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Barnwell Manor Wind Farm
Non-Technical Summary
January 2010

INTRODUCTION

This is a Non Technical Summary (NTS) of the Environmental Statement (ES) that supports a planning application by Barnwell Manor Wind Energy Ltd for construction of a 5 turbine wind farm on land belonging to Barnwell Manor Farm Estates. Barnwell Manor Wind Energy Ltd is a subsidiary of West Coast Energy Limited and has been specifically set up to develop the wind farm.

A formal Environmental Impact Assessment (EIA) scoping opinion was sought from East Northamptonshire Council in April 2008 and a response was provided on 16th June. Subsequent discussions with a representative of the Council Planning Department defined aspects of the development the Council required to be covered in the ES.

This NTS provides an overview of the proposed development, the key findings of the various technical studies, the potential environmental effects of the development, and proposed mitigation measures.

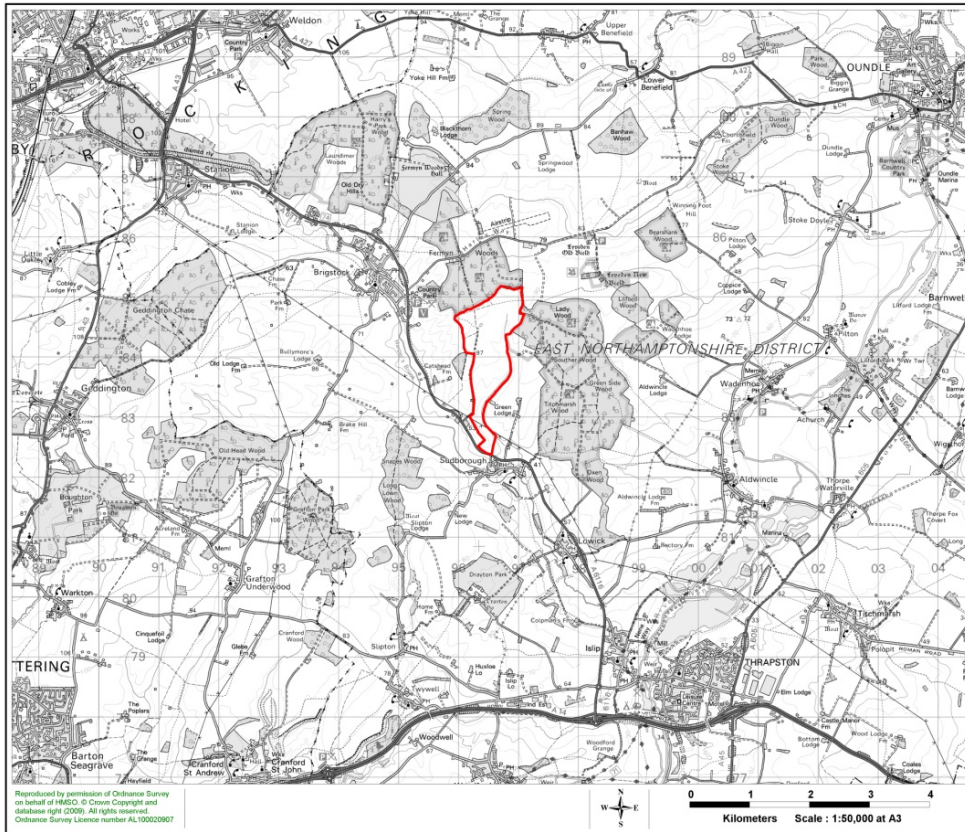
The full ES comprises of:

- Volume 1 - Written Text
- Volume 2 - Appendices
- Volume 3 - Figures and Drawings
- Non-Technical Summary

Site Location & Layout

The site is within East Northamptonshire Council's administration and lies north east of the A6116. The turbines are located east of the village of Brigstock and north of the village Sudborough. The site is 8km west of the town Oundle and 9km south east of the town of Corby. The proposed development area is currently used as agricultural arable land. A line of electricity pylons crosses the southern end of the site. Much of the site is bounded by woodland, with Fermyn Woods and Cherry Lap Wood to the north, Souther Wood and Lady Wood Head to the east and Cat's Head Wood to the west.

