



TEMPORIS WIND

SUPPORTING STATEMENT

SINGLE WIND TURBINE AT CHAPEL FARM

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1 INTRODUCTION

1.1 Background

This Supporting Statement (SS) has been prepared by Arcus Renewable Energy Consulting Ltd ('Arcus') to support a planning application submitted to Barnsley Metropolitan Borough Council ('BMBC') by Temporis Wind ('the Applicant') for the development of a single medium scale 500kW wind turbine (the 'Development') at Chapel Farm, approximately 1 km north-west of Stocksbridge, South Yorkshire (the 'Application Site').

Planning permission is sought for:

- A single wind turbine up to 78 metres in height to blade tip (50 metres to hub with a rotor diameter of 56 metres).
- Associated infrastructure including: turbine foundations; crane hardstanding; pole mounted transformer and associated cabling; and access tracks to the site.

These elements are clearly shown in Planning Drawings 003 and 004 which accompany the planning application.

Planning Permission is sought for this Development for 25 years from the first generation of electricity on site, after which time the turbine will be removed and the site restored.

1.2 The Application Site

The Application Site lies approximately 1 km north-west of Stocksbridge in South Yorkshire as illustrated in Planning Drawing 001. The proposed turbine location lies at an elevation of approximately 290 m AOD.

The Application Site and surrounding area comprises of mixed (arable and pastoral) farmland. Tofts Lane runs to the north of the site and the A616 is present at a distance of approximately 600 m south.

The Application Site will be accessed off Tofts Lane onto a newly constructed access track which will pass over land within the control of the applicant.

The layout of the Development is shown in Planning Drawing 002 accompanying the planning application.

1.2.1 Site Identification

The possibility of installing a wind turbine at the Application Site was assessed as part of feasibility work carried out by Arcus in 2010. The feasibility work carried out assessed particular technical, environmental and aesthetic issues relating to landscape and visual impacts.

In technical terms, a number of factors were initially considered which included:

- Topography – the steepness of the land determines which parts of the site are most suitable for erecting a turbine;
- Existing infrastructure – local roads, Rights of Way, overhead or underground services, etc., that pass in close proximity to the Application Site, or through it, that require to be protected or safeguarded during construction and in the unlikely event of a structural failure during operation;
- Access – the means of accessing the Application Site via the local road network can influence the size of turbine that can be accommodated;
- Grid connection capacity and location – the means of carrying the power off-site and the electrical power that can be accommodated by the grid network in the area; and

- Proximity to housing – to safeguard the amenity of nearby properties from the potentially intrusive effects of the turbine, both visually and noise related.

In environmental terms, the capacity of the Application Site may be further affected by areas of sensitivity, which may limit or even preclude development. Issues considered at the Application Site included:

- Ecology and ornithology – valuable habitats and protected species of plants, animals and birds that may be present on the site, including the flight path of birds and bats;
- Cultural heritage – archaeological features that may be present on the site; and
- Other features – field boundaries, drainage ditches / watercourses.

In landscape and visual terms, the capacity of the Application Site relates to its ability to accommodate a wind turbine without creating unacceptable effects on the physical fabric of the site itself, on the character of the surrounding landscape and on views from surrounding areas. A number of landscape and visual design objectives were set out to guide the design process, as follows:

- Turbine position within the site should respond to prevailing wind resource;
- Turbine position within the site should relate to landform features, contours and boundaries in order to provide a landscape basis for a wind energy development;
- The Development should respond to the scale of the landform and be appropriate for the overall landscape scale;
- The Development should respond to the local landscape context, so that when it is seen, it forms a positive image, with a clear rationale for the turbines position, particularly from key local receptors (e.g. surrounding minor roads, footpath users, isolated properties and Peak District National Park);
- The turbine should be sited as far from local residential properties as practicable, whilst avoiding topographical constraints and seeking to minimise environmental effects on the wider landscape; and
- The overall visual intrusiveness of the Development should be minimised.

This feasibility work concluded that the site had the potential to accommodate a wind turbine and a Screening Opinion request was submitted to Barnsley Metropolitan Borough Council in November 2010. Confirmation was received from Barnsley Metropolitan Borough Council dated 17th December 2010 that the Development was considered not to constitute EIA development. The position of the turbine and the access track were finalised at this stage resulting in the current layout of the Development

The outcome of the study was that the most suitable location for the turbine was in the centre of the field to the south of Tofts Lane at an elevation of approximately 290 m above ordnance datum, as shown in Planning Drawings 001 and 002. The turbine has been sited in the centre of the field, maximising the distance from field boundaries and Tofts Lane. The turbine is located approximately 420 m from the closest residential property however, following a noise assessment, as discussed in Section 3.2.5.1 and Appendix 3, no noise issues are anticipated from the operation of the turbine. In order to effectively consider ecological effects a Phase I Habitat Survey was carried out at the Application Site and surrounds, as discussed in Section 3.2.2 and Appendix 2.

Given all of the above the proposed location of the turbine is considered to be the optimum location on the Application Site.

1.3 The Applicant

The Applicant is a local farmer and land-owner who wishes to generate renewable energy at Chapel Farm. The electricity produced will be sold to the national grid under the current government backed Feed-in-Tariff scheme. This development will contribute towards meeting

the UK renewable energy targets in a small but nonetheless important way; as is the intention of the Feed-in-Tariff scheme. The installation of a wind turbine at the site has been the result of a detailed feasibility study, and the Applicant has worked closely with Arcus to come up with the most appropriate proposal for the site which is discussed in detail later in this Statement.

1.4 The Proposed Development

The Application will consist of a single wind turbine and associated infrastructure, including the turbine foundations, onsite crane hardstandings and access tracks. Descriptions of each component of the Development are found below. The layout of the Development within the Application Site is shown in Planning Drawing 002.

1.4.1 Wind Turbine

The Applicant has identified a candidate turbine; the PowerWind500, the key statistics of which are:

- Hub height: 50 m;
- Rotor diameter: 56 m;
- Maximum tip height: 78 m;
- Number of blades: 3; and,
- Output rating: 500 kW.

The blades will be manufactured from glass fibre reinforced plastic and the hub from steel. The nacelle houses the gearbox and generator. Subject to agreement with BMBC, the finish and colour of the turbines is likely to be semi-matt and pale grey. A typical turbine is illustrated in Planning Drawing 003.

1.4.2 Turbine Foundations

The form of the wind turbine foundations will depend on site geology, turbine location, and the turbine manufacturer's ground-stiffness foundation criteria. Preliminary site survey work will be undertaken prior to construction to determine the condition of the ground and which type of turbine foundations will be suitable on site. The foundations will take the form of reinforced circular concrete foundations which will include a circular steel support plinth to suit the base profile of the tower section. Turbine foundations will be typically 8 m x 8 m. A typical turbine foundation area is illustrated in Planning Drawing 004.

1.4.3 Crane Hardstanding

An area of hard-standing will be required in order to provide a stable base on which to lay down the turbine components ready for assembly and erection and to site the crane necessary to lift the tower sections, the nacelle and rotor components into place.

The total area of hard-standing, situated adjacent to the turbine location, including the (turbine base) will be approximately 2,310 m² (55 m by 44 m). The hard standing will be constructed of layers of compacted crushed stone or recycled aggregate. A typical crane hardstanding area is illustrated in Planning Drawing 004.

The crane hardstanding area will be left in place following construction in order to allow for use of similar plant should components require to be replaced during the turbine operational period. The hard-standing will be covered over with topsoil with a geo-textile separator between the soil and the stone. The soil will be allowed to naturally re-vegetate.

In addition to the hard-standing, an area of cleared ground may be required as a component lay-down area.

1.4.4 Access Tracks

The location makes use of existing access roads as far as possible, requiring only 80 m of new track to be constructed. The new access track will need to be constructed from Tofts Lane to the proposed location of the turbine. To minimise disruption the existing farm access point into the field will be used.

Access tracks will comprise a geotextile base with crushed stone on top, to a depth appropriate for the ground conditions to which a running surface of higher quality finer graded stone will be applied. The bellmouth of the site entrance would be suitably surfaced. Details of access track construction are illustrated in Planning Drawing 004.

2 PRE-APPLICATION CONSULTATION

2.1 Telecommunications

Table 2.1 below outlines the pre-application consultations that have been carried out to assess the effects on telecommunications infrastructure:

Table 2.1 – Telecommunication Consultation

Consultee	Response
Joint Radio Company (JRC)	No objections
Atkins	No objections
Ofcom	Identified one fixed link - 0395819/1
Arqiva	No objections

The end co-ordinates of the fixed link identified by Ofcom were plotted and at its closest point the link was located approximately 160 m from the proposed turbine and so no effects on it from the Development are anticipated.

No objections were raised by the other consultees.

2.2 Aviation

Temporis commissioned aviation specialists Wind Power Aviation Consultants Ltd to assess the likely aviation issues associated with the proposal. Their radar projections are produced using specialist radar propagation prediction software called 'Rview'. Wind Power Aviation Consultants noted that Waddington and Linton on Ouse would both need to be checked with the MoD. The MoD were consulted on the proposed turbine and a response was received, dated the 20th December 2010, which stated that the MoD had no concerns with the proposal. The Claxby and Clee Hill NATS radars were projected but no issues were identified.

3 PLANNING POLICY FRAMEWORK

This section of the Supporting Statement reviews the key Development Plan policies and guidance which cover the site and relate specifically to the Development. The aim of the section is to establish the land use implications of the Development considering its compliance with the Development Plan and identifying other material considerations to be taken into cognisance during the determination process, including Supplementary Planning Guidance (SPG). Although no relevant SPG's were identified, a number of national policies are relevant and are looked upon as a key material consideration to the Development. These are discussed in Section 3.4.

The Planning and Compulsory Purchase Act 2004, section 38(6) states that:

"In dealing with such an application the authority shall have regard to the provisions of the development plan, so far as material to the application, and to any other material considerations."

Based on the above, the process for determining a planning application can therefore be defined as:

- Identification of the Key Provisions within the Development Plan relevant to the application;
- Consideration of the Key Provisions within the Development Plan relevant to the application;
- Identification of the relevant Material Considerations;
- Consideration of the relevant Material Considerations; and
- Conclusions on whether Planning Consent is justified.

The Development Plan for the site comprises:

- RSS Regional Spatial Strategy for Yorkshire and the Humber (2008) (RSS); and,
- Barnsley Unitary Development Plan (Adopted 2000) (Local Plan) (BUDP).

In addition to the above policy, Planning Policy Statement (PPS) 22 sets out the current Government policy on renewable energy and provides guidance to Local Authorities. PPS 22 and its Companion Guide will form a material consideration in the determination of this application.

In the BMBC Local Plan, the Application Site is designated as Greenbelt and an Area of Borough Landscape Value (non-statutory). The principle of the Development in relation to these designations, and other relevant local plan policies, is explored below.

3.1 Development Plan Policy Requirements

3.1.1 Consideration of the Principle of the Development

This section of the SS takes into account all policies within the Development Plan which relate to the Application Site and the development of a single wind turbine in BMBC.

3.1.1.1 Regional Spatial Strategy for Yorkshire and the Humber

Policy EN1 – Energy Generation – Local Authorities should encourage proposals for the use of renewable energy resources, including onshore wind power, subject to an assessment of their impact on:

- Landscape, visual amenity and areas of ecological or historic importance;
- Surrounding residents and other occupiers;
- Traffic implications, and proximity to transport infrastructure;
- Any additional transmission requirements.

The following should also be considered under the policy:

- The extent to which the proposal helps to achieve wider environmental benefits such as reducing harmful emissions to the atmosphere;
- The way in which the proposal assists in achieving national targets of new electricity generating capacity from renewable energy sources;
- The extent to which there has been community involvement in developing the proposal; and
- The extent to which the proposal supports other policies in the Development Plan.

Policy ENV5 – Energy - The Region will maximise improvements to energy efficiency and increases in renewable energy capacity by maximising renewable energy capacity. The following Regional and Sub-Regional targets are in place for installed grid-connected renewable energy capacity:

Table 3.1 – Regional and Sub Regional Renewable Energy Targets

Area	2010	2021
Humber	124MW	350MW
North Yorkshire	209MW	428MW
South Yorkshire	47MW	160MW
West Yorkshire	88MW	295MW
Offshore	240MW	630MW
Total	708MW	1862MW

There is a requirement for annual monitoring of planning permissions and developments against the indicative local authority targets for 2010 and 2021 and taking action accordingly in order to ensure the regional and sub-regional targets are exceeded.

Policy YH1 Overall approach and key spatial priorities states that growth and change will be managed across places and communities in Yorkshire and Humber in order to achieve a sustainable development pattern.

The RSS recognizes that a high quality environment is critical to the social, economic and environmental well-being of the Region.

"The region is particularly susceptible to a number of environmental threats such as coastal erosion, flooding, atmospheric pollution and soil degradation, as well as the multi-faceted impacts of climate change. Positive, responsible environment management will be vital to safeguard and improve our environment..."

Policy YH2 Climate Change and Resource Use specifies a requirement for plans and investment decisions to help meet the target set out in the Regional Economic Strategy to reduce greenhouse gas emissions in the Region in 2016 by 20-25% (compared to 1990 levels) by increasing renewable energy capacity, amongst other actions.

3.1.1.2 Barnsley Unitary Development Plan

Policy ES12 Wind Energy Generation - sets out the Council's approach to determining renewable energy applications and is supplemented by policies ES12A, ES12B and ES12C, which relate specifically to wind energy developments. Policy ES12 comprises criteria that will be considered when determining a renewable energy application. In summary, these are

- Visual amenity;
- Noise;
- Access and road safety;
- Ecology;
- Archaeology;
- Impact on agricultural land uses; and
- Shadow flicker.

Policies ES12A seeks to encourage appropriate design of wind turbines including the colour, Policy ES12B relates to the decommissioning of wind turbines and Policy ES12C relates to the safeguarding of wind flow at existing wind farm sites.

3.1.1.3 Commentary

The Development will generate energy from a renewable resource yet contribute no significant detrimental effects to the surrounding environment. The Development will also help meet government targets for CO₂ reduction. The Development is therefore fully supported in principle by Policies EN1, EN5, YH1 and YH2 of the RSS and Policy ES12 of the local plan.

The requirements of other relevant policies are addressed in Section 3.1.2 below.

3.1.2 Site Specific Policies

In the BMBC Local Plan, the Application Site is designated as Greenbelt and an Area of Borough Landscape Value (non-statutory). The site specific policy requirements are discussed below.

3.1.2.1 Barnsley Unitary Development Plan

Policy GS9 - Green belt - seeks to protect the visual amenity of the green belt.

Policy GS7 – Green belt - seeks to maintain the openness of the green belt and states a presumption against development which would conflict with this objective or with any of the uses of other land within the green belt.

Policy GS13 - Areas of Borough Landscape Value seeks to protect the areas of Landscape value within the Development Plan area.

3.1.2.2 National Policy - PPG2 Green Belts

The origins of Green Belt date back to 1935 when the Greater London Regional Planning Committee put forward a proposal "to provide a reserve supply of public open spaces and of recreational areas and to establish a Green Belt or girdle of open space". Green Belt was established outside London following a 1955 circular inviting local planning authorities to consider the establishment of Green Belts.

PPG 2 sets out the 5 purposes of including land within Green Belts, these are:

- To check unrestricted sprawl of large built up areas;
- To prevent neighbouring towns from merging into one another;
- To assist in safeguarding the countryside from encroachment;
- To preserve the setting and special character of historic towns; and
- To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.

PPG 2 sets out a presumption against inappropriate development which is by definition, harmful to the Green Belt indicating that it is for the applicant to show why permission should be granted. Planning permission will only be granted in "*very special circumstances*".

In respect of "other operations" and material land use change, paragraph 3.12 of PPG 2 states,

"The carrying out of such operations and the making of material changes in the use are inappropriate development unless they maintain openness and do not conflict with the purposes of including land in the Green Belt".

PPG 2 goes on to state that when any large scale development or redevelopment of land in the Green Belt, occurs (whether appropriate, or inappropriate development) it should "*so far as possible contribute to the achievement of the objectives for the use of land in Green Belts*". It goes on to state that the visual amenities of the Green Belt should "*not be injured by proposal for development within*" the Green Belt which although they wouldn't prejudice the

purposes of including land within the Green Belt may be visually detrimental by reason of their siting, materials or design.

3.1.2.3 Commentary

In order to determine whether the Development is acceptable or not it is first necessary to determine whether or not it is inappropriate development, as defined by PPG 2.

Wind turbines are not specifically mentioned in PPG 2, they would most likely however fall within the definition of engineering and other operations which is included. The principal consideration in determining whether development of this type is appropriate for the Green Belt is its effect on the openness of the Green Belt and on the purpose of the Green Belt.

In a recent appeal decision at Cliffs Farm, Mawdesley, Ormskirk¹ the Inspector concluded,

"I do not consider that the erection of turbines and associated equipment comes within the ambit of appropriate development as set out in national and [local] policy"

The Inspector goes on to explain that the openness of the Green Belt is affected as the turbine bases, towers and ancillary elements all occupy previously undeveloped land. The loss is however considered to be very modest in scale due to the small development footprint in the context of the large uninterrupted expanse of open land.

This position is supported by PPS 22: Renewable Energy which indicates that,

"When located in the Green Belt, elements of many renewable energy projects will comprise inappropriate development, which may impact on the openness of the Green Belt. Careful consideration will therefore need to be given to the visual impact of projects, and developers will need to demonstrate very special circumstances that clearly outweigh any harm by reason of inappropriateness and any other harm if projects are to proceed."

By virtue of the nature of the Development it could represent an inappropriate development. However, the introduction of a single tall structure to rolling lowland farmland, as a result of the gently undulating nature of the site and surrounding environs, with associated tree cover and scattered settlement, would have a limited effect on the openness of the Green Belt.

It is also necessary to consider whether there are "very special circumstances" that would justify the development. In particular there are two circumstances that require due consideration, namely locational need and the wider benefits of renewable energy.

Locational Need

Wind turbines have numerous requirements which dictate the areas within which they can be located. Principally, wind turbines require to be located within areas which have the following:

- Suitable wind speed;
- Free from obstruction that would affect wind flow;
- Large amount of available land (turbines will generally require an area in the region of up to 6 times the rotor diameter by 4 times the rotor diameter);
- Suitable road network for turbine component deliveries;
- Suitable ground conditions to support the structures;
- Availability of grid connection; and
- Suitable separation from residential property to avoid noise effects.

