland Environment Agency (NIEA) guidance. Sites designated for their nature conservation features within a radius of 2 km of the site boundary were also considered in order to assess potential remote effects on valuable ecological site-based receptors.

1.53 The following specialist surveys were undertaken:

- Phase 1 Habitat Survey;
- Phase 2 National Vegetation Classification Survey;
- Classification of the Mire Macrotope;
- Bat Survey;
- Otter Survey;

- Badger Survey;
- Smooth Newt Survey;
- Common Lizard Survey; and,
- Marsh Fritillary Survey.

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

1.55 The design of the proposed wind farm and the implementation of the proposed mitigation measures, would result in a neutral effect on the integrity of the River Faughan SCI & ASSI and Ness Woods ASSI. A draft Habitats Regulations Assessment is included in **Appendix 7.2**.

1.56 There would be slight adverse effects on blanket and modified bog as a result of a changes to the extent of these habitats. However, the loss equates to 3% of the total area of blanket bog within the planning application boundary, with effects being confined within the site, and not adversely affecting the integrity or conservation status of the respective habitats. It is anticipated that habitat management undertaken within the Land Under Application Control to improve conditions for active peat generation and compensate for the direct loss of habitat would have a large beneficial effect.

1.57 There would be a slight adverse effect on wet neutral grassland and marsh grassland that would result in a change to the extent of these habitats through direct habitat loss and disturbance during construction however the effects would be confined to within the site.

1.58 There is potential for a slight adverse effect on bats that could result in a change to the distribution and abundance of bats however the effects would be confined to the insignificant population of bats that use the site for foraging and commuting. The effects would not adversely affect the integrity or conservation status of the local bat population

1.59 An Outline Habitat Management Plan (OHMP) has been produced for the Land Under Application Control. A copy of the OHMP can be found in **Appendix 7.7**. There is an opportunity to benefit the flora and fauna of the survey site, compensate for the direct loss of habitat and provide a net benefit for biodiversity over and above the requirements for mitigation measures. The purpose of the plan would be to provide long-term management & monitoring objectives for the site during the operational life of the wind farm that would have a large beneficial effect.

1.60 With landowner agreement the OHMP would aim to improve conditions for active peat generation; improve the habitat for bird species and for marsh fritillary butterfly with a suitable grazing regime; to undertake habitat management along the Burntollet River including thinning and replanting of trees; and to prevent any further peat cutting or burning.

1.61 The proposed development does not involve significant land take and with implementation of the mitigation measures proposed would result in no significant transboundary, cumulative or residual effects on the known ecological environment as a result of the proposed development.

Fisheries Assessment

1.62 An assessment has been undertaken to assess the potential impacts on receiving watercourses resulting from the construction, operation and decommissioning of the proposed development. Background data on the fish stocks and status of the River Faughan was sourced through consultation with the Loughs Agency. Environmental monitoring data for the River Faughan was provided by the Northern Ireland Environment Agency (NIEA)

1.63 During a preliminary site visit in January 2010 an overview of the proposed wind farm site and principal drainage streams was carried out. This was followed by a full habitat survey in August 2011 and a fish stock survey in September 2011 which was carried out by electrofishing.

1.64 A full fisheries habitat survey was undertaken on the two principal watercourses flowing adjacent to or within the proposed site boundary, the Burntollet River and the Meenarnet Burn.

1.65 The construction and operation of the proposed wind farm development will have a neutral impact on fish stocks and aquatic biology of the Burntollet River and tributary streams.

1.66 Provided proposed mitigation measures are implemented as specified, which include no instream works occurring in the four main watercourses draining the proposed site and liaison with Loughs Agency regarding the timing of works within 20 m of a stream, the proposed wind farm will also have a neutral impact on the Atlantic salmon as the primary feature of the River Faughan and Tributaries SCI (SAC).