The site location plan is shown in Figure 1 and the site layout is shown in Figure 2 (please note that these figures are not drawn to scale. Full scale plans are contained in Volume 3 of the ES). The development footprint of the wind farm, which comprises the turbine bases, sub-station building, new access tracks and site access, comes to 6.9ha. The potential generation capacity of the wind farm will be up to 12.5MW.



Barnwell Manor Wind Farm

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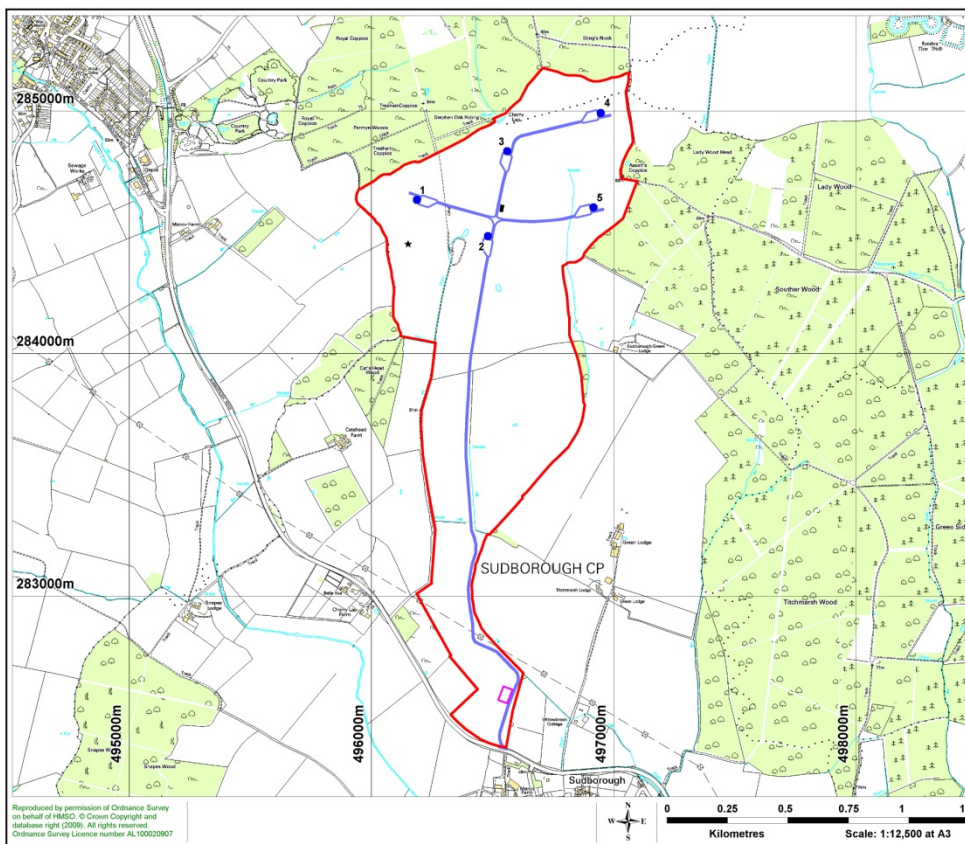
Legend:

- Application Boundary

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Figure 1 Site Location

Drawn by: KG 18/12/2009
 Checked by: GS 1290/E/125b
 Approved by: JC TL 01y



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Legend:

- Application Boundary
- Turbine Locations
- Onsite Access Tracks
- 80m Met Mast Location
- Substation
- Construction Compound

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Figure 2 Site Layout and Application Boundary

Drawn by: AIW 18/12/2009
 Checked by: GS 1290/SL/068a
 Approved by: JC TL 01y

Construction, Transport and Decommissioning

Construction is expected to take up to 6 months. The foundations proposed for the turbines are an inverted 'T', in section consisting of a reinforced central concrete pedestal. The maximum intended depth of the foundations will be around 3 metres. The total foundation area for each turbine is likely to be about 16m x 16m. However, there may be slight variation in the foundation area depending upon the turbine manufacturer that is selected and upon the ground conditions.