These requirements mean that turbines can generally not be accommodated in urban areas. As a consequence countryside locations are necessary for wind turbine developments and in some cases, such as this, it will include Green Belt locations.

¹ APP/D2320/A/08/2069152

Wider Benefits of Renewable Energy

PPS 22 states that in the case of renewable energy developments,

"very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources."

The Intergovernmental Panel on Climate Change makes clear in its Fourth Assessment Report (AR4) the need for urgent action to tackle climate change and provides a sound basis for developing the national and international response. The UK has so far adopted several policies and measures to tackle the issue, these responses are based on a range of findings including:

- Renewables Statement of Need, Energy Review, Annex D, 2006;
- Stern Review: The Economics of Climate Change, 2006;
- UK Renewable Energy Strategy Consultation, June – Sept 2008.

These documents establish the need for urgent action to tackle climate change. The Stern Review found that failure to act in relation to climate change would cost 5% of GDP in the UK whilst taking action to reduce these impacts would cost around 1% of GDP in the UK. The report acknowledges that the action which is taken over the next 10- 20 years is likely to have lasting impacts upon the climate over the next century.

The UK Renewable Energy Strategy Consultation consulted on a range of measures that could assist in meeting CO2 reduction targets, namely:

- *"extending and raising the level of the Renewables Obligation to encourage up to 30-35% of our electricity to come from renewable sources by 2020;*
- *introducing a new financial incentive mechanism to encourage a very large increase in renewable heat;*
- *delivering more effective financial support for small-scale heat and electricity technologies in homes and buildings;*
- *helping the planning system to deliver, by agreeing a clear deployment strategy at regional level similar to the approach established for housing;*
- *ensuring appropriate incentives for new electricity grid infrastructure and removing grid access as a barrier to renewable deployment;*
- *exploiting the full potential of energy from waste, by discouraging the landfilling of biomass as far as is practical;*
- *requiring all biofuels to meet strict sustainability criteria, to limit adverse impacts on food prices, or other social and environmental concerns;*
- *promoting the development of new renewable technologies, through effective support particularly where the UK has the potential to be a market leader; and*
- *maximising the benefits for UK business and jobs, by providing a clear long-term policy framework, working with Regional Development Agencies to tackle key blockages, considering support for specific technologies and addressing skills shortages."*

National planning policy has recently been updated to reflect the importance of tackling climate change issues. Planning Policy Statement: Planning and Climate Change, Supplement to Planning Policy Statement 1 states,

"This PPS on climate change supplements PPS 1 by setting out how planning should contribute to reducing emissions and stabilising climate change and take into account the unavoidable consequences".

The guide seeks to provide a positive policy environment for renewable and low carbon generation, particular reference is made to this in paragraph 19 which states:

"In developing their core strategy and supporting local development documents, planning authorities should provide a framework that promotes and encourages renewable and low carbon energy generation. Policies should be designed to promote and not restrict renewable and low-carbon energy and supporting infrastructure."

This is further supported by paragraph 20 which states:

"In particular, planning authorities should:

- not require applicants for energy development to demonstrate either the overall need for renewable energy and its distribution, nor question the energy justification for why a proposal for such development must be sited in a particular location;*
- ensure any local approach to protecting landscape and townscape is consistent with PPS 22 and does not preclude the supply of any type of renewable energy other than in the most exceptional circumstances;*
- alongside any criteria-based policy developed in line with PPS 22, consider identifying suitable areas for renewable and low-carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources, but in doing so take care to avoid stifling innovation including by rejecting proposals solely because they are outside areas identified for energy generation; and*
- expect a proportion of the energy supply of new development to be secured from decentralised and renewable or low-carbon energy sources"*

Summary

On balance the benefits derived from the Development in helping to off-set the impact of climate change would outweigh its very limited effect on the openness of the Green Belt. The potential off-setting of CO₂ emissions represents the very special circumstances which are required to outweigh any harm due to inappropriate development, and very limited effect on the openness of the Green Belt.

3.2 General Development Policies

A review of the Development Plan has highlighted the wide range of issues that require to be considered when determining the acceptability of the Development. These issues are considered below, with reference to the planning policy to which they relate.

3.2.1 Landscape

Policies YH1, YH9, E7 and ENV10 of the RSS and Policies ES12, WR12, GS13 and BE6 of the Local Plan are relevant for the Development and set out the protection of landscape quality.

The accompanying Zone of Theoretical Visibility (ZTV), as show in Planning Drawing 005, shows the extent of visibility of this Development. It should be borne in mind that ZTV maps show the worst case scenario and are theoretical tools used to assist in viewpoint selection, turbine selection and to illustrate the potential influence of the development within the wider landscape, however, they need to be qualified by the following constraints:

- ZTV maps are based on bare ground model data which is limited by the detail of the digital terrain model data used and does not take account of topographical variations or screening from built form or vegetation.
- Substantial areas are shown which suggest there is theoretical visibility from these locations, but as they are moorland, forestry or agricultural land, there is effectively no public presence within these areas and the likelihood of views being experienced is consequently low.

The Development is sufficiently small in scale to offer no detrimental effect to the local landscape or have any effect on the integrity of the Greenbelt and Area of Borough Landscape Value, within which it is proposed. A Landscape and Visual Impact Assessment, including a series of photomontages and wirelines of the Development within its surroundings from key viewpoints, as agreed with BMBC, has been produced and included in Appendix 1. It is considered that this assessment should provide sufficient information for BMBC to assist decision making and demonstrate how the turbine blends into the landscape.

3.2.2 Ecology and Ornithology

Policies ENV6 and ENV8 of the RSS and Policies ES12, GS15, GS16, GS17, GS18 and WR13 of the Local Plan are relevant for the Development and set out the protection of designated sites and protected species.

There are no internationally important nature conservation sites; no nationally important nature conservation sites; no regional or locally important nature conservation sites or national natural heritage designations either within or within close proximity to the Application Site.

A Phase I Habitat Survey (see Appendix 2) was conducted at and in the vicinity of the Application Site which identified:

- Effects to both statutory (as illustrated on Planning Drawing 006) and non-statutory designated sites are considered extremely unlikely given the intervening distances and lack of ecological connectivity between the survey area and these sites. In addition, the survey area is not considered to form an integral part of the local green infrastructure insofar as it is not publicly accessible and comprises mainly agricultural land use.
- The habitats throughout the survey area and immediate surrounds are of limited substantive ecological value. The Development is likely to cause the permanent loss of a small amount of improved grassland but this effect will have negligible ecological consequences. Dry stone walls may offer shelter for a limited diversity of small mammals, reptiles and invertebrates but construction will not directly affect these features.
- Brown hare were not recorded on site.
- There are no badger setts or other evidence of activity within the survey area and so disturbance of setts or harm to badgers is currently unlikely.
- The study area lacks any features considered to be of high value to roosting, foraging or commuting bats. In addition, the turbine is located more than 50 m (to blade tip) from surrounding dry stone walls – the only relatively valuable feature for bats in the area – and therefore exceeds the 50 m buffer recommended by Natural England TIN051².
- The site has limited potential to support bird species of high conservation concern throughout the year, with flight levels of target species considered likely to be extremely low. Proposed ground works might damage or destroy nesting birds and would therefore constitute an offence under the Wildlife and Countryside Act 1981 (as amended). To ensure that works are legally compliant, it is recommended that ground disturbance during the bird nesting season (March–August) is avoided or, if necessary, preceded by a nesting bird survey and delaying works until birds have fledged and nests no longer in use.

² Natural England (2009) *Bats and single large turbines – Joint Agencies Interim Guidance*. Natural England Technical Information Note TIN069.

Given the location and scale of the proposed turbines, nature of the receiving environment (agricultural land) and distance from designated sites, the Development is not considered to have an adverse effect on ecological interests.

3.2.3 Cultural Heritage

Policy ENV9 of the RSS and Policies ES12, BE1A, BE2, BE3 and BE4 of the Local Plan are relevant for the Development and set out the protection of listed buildings, archaeological sites and conservation areas.

The MAGIC website³ was interrogated for information pertaining to historic and built environment designations. There are no International or National Historic or Built Environment Designations either within or within close proximity to the Application Site. The only designated feature identified within a 2.5 km radius is a glass furnace at Bolsterstone, a designated scheduled monument, located 1.95 km south-east. Statutory designations have been plotted on a map as illustrated in Planning Drawing 006.

The Development is therefore not considered to have an adverse effect on this, or other similar interests.

3.2.4 Hydrology/ Flood Risk

Policies YH1, YH2, ENV1 and ENV2 of the RSS are relevant for the Development and set out the protection of water resources and flood risk. There are no specific policies relating to the hydrological environment within the BUDP.

The Development site is on an elevated position with a number of springs in the vicinity, the closest of which is located approximately 200 m northeast. The closest stream is a tributary to Spring Beck, located approximately 1 km west. A review of the Environment Agency flood risk maps⁴ for the site confirmed that the site is not located within a designated flood risk zone.

The Application Site lies outside all three EA Groundwater Source Protection Zones⁵ and the bedrock underlying the Development does not form a principal aquifer for potable supply.

There are no significant hydrological effects predicted as a result of the Development. The need for sustainable urban drainage systems will be negligible due to the small footprint of the Development.

3.2.5 Residential Amenity

3.2.5.1 Noise

Policies ES12, ES1 and ES13 of the Local Plan are relevant for the Development and set out the requirement for noise emissions and effects on residents to be considered.

Assessment of noise from operation of the Development has been carried out (see Appendix 3), following the recommendations of ETSU-R-97, the method of assessing wind turbine noise recommended by Government Guidance. The assessment covers two candidate turbines the Powerwind 500 and the EWT 500. No data exists for the EWT500 so as a worst case the larger EWT900 data was used.

Should a Powerwind 500 turbine be installed at the site, predicted maximum noise levels at all properties are below 35dB, $L_{A90, 10min}$ at wind speeds up to 10 ms^{-1} , therefore meeting the criteria for the simplified assessment method.

³ The MAGIC website. Available at <http://magic.defra.gov.uk/website/magic/> [Accessed 20/01/2011].

⁴ The EA Flood Risk Map [online] Available at: <http://maps.environment-agency.gov.uk/wiyby/wiybyController#x=424992&y=400524&lg=1,&scale=8> [Accessed on 20/01/2011].

⁵ The EA Groundwater Source Protection Zones Map [online] Available at: http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=drinkingwater&layerGroups=default&lang=_e&ep=map&scale=8&x=424992&y=400524 [Accessed on 20/01/2011].

Based upon the EWT-900 turbine, predicted noise levels at all properties due to operation of the Development are lower than the identified limits at wind speeds up to 12ms⁻¹.

It is therefore concluded that noise levels at all noise-sensitive properties, due to operation of either of the candidate turbines, would be acceptable in terms of the recommendations of ETSU-R-97. The impact of the Development upon residential amenity is considered to be not significant.

3.2.5.2 Shadow Flicker

Policy ES12 of the Local Plan is relevant for the Development and sets out the requirement for considering shadow flicker effects on residents.

Guidance presented within the Companion Guide to PPS 22⁶ describes shadow flicker as an effect that *"under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off. It only occurs inside buildings where the flicker appears through a narrow window opening."*

The flickering may have the potential to cause disturbance and annoyance to residents if it affects occupied rooms of a house. Persons with photosensitive epilepsy are usually sensitive to flickering light that is between 3 to 60 Hertz (Hz)⁷. The frequencies of flicker caused by modern wind turbines (less than 1 Hz)^{8,9} are well below the sensitive range. Therefore, any potential shadow flicker effects from the Development are purely an effect on residential amenity, rather than having the potential to affect the health or well-being of residents.

As shadow flicker only has the potential to occur during the operational phase of the Development, there would be no effect during construction.

The Companion Guide advises that the shadow flicker effect can only occur within 130 degrees either side of north relative to the turbine positions, as turbines do not cast long shadows on their southern side. It also advises that the effect is most likely to occur within 10 rotor diameters of the turbine position (10 rotor diameters is 560 m for this Development).

Although no formal guidance is available regarding what levels of shadow flicker may be considered acceptable in the UK, *Wind Energy Development Guidelines* published by the Ireland Department of the Environment, Heritage and Local Government (2006) states that, "It is recommended that shadow flicker at neighbouring offices and dwellings within 500m should not exceed 30 hours per year or 30 minutes per day."¹⁰

In the interest of a more detailed analysis, Resoft's WindFarm computer software package has been used to calculate theoretical annual durations and the area of potential effects.

This software creates a mathematical model of the Development and its surroundings based on:

- Turbine location, hub height and rotor diameter;
- Topography (obtained from ordnance survey land-form panorama elevation data on 50 m horizontal grid); and

⁶ Department of Local Communities and Government (2004) *Planning for Renewable Energy: A Companion Guide to PPS 22*, pp 177.

⁷ Epilepsy Action (2007) Photo-sensitive Epilepsy [online]. Available at: <http://www.epilepsy.org.uk/info/photo.html> [Accessed on 20/04/2010].

⁸ Epilepsy Action (2007) Other Possible Epilepsy Triggers [online]. Available at: http://www.epilepsy.org.uk/info/photo_other.html [Accessed on 20/04/2010].

⁹ ODPM (2004) *Planning for Renewable Energy: A Companion Guide to PPS 22*, pp 177.

¹⁰ The shadow flicker recommendations are based on research by Predac, a European Union sponsored organisation promoting best practice in energy use and supply which draws on experience from Belgium, Denmark, France, the Netherlands and Germany.

- Latitude and longitude of the Application Site (used in calculating the position of the sun in relation to time of day and year).

A cut off distance of 10 rotor diameters (560m) from the turbine was employed during the calculations.

Certain worst-case assumptions are also made in the calculation, including:

- Weather conditions are such that shadows are cast on every day of the year i.e. bright sunshine every day;
- The turbine rotor will always be facing directly towards a given window, maximising the size of the shadow and duration of the effect;
- The turbines will always be rotating; and
- There will not be intervening structures or vegetation (other than topography) that may restrict the visibility of a turbine, preventing or reducing the effect.

The area of potential effect calculated through the software package is shown in Planning Drawing 007.

Shadow flicker effects are only predicted to occur at one residential property, known as Dyson Cote, where predicted effects are expected to total 5 hours per year. The effect of the impact falls well below that considered significant by current available guidance as described above, being both below 30 hours per year or 30 minutes per day and further than 500m from the nearest turbine.

Therefore, shadow flicker effects as a result of the Development, at a single residential property, are not considered to be significant.

3.2.5.3 Television

No relevant policies were identified relating to television interference.

Consultation with the BBC via the online assessment tool¹¹ identified that from the proposed turbine location it is considered that 1,342 homes for whom there is no alternative analogue off-air service will be affected. The turbine is anticipated to affect up to 4,851 homes for whom there may be an alternative analogue off-air service. The transmitters likely to be affected are:

- Stocksbridge
- Emley Moor (Ch5)
- Emley Moor
- Oughtibridge
- Millhouse Grn

The proposal would have the potential to affect the television reception of residents, however given that the region is due to complete the switch from analogue to digital TV by September 2011, it is considered unlikely that there would be any affect by the time the consented turbine would be constructed and commissioned.

3.2.6 Public Rights of Way

No relevant policies were identified relating to Public Rights of Way.

A review of Ordnance Survey mapping identified public rights of way in the vicinity of the Development including:

¹¹ BBC (2010) *Windfarm Assessment Tool* [Online] Available at http://www.bbc.co.uk/reception/info/windfarm_tool.shtml. Accessed 20/01/2011

- Footpath linking Tofts Lane with Pond Farm – at its closest the footpath is 160 m northeast;
- Footpath linking Chapel Farm with Carr Head Farm - at its closest the footpath is 180 m west;
- Footpath along Mucky Lane – at its closest the footpath is 280 m east; and,
- National Trail – at its closest 440 m south.

There is anticipated to be no change to the continued operability of these footpaths and National Trail associated with the construction and operation of the proposed turbine.

From a safety point of view, the footpaths are also located far enough away from the turbine to pose a risk to users. The Technical Annex to PPS22¹² recommends a separation distance of 78 m from footpaths for this Development (topple distance). The proposed location of the turbine is well outside of this minimum distance.

3.2.7 Access

Policy ES12 of the Local Plan is relevant for the Development and sets out the requirement for access and road safety.

Access to the site would be taken from Tofts Lane. Approximately 80 m of new site access track will need to be built as there are currently no access tracks into the field in which the turbine is proposed to be sited. The track would have a nominal width of 5 m.

The turbine components are of sufficiently small size that they would be transported on vehicles with dimensions similar to those of conventional heavy goods vehicles, and therefore do not constitute 'abnormal loads'.

Given the nature of the Tofts Lane to the north of the Application Site, from which access will be taken, the small scale of the Development and the short term nature of the construction period (anticipated to be approximately 12-16 weeks), it is anticipated that construction traffic associated with the Development will have negligible traffic flow effects or associated environmental effects during construction.

Traffic generated during the operation phase of the Development will be limited to infrequent routine maintenance, and unplanned maintenance as required, and this is expected to produce less than 20 trips per year. As a result, no effects are anticipated.

3.2.8 Cumulative Considerations

The Development is considered to be at such a small scale that there would be no adverse cumulative effect with any existing or consented turbines within the immediate area.

3.2.9 Settlement Considerations

The Application Site is located approximately 1 km from the northern extent of Stocksbridge, which is the nearest settlement. The closest properties of Stocksbridge are industrial, with the closest residential properties located 1.1km southwest of the Application Site. It is therefore considered that any effect on this settlement will be negligible.

3.3 Assessment of the Development Plan

There are a wide range of policies that seek to provide varying levels of protection to resources in South Yorkshire. These place the highest level of protection on internationally and nationally designated sites and will consider development proposals in that context. At the regional and local levels, some protection is offered however there is general recognition

¹² Technical Annex to PPS22 Companion Guide Planning for Renewable Energy. Available at <http://www.communities.gov.uk/documents/planningandbuilding/pdf/147447.pdf> [Accessed on 16/02/2011]

that there are circumstances where development that adversely affects these resources may be considered to be acceptable due to the other associated benefits.