1.67 Implementation of the mitigation measures proposed would result in no significant transboundary, cumulative or residual effects on the fisheries environment as a result of the proposed development.

Ornithology Assessment

1.68 An assessment has been undertaken to assess the potential impacts on bird species utilising the proposed Barr Cregg Wind Farm site. The bird communities on the site and in appropriate surrounding buffer areas have been surveyed over three consecutive years covering three breeding seasons and two winter and migration seasons.

1.69 Two Annex 1 raptor species were found by the surveys: peregrine (not breeding within 2 km but occasional sightings of non-breeding birds) and merlin (breeding possible within 3 km but no further evidence found). One Red-listed species (quail) was recorded possibly breeding, but in just one of the baseline years and this migratory species is not expected to be regularly occurring on the site. Six Amber-listed species (snipe, sand martin, swallow, skylark, grasshopper warbler and linnet) were found breeding on the site. One additional Amber-listed species (Kestrel) was probably breeding within 2 km.

1.70 Possible effects on birds of the proposed wind farm have been assessed using defined criteria and where possible quantified. In most cases, effects have been assessed as negligible (barr snipe, skylark and grasshopper warbler). Where

adverse effects have been identified mitigation measures such as carrying out bird surveys pre construction and during construction for any works being undertaken within the bird breeding season (April – July) and undertaking Habitat Management have been described and the resulting residual effects have been assessed as negligible.

1.71 Following Scottish Natural Heritage criteria, it is considered that none of the bird species recorded from the site or relevant buffer areas would require an assessment of cumulative effects.

1.72 The most recently published research (Pearce-Higgins et al 2012) suggests that for some bird species there might be positive effects from wind farm construction. Such positive effects are suggested for breeding skylarks and meadow pipits both of which occur on the site. The research suggests that the positive effects might be due to vegetation disturbance during construction creating open areas known to benefit these species. Increased breeding densities for these species might also be beneficial for other birds that use the Barr Cregg site, notably the birds of prey that hunt over the site and include small birds in their diet and also for the cuckoo, which in Northern Ireland lays its eggs principally in the nests of meadow pipits and so is reliant on healthy populations of this species.

1.73 In view of these possible positive effects for some species, and the implementation of the mitigation measures proposed, would result in no significant transboundary or residual effects on bird populations in the area as a result of the proposed development.

Acoustic Assessment

1.74 An assessment of the acoustic impact from both the construction and operation of the proposed Barr Cregg Wind Farm was undertaken taking into account the most sensitive receptors.

1.75 The operational noise impact was assessed according to the guidance described in the 'The Assessment and Rating of Noise from Wind Farms', referred to as 'ETSU-R-97', as recommended for use in relevant planning policy. The methodology described in this document was developed by a working group comprised of a cross section of interested persons including, amongst others, environmental health officers, wind farm operators and independent acoustic experts. It provides a robust basis for assessing the noise impact of a wind farm and has been applied at the vast majority of wind farms currently operating in the UK.

1.76 Representative baseline conditions (the "background noise level") at nearest neighbours were established by undertaking noise surveys at four nearby properties. These measured levels were then used to infer the background noise levels at other nearby properties as the ETSU-R-97 document recommends. As background noise levels depend upon wind speed, as indeed do wind turbine noise emissions, the measurement of background noise levels at the survey locations were made concurrent with measurements of the wind speed and wind direction, which covered a representative range. These wind measurements are made at the wind turbine site rather than at the properties, since it is this wind speed that will subsequently govern the wind farm's noise generation.

1.77 An estimate of noise levels at the nearest neighbours, using a sound propagation model, were made over a range of wind speeds taking into account the position of the proposed wind turbines, the nearest neighbours, and the candidate wind turbine type.

1.78 The relevant noise limits were then determined through analysis of baseline conditions and the criteria specified by the ETSU-R-97 guidelines. The general principle regarding the setting of noise criteria is that limits should be based relative to existing background noise levels, except for very low background noise levels, in which case a fixed limit may be applied. This approach has the advantage that the limits can directly reflect the existing noise environment at the nearest properties and the impact that the wind farm may have on this environment.