As soon as is practical following completion of the turbine installation, the immediate construction area of each foundation and hardstanding will be restored to their original profile. The soils will be replaced and reseeded as appropriate. Surplus excavated material will be removed from the site, or used for track maintenance during construction, as appropriate. Surplus soil will be used to restore track edges after construction. This progressive reinstatement has been found to assist with re-establishment of the local ecology as it minimises the time soil and turf are in storage.



The critical period for transportation movements of the wind farm is during construction. Thereafter, vehicle movements to and from the site will be minimal and will relate only to routine maintenance and inspection. The County Highways Officer has been consulted during preparation of the wind farm and no objections were raised in principle to both the proposed route for delivery of the turbines and for the proposed site access. The recommended route for both HGVs and exceptional load vehicles starts from the A14, exiting onto the A6116 northbound at Junction 12. The site will be accessed approximately 3 miles along the A6116 near the village of Sudborough.

On cessation of wind farm operations, all major equipment and structures will be removed from the site. This process will take approximately six months to complete. The site would revert back fully to the current use and no visual impact of the wind farm operation would be left on the site.

THE NEED FOR THE DEVELOPMENT

There is a strategic requirement in UK law to tackle climate change and to increase renewable energy generation, with onshore wind making a significant contribution to this. Any environmental impact associated with the proposal must be seen in this context.



Local, regional and national planning and energy policies make a commitment to increasing the amount of electricity generated from renewable sources. The relevant Development Plan for the Barnwell Manor site comprises the East Midlands Regional Spatial Strategy (RSS) and the North Northamptonshire Core Spatial Strategy. The Rural North, Oundle and Thrapston Plan, whilst not yet adopted, is at an advanced stage and is considered to carry significant material weight.

The Development Plan supports the need for wind farms and the crucial (and increasing significant) role that they play in meeting energy targets. The requirements of the various policy criteria have been rigorously assessed as part of this Environmental Impact Assessment process and reported in detail in the Chapters of Volume 1 of the ES.

In addition to the Development Plan, other material planning considerations must be taken into account in determining these planning applications. These include national planning policy which supports the need for onshore wind, security of UK energy supply, environmental and economic benefits. These issues are addressed in further detail in the supporting Planning Application document

The key environmental and economic benefits of the proposal are summarised below:

- The site would make an important contribution to both regional and national targets for electricity production from renewable sources
- Based on five 2.5MW turbines (12.5MW installed capacity), there will be significant carbon dioxide emission savings over the lifetime of the wind farm. Significant emission savings of NO_x and SO₂ will also result over the lifetime of the wind farm. Once constructed, wind generation produces no carbon, nitrogen or sulphur emissions.
- Utilising updated figures of average UK household electricity consumption of 4,700 kWh per annum¹, computer based assessment, using a generic 30% capacity factor projects that the proposed wind development, based on eight 2.5MW turbines could be sufficient to each year supply the averaged annual domestic needs equivalent to around 7,000 homes². This would be the equivalent to in excess of one fifth of the total number of households in East Northamptonshire.
- The construction of the wind farm would cost in the region of £19m. There would be potential significant local economic benefits, particularly during the construction phase, including use of local contractors and expenditure on local goods and services.

In addition, the Barnwell Manor Wind Farm proposal will provide a greater diversity in the energy mix, will be indigenous, independent of outside fuel sources and undepletable, all which ensure security and continuity of supply as fossil fuels continue to deplete and the UK becomes increasingly dependent on energy imports from international markets.