It is considered that the Development is compatible with the Development Plan policies by:

- Not impacting on surface water features as the closest water feature is a spring 200 m northeast of the proposed turbine. There are considered to be no impacts on the quality and quantity of water supplies associated with the construction and operation of the wind turbine.
- There are no sites designated for their ecological value within, or within close proximity of the Application Site. A Phase I Habitat Survey was carried out at the site which did not identify any potential for protected species and as a result the Development it is not considered to have an adverse effect on ecological features.
- There are no International or National Historic or Built Environment Designations either within or within close proximity to the Application Site. The only designated feature identified within a 2.5 km radius is a glass furnace at Bolsterstone, a designated scheduled monument, located 1.95 km south-east. The Development is therefore not considered to have an adverse effect on this, or other similar interests.
- The Development fits well into the existing landscape: The turbine is non-intrusive and fits well in the surrounding area and will therefore not have an intrusive or detrimental impact on the surrounding landscape. A series of photomontages and wirelines showing the turbine in the surrounding landscape, from key viewpoints, will be produced and submitted to BMBC.
- The Development has a need to be located within the countryside due to the nature of wind turbines which have numerous requirements which dictate the areas within which they can be located. Principally, wind turbines require to be located within areas which have the following:
 - Suitable wind speed;
 - Free from obstruction that would affect wind flow;
 - Large amount of available land (turbines will generally require an area in the region of up to 6 times the rotor diameter by 4 times the rotor diameter);
 - Suitable road network for turbine component deliveries;
 - Suitable ground conditions to support the structures;
 - Availability of grid connection; and
 - Suitable separation from residential property to avoid noise effects.

An urban environment would commonly not be appropriate predominately from a space and wind flow perspective. A location in the countryside enables access to all of the above thus making the Application Site suitable for the Development.

- The Application Site is located approximately 1 km from the northern extent of Stocksbridge, which is the nearest settlement. Given the size of the proposed turbine, and distance from Stocksbridge, it is considered that any effect on this settlement will be negligible. Other residential properties that are located closer include individual farmsteads. Noise and shadow flicker assessments have been carried out which identified no residential amenity effects.
- Wind turbines create no atmospheric pollution during operation, and no effects on local air quality are anticipated. During construction there is the potential for vehicle exhaust emissions and dust. However, given the short term nature of the construction period, distance to nearest residential properties and the high degree of dispersion, no air quality effects are anticipated.

3.4 Material Considerations

There are a range of material considerations that will be taken into account when determining this application. This section sets out national planning policy and guidance that is considered to be material in the consideration and determination of this planning application.

3.4.1 Planning Policy Guidance and Planning Policy Statements

Planning Policy Statements (PPSs) provide guidance to Local Authorities and others on planning policy and the operation of the planning system. They also explain the relationship between planning policies which have an important bearing on issues of development and land use. Local Authorities must take their contents into account in preparing their Development Plans and in considering planning applications where appropriate. A summary of relevant PPSs is provided below along with a brief outline of their key principles. Government policy on renewable energy is outlined in PPS 22: Renewable Energy.

3.4.1.1 PPS 22: Renewable Energy (2004)¹³ and Planning for Renewable Energy a Companion Guide to PPS 22¹⁴

PPS 22 considers all renewable energy developments, regardless of scale or technology, as stated below:

"Small-scale projects can provide a limited but valuable contribution to overall outputs of renewable energy and to meeting energy needs both locally and nationally. Planning authorities should not therefore reject planning applications simply because the level of output is small."

PPS 22 also advises that any installed capacity targets are to be expressed as a minimum rather than a maximum, and should be kept under review.

3.4.1.2 PPS 1: Delivering Sustainable Development (2005)¹⁵ and Planning and Climate Change: A Supplement to PPS 1 (December 2007)¹⁶

PPS 1 advises that policies contained within each PPS should be classed as material considerations, however the policies within PPS 1 should take precedence where existing PPSs place less emphasis on climate change. This also applies to Development Plan Policies which pre-date this PPS.

The document highlights that developers should not be required to demonstrate the overall need for renewable energy, and that any approach to protect the landscape is consistent with PPS 22.

3.4.1.3 Other National Policy

The following additional Planning Policy Statements are also relevant to this Development:

- PPS 5: Planning for the Historic Environment (2010)¹⁷,
- PPG 24: Planning and Noise (1994)¹⁸; and,

¹³ Planning Policy Statement 22: Renewable Energy [online] Available at:

<http://www.communities.gov.uk/publications/planningandbuilding/pps22> [Accessed 13/01/2011].

¹⁴ Planning for Renewable Energy: A Companion Guide to PPS22. [online] Available at:

<http://www.communities.gov.uk/publications/planningandbuilding/planningrenewable> [Accessed 13/01/2011].

¹⁵ Planning Policy Statement 1: Delivering Sustainable Development [online] Available at:

<http://www.communities.gov.uk/publications/planningandbuilding/planningpolycystatement1> [Accessed 13/01/2011].

¹⁶ Planning Policy Statement: Planning and Climate Change - Supplement to Planning Policy Statement 1 [online] Available at:

<http://www.communities.gov.uk/publications/planningandbuilding/ppsclimatechange> [Accessed 13/01/2011].

¹⁷ Planning Policy Statement 5: Planning for the Historic Environment [online] Available at:

<http://www.communities.gov.uk/documents/planningandbuilding/pdf/1514132.pdf> [Accessed 13/01/2011].

- PPS 25: Development and Flood Risk (2006)¹⁹.

3.4.2 Climate Change Act 2008 and Renewable Energy Strategy 2009

The United Kingdom is obliged to reduce its greenhouse gas emissions (principally carbon dioxide; CO₂) by 12.5 % by 2008-2012, based on 1990 emission levels. This is a requirement of the Framework Convention on Climate Change, otherwise known as the Kyoto Protocol²⁰.

Latest estimates show that in 2008, the net UK CO₂ emissions²¹ were 10.5% below 1990 levels, 2 % lower than 2007^{22,23}. Further action is required for the UK to curb CO₂ emissions over the next few years if the Government's targets are to be met.

The Development would help further reduce the CO₂ emissions by generating electricity from renewable sources and help meet government targets for CO₂ reduction.

3.4.3 Renewables Statement of Need

In July 2006, the UK Energy Review was published by the Department of Trade and Industry. Annex D contains "The Renewables Statement of Need". This document states:

"New renewable projects may not always appear to convey any particular local benefit, but they provide crucial national benefits. Individual renewable projects are part of a growing proportion of low-carbon generation that provides benefits shared by all communities both through reduced emissions and more diverse supplies of energy, which helps the reliability of our supplies. This factor is a material consideration to which all participants in the planning system should give significant weight when considering renewable proposals. These wider benefits are not always immediately visible to the specific locality in which the project is sited. However, the benefits to society and the wider economy as a whole are significant and this must be reflected in the weight given to these considerations by decision makers in reaching their decisions."

This Development contributes to the National objective of increasing renewable energy production, therefore fulfilling the Statement of Need.

¹⁸ Planning Policy Guidance 24: Planning and Noise [online] Available at: <http://www.communities.gov.uk/planningandbuilding/planningsystem/planningpolicy/planningpolicystatements/ppg24/> [Accessed 13/01/2011].

¹⁹ Planning Policy Statement 25: Development and Flood Risk [online] Available at: <http://www.communities.gov.uk/documents/planningandbuilding/pdf/planningpolicystatement25.pdf> [Accessed 13/01/2011].

²⁰ European Commission 2010 *The Kyoto Protocol* [online] Available at <http://ec.europa.eu/environment/climat/kyoto.htm> [Accessed 13/01/2011].

²¹ CO₂ emissions contribute to 70% of the potential global warming effect of anthropogenic emissions of greenhouse gases and in the UK the CO₂ accounts for about 85 % of the total greenhouse gas emissions. [online] Available at: <http://www.berr.gov.uk/files/file50671.pdf> [Accessed 13/01/2011].

²² MtCO₂e/yr = Millions of tonnes of carbon dioxide equivalent emitter per year

²³ DECC (2009) *Special Feature – CO₂ Emissions* [online]. Available at <http://www.berr.gov.uk/files/file50671.pdf> [Accessed on 13/01/2011].

4 CONCLUSIONS

After considering all the relevant policies, it has been established that the Development convincingly complies with the relevant Development Plan policies. As this Supporting Statement demonstrates, due to the size and scale of the single turbine Development, all potential effects that may occur are either insignificant or negligible, ensuring compliance with all Development Plan policies. Additionally, there are several material considerations which support the Development and provide significant justification for the Development being permitted.

The Development site is situated within an area of landscape designated as an Area of Borough Landscape Value, a non statutory designation, and Greenbelt. Considerable care has been taken in the design of the Development to avoid unacceptable environmental effects whilst ensuring that the site can make a contribution to the UK's requirement for renewable energy generation from a secure, domestic source. It is considered that the wider benefits of the Development outweigh the largely localised and temporary landscape effects.

The Development will add up to 500 kW of electricity generating capacity from renewable sources, and in doing so, contribute to regional and national renewable energy targets, specifically those which aim to reduce greenhouse gas emissions and alleviate the effects of climate change.

Taking into account all policies relevant to the Development and material considerations, the Development is in compliance with the overriding aims and objectives of these policies and as such it is requested that consent is granted for the Development.

APPENDIX 1

Landscape and Visual Impact Assessment

Prepared by



1 INTRODUCTION

This Landscape and Visual Impact Assessment has been prepared by e*SCAPE Urbanists and presents the findings of the landscape and visual impact assessment and the anticipated effect of the proposed Chapel Farm Wind Turbine (78 m to blade tip single turbine development) upon local landscape character and visual amenity.

The landscape and visual assessment is divided into four main subsections:

- **Assessment Methodology** - An explanation of the methodology and significant criteria employed for the landscape and visual assessment.
- **Baseline Conditions** - *Landscape* - A description of the existing landscape and visual status is recorded under baseline conditions. The data reviewed includes recording existing landscape features, characteristics, designations and the value and importance of the landscape and visual resources within the vicinity of the Site. This data is used as a benchmark to predict how the fabric, character and quality of the landscape may be affected by the introduction of the Single Wind Turbine. *Visual Amenity* - The baseline establishes the area of study for visual assessment within which all or part of the proposed turbine may be visible. This is established with reference to computer generated visibility maps, such as ZTV, (Zones of Theoretical Visibility), Topography and Scope of Study Area. These are then checked in the field and used to identify six representative viewpoints.
- **Potential Impacts and Cumulative Impacts** - An assessment of potential effects on the landscape and visual amenity is undertaken to assess the likely impact and effects associated with construction and operation of the proposed turbine. Simultaneously, a cumulative landscape and visual effects assessment is undertaken to establish whether there are circumstances where there could be any cumulative effects upon the landscape and visual amenity as a result of the single turbine being viewed in conjunction with other similar wind turbine energy developments. These could be either operational, under construction, consented or subject to an application for planning consent.
- **Mitigation Measures and Conclusion** - Mitigation measures are considered and described where appropriate; however, these are limited due to the nature of the proposed structure. The study closes with a conclusion regarding the acceptability of the proposed turbine in landscape and visual terms.

2 ASSESSMENT METHODOLOGY

In this assessment, the following distinction is made between landscape and visual effects: Landscape effects are defined as physical changes in the fabric, character and quality of the landscape as a result of the proposed development; whereas, visual effects are defined as changes in views of the landscape resulting from the proposed development and the effects of those changes on visual receptors from viewpoints within the defined visual impact area around the site.

The format of this assessment is primarily based on the principles described in "The Landscape Institute and Institute of Environmental Management and Assessment Guidelines for Landscape and Visual Impact Assessment, Second Edition, published 2002"

The assessment is also in accordance with the requirements of the Town and Country Planning (Environmental Impact Assessment) (England & Wales) Regulations 1999. The LVIA is influenced by the best practice and guidance put forward in the documents published by Scottish Natural Heritage:

- Guidelines on the Environmental Impact of Wind farms and Small Scale Hydro Electric Schemes (Ref. 6-9);
- Visual Representation of Wind farms. Good Practice Guidance (SNH 2006) (Ref. 6-10);
- Cumulative effect of wind farms (Ref. 6-11);

Reference on the specific landscape character of the area was gained from the published documents issued by Natural England: 'JCA 51 Dark Peak' and 'JCA 37 Yorkshire Southern Peak Fringe', and Barnsley Borough Landscape Character Assessment produced in 2002 by Environmental Consultancy University of Sheffield and Land Use Consultants

A desktop study was carried out of the published information to establish the landscape context of the site and to verify potential viewpoints, agreed by the LPA, to assess what likely impact the development may have on the visual quality of the views. The agreed amount of viewpoints were photographed and converted into before and after wireframes or photomontages using 3D software to express the likely impacts on the visual amenity. These viewpoints will be selected to capture an overall representation of the typical receptors within the locality. Other, general viewpoints are commented on in the Baseline section.

The development site and surrounding areas were visited in April 2011 for the assessment of the initial proposals and verification of the potential viewpoints. Photographs were taken on each of these days as a record of the visit and further photographs for the photomontages were taken later on 2nd May 2011. The weather conditions were good, being lightly overcast in the mornings becoming sunny in the afternoon. Short, medium and long views out of and into the site were achieved.

Preliminary discussions and email correspondence were undertaken with the Planning Department of Barnsley Metropolitan Borough Council to discuss the optimum and sensitive viewpoints within the locality. The landscape and visual assessment is based on a 7.5 km study area, which is broad enough to assess the potential impacts within the landscape bordered by the M1 and the Peak District and this helped to generate a list of potential viewpoints in conjunction with findings of the baseline report.

2.1 Landscape and visual assessment

The **landscape impact assessment** describes the likely nature and scale of changes on individual landscape elements known as 'receptors' and the resultant effect on the landscape character due to the proposed development. The extent to which a landscape can accommodate change due to development varies according to a range of factors such as land use, the scale and pattern of the landscape, visual enclosure, the quality of view and the value of the landscape. Changes to the fabric and character of a particular landscape may affect the perceived value of that landscape, giving rise to changes in its quality. The scale or magnitude of landscape effects ranges from negligible, through minor to moderate and major. Such changes are usually described as either adverse or beneficial, but as there is no substantial landscape mitigation that can be applied due to the height of the turbines all impacts should be judged as varying degrees of adverse.

The **assessment of visual affects** describes the changes in the visual character of available views and in the visual amenity of local receptors arising from the development. The sensitivity of visual receptors and views will be dependent on the context of the view, the importance of the view and the nature of the receptor. The scale or magnitude of visual change is affected by scale, the degree of contrast, the permanence of the effect, angle of view, distance and the extent of change.

A cumulative assessment has been carried out to consider the proximity of the existing wind farm at Spicer Hill; however, it is highly unlikely that the proposed single turbine will be seen in conjunction with the existing turbines. The Spicer Hill Wind Farm is too far away for the single wind turbine of this proposal to be considered as an extension to it, but it is cumulatively considered as part of the landscape and visual effects of the proposed development.

The initial focus has been on a radius of approximately 5km from the application site as it is generally considered that observers further away than 5 km are unable to perceive detail. However, the potential for effects, (such as changes to skyline) at greater distances are also considered.

We have visited the site to define the extent of visibility both within and outside the site. We then tested the viewpoints that were selected to represent views from the most commonly used locations in and around the site. The existing views from each of these points are briefly described.

The areas within which any of the activities of the proposed development, be they temporary or permanent, are likely to be visible is known as the Zone of Theoretical Visibility (ZTV). Computer techniques are available for establishing a ZTV based on topographic information but for predominantly flat landscapes these tend to be theoretical and are sometimes better established by fieldwork. For this proposal the ZTV was established by computer generated plans and then tested through fieldwork during the site visits.

Viewpoints are selected on the basis of which locations provide the clearest views of the site and are also the most accessible to the public. Some viewpoints also represent areas which may be perceived to be sensitive to the visual impact of the proposed development due to their nature or proximity, but which in reality have restricted views of the site.

The following qualifications, however, apply to the ZTV:

- There may be a number of areas from which there is the potential to view part of or the entire proposed turbine but these are from areas which are not publically accessible and to which it is unlikely that they gain regular access, e.g. farmland and private property.

- The ZTV does not account for obstructions to the view such as buildings, minor changes in the terrain and vegetation cover such as woodland and hedgerows, all of which may influence the degree of visibility of the proposed development.
- The ZTV does not account for the likely orientation of a viewer, for instance, whether they are static or travelling in a moving vehicle such as a car.

Nevertheless, the ZTV is a valuable tool in determining the visibility of the proposal but it tends to over estimate the degree of visibility. To overcome this, extensive field surveys have been undertaken during the daytime, to verify the ZTV.

2.2 Significance Criteria

The potential significance of landscape and visual impacts is determined by a combination of the magnitude of the potential impact and the sensitivity of the receptor to change. These two variables can be correlated as illustrated in Table A, below. Thus, a landscape impact of low magnitude may nevertheless be assessed to have a moderate impact in a highly sensitive landscape such as an AONB or a National Park. In general the following principles apply:

- Properties/settlements and roads are considered to be of medium sensitivity, apart from when located in AONB's, National Parks and LGV's etc, whereby they will be considered as High. Also, places of historic and cultural significance are deemed to be of high sensitivity. Industrial landscapes and suchlike are considered to be of low sensitivity.
- The magnitude is determined by the distance from the viewer, the extent of change in the field of vision, the proportion or number of views affected during the duration of each from each viewpoint, or a sequence of viewpoints that may have transient views (e.g. along a road).
- Greater weight is given to visual impacts on public viewpoints than on private properties.

Table A - Principles of Assessing Significance of Landscape and Visual Impacts

Sensitivity/ Magnitude	Low	Medium*	High
Negligible	Negligible Impact	Minor Impact	Moderate Impact
Slight	Negligible/Minor Impact	Minor/Moderate Impact	Moderate/Major Impact
Moderate	Minor Impact	Moderate Impact	Major Impact
Substantial	Minor/Moderate Impact	Moderate/Major Impact	Major/Maximum Impact
Severe	Moderate Impact	Major Impact	Maximum Impact

The above consideration of the sensitivity of the receptors with the magnitude of the potential impacts provides an overall assessment of the potential significance of impacts. However, this process is not a quantitative process; there is not an absolute scoring system. Instead, the correlation of the two factors, although reflecting recognised features and methods of working outlined in this report, is in the end a matter of professional judgment.