1.79 The cumulative noise effects of any existing or proposed wind farm / single turbine that could theoretically have an effect in combination with Barr Cregg have been considered in this assessment.

1.80 For those properties considered, the predicted noise levels are within noise limits at all considered wind speeds. The proposed Barr Cregg Wind Farm therefore complies with the relevant guidance on wind farm noise and the impact on the amenity of all nearby properties would be regarded as acceptable.

1.81 A construction noise assessment, which has incorporated the impact from increased traffic noise, indicates that predicted noise levels likely to be experienced at representative critical properties are within targets in relation to relevant construction noise criteria.

Archaeology & Heritage Assessment

1.82 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 has been utilised. The assessment investigated the potential physical impact upon any known or potential sub-surface archaeological features within the development boundary and upon the setting of those monuments of regional importance within the 5 km search area.

1.83 The assessment identified that 1 recorded archaeological site is contained within the development area, however this was subsequently found to be a non-antiquity and therefore of no archaeological significance.

1.84 An inspection of the proposed development area identified no previously unknown archaeological features within the application site. Following an assessment of the proposed development, it was concluded that the construction of the wind farm would have no physical impact on known archaeology within the development area.

1.85 Following discussions with Northern Ireland Environment Agency: Historic Monument Unit it was agreed that any further assessment of the potential impact upon the setting of monuments of regional importance would be limited to those sites contained within the Ballygroll complex and a nearby chambered grave off Slaghtmanus Road. This assessment found that in the case of both sites, that a

minor adverse impact would be placed upon the setting of the monuments but that the wind farm would not impact upon the critical views of these monuments.

1.86 Implementation of the mitigation measures proposed would result in no significant cumulative or residual effects on the known archaeology within the development area and its wider context as a result of the proposed development.

Geology & Hydrogeology Assessment

1.87 An assessment of the likely potential geological and hydrogeological impacts was undertaken and includes a peat slide risk assessment due to the presence of peat on-site. The study is principally concerned with the development area and its immediate surroundings, though where necessary a wider area has been studied. The wider area included the River Faughan and its Tributaries Area of Special Scientific Interest (ASSI).

1.88 The site is generally underlain by superficial deposits of peat, overlying bedrock of the Ballykelly Formation. A Peatslide Hazard Risk Assessment has been undertaken and the results for the site are 'low risk'.

1.89 The River Faughan and Tributaries ASSI/SCI are located in the northern section of the site adjacent to the Rivers Burntollet and Loughermore. Development in this part of the site will comprise the construction of access tracks and the site entrance. The significance of the residual effect of the proposed Wind Farm on the River Faughan and Tributaries ASSI/SAC after mitigation is considered to be slight adverse, and is not considered to be significant.

1.90 The locally important superficial aquifers at the north of the site cover the area of alluvium and glaciofluvial sand and gravel identified on the BGS GeoIndex. The aquifers are located to the north of the turbines and the significance of the residual effect of the proposed wind farm on them is considered to be neutral/slight adverse; this is considered to be not significant.

1.91 Overall the likely residual effect on the peat, River Faughan and Tributaries ASSI/SCI and the aquifer is considered to be not significant.

1.92 Implementation of the mitigation measures proposed would result in no significant cumulative or residual effects on the geological or hydrogeological environment as a result of the proposed development.

Hydrology Assessment

1.93 An assessment of the likely effects of the proposed wind farm on hydrology and surface water quality has been undertaken. The report identifies and assesses the potential effects on existing natural and artificial drainage patterns; runoff rates and volumes; flooding and impediments to flows; surface water dependant ecosystems, including hydrological units of blanket peat, and water quality of surface waters including abstractions.