¹ BWEA (2002). Calculation for Wind Energy Statistics. <http://www.bwea.com/edu/calcs>

² Stated figures assume 12.5MW overall capacity (i.e. five 2.5MW turbines), an annual capacity factor of 30%, and an annual domestic household electricity consumption of 4,700kWh. These are estimated figures with on-site wind speeds derived from NOABL.

LANDSCAPE AND VISUAL EFFECTS

The proposed development would be located within a landscape defined by an undulating topography extensive woodland cover and lack of built development, which contrasts markedly with surrounding areas. The combination of topography and woodland act to limit the effects of the development upon landscape character and upon views at middle- and longer-distances, and to restrict cumulative effects with other developments and proposals.

The introduction of large, man-made elements would lead to a marked effect on landscape character and visual amenity in the vicinity of the development site. However, the effects on landscape character would diminish with distance from the site, as would visual effects.

At closer proximity, the proposal would be a prominent, and in some cases dominant, new landscape feature and would have a significant effect locally upon the landscape character of adjacent parts of Rockingham Forest and the Harper's Brook valley. Significant effects upon residential properties would also occur where clear and direct views towards the proposed turbines would occur. As the closest properties are approximately 1km away from the turbines, it is not considered that these effects would be unacceptable or overbearing to the amenity of the properties.

Whilst significant, these localised effects would not be automatically unacceptable due the subjective nature of individual responses to the presence of wind farms. Due to the topography and land cover of the receiving landscape, and small number of turbines, it is considered that the capacity of the landscape to accommodate such change would not be exceeded and that turbines would form a new element within the wider landscape rather than lead to an extensive change in the underlying character.

ECOLOGY

The proposed wind farm development at Barnwell Manor holds no statutory or non statutory designations. The Sudborough Green Meadows SSSI adjacent to the Site is assessed as being unaffected by the proposed development.

Three bat species were identified foraging and commuting across the site, daubenton's bat, common pipistrelle and soprano pipistrelle, with a possible fourth commuting across the site (possible natterer's or whiskered bats) and a fifth, barbastelle bat commuting along the site boundary on one occasion. A small soprano pipistrelle roost was identified in a tree on the south eastern site boundary. The effect on these species has been assessed as of no significance.

Badgers and their setts are present on the site but the majority are outwith the zone of effect of any infrastructure. Therefore there is no effect predicted for this species.



Of the 17 ponds on site, or within 500m of the proposed turbines or associated infrastructure, 11 contained breeding populations of great crested newts. The population present on Barnwell Manor site as a whole was assessed as a medium sized population. Due to suitable mitigation being undertaken as outlined above, the proposed development is assessed as having no significant effect on the newt population present.



No signs of otter or water vole were identified on any of the watercourses and ditches present on Site.

ORNITHOLOGY

The proposed wind farm development at Barnwell Manor holds no statutory designations within or adjacent to the site, although it is situated 3.5 km to the north-west of the Upper Nene Valley Gravel Pits SSSI designated for its bird interests. The development is not predicted to have any impact on the integrity of this site.

Desk and field studies of the site identified:

- Breeding red kite in the forestry surrounding the site with 2 pairs nesting within 0.5 km of the proposed development.
- Twenty six bird species of potential conservation concern were recorded on the site. Of these 15 were considered of potential conservation value at the site ranging from High to Lower value.
- Red kite, lapwing and golden plover were consider to be at potential risk of collision with turbines and collision risk modelling revealed predicted annual collision rates of 0.76 (red kite), 2.47 (lapwing) and 0.018 (golden plover) respectively.

In Environmental Impact Assessment terms all ornithological receptors are predicted to undergo either no impact or an impact of no greater than Slight Adverse significance.

CULTURAL HERITAGE

Cartographic and bibliographic sources indicate that the development area has been subject to extensive human activity from the Iron Age through to the post-medieval period and has primarily been given over to agricultural activity in the modern period. The majority of on-site impacts are associated with the Gartree Roman Road or the medieval estate at Lyveden.