Table B, below, provides a brief definition of the full range of significance criteria.

Table B - Significance criteria for landscape and visual impacts

Significance	Definition
Negligible	The proposed scheme is appropriate in its context. It may be difficult to differentiate from its surroundings and would affect very few or no receptors.
Minor	The proposed scheme would cause a barely perceptible impact, and would affect few receptors.
Moderate	The proposed scheme would cause a noticeable difference to the landscape, and would affect several receptors.
Major	The proposed scheme would cause an obvious change to the character and/or appearance of the landscape for a long period of time or permanently. It would affect many receptors.

These ratings reflect the existing site condition but also the nature and scale of the proposed development. The visual impacts arising from visual changes in the appearance of the landscape associated with the development and perceived by the visual receptor may be beneficial or adverse and are assigned a significance rating.

2.3 Assessing Visual Receptor Sensitivity

Visual receptor sensitivity is assessed using a three-point scale from low, medium, to high. The definitions are:

- High – Residents experiencing principal views from dwellings, recreational users focussing on high quality landscape (walkers, cyclists) on footpaths/cycleways, people experiencing views from important landscape features of physical, cultural or historic interest, beauty spots and picnic areas.
- Medium – Road users and train passengers with views of affected landscape, residents experiencing secondary views, users of secondary footpaths/cycleways through recreational countryside experiencing views, outdoor recreational users focussing on activity (golf, shooting, sailing).
- Low – Workers, users of facilities and commercial buildings (indoors) experiencing views from building.

3 BASELINE CONDITIONS

3.1 Site Conditions

The proposed development site is located in a field off Tofts Lane, situated just to the north of Stocksbridge, South Yorkshire. The area is recognised as Greenbelt and has been identified as such in the Screening Opinion issued by Barnsley Planning Authority.

There are a number of farmsteads and single residential dwellings in the area and substantial open grass areas surround the site. The topography climbs progressively towards the top of a ridge south of the site. There is the presence of woodland that offers some screening to the north and other copses and hedgerow trees within the vicinity provide further, if rather sporadic, screening. A large electricity substation is located in the adjacent field to the east of the proposed site. The application site area is approximately 0.47 hectares, although the footprint of the turbine foundations is only 64m². See Planning Drawings 001, 002 and 004.

The proposed development is for the erection of a single wind turbine 78m to blade tip, with a hub height of 50m, and associated access roads, crane standings and cable trenching.

3.2 Landscape Character Designations

The study area lies within the Natural England Joint Character Area no 37, (JCA 37 Yorkshire Southern Peak Fringe. The general character of this area is described as follows:

"The upland plateau drops down from west to east and is deeply dissected by a series of rivers, notably the Don, the Calder, the Hebble Brook and the Colne in the north and the Sheaf, Rivelin and Loxley in the south near Sheffield. These rivers have created a deeply dissected landscape with high plateaux cut by steep-sided valleys. Patterns of settlement have been strongly influenced by this dominant land form, combined with the historical development of the textile industry and other local industries. Mills and factories, and their associated towns and transport routes, have been mainly confined to the valley bottoms and slopes where they have often spread in a linear form".

Significantly it is accepted that there has been a traditional presence of tall structures within this area that offer a positive aspect to waymarking and legibility within the landscape: *"Tall mill chimneys often act as a focal point in each valley while terraces of stone-built houses are packed into the valley bottoms and spread up the hillsides."*

The key characteristics of this area are:

- *Eastern slopes of the Pennines, dropping from upland in the west down to the east, dissected by numerous steep-sided valleys.*
- *Extensive urban influences from the matrix of large and small towns.*
- *Close conjunction of large-scale industry, urban areas and transport routes with open countryside.*
- *Predominance of local sandstone and 'gritstone' as a building material notably in large and dominant industrial buildings.*
- *Urban development mainly confined by valleys creating dramatic interplay of views between settlements and the surrounding hillsides.*
- *Predominantly pastoral farming with strong linear patterns of walled enclosures on plateaux.*
- *Predominantly broadleaved woodlands on steep valley sides forming important backdrops to industrialised areas.*

- *Impression of a well-wooded landscape even though tree cover is relatively sparse overall.*
- *Dense network of roads, canals and railways.*

The following description offers comment on the pressures of the changing countryside:

3.3 Changing countryside

The section on the changing countryside highlights the pressures on the landscape through changes in land use. It makes reference to the opportunities of introducing wind turbines into the landscape, albeit with a slightly negative undertone:

- *The traditional industries of wool and textiles, steel making and heavy engineering have declined but the area is still under pressure for further urban development including housing, new types of industry and transport routes.*
- *The higher land provides opportunities for wind turbines and communications masts. These, along with pylon lines and other tall structures, can add to the visual clutter which tends to be characteristic of much of the area.*

3.4 Barnsley Borough Landscape Character assessment

A localised study has also been carried out in the form of the Barnsley Borough Landscape Character Assessment produced in 2002 by Environmental Consultancy University of Sheffield and Land Use Consultants.

The study describes the character areas of Barnsley and the proposed turbine sits in Character Area F2. This assesses the character of the landscape around Penistone and the wider area within the vicinity of the proposed turbine.

The General Characteristics of the landscape are described as following:

- *Stepped landform rising to 364m at Hartcliffe Hill.*
- *Fields of pasture comprising small to medium geometric field units strongly defined by distinctive stone walls.*
- *Linear or circular beech plantations stand out on the skyline, sometimes enclosed by stone walls.*
- *Unimproved pasture with scrub on steeper slopes. Scattered farmsteads of local light coloured stone.*
- *Penistone is the largest settlement in the area, lying on the edge of the Don Valley.*
- *Isolated trees form silhouettes against the skyline.*
- *Pylons and power lines are visually prominent on the skyline.*
- *Single lane rural roads criss-cross the open countryside, bounded by stone walls.*
- *Disused industrial quarries, shafts and mines indicate the historical importance of the area for the extraction of coal and stone.*
- *Panoramic views over adjacent river valleys and towards the open moorland of the Peak District National Park.*

The proposed single wind turbine will be visible from a number of locations within the vicinity and the ZTV plan, see Planning Drawing 005, shows in greater detail the potential visibility of the turbine in the area and the following section provides an overview from the site.

3.5 Visual Assessment - Zone of Theoretical Visibility

The single wind turbine sits at an approximate elevation of 285m above ordnance datum (AOD) and the blade tip is 78 m at its highest point. The hub is the main focus that tends to catch the viewers eye and this is situated at a height of 50m. Generally, the long-range dominance of the ZTV lies to the northwest of the site, but it will be generally viewed from all around, out to approximately 4kms.

3.5.1 ZTV to the north of the site

Views to the immediate north takes in the Chapel Farm farmstead and beyond that the southern edges of Penistone and Cubley are visible. Views to the northeast capture the western edges of Thurgoland and Oxbridge. The 'Trans-Pennine trail route 6,' travels near to the turbine on a path from the north to east of the area. It is likely that a number of views of the turbine will be obtained on various points along the trail, however, it is mostly enclosed by landscape screening and building lines.

The ZTV suggests that some long-range views from the wind farm on Spicer Hill could be achieved but these have been discounted in the field due to various plantations and woodlands, as well as Penistone and Cubley, which will provide a screen from eye level. Also, these hills are some 7-8 kms away and it would be very difficult to see a single wind turbine with the naked eye from this distance.

3.5.2 ZTV to the east of the site

Views in and out of the River Don Valley are mostly outside of the ZTV due to the topography and woodland on the hillside running down to the river.

3.5.3 ZTV to the west of the site

There are long-range views of the site across the area described as Penistone Upland Farmland in the Barnsley Landscape Character Study.¹

3.5.4 ZTV to the south of the site

The town of Stocksbridge lies to the immediate south of the proposed site and the ZTV suggests that the southern edge of the town along with the rising hills towards Ewden Village will gain views of the proposed turbine in localised places.

The Underbank Reservoir has no official public access, apart from the Outdoor Pursuits Centre, and potential views of the proposed turbine are restricted due to the nature of the topography and vegetation on the slopes leading up to the turbine. There is a public footpath that travels through part of the reservoir leading up to Claypits Lane.

Medium range views can be gained from the main road from the Woodhead Pass to the M1, A616, in certain places, such as when passing the northern edge of the Underbank Reservoir and Stocksbridge.

Generally, the proposed single wind turbine will be visible from a number of receptors within the area. Receptors have been identified through both desk study and field work and are summarised in Table C below. The significant receptors have been used as a basis for identifying the viewpoints. These are numbered and are shown on Figure 7–Viewpoint Locations Map. For this study we consider that six viewpoints will be sufficient to capture an

¹ *Barnsley Borough Landscape Character Assessment produced in 2002 by Environmental Consultancy University of Sheffield and Land Use Consultants*

overall representation of the likely visual impact on the landscape and surrounding visual amenity.

Table C – Significant Viewpoint/Visual Receptor

Ref	Viewpoint	Approx distance from site	Viewpoint Coordinates
V1	View northwest from the track at Mucky Lane, which will also capture the receptor of Barnsley Boundary Walk south. This is representative of public rights of way and isolated farmsteads in the close vicinity of the proposed turbine.	377m	426196, 399665
V2	View from Long Lane and public footpath.	2660m	424483, 397959
V3	View looking southwest from Cubley. Penistone Boundary Walk at Mortimer Road.	2407m	424614, 401897
V4	View from the A629 heading north out of Thurgoland. Distant view of the proposed turbine over the valley.	2713m	428561, 401268
V5	View from the edge of Green Moor village looking west.	2337m	428410, 399468
V6	View from Claypits Lane, Stocksbridge, edge of Underbank Reservoir.	1422m	425238, 398941

4 POTENTIAL IMPACTS

The nature and magnitude of landscape and visual impacts will change during the construction and development process. Some impacts may be severe but short term whereas others are minor impacts with residual effects, which may be of a permanent nature. In addition, some impacts could be significantly mitigated by landscape and other measures, which will have benefit in the longer term. Potential impacts that may occur during the stages of this development are summarised below.

Short term impacts are those that occur during the construction period. These are considered as follows:

- Site access, delivery and traffic movements
- Earthworks and materials stockpiles
- Construction equipment and plant
- Utilities, including water and lighting
- Temporary parking
- Site compound and accommodation
- Additional noise
- Additional mud to roads

Medium term impacts are those that occur on completion of the works:

- Presence of built structures
- Storage areas and plant
- Stockpiles of materials/products

Long term impacts are considered on a scale of 15 years following the completion of the works, and can be considered as residual impacts. Residual impacts are similar to the impacts on completion but may be partially or wholly mitigated by proposed landscape infrastructure, site management and other development proposals. However, the height of the turbine is restrictive when it comes to implementing significant landscape infrastructure. The residual impacts represent the long-term impacts of the development following the implementation of any landscape mitigation measures. Therefore the likely residual impacts after 15 years following completion are likely to be as described in the viewpoint assessment below.

4.1 Nature of works

Part of the development site will be cleared of vegetation, topsoil and subsoil, which will be stored for re-use as appropriate. The site will then be excavated to form new levels for the turbine. The turbine will be set at approximately the same level as the existing ground level. The construction period is likely to last approximately 12-16 weeks. During that time there will be site accommodation cabins, construction vehicles and building materials located within the development site, and impacts will be contained to the immediate locality.

4.2 Viewpoint Assessment

4.2.1 Viewpoint 1: Barnsley Boundary Walk at Mucky Lane (See Figure 1) - Distance from Proposed Turbine – 375m.

The viewpoint is located on the track that heads northwards and at a junction with the Barnsley Boundary Walk, at a height of 263 m AOD, at grid coordinates 426196, 399665. It represents the views obtained by users of the track and footpaths.

4.2.1.1 *Landscape Effects*

The existing view northwards looks uphill over farmland. Field patterns are easily distinguishable, demarcated by gritstone walls and hedgerows with sporadic mature trees. No farm buildings or residential properties are visible from this viewpoint, but there are a number of manmade elements captured within the view, in the form of large pylons with high voltage cables that run along the valley to the main substation that is adjacent to the site.

The predicted view of the turbine can be seen in the wireframe in viewpoint 1 and shows that the upper half will be fully visible from this viewpoint. The upper half of the supporting column and the three blades will pass above the horizon line and the hub height of 50 m will be visible. The turbine is likely to be of a neutral colour, such as light grey, and this will help the blades to be less obtrusive against the skyline. The turbine will provide a fresh introduction of a development of this nature into this landscape, but it provides more sculptural elegance as a structure than the adjacent pylons also located within this vicinity. The slim profile and colouration of the turbine produces an effect that is not totally incongruous within the landscape, and especially against the skyline, and therefore the turbine will be relatively insignificant in the wider landscape.

4.2.1.2 *Landscape Sensitivity*

The viewpoint is located within the Penistone Upland Farmland², character type and the Landscape Character assessment considers, "landscape sensitivity to built development is judged to be high and landscape capacity is considered to be low". The strength of character has been described as 'strong', due to the nature of the landscape fabric that is defined by the stone boundary walls and open field patterns. It is a large-scale open landscape containing a network of man-made structures, (Pylons and cables).

The report comments on the landscape's sensitivity to development and seems to be referring to large-scale residential or industrial schemes. From visiting the area in the field we believe the landscape sensitivity to be more in keeping with a Medium grade rather than high. We assign High grade to landscapes that possess national designations such as AONB and LGV etc; however, we note that the site is within Greenbelt. We also believe that this landscape has the capacity to accommodate small-scale development, such as the proposed single turbine.

4.2.1.3 *Magnitude and Significance of Landscape Effects*

The magnitude of change resulting from the proposed single turbine is considered to be moderate due to the condition of the landscape and its capacity to accommodate the change. The existing effects of the man-made elements, such as pylons, and the broad expanse of the landscape help to influence this. The viewpoint in Figure 1 illustrates how the single turbine can sit within the field with little impact due to the scale of the surrounding landscape. The significance of the landscape effects is therefore of a moderate impact. This acknowledges that the proposed turbine will make a noticeable change to the landscape character, fabric and quality of the landscape and affect a number of receptors within the vicinity.

4.2.1.4 *Visual Effects*

The main receptors from this view are from walkers using the local public footpaths and therefore this view will have medium receptor sensitivity. Views of the turbine will be achievable from Barnsley Boundary Walk and the track of Mucky Lane.

² Barnsley Borough Landscape Character Assessment produced in 2002 by Environmental Consultancy University of Sheffield and Land Use Consultants – F2 Penistone Upland farmland page 189

4.2.1.5 Magnitude and Significance of Visual Effects

It has been established that the proposed single wind turbine is visible from the footpath; however, the visual effects experienced by these walkers constitute a slight magnitude of change, as the view is already interrupted with the presence of pylons and columns. The significance of the visual effects is of minor impact. This acknowledges that the view from this vantage point will be obviously changed by the introduction of the single turbine but will be viewed amongst the other existing structures in the viewpoint.

4.2.2 Viewpoint 2: Junction of Long Lane and public footpath (See Figure 2) Distance from Proposed Turbine – 2660 m.

The viewpoint is located where Wind Hill Lane merges into Long Lane. There is a lay-by adjacent to the start of a public footpath. The view is taken at 331 m AOD, at grid coordinates 424483,397959. It represents the views obtained by walkers who use a locally well-known footpath network that leads out into open countryside. It also represents views from the closest edge of the Peak District National Park.

4.2.2.1 Landscape Effects

The existing view forms a panorama over open farmland across the tops of the two sides of the Little Don River Valley. The pylons feeding cables to the substation adjacent to the site can be clearly seen on the horizon. The view consists of green fields that are broken up by low hedgerows and sporadic clumps of trees. Woodlands are quite prolific in this view but the openness of the landscape character is dominant.

The predicted view of the turbine can be seen in the wireframe (Figure 2a) and photomontage of view (Figure 2b) and shows that the blades, hub and upper portion of the supporting column will be visible over the ridgeline. The proposed turbine will merge with the existing pylons on the skyline. The turbine is likely to be of a neutral colour, such as light grey, and this will help the blades to be virtually unperceivable against the skyline. Therefore the turbine will not be very intrusive within the wider landscape.

4.2.2.2 Landscape Sensitivity

The viewpoint is located outside of the Barnsley Landscape Character Assessment but possesses similar qualities to those described as F2 Upland Farmland. It is true to the description of JCA 37³ outlined in the Section 3.0 Baseline of this report. From assessment in the field we have graded the sensitivity of this landscape as medium.

4.2.2.3 Magnitude and Significance of Landscape Effects

The magnitude of change is considered to be slight as the proposed turbine is not highly visible from this distance and set amongst existing pylons. The significance of the visual effects is of a minor impact and therefore the proposed scheme would cause a barely perceptible impact, and would affect few receptors.

4.2.2.4 Visual Effects

The main receptors from this view are walkers on the public footpath and road users of Long Lane. Therefore the receptor sensitivity is considered to be medium. Views of the proposed turbine will be gained on the horizon and the top blades, hub and upper column of the proposed turbine will be just visible from this viewpoint as seen in the computer-generated wireframe in Figure 2a. It will be visible amongst the existing pylons on the horizon;

³ *Natural England: 'JCA 37 Yorkshire Southern Peak Fringe'.*

however, due to the light colour of the proposed turbine it should be capable of being accommodated within the large open scale of the landscape.

4.2.2.5 Magnitude and Significance of Visual Effects

As the proposed turbine is barely visible an effect of slight is recorded as the magnitude of change. The significance of visual effects is minor and this acknowledges that the view from this vantage point would cause a barely perceptible impact, and would affect few receptors.

4.2.3 Viewpoint 3: View looking southwest from Cubley (See Figure 3) Distance from Proposed Turbine – 2407 m

The viewpoint is located on the southwest edge of Cubley and also represents views from the southern edge of Penistone. The viewpoint is taken from the junction of Penistone Boundary Walk and Mortimer Road at 262 m AOD, grid coordinates 424614, 401897.