1.94 Measures have been taken to minimise effects on surface water characteristics, with particular emphasis upon preservation of existing hydrology in the vicinity of blanket peat bog in order to avoid degradation of intact peat or further degradation of existing modified peat. Measures include:

- Structures requiring significant excavations have generally been located in areas where existing peat bog has been determined to be extensively affected by artificial drainage, in order to avoid potential adverse effects.
- Consideration has been given to routes, alignment, and proposed construction type of access tracks in the vicinity of blanket bog, in order to prevent creation of preferential flow routes by excavating through peat, and starvation of hydrological units of peat bog down slope of excavations. In particular, creation of contoured ditches on steeper slopes has been avoided in order to avoid the enhanced peat drainage effect anticipated from such a scenario.
- Use of floating-foundation-type access tracks are proposed wherever feasible in order to minimise cut tracks and associated drainage excavations likely to cause additional drainage to peat bog. Floating-type tracks allow retention of the surface.

1.95 Implementation of the mitigation proposed would result in no significant cumulative or residual effects to the receiving hydrological environment as a result of the proposed development.

Transport Assessment

1.96 An assessment of the predicted levels of traffic movements associated with the proposed wind farm has been undertaken. The main transport effects will be associated with the movements of commercial Heavy Goods Vehicles (HGVs) and Abnormal Loads to and from the site during the construction phase of the development. Once the wind farm is operational, it is envisaged that the amount of traffic associated with the scheme will be minimal, comprising service and maintenance visits.

1.97 The proposed access route for large turbine components (abnormal loads) will be from either Belfast or Derry before taking the A6 from either direction. From the A6 the vehicles would turn onto the Baranailt Road before turning left onto Craigatoke Road. They would follow the Craigatoke Road before turning left at the cross roads onto the Slaghtmanus Road and continue west to the site entrance.

1.98 The main traffic impacts are associated with the increase in vehicle movements along the Craigatoke and Slaghtmanus Roads during the construction stage of the project. 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. This is not considered to be a significant effect.

1.99 A Traffic Management Plan will be developed and agreed with the relevant stakeholders including local residents in order to control and mitigate impacts associated with vehicles movements.

1.100 Implementation of the mitigation measures proposed would result in no significant cumulative or residual effects on the road network as a result of the proposed development.

Electromagnetic Interference and Aviation Assessment

1.101 An assessment has been undertaken of the likely effects of the proposed Barr Cregg Wind Farm upon communication systems that use electromagnetic waves as the transmission medium and aviation systems.

1.102 No impact upon the microwave communications has been identified as mitigation has been applied through the continual design evolution of the turbine layout to avoid those areas where interference may be caused or where link operators have requested turbines are not situated.

1.103 The proposed development has been assessed through calculation and consultation as to its potential impact on all forms of relevant electromagnetic communications. Through applied and proposed mitigation the residual effect on such systems will be minimal.

1.104 The proposed development has been assessed through study and consultation as to its potential impact on aviation and military interests. This has shown that no impact is anticipated.

Shadow Flicker Assessment

1.105 Under certain combinations of geographical position, time of day, time of year & meteorological conditions, the sun may pass behind the turbine rotor and cast a shadow over neighbouring buildings' openings (i.e. windows and doors) where the contrast between light and shade is most noticeable. To a person within that room the shadow, depending on its intensity, may appear to flick on and off, giving rise to an effect referred to as shadow flicker.

1.106 A shadow flicker analysis has been undertaken assuming shadow flicker to occur up to or equal to 10 rotor diameters distant (based on best practice guidelines) from turbine locations (900m). It has been shown that for the worst case conditions, there are no instances of shadow flicker at dwellings within this distance.

Socio - Economic and Tourism Assessment

1.107 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.

1.108 The construction is expected to provide local employment opportunities for contractors with a workforce of between 10 – 40 persons over a period of 12 -18 months with an average of 20 jobs expected to be provided. During operation two full time jobs and one part time job will be created.