Potential visual impacts on the setting of Scheduled Ancient Monuments, Listed Buildings, Conservation Areas and Registered Parks and Gardens by the proposed wind farm were identified in this assessment. The majority of visual impacts have been judged to be of *Minor* or *Negligible* significance in each case. There will, however, be an impact of Moderate significance on All Saints Church in Sudborough and an impact of *Major* significance on the medieval manor at Lyveden which comprises an unfinished summer house, a manor house and the remains of a designed garden. An impact of *Major* significance is expected upon the associated Grade II Listed Lyveden Cottage.

Mitigation is proposed to offset the impacts of the proposal. In compliance with national and local planning policies, it is advised that a programme of archaeological works will be required prior to ground breaking works associated with the development of the site. Such a programme will be required to mitigate the impact of the proposed access track on Gartree Roman Road and the impact of Turbine 5 on a possible charcoal burning platform. Northamptonshire Council's archaeological advisor has indicated that geophysical survey in the area where the proposed access track will cross the line of the Roman Road be sufficient to identify its presence. Depending upon the outcome of this survey, further mitigation during the construction phase may be advised. The location of the charcoal burning platform in immediate proximity to proposed Turbine 5 and the amount of known archaeology in the area also necessitates further evaluation, by geophysical survey and trial trenching, in the location of the turbine pads and crane bases. Such an evaluation would identify and establish the significance of any hitherto unknown remains and it is envisioned that these works will be carried out as planning conditions prior to the commencement of construction on site.

The sites at Lyveden comprise a Scheduled Ancient Monument, two Grade I Listed Buildings and a Grade II* Registered Garden as well as an associated Grade II Listed Cottage. These sites are located northeast of the proposed wind farm. The planting of native shrubs along the western boundary and woodland planting around the southern and western edge of the Lyveden property boundary could potentially act as mitigation. This would not only act as a screen but in the case of the woodland planting would restore the form of previous woodland at the site. Dependent upon the mix of appropriate historic deciduous species chosen to make up the screen and their associated growth rates; it is likely that the impact of *Major* significance upon the setting of Lyvedon will begin to reduce – although without further assessment, the period of time for such mitigation to have such an impact is unknown but is likely to be several years. However, the National Trust have raised reservations regarding the effectiveness and appropriateness of the proposed mitigation and as such it is not proposed that this will be implemented. In the meantime, it is proposed that compensatory mitigation could be provided by preserving the setting of the sites by record during the course of the wind farm's operation. This could be achieved through a combination of comprehensive photomontage in conjunction with LiDAR or laser scanning which would produce a three dimensional digital replica of the current setting of the monuments at Lyveden. Furthermore it is thought that a photomontage taken from the tower of All Saints Church and encompassing views toward the proposed wind farm in the north could serve as preservation of the setting by record and thus mitigate the impacts of the wind farm upon the church during the course of the wind farm's operation.

GEOLOGICAL AND HYDROGEOLOGICAL IMPACTS

No watercourses cross the area where the wind turbines are proposed, which is located on top of a hill. The hilltop position of the site means that it is not at risk of flooding. According to the Environment Agency's Flood Map, the entire site is in Flood Zone 1, with an annual probability of flooding of less than 1 in 1000.

The low permeability of the soil and drift deposits over the majority of the site mean that the development of the wind farm is not likely to have any significant impact on groundwater resources, apart from a possible impact from any contamination released in the vicinity of the site compound.

The greatest potential risk of impacts to watercourses will be during the construction phase. Best practice construction procedures will aim to avoid such risks.

The development is predicted to result in a slight increase in runoff to the watercourse, which can be mitigated by appropriate use of SUDS techniques.

During the operation of the wind farm, on-site activity is likely to be limited to maintenance and associated vehicle movements. Hard standing and tracks will remain in place. Potential impacts of the operation phase include chemical pollution (e.g. by fuel or lubricating oil) and a small increase in surface runoff.