4.2.3.1 Landscape Effects

The existing view is across farmland and the pylons feeding cables to the substation adjacent to the site can be clearly seen on the horizon. The view consists of green fields that are broken up by low hedgerows and sporadic clumps of trees.

The predicted view of the turbine can be seen in the wireframe in viewpoint 3 and shows that only the top blade will be visible over the ridgeline. The hub and supporting column will be screened by the ridge and trees on the horizon. The turbine is likely to be of a neutral colour, such as light grey, and this will help the blades to be virtually unperceivable against the skyline. Therefore the turbine will not be intrusive within the wider landscape.

4.2.3.2 Landscape Sensitivity

The viewpoint is located within the Penistone Upland Farmland⁴, character type and the report considers this, "landscape sensitivity to built development is judged to be high and landscape capacity is considered to be low". The strength of character has been described as 'strong', due to the nature of the landscape fabric that is defined by the stone boundary walls and open field patterns. It is a large-scale open landscape containing a network of man-made structures, (Pylons and cables).

From visiting the area in the field, we believe the landscape sensitivity to be more in keeping with a Medium grade. We would assign High grade to landscapes that possess national designations such as AONB and AGLV etc. We also believe that this landscape has the capacity to contain small-scale development, such as the proposed single turbine.

4.2.3.3 Magnitude and Significance of Landscape Effects

The magnitude of change resulting from the proposed single turbine is considered to be negligible due to the condition of the landscape and its capacity to accommodate the change. The existing effects of the man-made elements, such as pylons, and the broad expanse of the landscape help to influence this. The computer generated wireframe viewpoint illustrates how the single turbine will be barely perceivable within the scale of the surrounding landscape. The significance of the landscape effects is therefore of a minor impact. This acknowledges that the proposed turbine will make a barely perceivable change to the landscape character, fabric and quality of the landscape and affect very few of the receptors within the vicinity.

⁴ Barnsley Borough Landscape Character Assessment produced in 2002 by Environmental Consultancy University of Sheffield and Land Use Consultants – F2 Penistone Upland farmland page 189

4.2.3.4 *Visual Effects*

The main receptors from this view are from walkers on the Penistone Boundary Walk, Mortimer Road and the residents of the properties on the southern edges of Penistone and Cubley. The top blades of the proposed turbine will be just visible from this viewpoint and will be accommodated within the large open scale of the landscape. Therefore the receptor sensitivity is considered to be medium.

4.2.3.5 *Magnitude and Significance of Visual Effects*

As the proposed turbine will be accommodated within the large-scale landscape an effect of negligible is recorded as the magnitude of change. The significance of visual effects is therefore minor impact and this acknowledges that the view from this vantage point would cause a barely perceptible impact, and would affect few receptors.

4.2.4 Viewpoint 4: Thurgoland-Junction on A629 and B6462 (See Figure 4) Distance from Proposed Turbine – 2713 m

The viewpoint is located on the western edge of Thurgoland looking southwest, at 240 m AOD, at grid coordinates 428561, 401268. It represents the views obtained by residents of Thurgoland and travellers on the main linking road from Huddersfield to Sheffield (A629).

The existing view looks westwards out towards the distant hills of Snowden Hill. Farm buildings dominate the foreground along with roadside hedges. The views beyond into the middleground and long distance contain the characteristic field patterns that are easily distinguishable by gritstone walls, hedgerows and sporadic mature trees. The pylons that lead into the adjacent substation are clearly seen travelling along the horizon.

The predicted view of the turbine can be seen in the computer generated wireframe in Figure 4 and shows that the blades, hub and upper portion of the supporting column will be visible over the ridgeline. The proposed turbine will merge with the existing pylons on the skyline. The turbine is likely to be of a neutral colour, such as light grey, and this will help the blades to be virtually unperceivable against the skyline. Therefore the turbine will not be intrusive within the wider landscape.

4.2.4.1 *Landscape Effects*

The existing view looks westwards out towards the distant hills of Snowden Hill. Farm buildings dominate the foreground along with roadside hedges. The views beyond into the middleground and long distance contain the characteristic field patterns that are easily distinguishable by gritstone walls, hedgerows and sporadic mature trees. The pylons that lead into the adjacent substation are clearly seen travelling along the horizon.

The predicted view of the turbine can be seen in the computer generated wireframe in viewpoint 4 and shows that the blades, hub and upper portion of the supporting column will be visible over the ridgeline. The proposed turbine will merge with the existing pylons on the skyline. The turbine is likely to be of a neutral colour, such as light grey, and this will help the blades to be virtually unperceivable against the skyline. Therefore the turbine will not be intrusive within the wider landscape.

4.2.4.2 *Landscape Sensitivity*

The viewpoint is located within the Penistone Upland Farmland⁵, character type and the report considers the, "landscape sensitivity to built development is judged to be high and

⁵ *Barnsley Borough Landscape Character Assessment produced in 2002 by Environmental Consultancy University of Sheffield and Land Use Consultants – F2 Penistone Upland farmland page 189*

landscape capacity is considered to be low". The strength of character has been described as 'strong', due to the nature of the landscape fabric that is defined by the stone boundary walls and open field patterns. It is a large-scale open landscape containing a network of man-made structures, (Pylons and cables).

From visiting the area in the field, we believe the landscape sensitivity to be more in keeping with a Medium grade. We would assign High grade to landscapes that possess national designations such as AONB and AGLV etc. We also believe that this landscape has the capacity to contain small-scale development, such as the proposed single turbine.

4.2.4.3 Magnitude and Significance of Landscape Effects

The magnitude of change is considered to be slight as the proposed turbine is not highly visible from this distance and set amongst existing pylons. The significance of the visual effects is of a minor impact and therefore the proposed scheme would cause a barely perceptible impact, and would affect few receptors.

4.2.4.4 Visual Effects

The main receptors from this view are residents to the western edge of Thurgoland and the road users of the A629. Therefore the receptor sensitivity is considered to be medium. Views of the proposed turbine will be gained on the horizon and the top blades, hub and upper column of the proposed turbine will be just visible from this viewpoint, as shown in the computer generated wireframe of Figure 4, however, it should be capable of being accommodated within the large open scale of the landscape.

4.2.4.5 Magnitude and Significance of Visual Effects

As the proposed turbine is barely visible an effect of slight is recorded as the magnitude of change. The significance of visual effects is minor and this acknowledges that the view from this vantage point would cause a barely perceptible impact, and would affect few receptors.

4.2.5 Viewpoint 5: Green Moor Village (See Figure 5a and b) Distance from Proposed Turbine – 2337 m

The viewpoint is located on the western edge of Green Moor Village looking to the west, at 251 m AOD, at grid coordinates 428410, 399468. It represents the views obtained by residents of Green Moor Village and travellers on the minor Green Moor Road.

4.2.5.1 Landscape Effects

The existing view looks westwards out towards the distant hills of Snowden Hill. Residential buildings are dominant in the immediate foreground along with roadside stonewalls and hedges. Lampposts and telegraph create a substantial amount of visual clutter in this view. The views beyond into the middle ground and long distance contain the characteristic field patterns that are easily distinguishable by gritstone walls, hedgerows and sporadic mature trees. The pylons that lead into the adjacent substation are clearly seen travelling along the horizon.

The predicted view of the turbine can be seen in the computer-generated wireframe in Figure 5a and the photomontage shown in Figure 5b. These illustrate that the blades, hub and upper portion of the supporting column will be visible over the ridgeline. The proposed turbine will merge with the existing pylons on the skyline. The turbine is likely to be of a neutral colour, such as light grey, and this will help the blades to be virtually unperceivable against the skyline. Therefore the turbine will not be intrusive within the wider landscape.

4.2.5.2 Landscape Sensitivity

The viewpoint is located within the Penistone Upland Farmland⁶, character type and the report considers the, "landscape sensitivity to built development is judged to be high and landscape capacity is considered to be low". The strength of character has been described as 'strong', due to the nature of the landscape fabric that is defined by the stone boundary walls and open field patterns. It is a large-scale open landscape containing a network of man-made structures, (Pylons and cables).

From visiting the area in the field, we believe the landscape sensitivity to be more in keeping with a Medium grade. We would assign High grade to landscapes that possess national designations such as AONB and AGLV etc. We also believe that this landscape has the capacity to contain small-scale development, such as the proposed single turbine.

4.2.5.3 Magnitude and Significance of Landscape Effects

The magnitude of change is considered to be negligible as the proposed turbine is barely visible from this distance and set amongst existing pylons and partially obscured by vegetation. The significance of the visual effects is of a minor impact and therefore the proposed scheme would cause a barely perceptible impact, and would affect few receptors.

4.2.5.4 Visual Effects

The main receptors from this view are residents to the western edge of Green Moor Village and the road users of Green Moor Road. Therefore the receptor sensitivity is considered to be medium. Views of the proposed turbine will be gained on the horizon and the top blades, hub and upper column of the proposed turbine will be just visible from this viewpoint, as shown in the computer generated wireframe of Figure 5a and photomontage of Figure 5b, however, it should be capable of being accommodated within the large open scale of the landscape.

4.2.5.5 Magnitude and Significance of Visual Effects

As the proposed turbine is barely visible an effect of negligible is recorded as the magnitude of change. The significance of visual effects is minor and this acknowledges that the view from this vantage point would cause a barely perceptible impact, and would affect few receptors.

4.2.6 Viewpoint 6: Claypits Lane, Stocksbridge (See Figure 6) Distance from Proposed Turbine – 1422 m

The viewpoint is located on the road adjacent to the southeast corner of the Underbank Reservoir. The lane merges into Sunny Moor Lane and on the western edge of Stocksbridge. It is with the proximity of a public footpath leading to the reservoir. The view is taken at 180 m AOD, at grid coordinates 425238,398941. It represents the views obtained by recreational walkers who use a locally well-known footpath network that leads out into open countryside. It also represents views from the western edge of Stocksbridge.

4.2.6.1 Landscape Effects

The existing view captures the residential edge of Stocksbridge combined with the treelined road of Claypits Lane, looking across the top of the Little Don River Valley. The pylons feeding cables to the substation adjacent to the site can be clearly seen on the horizon. The view consists of hills of green fields that are broken up by low hedgerows and sporadic

⁶ Barnsley Borough Landscape Character Assessment produced in 2002 by Environmental Consultancy University of Sheffield and Land Use Consultants – F2 Penistone Upland farmland page 189

clumps of trees. Woodlands are quite prolific leading up from the valley in this view but the openness of the landscape character is clearly distinguished. A cluster of buildings belonging to Briery Busk Farm is visible on the northern valley hillside.

The predicted view of the turbine can be seen in the wireframe (Figure 6) and shows that the blades, hub and upper portion of the supporting column will be visible over the ridgeline. The proposed turbine will merge with the existing pylons on the skyline. The turbine is likely to be of a neutral colour, such as light grey, and this will help the blades to be virtually unperceivable against the skyline. Therefore the turbine will not be very intrusive within the wider landscape.

4.2.6.2 Landscape Sensitivity

The viewpoint is located within the Penistone Upland Farmland⁷, character type and the report considers this, "landscape sensitivity to built development is judged to be high and landscape capacity is considered to be low". The strength of character has been described as 'strong', due to the nature of the landscape fabric that is defined by the stone boundary walls and open field patterns. It is a large-scale open landscape containing a network of man-made structures, (Pylons and cables).

From visiting the area in the field, we believe the landscape sensitivity to be more in keeping with a Medium grade. We would assign High grade to landscapes that possess national designations such as AONB and AGLV etc. We also believe that this landscape has the capacity to contain small-scale development, such as the proposed single turbine.

4.2.6.3 Magnitude and Significance of Landscape Effects

The magnitude of change resulting from the proposed single turbine is considered to be slight due to the condition of the landscape and its capacity to accommodate the change. The existing effects of the man-made elements, such as pylons, and the broad expanse of the landscape help to influence this. The viewpoint illustrates how the single turbine can sit within the broader view with little impact due to the scale of the surrounding landscape. The significance of the visual effects is of a minor impact and therefore the proposed scheme would cause a barely perceptible impact, and would affect few receptors within the vicinity.

Visual Effects

The main receptors from this view are residents to the western edge of Stocksbridge, walkers on the public footpath network and the road users of Claypits Lane. Therefore the receptor sensitivity is considered to be medium. Views of the proposed turbine will be gained on the horizon and the top blades, hub and upper column of the proposed turbine will be just visible from this viewpoint, as shown in the computer-generated wireframe of Figure 6. However, the single wind turbine should be capable of being accommodated within the large open scale of the landscape.

4.2.6.4 Magnitude and Significance of Visual Effects

As the proposed turbine is barely visible an effect of slight is recorded as the magnitude of change. The significance of visual effects is minor and this acknowledges that the view from this vantage point would cause a barely perceptible impact, and would affect few receptors.

⁷ *Barnsley Borough Landscape Character Assessment produced in 2002 by Environmental Consultancy University of Sheffield and Land Use Consultants – F2 Penistone Upland farmland page 189*

4.3 Impact Significance Summary

Table D summarises the significance of the impacts on the landscape and visual amenity.

Table D Significance of impact on Landscape and Visual Amenity

Viewpoint	Landscape Impact Assessment			Visual Impact Assessment		
	Sensitivity of Landscape	Magnitude of Change	Significance of Landscape Effects	Receptor Sensitivity	Magnitude of change	Significance of Visual Effects
VP1 - Track at Mucky Lane, which will also capture the receptor of Barnsley Boundary Walk.	<i>Medium</i>	<i>moderate</i>	<i>Moderate Impact</i>	<i>Medium</i>	<i>Slight</i>	<i>Minor Impact</i>
VP2 - View from Long Lane and public footpath.	<i>Medium</i>	<i>Slight</i>	<i>Minor Impact</i>	<i>Medium</i>	<i>Slight</i>	<i>Minor Impact</i>
VP3 - View from Cubley and Penistone.	<i>Medium</i>	<i>Negligible</i>	<i>Minor Impact</i>	<i>Medium</i>	<i>Negligible</i>	<i>Minor Impact</i>
VP4 - View from the A629 at Thurgoland.	<i>Medium</i>	<i>Slight</i>	<i>Minor Impact</i>	<i>Medium</i>	<i>Slight</i>	<i>Minor Impact</i>
VP5 - View from the edge of Green Moor village looking west.	<i>Medium</i>	<i>Negligible</i>	<i>Minor Impact</i>	<i>Medium</i>	<i>Negligible</i>	<i>Minor Impact</i>
VP6 - View from Claypits Lane, (Edge of Underbank Reservoir).	<i>Medium</i>	<i>Slight</i>	<i>Minor Impact</i>	<i>Medium</i>	<i>Slight</i>	<i>Minor Impact</i>

5 MITIGATION AND CONCLUSIONS

The study concludes that the turbine is a new introduction to an already modified rural landscape. It has also demonstrated that generally the landscape within the area of Stocksbridge and Penistone, South Yorkshire is capable of absorbing a certain degree of change. There are a number of manmade objects and features within the landscape, such as dwellings, farm buildings and pylons. The scale and nature of the proposed turbine is such that it will not be obviously visible from a large part of the surrounding area and this is helped considerably by the slim line design and light grey in colour of its component parts. The ancillary buildings can also be of a sympathetic colour, such as green but this will need to be approved by the LPA.

It is unlikely that the proposed turbine will be viewed collectively with the wind farm of Spicer Hill and therefore there is considered to be no cumulative effect of impacts with this development.

The installation of the turbine is mostly adverse to the localised site but generally non-obtrusive to the broader landscape, with construction limited to access roads and temporary site buildings and equipment.

The predicted views of the study shows that the introduction of a development of this nature into this landscape provides a structure that possesses more sculptural elegance than the adjacent pylons also located within this vicinity. The turbine is likely to be of a neutral colour, such as light grey, and this will help the blades to be less obtrusive against the skyline. In a majority of locations only the upper portion will be fully visible in the landscape and seen amongst the other man-made objects such as pylons. The slim profile and colouration of the turbine produces an effect that is not totally incongruous within the landscape, and especially against the skyline, and therefore the turbine will be relatively insignificant within the wider landscape.

The 'significance of impact on Landscape and Visual Amenity,' concludes that the proposed turbine will have an impact on the landscape that ranges from mostly minor to moderate and therefore should be able to accommodate the change generated from the proposed development.

The existing woodlands and hedgerow trees within the locality offer substantial screening of the turbine for all ranges of views. Many of the typical receptors, such as the Trans-Pennine Trail and public footpaths are enclosed with heavy vegetation and therefore obscure views to the wider landscape.

APPENDIX 2

Ecology Appraisal

1 INTRODUCTION

1.1 Background

Arcus Renewable Energy Consulting Ltd (Arcus) was appointed by Temporis Wind to undertake an appraisal of ecological interests in relation to this proposed wind development near Stocksbridge, Barnsley. The Development comprises a single wind turbine measuring 78 m to blade tip and associated access track and substation. Full details are provided with the Supporting Statement.

The Application Site is located in the Coal Measures Natural Area. This Natural Area is characterised by its mosaic of urban and natural features; a network of towns and cities and many ancient woodlands, valley wetlands and large arable fields. The Application Site and its surrounds are typical of the intensive arable farming practices in the area.

This report describes and evaluates the nature conservation interest of the Application Site and immediately surrounding area, in terms of habitats, species and designated sites. The ecological implications of the Development are assessed in terms of legislation and planning policy and recommendations are made, where necessary, to ensure that the Development progresses in a way that is consistent with these policies.

1.2 Structure of Report

This report is structured into the following sections:

- *Relevant Legislation and Policy* – Summary of the legislation and planning policy that is relevant to wildlife and nature conservation.
- *Study Methods* – Details about desk study and field survey methods.
- *Results* – Details about the results of desk study and field surveys.
- *Discussion and Recommendations* – Describes features of interest and makes recommendations to ensure compliance with legislation and policy.
- *Compliance with Local Planning Policy* – Outlines how the Development complies with Local Planning Policy.

2 RELEVANT LEGISLATION & POLICY

2.1 Legislation

2.1.1 *Habitat Regulations*

The Conservation of Habitats and Species Regulations 2010 (the 'Habitat Regulations')¹ are the principal means by which Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') is transposed into law in England and Wales. The legislation is also partly responsible for implementing the provisions of Council Directive 2009/147/EC on the Conservation of Wild Birds (the 'Birds Directive'). The Habitat Regulations afford protection to certain species identified in the Habitats Directive, including those requiring strict protection (European Protected Species). This legislation makes it an offence to deliberately capture, kill or disturb² wild animals protected under the Habitat Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time).