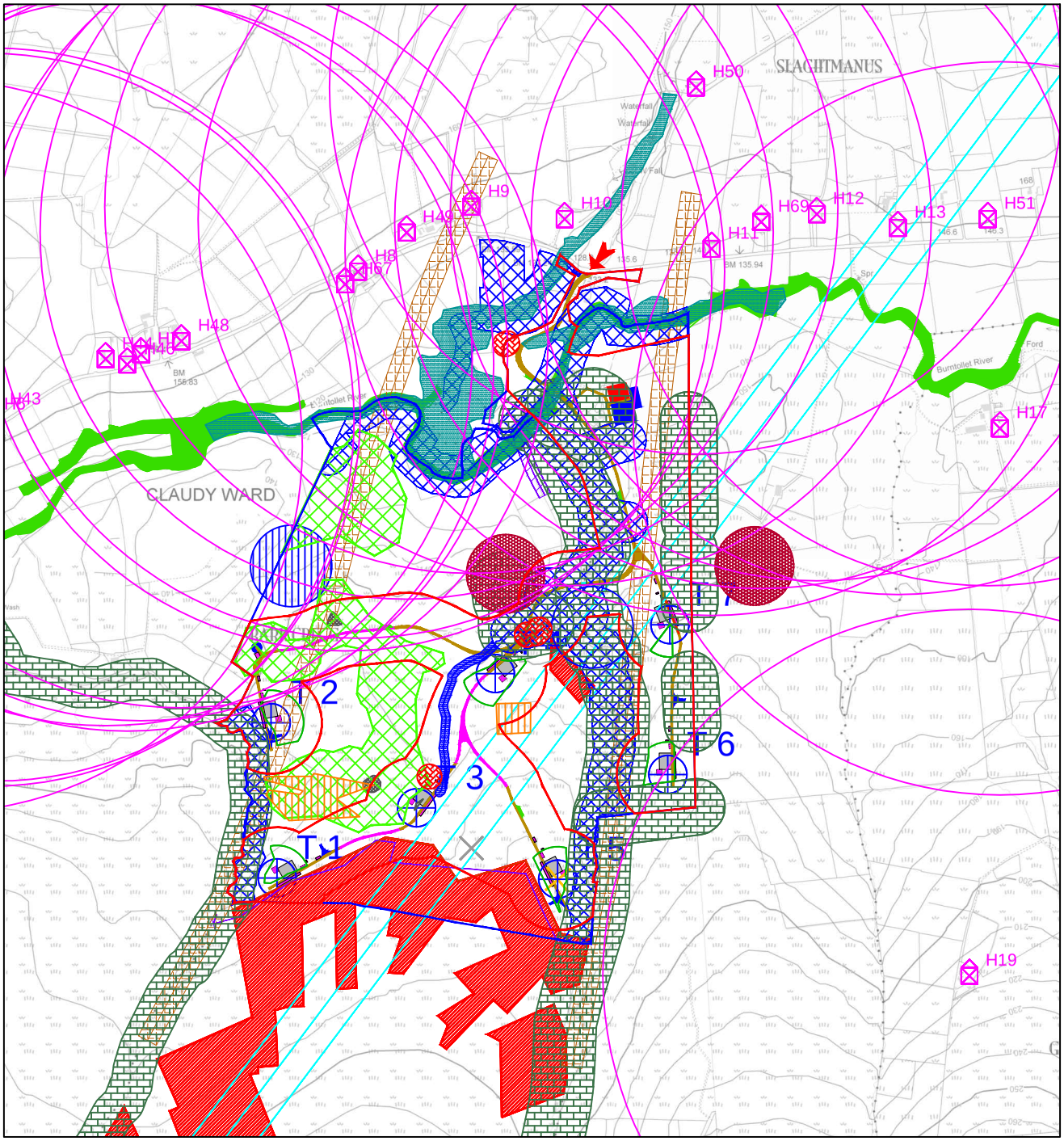
1.109 RES accepts that economic benefits to the local community are largely indirect, whilst environmental benefits, in terms of combating climate change, can be perceived as somewhat intangible and of more regional or national consequence.