The following mitigation measures are proposed:

- Development and implementation of a Pollution Prevention Plan following published Pollution Prevention Guidelines;
- Development and implementation of a site-specific Erosion and Sediment Control Plan;
- The use of waterless chemical toilets during the construction phase of the development;
- The design of site drainage in accordance with the guidance given by CIRIA and the Environment Agency on Sustainable Drainage Systems (SUDS);
- The minimisation of areas of exposed soil during the construction phase of the development.

Assuming that the proposed mitigation measures are adopted and that best practice is followed, the development is assessed as having no significant impact on the groundwater environment and groundwater abstractions and a minor, localised, impact on soils, surface water and one possible surface water abstraction.



NOISE

The noise assessment of the Barnwell Manor Wind Farm has been carried out according to ETSU-R-97, *Assessment and Rating of Noise from Wind Farms*, as referred to in PPS22, *Renewable Energy*. Noise monitoring has been carried out at 7 locations, agreed with East Northamptonshire Council.

Noise levels are normally expressed in decibels. Noise in the environment is measured using the dB(a) scale which includes a correction of the response of the human ear to noises with different frequency content. Table 1 below shows noise from various sources and approximate levels of noise in the environment.

Table 1: Example of Indicative Noise Levels³

Source / Activity	Indicative Noise Level dB (A)
Threshold of Pain	140
Jet Aircraft at 250m	105
Truck at 30m at 100m	65
Busy General Office	60
Wind Farm at 350m	35-45
Quiet Bedroom	35
Rural night-time background	20-40
Threshold of Hearing	0

Appropriate noise limits have been derived, according to ETSU-R-97, for the site based on the results of the noise monitoring. Predictions of the worst-case noise levels likely to result from the operation of the wind farm were carried out, based on the proposed site layout and using the noise characteristics of Nordex N90 2.5MW Wind Turbines.

The assessment shows that predicted noise levels meet the ETSU-R-97 night-time noise limits and day-time noise limits, under all wind conditions.

A detailed assessment of noise impact from construction activities has not been carried out. Noise from such activities will, however, be below published guideline noise limits.



³ Taken from Planning Advice Note (PAN) 45 'Renewable Energy Technology' (Scottish Executive, 2002)

INFRASTRUCTURE AND SAFETY

The potential infrastructure assessed in this Section comprise of - Transportation, Construction, Telecommunication, Public Access and Aviation issues. Construction will take approximately 6 months and is unlikely to have any significant adverse implications. Further details of construction activities and general mitigation procedures that will take place during construction are found in Volume 1 of the ES. The County Highways Authority were consulted on both the proposed route for construction traffic and the visibility splays at the site entrance. No objections were raised on this at the pre-application stage. It is not envisaged that these issues will create any major impacts.

With regard to telecommunications, several organisations were consulted to assess the potential for disturbance to communication systems as a result of the proposed wind farm development. Initially 2 companies raised an objection: Northumbrian Water and the Joint Radio Company (JRC). However, correspondence and further work with these organisations have led to a withdrawal of objections from both. It is therefore predicted that the positioning and dimensions of the turbines will not cause disturbance to communication systems, including those used by emergency services and mobile telephone service providers.

Following the initial consultation at the EIA Scoping stage an objection to the development was received from the Ministry of Defence (MoD) regarding impacts upon RAF Cottesmore and RAF Wittering. In view of this, aviation consultants Cyrrus were commissioned to undertake an assessment of the aviation impact of the site. The conclusions from the Cyrrus report stated that:

“On balance, it is assessed that the proposed site of the Barnwell Manor wind farm lies beneath airspace of limited operational significance, and is located sufficiently distant from extant flight profiles in use at both RAF Cottesmore and RAF Wittering to present little, if any, significant operational impact on Air Traffic Service provision. Any resultant adverse impact could be readily overcome via the employment of a number of simple operational mitigation measures without the need to resort to the more expensive technical solutions available.”



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