2.1.2 *Wildlife and Countryside Act 1981 (as amended)*

The Wildlife and Countryside Act 1981³, as amended by the Countryside and Rights of Way Act (CROW) 2000 and the Natural Environment and Rural Communities Act (NERC) 2006⁴, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)⁵ and Council Directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive)⁶. This legislation details a large number of offences in relation to the killing and taking of wild birds, animals and plants. A number of Schedules are attached which categorise species, such that the degree of protection afforded varies according to the Schedule on which a species is listed. This is also the principal legislation controlling the spread of invasive non-native species.

2.1.3 *The Hedgerow Regulations 1997*

The overall aim of the Hedgerow Regulations⁷ is to secure the retention of important countryside hedgerows, principally ancient and species-rich hedges. The Hedgerow Regulations also introduced new arrangements for planning authorities in England and Wales to protect important hedgerows in the countryside by controlling their removal through a system of notification.

2.1.4 *The Protection of Badgers Act 1992*

Badgers receive strict protection under the Protection of Badgers Act 1992⁸, which prohibits the taking, injuring, selling, possessing or killing of badgers and makes it an offence to ill treat any badger, damage, destroy, disturb or cause a dog to enter a badger sett. The 1992 Act defines a badger sett as "*any structure or place, which displays signs indicating current use by a badger*".

¹ The principal means by which the Habitats Directive is transposed into law in England and Wales.

² Disturbance, as defined by the Habitat Regulations, includes in particular any action which impairs the ability of animals to survive, breed, rear their young, hibernate or migrate (where relevant); or which affects significantly the local distribution or abundance of the species.

³ The Wildlife and Countryside Act 1981 (England and Wales) (Amendment) Regulations 2004. Statutory Instrument 2004. No.1487. DETR. [online] Available at: www.opsi.gov.uk [Accessed 06/10/2010].

⁴ Natural Environment and Rural Communities Act (2006) [online] Available at: http://www.opsi.gov.uk/acts/acts2006/pdf/ukpga/20060016_en.pdf [Accessed on 06/10/2010].

⁵ Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) [online] Available at: <http://conventions.coe.int/Treaty/EN/Treaties/Html/104.htm> [Accessed 04/10/2010].

⁶ Council Directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive) [online] Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:020:0007:0025:EN:PDF> [Accessed 04/10/2010].

⁷ Hedgerow Regulations 1997 [online] Available at <http://www.legislation.gov.uk/ukxi/1997/1160/contents/made> [Accessed 24/03/2011].

⁸ Protection of Badgers Act 1992. [online] Available at: <http://www.legislation.gov.uk/ukpga/1992/51/contents> [Accessed 24/3/2011].

2.2 Planning Policy

2.2.1 Planning Policy Statements

Planning Policy Statement 9 (PPS9) and its accompanying document ODPM 06/2005 set out current government policy on biodiversity and nature conservation and places a duty on Planning Authorities to consider the effect of a development on legally protected species as a material consideration in the planning application determination process. PPS9 also promotes sustainable development by ensuring that developments take account of the role and value of biodiversity and that it is conserved and enhanced within a development.

2.2.2 Regional Spatial Strategy

Policy ENV 6 - Forestry, Trees and Woodland - This policy seeks to protect and enhance the trees and woodland within the region.

Policy ENV8 - Biodiversity - This policy qualifies that the Region will safeguard and enhance biodiversity and geological heritage, and ensure that the natural environment functions as an integrated network of habitats. Plans and investment decisions should therefore aim to *"...maintain and enhance, restore or add to the distinctive elements of the natural environment in line with international, national, regional, sub regional and local importance for biodiversity..."*.

2.2.3 Barnsley Unitary Development Plan

Policy ES12 - Wind Energy Generation - Criterion D of this policy requires that proposals are assessed in relation to the potential effect upon wildlife and ecology resource within the areas which they are proposed.

Policy GS15 - Habitats - This policy seeks to protect habitats from development which would have a detrimental impact upon important habitats within the UDP area.

Policy GS16 - Nationally Designated Sites - This policy affords protection to sites which have been given a national ecological designation.

Policy GS17 - Internationally Designated Sites - This policy affords protection to those sites which have been given an international ecological designation.

Policy GS18 - Locally Designated Sites - This policy affords protection to sites which have been given a local ecological designation.

Policy WR13 - Safeguarding sites of local nature conservation interest - This policy seeks to protect sites from development which is likely to have a harmful effect upon these sites.

2.2.4 Biodiversity Action Plans - Barnsley Biodiversity Action Plan

The UK Biodiversity Action Plan (UKBAP) was developed to fulfil the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. A list of national priority species and habitats has been produced (and is regularly updated) each with specific action plans defining the measures required to ensure their conservation. Regional and Local Biodiversity Action Plans (LBAPs) have also been developed for species and habitats of nature conservation importance at regional and local levels.

3 METHODS

3.1 Desk Study

A desk study provides existing ecological information which is used to help establish the baseline condition of the site and surrounds. There is no local record centre for Barnsley; however, existing ecological information about species, habitats and designated sites of nature conservation importance, was sought from the following:

- Barnsley Council;
- National Biodiversity Network (NBN)⁹; and
- Multi-Agency Geographic Information for the Countryside (MAGIC)¹⁰;
- Barnsley Biodiversity Trust; and
- Barnsley Biodiversity Action Plan (LBAP)¹¹.

Notable species and habitats are those that are:

- Protected by European Union (EU) legislation;
- Protected by United Kingdom (UK) Legislation;
- Listed as UK Biodiversity Action Plan (BAP) priorities;
- Listed as Barnsley Local BAP priorities; and
- Included in International Union for Conservation of Nature (IUCN) Red and Amber Lists.

Statutory designated sites are protected by EU and UK legislation and include:

- Special Protection Areas (SPA);
- Special Areas of Conservation (SAC);
- Ramsar sites;
- Sites of Special Scientific Interest (SSSI);
- National Nature Reserves (NNR); and
- Local Nature Reserves (LNR).

Non-statutory designated sites are protected by local planning policy and include:

- Natural Heritage Sites (NHS)

Unless otherwise stated, the following search distances were used:

- 2 km radius for species, habitats and non-statutory designated sites;
- 5 km radius for all statutory designated sites (excluding SPA); and
- 20 km radius for SPA.

3.2 Phase 1 Habitat Survey

Extended Phase 1 Habitat Survey is used to classify and map semi-natural habitats and their constituent plant species, as well as to assess the potential of those habitats to support other wildlife. The survey assessed and classified semi-natural habitats within approximately 100 m of turbine location and access track and sought to determine the presence or absence of controlled botanical species. The survey was conducted in accordance with the standard Phase 1 Habitat Survey methods during a single site visit on 17th February 2011. This survey date is outside the optimum survey period (which is defined as April to September inclusive); however, given the range of habitats identified, it is unlikely that surveys at other times of the year would qualitatively alter the results.

3.3 Terrestrial Fauna

The potential for habitats and features within the survey area to support notable animal species was assessed during the habitat survey. All habitats and features with such potential

⁹ www.searchnbn.net

¹⁰ www.magic.gov.uk

¹¹ www.barnsleybiodiversity.org.uk

as well as any evidence to suggest or confirm the presence of those species (*e.g.* prints or direct observation), were recorded.

Table 3.1 Habitats and field signs associated with notable fauna

Taxon	Indicative habitat(s)	Field signs
Bats	<i>Roosts</i> – Trees, buildings, bridges, caves <i>etc.</i> <i>Foraging areas</i> – <i>e.g.</i> parkland, water bodies and streams, wetlands, woodland edge, hedgerows <i>Commuting routes</i> – linear features (<i>e.g.</i> hedgerows, water courses, tree lines)	In or on potential roost sites: droppings, urine spotting; oil from fur-staining near roost entrances, feeding remains (<i>e.g.</i> moth wings under a feeding perch).
Badger	Found in most rural and many urban habitats	Sett entrances, bedding, latrines, hairs, paths, prints, scratching posts.
Otter	Watercourses	Holts (or dens), prints, spraints, slide marks into watercourses, feeding signs (<i>e.g.</i> fish bones).
Water vole	Water bodies/watercourses	Burrows, grazed 'lawns', prints, latrines & droppings, feeding stations.
Other small mammals (<i>e.g.</i> dormouse, harvest mouse)	Hedgerows, dense scrub, unmanaged grassland	Gnawed nuts, hairs.
Birds	Trees, scrub, hedgerow, field margins, grassland, and buildings suitable for breeding	Nests, droppings below nests, sites, tree holes.
Amphibians	Ponds and standing water with nearby terrestrial habitats	Direct observation
Reptiles	Rough grassland, log and rubble piles	Sloughed skins
White-clawed crayfish	Streams	Direct observation
Invertebrates	All terrestrial habitats are likely to support invertebrate assemblages, but the richest sites support ancient semi-natural or a high diversity of habitats.	Few specific field signs, but could include solitary bee and wasp burrows <i>etc.</i>

4 RESULTS

4.1 Desk Study

4.1.1 Designated Sites

4.1.1.1 Statutory Designated Sites

There are 11 designated sites of nature conservation interest (excluding geological sites) within the search areas (Table 4.1).

Table 4.1 Summary of Statutory Designated Sites in the search area

Site Name	Distance & Direction from survey area	Status	Description
Peak District Moors	3 km SW	SPA	Internationally important breeding bird populations including raptors, waders and other upland species.
South Pennine Moors	3 km SW	SAC	Internationally important bog and heath communities, as well as notable sessile oak woods.
The Dark Peak	3 km SW	SSSI	Nationally important mire and heath habitats.
Spring Meadows, Aldermans Head and Cow Croft Meadows	3 km W	SSSI	Nationally important species-rich unimproved neutral grassland.
Wharnccliffe Heath	4 km SE	LNR	n/a
Town End Common	4 km SE	LNR	n/a
Canyards Hills	5 km S	SSSI	Nationally important heath, 'boggy' vegetation and ponds supporting a diversity of aquatic plants, invertebrates and amphibians.

4.1.1.2 Non-statutory Designated Sites

There are no Natural Heritage Sites within 2 km of the Application Site.

4.1.2 Species and Habitats

The Barnsley BAP includes priority species and habitats for which action plans have been developed (summarised in Table 4.2). In addition to these species and habitats, the NBN returned additional records important features but are too numerous to list in details. Instead, the NBN records have been interpreted in light of survey findings and form an implicit part of the assessment below.

Table 4.2 Summary of Barnsley BAP species and habitat action plans

Habitat Action Plans	Species Action Plans
Upland Oakwood	Hedgehog
Lowland Heathland	Barn Owl
Upland Heathland	Skylark
Blanket Bog	Tree Sparrow
Purple Moor Grass and Rush Pasture	Twite
Reedbeds	Great Crested Newt
Ponds	Salmon
Rivers	Bullhead
Open Mosaic Habitats on previously Developed Land	White-clawed Crayfish
Lowland Mixed Deciduous Woodland	Glow Worm
Wet Woodland	Dingy Skipper
Wood Pasture and Parkland	Bats
Hedgerows	Bluebell
Arable Field Margins	Water Vole
Floodplain Grazing Marsh	Otter
Lowland Meadows	Grey Partridge
Lowland Dry Acidic Grassland	Bittern
	Kestrel
	Little Ringed Plover
	Lapwing

4.2 Phase 1 Habitats and Terrestrial Fauna

Table 4.4 provides a summary of the habitats recorded and their conservation status. In addition, fauna that were recorded or considered likely to occur in the area are listed. Habitats and species not listed are considered extremely unlikely to occur and are not addressed further in this appraisal.

Table 4.4 Summary of Phase 1 habitats and fauna and their conservation status

		Conservation & Legal Status			
		EC Legislation	UK Legislation	UKBAP	LBAP
Receptor	Description				
Habitats					
Improved grassland	Dominated most of the survey area. Species-poor. Grazed by livestock.				
Wall	Dry stone wall surrounded the fields within the survey area.				
Scrub	Very small patches flanking parts of the dry stone wall.				
Hardstanding	A minor road to the north of the survey area.				
Fauna					
Brown hare	No evidence but likely to occur in the area in low numbers.			✓	
Badger	No evidence but likely to occur in the area in low numbers.		✓		
Bats	Limited numbers likely to forage/commute along stonewalls. No roosting opportunities.	✓	✓	✓	✓

5 DISCUSSION AND RECOMMENDATIONS

This section describes the nature conservation interest of the site based on the results of the desk study and field surveys and outlines mitigation, compensation and enhancement, where appropriate.

5.1 Designated sites

Effects to both statutory and non-statutory designated sites are considered extremely unlikely given the intervening distances and lack of ecological connectivity between the survey area and these sites. In addition, the survey area is not considered to form an integral part of the local green infrastructure insofar as it is not publicly accessible and comprises mainly agricultural land use.

5.2 Habitats

The habitats throughout the survey area and immediate surrounds are of limited substantive ecological value. The Development is likely to cause the permanent loss of a small amount of improved grassland but this effect will have negligible ecological consequences. Dry stone walls may offer shelter for a limited diversity of small mammals, reptiles and invertebrates but construction will not directly affect these features.

5.3 Terrestrial Fauna

5.3.1 *Brown hare*

Brown hare were not recorded but are likely to be present in the area since arable land is an important resource for breeding and foraging. The loss of a small amount of grassland is unlikely to affect resources important to this relatively common and widespread species, especially in the local area, which is rich in grassland. Disturbance during construction will be limited since brown hare are primarily a nocturnal/crepuscular species and construction activity will generally only take place during daylight hours.

Furthermore, given the abundance of suitable habitat nearby, it is expected that any brown hares that are displaced during the construction phase would readily occupy habitats elsewhere within or outside the survey area.

5.3.2 *Badgers*

There are no badger setts or other evidence of activity within the survey area and so disturbance of setts or harm to badgers is currently unlikely. However, badgers (and other terrestrial fauna) can be adversely affected by construction activities when active above ground (*e.g.* falling into excavations) and so developments should be carried out sensitively, in line with Natural England guidance¹². The most effective mitigation for this Development will be to ensure that deep excavations are covered at night to avoid animals falling into deep excavations. All excavations, including shallow ones, should also provide a means of escape (typically a shallow ramp) for all animals.

5.3.3 *Bats*

The study area lacks any features considered to be of high value to roosting, foraging or commuting bats. In addition, the turbine is located more than 50 m (to blade tip) from surrounding dry stone walls – the only relatively valuable feature for bats in the area – and therefore exceeds the 50 m buffer recommended by Natural England TIN051¹³. Such buffers are considered sufficient to mitigate many of the effects of large turbines and so it is assumed that a larger separation distance for this small turbine will further reduce the already unlikely risk of collision for all bat species.

¹² Natural England (2010) *Interim Guidance Document: Badgers and Development – A guide to best practice and licensing*.

¹³ Natural England (2009) *Bats and single large turbines – Joint Agencies Interim Guidance*. Natural England Technical Information Note TIN069.

5.3.4 Birds

The Application Site has limited potential to support species of high conservation concern throughout the year, with flight levels of target species considered likely to be extremely low. The site will most likely support species of open arable landscapes (rather than more complex habitats) such as low numbers of breeding lapwing, skylark and yellow wagtail. However, the presence and abundance of these species will be strongly dependent on the prevailing arable land use and would most likely be limited to low numbers of breeding pairs. No Schedule 1 listed species are likely to breed at or near the proposed Development, therefore special measures to prevent disturbance to such species are not required.

Proposed ground works might damage or destroy nesting birds and would therefore constitute an offence under the Wildlife and Countryside Act 1981 (as amended). To ensure that works are legally compliant, it is recommended that ground disturbance during the bird nesting season (March–August) is avoided or, if necessary, preceded by a nesting bird survey and delaying works until birds have fledged and nests no longer in use.

6 COMPLIANCE WITH DEVELOPMENT PLAN

This section outlines how the Development complies with Barnsley UDP policies relevant to nature conservation and biodiversity.

6.1 Policy ES12 Wind Energy Generation

The potential effects on wildlife and ecology are assessed herein; therefore, the Development is compliant with this policy.

6.2 Policy GS15 Habitats

The Development will not adversely affect important habitats and is therefore compliant with this policy.

6.3 Policy GS16 Nationally Designated Sites

The Development will not adversely affect the nature conservation interest of any nationally designated sites and is therefore compliant with this policy.

6.4 Policy GS17 Internationally Designated Sites

The Development will not adversely affect the integrity of any internationally designated sites and is therefore compliant with this policy.

6.5 Policy GS18 Locally Designated Sites

Information on locally designated sites could not be available. However, given the range of habitats within the survey area and lack of ecological connectivity, it is extremely unlikely that any local nature sites would be impacted. It is believed therefore, that the Development is compliant with this policy.

6.6 Policy WR13 Safeguarding sites of local nature conservation interest

Given the habitats recorded within the survey area, it is extremely unlikely that sites of local nature conservation interest will be adversely affected and the Development, therefore, is compliant with this policy.

APPENDIX 3

Noise Assessment

1 INTRODUCTION

1.1 Background

Arcus Renewable Energy Consulting Ltd (Arcus) was appointed by Temporis to undertake a noise assessment in relation to a proposed single medium-scale wind turbine development near Stocksbridge, Barnsley. The Development comprises a single wind turbine with associated access track and substation. Full details are provided with the Supporting Statement which accompanies the planning application.

This report describes and evaluates the potential noise impacts associated with the proposed development. The noise implications of the Development are assessed in terms of legislation, industry best practice and planning policy and recommendations are made, where necessary, to ensure that the development progresses in a way that is consistent with these policies.

1.2 Structure of Report

This report is structured into the following sections:

- *Requirements of the Development Plan* – Summary of the planning policy that is relevant to noise.
- *Assessment of Development Plan* – Details the methodologies employed and the operational noise assessment conducted.
- *Compliance with Development Plan* – Outlines how the development complies with Local Planning Policy.