1.110 Once operational the wind farm would pay rates of £4,000 per MW. For the proposed 12.6 MW wind farm this will equate to rates of £50,400 per annum with the total value of the fund over the lifetime of the project equating to £1,260,000

being paid to The Department of Finance & Personnel / Derry City Council, which will be used to pay for a wide range of services.

1.111 RES believes that the Community Fund is the most equitable and effective method of ensuring local benefit. It is most likely that the proposed Bar Cregg Community Fund would comprise a specially constituted Charitable Trust Fund. The Community Fund will be based on £2000 per MW for the 25 year lifetime of the project. Based on a 12.6 MW project this equates to a community fund of £26,200 per annum, with the total value of the fund over the lifetime of the project equating to £655,000. The impact is therefore beneficial and considered to be of minor significance.

1.112 Whilst the wind farm will not directly prevent the public from visiting the area surrounding the wind farm, there is the potential for indirect impacts on recreation and tourism due to perceived changes in the landscape and personal opinions relating to this type of development, however impacts upon tourism are not considered to be significant.



KEY

- PLANNING APPLICATION BOUNDARY
- LAND UNDER APPLICANT CONTROL
- OCCUPIED HOUSE 900M 10D BUFFER
- TURBARY FROM LAND REGISTRY MAPS
- ENVIRONMENTAL DESIGNATION: SAC & ASSI FAUGHAN RIVER & TRIBUTARIES
- WATER COURSE 50M BUFFER (DETAILED SURVEY)
- STRATEGIC FLOOD EXTENTS Q100 + 50M BUFFER
- ARTIFICIAL DRAINAGE 10M BUFFER
- RADIO COMMUNICATION LINK (JRC)
- BAT BUFFER TO TURBINE CENTRE (EQUIVALENT TO 50M FROM ANY BLADE)
- FENCE DEMARCATING TURBARY PLOTS
- SENSITIVE BLANKET BOG (DETAILED SURVEY)
- SUB-SURFACE REMOVED PEAT
- PEAT DEPTH GREATER THAN 3M
- BADGER SETT 30M
- GEOLOGICAL FAULT 25M BUFFER (APPROXIMATE)
- SAND MARTIN COLONIES 96.5M BUFFER
- SCHEDULED MONUMENT RECORD 100M BUFFER

INFRASTRUCTURE KEY

- WIND TURBINE LOCATION
- MICROSITING BUFFER (80M)
- SITE TRACKS (NEW EXCAVATED)
- SITE TRACKS (NEW FLOATED)
- CONTROL BUILDING & SUBSTATION COMPOUND
- METEOROLOGICAL MAST LOCATION (PERMANENT LATTICE TYPE)
- CLEAR SPAN WATERCOURSE CROSSING
- CRANE HARD STANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY PASSING PLACES & TURNING HEADS
- TEMPORARY CONSTRUCTION COMPOUND
- TEMPORARY ENABLING WORKS COMPOUND
- METEOROLOGICAL CALIBRATION REFERENCE MAST LOCATION
- METEOROLOGICAL CALIBRATION MAST LOCATION
- SITE ENTRANCE LOCATION

BARR CREGG WIND FARM

FIGURE 1.4

CONSTRAINTS & INFRASTRUCTURE LAYOUT

LAYOUT DWG	02381D1001-09	T-LAYOUT NO.	02381D0001-12

DRAWING NUMBER

02381D2103-04

SCALE - 15,000 @ A4

NON-TECHNICAL SUMMARY

Conclusion

1.113 The potential effects of the proposed Barr Cregg 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.

1.114 The Barr Cregg 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).