2 REQUIREMENTS OF THE DEVELOPMENT PLAN

The relevant provisions within the Development Plan relevant to noise effects are:

2.1 Barnsley Unitary Development Plan

Policy ES12 Wind Energy Generation identifies those criteria against which wind energy developments will be assessed. This policy identifies that the potential noise of the development should be taken into consideration in the determination of any planning applications for wind energy developments.

Policy ES1 Pollution seeks to protect both the environment and sensitive land uses from pollution.

Policy ES13 Enforcement of Planning Control seeks to control breaches of planning control and outlines the instances where enforcement action is likely to be taken.

3 NOISE ASSESSMENT

The aim of the assessment is to predict the effects of noise at the nearest noise sensitive receptors and assess this against relevant standards and guidelines.

3.1 Guidelines and Assessment Methodology

The following guidance and information sources have been considered in carrying out this assessment:

- Planning Policy Statement 22 (PPS 22) Renewable Energy (2004)¹;
- Planning Policy Guidance 24 (PPG 24) Planning and Noise (1994)²;

¹ Planning Policy Statement 22: Renewable Energy, Office of the Deputy Prime Minister, 2004. TSO

- ETSU-R-97: The Assessment and Rating of Noise from Wind Farms³; and
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)⁴.

3.1.1 PPS 22 Renewable Energy

PPS 22 provides guidance to local authorities on policy matters relating to renewable energy developments. In terms of noise, it states:

"The 1997 report by ETSU for the Department of Trade and Industry should be used to assess and rate noise from wind energy development."

The Companion Guide to PPS 22⁵ provides further details of technical aspects of renewable energy technologies. In terms of noise from wind turbines, it describes its character and sources, and restates that ETSU-R-97 should be used in the assessment process. It also states that there is no evidence that ground transmitted low frequency noise from wind turbines is at a sufficient level to be harmful to human health.

3.1.2 PPG24 Planning and Noise

PPG24 provides guidance to local authorities in England on the use of their planning powers to minimise the adverse effects of noise. The guidance:

- Outlines considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which will generate noise;
- Recommends appropriate levels for exposure to different sources of noise; and
- Advises on the use of conditions to minimise the effects of noise.

It gives no specific guidance on the assessment of noise from wind farms.

3.1.3 ETSU-R-97

ETSU-R-97 provides a framework for the assessment and rating of noise from wind turbine installations. It is the accepted standard for wind energy developments in the UK, and as such the methodology has been adopted for this assessment.

It specifies the use of the $L_{A90,10min}$ descriptor for both background and wind turbine noise. Therefore, unless otherwise specified, all references to noise levels within this report relate to this descriptor. Similarly, all wind speeds referred to relate to a height of 10 m above ground level (AGL) unless otherwise stated. ETSU-R-97 recommends the application of noise limits at the nearest noise-sensitive properties, to *"...offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or planning authorities"*. Separate noise limits apply for quiet daytime and night-time, as outlined below.

Quiet daytime is defined in ETSU-R-97 as 18:00 – 23:00 every day, as well as 13:00 – 18:00 on Saturday and 07:00 – 18:00 on Sundays. During these periods, the guidance prioritises the protection of outdoor amenity for residents, by applying noise limits that would not significantly affect the enjoyment of areas such as gardens. The daytime noise limit is defined as a fixed lower limit of 35-40 dB(A), or 5 dB(A) above the measured background noise level, whichever is the greatest.

² Planning Policy Guidance 24: Planning and Noise, Office of the Deputy Prime Minister, 1994. TSO

³ ETSU-R-97 (1996) The Assessment and Rating of Noise from Wind Farms, ETSU: DTI.

⁴ Draft National Policy Statement for Renewable Energy Infrastructure (EN-3).

⁵ Planning for Renewable Energy, A Companion Guide to PPS 22, Office of the Deputy Prime Minister 2004. TSO

Different standards apply at night, where sleep disturbance is the primary concern rather than the requirement to protect outdoor amenity⁶. Night-time is considered to be all periods between 23:00 and 07:00. A limit of 43 dB(A) is recommended for night-time at wind speeds or locations where the background noise level is less than 38 dB(A). Where background noise levels exceed 38 dB(A) the limit is set to 5 dB(A) above the background noise level.

Both quiet daytime and night-time limits may be increased to 45dB(A) where the occupier of a property has some financial involvement in the Development.

Where predicted operational noise levels are below the lower daytime fixed limit of 35dB, $L_{A90, 10min}$ at wind speeds up to $10ms^{-1}$, ETSU-R-97 allows for the use of a simplified assessment method, whereby an assessment against background noise levels is not required, as the lowest fixed limit will not be exceeded.

3.1.4 Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)

The UK Government published its draft National Policy Statement for Renewable Energy (EN-3) in October 2010. Paragraphs 2.7.55 and 2.7.57 confirm that "...assessment of noise from the operation of the wind turbines should use ETSU-R-97, taking account of the latest industry good practice."

3.2 Operational Noise Assessment Methodology

Potential noise sensitive receptors in the area around the Development were identified from Ordnance Survey 1:25,000 Scale digital mapping and confirmed as permanent dwellings using Ordnance Survey Address Layer 2 data; a database which combines Royal Mail address data with buildings identified on large-scale Ordnance Survey mapping and provides addresses, descriptions and grid references.

Two different candidate turbines have been considered in this assessment, the first of which is the EWT DirectWind DW-500 (50 m to hub, 75.75 m to tip). At the time of writing (June 2011) the manufacturer is currently undertaking noise emissions testing of this turbine in compliance with BS:EN:61400-14⁷. The candidate turbine is a 500kW variant of the 900kW DW-900, therefore the best currently available data is that of the EWT DirectWind DW-900. Assessment using this data is therefore considered to be a worse-case assumption. For both candidate turbines, the manufacturer's original noise emissions data is included in the Annex A1 and A2 and reproduced below.

Table 1: Manufacturer's Noise Emission Data, EWT DirectWind DW-900

Wind Speed at 10m AGL, ms^{-1}	5	6	7	8	9	10
Sound Power Level, dB, L_{WA} , dB	97.8	99.1	100.1	100.9	101.4	101.6

Table 2: Manufacturer's Octave Band Data, EWT DirectWind DW-900

Octave Band Centre Frequency, Hz	63	125	250	500	1000	2000	4000	8000
Sound Power Level dB, L_{WA} , measured at a Wind Speed of $10 ms^{-1}$	83.0	89.0	93.0	97.0	95.0	92.0	90.0	84.0

The maximum sound power level for this turbine is shown to be 101.6 dB(A) at a windspeed of $10 ms^{-1}$.

⁶ Note that the limits apply to external noise levels, and have been chosen to prevent sleep disturbance indoors, assuming that bedroom windows are open.

⁷ BS EN (IEC) 61400-14:2005 Wind Turbines – Part 14 Declaration of apparent sound power level and tonality values (Draft for Development)

The second candidate turbine is the Powerwind 500 (50 m to hub, 78 m to tip).

Table 3: Manufacturer's Noise Emission Data, Powerwind 500

Wind Speed at 10m AGL, ms^{-1}	3	4	5	6	7	8	9	10	11	12
Sound Power Level, dB, L_{WA} , dB	82.1	88.7	93.9	97.6	99.9	100.8	100.8	100.8	100.8	100.8

At the time of writing, a frequency analysis of the turbine's noise emission was not available, therefore a typical spectrum was calculated based upon the mean average of 3 other similar turbines; the Vestas V52, Gamesa G52 and EWT DirectWind DW-900. The resulting spectrum was then scaled to equate to the Powerwind's maximum guaranteed sound power level of 100.8 dB, and is detailed in Table 4.

Table 4: Typical Octave Band Data, scaled to 100.8 dB

Octave Band Centre Frequency, Hz	63	125	250	500	1000	2000	4000	8000
Typical Sound Power Level dB, L_{WA} , measured at a Wind Speed of 10 ms^{-1}	82.8	89.1	92.5	95.3	95.0	92.8	88.5	77.5

Noise immission⁸ levels for these candidate turbines have been predicted using the methodology described in ISO9163-2:1996⁹, with the following assumptions:

EWT DirectWind DW-900

- Measured noise emission data has been used as the source input;
- Acoustically hard ground ($G=0$);
- No barrier attenuation;
- A temperature of 10°C ; and
- Relative humidity of 70 %.

Powerwind 500

- Guaranteed noise emission data has been used as the source input;
- Acoustically mixed ground ($G=0.5$);
- No barrier attenuation;
- A temperature of 10°C ; and
- Relative humidity of 70 %.

The maximum sound power levels of these turbines have been used in the preparation of a noise contour plot, shown in Figure 1.

3.2.1 Identification of Receptors

Table 5 details the closest dwellings to the Development. Provided that noise at these locations is found to be compliant with limits, this would indicate that all other receptors would also comply with noise limits. The locations of these dwellings are shown in Figure 1.

⁸ Literally incoming noise, *i.e.* the noise levels at receptor locations.

⁹ ISO 9613-2: 1996 Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation.

Table 5: Potential Noise Sensitive Receptors

Property Name	Easting	Northing	Distance to Turbine
Chapel Farm	426152	400543	505 m
4 Pond Farm	426519	400477	579 m
Dyson Cote	425851	400440	496 m
Carr Head Farm	425869	399718	421 m

3.2.2 Baseline Noise Survey Locations

Background noise measurements were taken at or as close as possible to the most representative noise sensitive receptor to the Development. This approach is in accordance with standard practice in environmental noise assessments and with ETSU-R-97.

3.2.3 Baseline Noise Survey

As previously agreed with Barnsley Council's Environmental Health Department, baseline (background) noise measurements were carried out at Chapel Farm between Friday 4th and Wednesday the 23rd of February 2011. Details of the monitoring location are provided in Table 6 and shown in Figure 1.

Table 6: Baseline Noise Survey

Location	Grid Reference	Description of Monitoring Location	Background Noise Sources Present
Chapel Farm	426129, 400562	In field to north of Chapel Farm	Bird song, distant traffic, wind in trees.

The survey was carried out in accordance with the method specified in ETSU-R-97, as follows:

- Type 1 measuring equipment, equipped with a suitable windshield, was used, which was calibrated at the start of the survey, and calibration checked at the end of the survey. No significant calibration drift occurred;
- Measurements were performed at a height of 1.3 m above ground level (AGL), in free-field conditions, i.e., a minimum of 3.5 m and, where possible, more than 10 m from any reflective surface other than the ground;
- Background noise levels were recorded at continuous 10-minute intervals, as $L_{A90, 10min}$;
- Wind speeds were measured simultaneously at a height of 10 m AGL at a location representative of the proposed turbine location (grid reference 426142, 400038). The location of the wind speed measuring mast is shown in Figure 1;
- A rain gauge was installed beside the noise monitoring equipment to record periods of rainfall, as ETSU-R-97 specifies that noise measurements from periods of heavy rain should not be used. Where rainfall of $\geq 0.1\text{mm}$ was recorded in any 10 minute interval, measurements during these periods were excluded. Where any single 10 minute interval was bounded by intervals of rainfall, these were also excluded as a conservative measure; and
- An equivalent of a minimum of one week of data was obtained, after exclusions are taken into account.

Survey record sheets and equipment calibration certificates are included in Annex A3 and Annex A4 of this report.

3.2.4 Background Noise Levels

The measured background noise levels and wind speeds have been correlated and sorted into quiet daytime and night-time periods. Periods where rainfall occurred were discarded, as described above. Trendlines (lines of best fit) were then applied to scatter plots of the data to represent 'prevailing background noise level' curves.

Table 7 details the prevailing background noise levels obtained for quiet daytime and night-time measurement periods. Charts 1 and 2 present this data graphically. Due to the lack of data points at high wind speeds, a conservative approach has been taken, and the background noise levels are assumed to remain constant above wind speeds of 10 ms⁻¹, as shown in italics.

Table 7: Prevailing Background Noise Levels, Chapel Farm

	Wind Speed at 10m AGL, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Background Noise Level, L _{A90,10min} /dB(A)									
Quiet Daytime	32.5	33.0	34.0	35.7	38.1	41.0	43.9	46.3	<i>46.3</i>	<i>46.3</i>
Night-time	27.7	29.8	32.4	35.1	37.8	40.2	42.2	43.5	<i>43.5</i>	<i>43.5</i>

3.2.5 Noise Limits

Table 8 details the noise limits calculated from the prevailing background noise levels shown in Table 7. Daytime and night-time noise limits are shown graphically in Charts 1 and 2. Whilst Chapel Farm is a financially involved property, an increased limit is not necessary in order to meet the requirements of ETSU-R-97. All four properties have therefore been assessed under the same lower fixed limit.

Table 8: Noise Limits

	Wind Speed at 10m AGL, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Background Noise Level, L _{A90,10min} /dB(A)									
Quiet Daytime	37.5	38.0	39.0	40.7	43.1	46.0	48.9	51.3	<i>51.3</i>	<i>51.3</i>
Night-time	43.0	43.0	43.0	43.0	43.0	45.2	47.2	48.5	<i>48.5</i>	<i>48.5</i>

3.2.6 Potential Effects

For each candidate turbine, predicted maximum noise immission levels have been calculated for the receptors detailed in Table 5 and are detailed in Tables 9 and 10.

Table 9: Predicted Operational Noise Levels, EWT DirectWind DW-900

	Wind Speed at 10m AGL, ms ⁻¹					
	5	6	7	8	9	10
	Predicted Noise Level, L _{A90,10min} , dB(A)					
Chapel Farm	31.9	33.2	34.2	35.0	35.5	35.7
4 Pond Farm	30.5	31.8	32.8	33.6	34.1	34.3
Dyson Cote	32.1	33.4	34.4	35.2	35.7	35.9
Carr Head Farm	33.5	34.8	35.8	36.6	37.1	37.3

Table 10: Predicted Operational Noise Levels, Powerwind 500

	Wind Speed at 10m AGL, ms ⁻¹									
	3	4	5	6	7	8	9	10	11	12
	Predicted Noise Level, L _{A90,10min} , dB(A)									
Chapel Farm	14.4	21.0	26.2	29.9	32.2	33.1	33.1	33.1	33.1	33.1
4 Pond Farm	13.0	19.6	24.8	28.5	30.8	31.7	31.7	31.7	31.7	31.7
Dyson Cote	14.6	21.2	26.4	30.1	32.4	33.3	33.3	33.3	33.3	33.3
Carr Head Farm	16.0	22.6	27.8	31.5	33.8	34.7	34.7	34.7	34.7	34.7

As Table 10 shows, predicted maximum noise levels of the Powerwind 500 turbine are below the lower daytime fixed limit of 35dB, L_{A90, 10min} at wind speeds up to 10ms⁻¹ at all properties, therefore meeting the criteria for the simplified assessment method. As it has been established that noise levels due to operation of a Powerwind 500 turbine would be acceptable in terms of the recommendations of ETSU-R-97, the following assessment against background noise will only include the EWT-900 turbine.

Table 11 details the difference (margin) between the predicted noise levels of the EWT DW-900 turbine and daytime limits. A negative value indicates that the predicted operational noise levels are below the noise limit.

Table 11: Daytime Operational Noise Assessment, EWT DirectWind DW-900

	Wind Speed at 10m AGL, ms ⁻¹					
	5	6	7	8	9	10
	Margin Between Predicted Level and Limit, dB					
Chapel Farm	-7.1	-7.5	-8.9	-11.0	-13.4	-15.6
4 Pond Farm	-8.5	-8.9	-10.3	-12.4	-14.8	-17.0
Dyson Cote	-6.9	-7.3	-8.7	-10.8	-13.2	-15.4
Carr Head Farm	-5.5	-5.9	-7.3	-9.4	-11.8	-14.0

The daytime noise assessment is presented graphically in Chart 1. The predicted noise levels are shown to be below the daytime noise limits at every property.

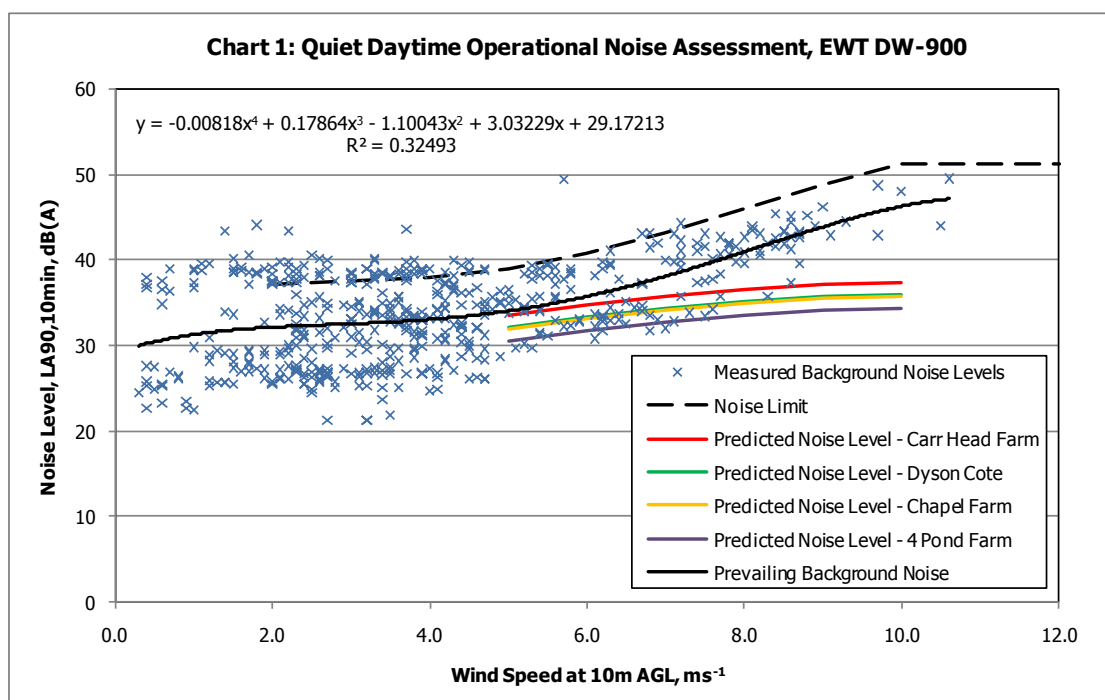
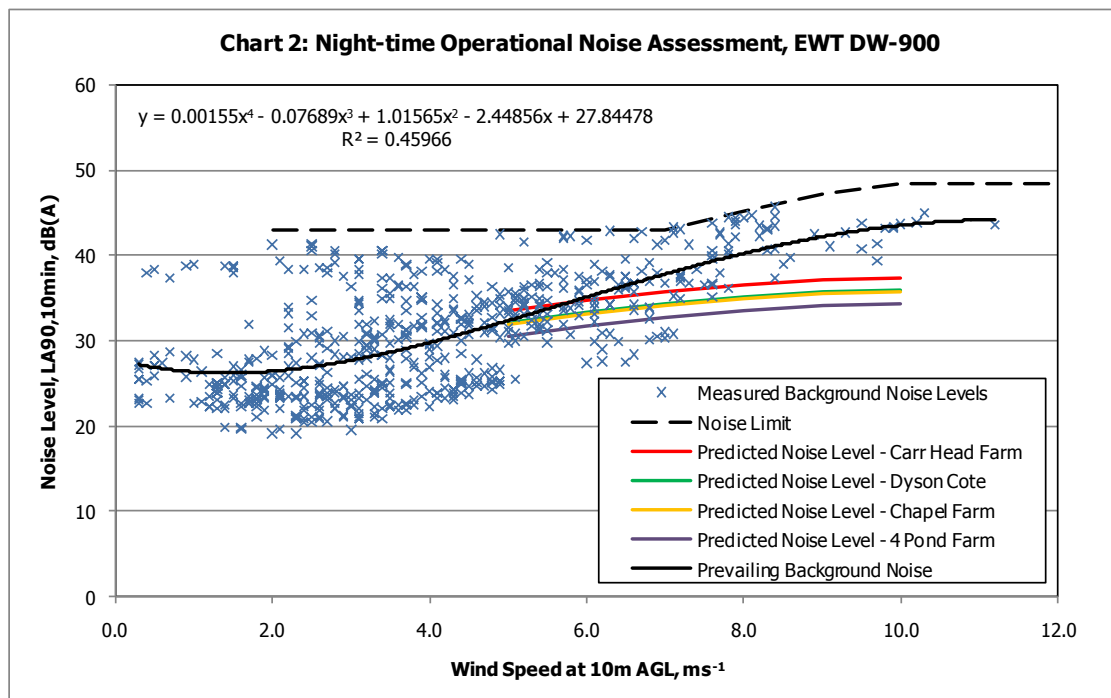


Table 12 details the difference (margin) between the predicted noise levels and night-time limits, based upon the EWT-900. A negative value indicates that the predicted operational noise levels are below the noise limit.

Table 12: Night-time Operational Noise Assessment, EWT DirectWind DW-900

	Wind Speed at 10m AGL, ms ⁻¹					
	5	6	7	8	9	10
	Margin Between Predicted Level and Limit, dB					
Chapel Farm	-7.2	-7.6	-9.0	-11.1	-13.5	-15.7
4 Pond Farm	-8.6	-9.0	-10.4	-12.5	-14.9	-17.1
Dyson Cote	-7.0	-7.4	-8.8	-10.9	-13.3	-15.5
Carr Head Farm	-5.6	-6.0	-7.4	-9.5	-11.9	-14.1

The night-time noise assessment is presented graphically in Chart 2. The predicted noise levels are shown to be below the night-time noise limits at every property.



4 CONCLUSION

Assessment of noise from operation of the Development has been carried out, following the recommendations of ETSU-R-97, the method of assessing wind turbine noise recommended by Government Guidance.

Should a Powerwind 500 turbine be installed at the site, predicted maximum noise levels at all properties are below 35dB, $L_{A90, 10min}$ at wind speeds up to 10 ms⁻¹, therefore meeting the criteria for the simplified assessment method.

Based upon the EWT-900 turbine, predicted noise levels at all properties due to operation of the Development are lower than the identified limits at wind speeds up to 12ms⁻¹.

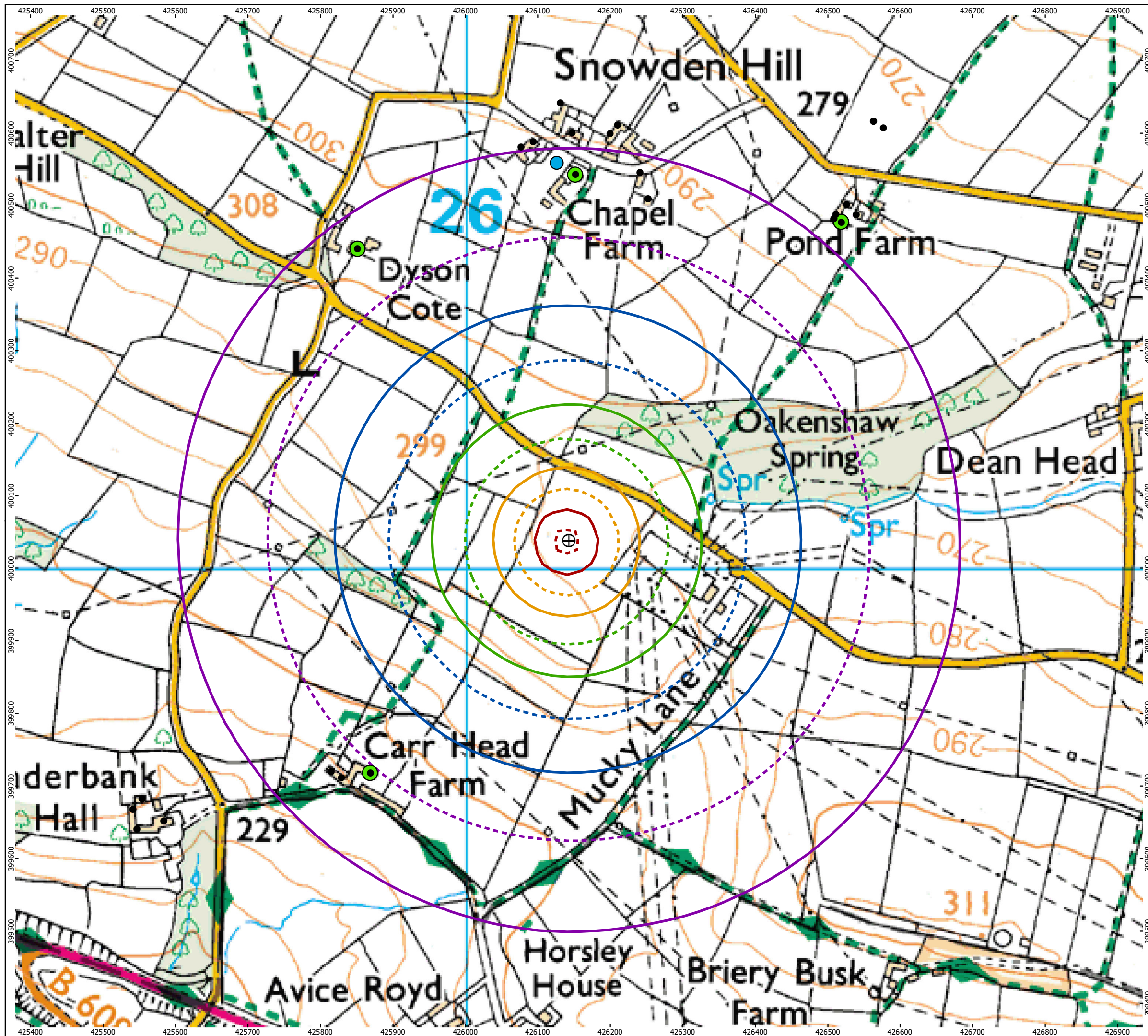
It is therefore concluded that noise levels at all noise-sensitive properties, due to operation of either of the candidate turbines, would be acceptable in terms of the recommendations of ETSU-R-97. The impact of the Development upon residential amenity is considered to be not significant, and as such meets the requirements of the Development plan.

Should the Development be assessed in accordance with BS4142¹⁰ methodology, the likelihood of complaints in relation to the Development would be considered to be below the level of 'marginal significance' for either the EWT DW-900 or Powerwind 500 turbines.

¹⁰ BS 4142: 1997 Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas.

FIGURES

Figure 1 – Noise Contour Plot



Key

- Residential Dwelling
- Assessment Location
- Monitoring Location
- ⊕ Potential Turbine Location

Predicted Noise Level, EWT DW-900

LA90,10min

- 35 dB
- 40 dB
- 45 dB
- 50 dB
- 55 dB

Predicted Noise Level, Powerwind 500

LA90,10min

- 35 dB
- 40 dB
- 45 dB
- 50 dB
- 55 dB

Contours show maximum predicted noise level, calculated according to ISO 9613-2:1996, with a receiver height of 4.0m

Dwelling location data is extracted from OS Mastermap Address Layer 2 Data.

1:5,000 Scale @ A3

0 125 250 m



Produced: AM
Reviewed: SM
Approved: ACM

Ref: 610/ENV/001

Revision: A

Date: 31/05/2011

Noise Contour Plot
Figure 1

Chapel Farm
Planning Application

ANNEXES

A1 EWT DIRECTWIND DW-900 TURBINE NOISE EMISSION DATA

Following information with regards to the sound power level measurements, are destilated from measurement data of a directwind 54*900 turbine.

The measurements were performed according to the International Standard IEC 61400-11 December 2002: "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques ".

At a wind speed of 8 m/s at 10 m height, the sound power level is determined: **100.9 dB(A)**. This Sound power level increases with the wind speed with about **1,3 dB per m/s** in the range from 5 to 7 m/s till about **0 dB per m/s** at higher wind speeds. The uncertainty is estimated to be 1.1 dB(A).

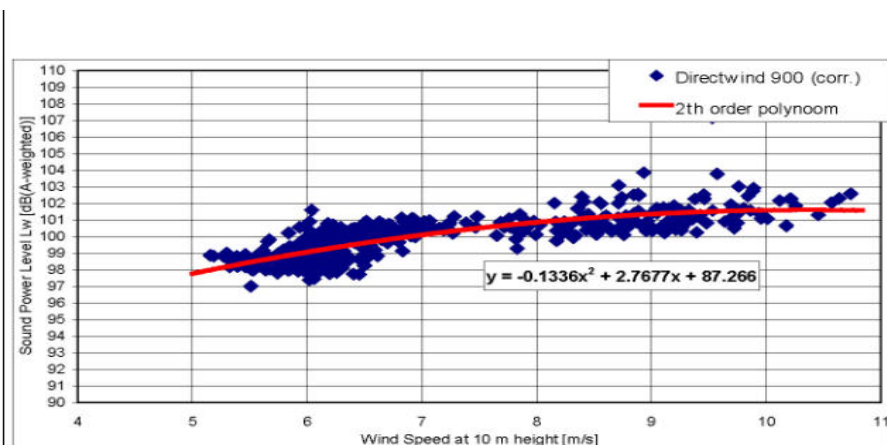
Table 1.1

1/3 octave spectrum of the sound power level in dB (A-weighted) , corrected for backgroundnoise at all windspeeds from 5 till 10 m/s.

Sound power level Lw in dB(A)		middle frequency of the octave bands [hz]							
Windspeed at a height of 10m		63	125	250	500	1k	2k	4k	8k
wind 5 m/s	97.8 dB(A)	77	86	92	92	90	89	86	76
wind 6 m/s	99.1 dB(A)	78	87	93	94	92	90	88	78
wind 7 m/s	100.1 dB(A)	79	88	94	95	93	91	89	79
wind 8 m/s	100.9 dB(A)	81	89	94	96	93	91	89	83
wind 9 m/s	101.4 dB(A)	82	89	94	97	94	92	90	84
wind 10 m/s	101.6 dB(A)	83	89	93	97	95	92	90	84

Figure below gives all the calculated sound power levels at the different wind speeds at reference conditions ($h = 10$ m and $z_0 = 0.05$ m) and after correction for the background noise. The figure also gives the 2th order regression on this curve:

$$L_w = 0.13 * v_{wind} + 2.77 * v_{wind}^2 + 87.3 \text{ dB(A)}$$



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Document name:

Sound Power Level
DW 54*900

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Date:

Document number:

Rev.:

Page:

Composed

AvdP

2/12/2005

1005000

a

1 of 1

Approved

AW

2/12/2005

Reference:

A2 POWERWIND 500 TURBINE NOISE EMISSION DATA

PowerWind

Sound Power Level

PowerWind 500

PowerWind 500 PG

PowerWind GmbH
Kehrwieder 8
20457 Hamburg
Deutschland

PowerWind	Sound Power Level	PI PW500 SoundPowerLevel en 03.pdf	
Date: 25/05/2011	PowerWind 500 PowerWind 500 PG	Revision: 3	Page: 2/3

Version	Date	Comment	Prepared by	Approved by	Released by
0	17.02.2011	New Document	RDI	THKO	CADI
1	21.04.2011	Corrections	SIWI	KPO	CADI
2	09.05.2011	New product	SIWI	THKO	CADI
3	25.05.2011	Corrections	SIWI	THKO	KPO

PowerWind	Sound Power Level	PI PW500 SoundPowerLevel en 03.pdf	
Date: 25/05/2011	PowerWind 500 PowerWind 500 PG	Revision: 3	Page: 3/3

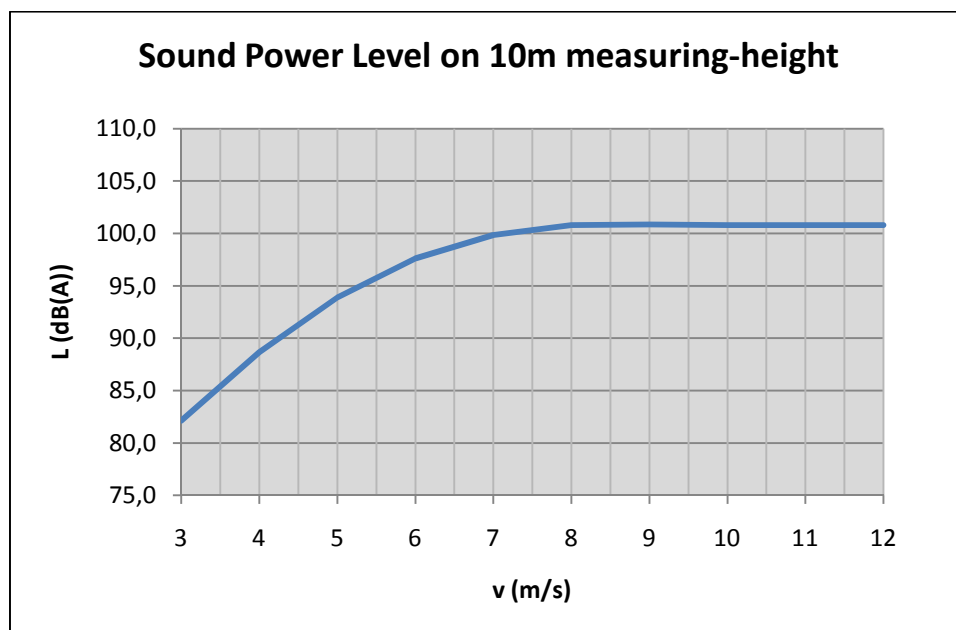
Guaranteed sound power level PowerWind 500 and PowerWind 500 PG

General:

The below listed values are based on calculations and are guaranteed by PowerWind.

Sound power level:

Wind speed on 10m measuring-height	3 m/s	4 m/s	5 m/s	6 m/s	7 m/s
Sound power level	82.1 dB(A)	88.7 dB(A)	93.9 dB(A)	97.6 dB(A)	99.9 dB(A)
Wind speed on 10m measuring-height	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
Sound power level	100.8 dB(A)	100.8 dB(A)	100.8 dB(A)	100.8 dB(A)	100.8 dB(A)



A3 NOISE SURVEY RECORD SHEET

Noise Survey Record Sheet

Project No:	610	Project Name:	Chapel Farm
Client:	Temporis	Installed By:	ND/AM

Location No (x/y):	1/1	Location Name:	Chapel Farm
Monitoring Location (GPS Grid Reference):			SE 26129 00562
Monitoring Location Description:	In field to North of Chapel Farm. Noise from barn to south but cannot be heard from monitoring location.		
Distance From Façade:		>10m	
Background Noise Sources Present:	Birds, distant road noise		
Other Noise Sources Present:			
Notes:	No audible noise from substation		
Photograph Files:	DSC0101, DSC0102, DSC0103, DSC0104		
Start Date & Time:	05/02/11 10:00	End Date & Time:	23/02/11 11:00

Equipment			
Item	Make	Model	Serial No.
Microphone	Rion	NH-21	316138
Sound Level Meter	Rion	NL-31	00593610
Calibrator	Rion	NC-74	34372738
Source of Equipment:		Arcus	
Noise Meter Clock set to GMT / ~~BST~~ (Delete as appropriate)			

Photo(s) of Monitoring Location:





Noise Survey Record Sheet – Visit Record

Initial	
Name:	ND/AM
Date & Time:	04/02/11 10:00
Noise Filename:	0101
Calibration Level (dB(A)):	94.0
Batteries Replaced? (Y/N):	Pre-charged
Notes: RAIN GAUGE LOCATED WITH KIT	

Final Check	
Name:	AM
Date & Time:	23/02/11 11:00
Calibration Level (dB(A)):	94.0
Level Before Calibration (dB(A)):	94.2
Notes:	

A4 CALIBRATION CERTIFICATE



CERTIFICATE OF CONFORMANCE

Date of Issue 23rd February 2010
Customer Arcus Renewable Energy Consultants Ltd
Certificate Number CONF021016

	Manufacturer	Type	Serial Number
Sound Level Meter	Rion	NL-31	00593610
Preamplifier	Rion	NH-21	30372
Microphone	Rion	UC-53A	316138

This is to certify that the instrument was tested and calibrated at the Manufacturer's factory according to their specification and that the product satisfied all the relevant requirements of the following Standards:

IEC 60651:1979 Type 1;
IEC 60804:1985 Type 1; and
IEC 61672-1:2002 Class 1.

The instrument also received a functional check by ANV Measurement Systems prior to despatch in the UK, in accordance with our standard procedures.

ANV Measurement Systems recommend that the instrument is calibrated at an interval of 12 months.

Signed 

Position 

Date 23/2/10

BEAUFORT COURT, 17 ROEBUCK WAY, MILTON KEYNES, MK5 8HL

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