

**ELECTRICITY ACT 1989 (SECTION 36 AND SCHEDULE 8)
TOWN AND COUNTRY PLANNING ACT 1990 (SECTION 90)
THE ELECTRICITY GENERATING STATIONS AND OVERHEAD LINES (INQUIRIES
PROCEDURE) (ENGLAND AND WALES) RULES 2007**

**PUBLIC INQUIRY TO CONSIDER SECTION 36 ELECTRICITY ACT 1989
APPLICATION BY STEADINGS WIND FARM LIMITED FOR CONSENT AND
DEEMED PLANNING PERMISSION TO CONSTRUCT AND OPERATE A WIND FARM
AT KIRKWHELPINGTON, NORTHUMBERLAND (KNOWN AS STEADINGS)**

SUMMARY PROOF OF EVIDENCE OF

Malcolm D Hayes BSc MIOA

NOISE INCLUDING ASSESSMENT OF CUMULATIVE EFFECTS

ON BEHALF OF STEADINGS WIND FARM LIMITED

BERR REFERENCE: GDBC/001/00278C

TYNEDALE COUNCIL REFERENCE: 20060540

NORTHUMBERLAND COUNCIL REFERENCE: 06/00023/CPC

3 DECEMBER 2007 FOR INQUIRY COMMENCING 15 JANUARY 2008

Qualifications and Experience

S.1 I am Malcolm David Hayes BSc MIOA and I have worked as an acoustical consultant for over 23 years. I provide an outline of my qualifications and experience within paragraphs [1.1 – 1.8].

Purpose, Scope and Structure of Evidence

S.2 The purpose of my evidence is to explain why I consider that noise and vibration associated with the construction, operation and decommissioning are not a determining issue for the granting of the consents sought for the proposed Steadings Wind Farm. I make reference to the ES [CD SWF 1.2] and the SEI [CD SWF 1.7].

S.3 Part 1 of my evidence describes my involvement with the project, considers any additional guidance issued by the Government dealing with noise and the development of wind farms and discusses the Statement of Matters in relation to noise emissions associated with the operation of the wind farm. Part 2 of my evidence deals with issues raised in Objector Statements of Case and Third Party responses. Part 3 of my Evidence deals with the cumulative noise impacts associated with the operation of all three wind farms which are to be considered at this Inquiry.

History of Association with the Project

S.4 I provide a history of my involvement with the project, from the initial planning stages incorporating 35 wind turbines, through to the development of a layout of 22 turbines which formed the initial planning application [CD SWF 1.2] through to the revised 21 turbine layout which is the subject of this planning inquiry [CD SWF 1.7]. [3.1 – 3.5]

S.5 The prediction of operational wind turbine noise indicates that the proposed Steadings Wind Farm may be operated with appropriate regard to ETSU-R-97 for associated and un-associated receptors neighbouring the development. This analysis has been provided within

Appendix 3 of the SEI [CD SWF 1.7] and is summarised within Tables 6.2 & 6.3 of the document.

Planning Policy Guidance

Planning Policy Statement 22: Renewable Energy

Companion Guide to PPS22

S.6 I have considered Planning Policy Statement 22: Renewable Energy [CD SWF 4.4] and its associated Companion Guide [CD SWF 4.5] within the Environmental Statement, EIA [CD SWF 1.2] Appendix 5: Section 3.1 – 3.2. [4.1]

ETSU-R-97: The assessment and rating of noise from wind farms [CD SWF 14.1]

S.7 ETSU-R-97 has been identified within PPS22 and the Companion Guide to PPS 22 as the appropriate method for the assessment of noise from wind farms. [4.2 – 4.3]

S.8 ESTU-R-97 states that daytime limits within the range of 35 to 40 dB $L_{A90,10 \text{ min}}$ offer a reasonable degree of protection to wind farm neighbours without placing unreasonable restrictions on wind farm development. [4.4]

Sleep Disturbance: WHO Guidelines for Community Noise [CD SWF 14.7]

S.9 I consider the relevance of the WHO Noise Criteria contained within WHO *Guidelines for Community Noise* that was issued after the publication of the ETSU-R-97 Guidance document. I do not consider the advice contained within the WHO *Guidelines for Community Noise* to have changed the validity of the advice contained within ETSU-R-97 when setting night-time noise limits to protect the sleep of neighbouring receptors. [4.5 – 4.7]

Local Policies

S.10 I consider the relevant local planning policies which deal with noise. These are contained within the Tynedale District Local Plan (2006), CS16, CS19 and CS22, [CD SWF 2.6], the Tynedale District Local Development Framework Core Strategy Submission Draft (October 2006), EN2, Regional Planning Guidance RPG1 [CD SWF 2.3] and the Northumberland County and National Park Joint Structure Plan (2005) (NCNPJSP), M2 and M4 [CD SWF 2.4]. [4.8 – 4.15]

Discussion of Noise Criteria for Complies with Policies

S.11 The acceptability of operational noise associated with a proposed wind farm in the Tynedale District is outlined within Policies TDLP CS22 and TDLDF EN 2 which require that no significant adverse effects should occur to neighbouring noise sensitive receptors. Tynedale District Environmental Health Department has identified the proposed site as an appropriate location for the development of a wind farm subject to the agreement of appropriate noise conditions to control the operational noise to an acceptable level. TD EHO has proposed a condition that is based upon the method described within ETSU-R-97. Compliance with the requirements of ETSU-R-97 should be considered as the appropriate noise criteria for acceptability of the Steadings Wind Farm. The EIA and SEI indicate that the proposed wind farm may be operated to meet these requirements. [4.16 – 4.18]

Introduction to Noise

S.12 Appendix 1 [SWFL5.3] provides a review and discussion of noise and the sources of noise associated with wind turbines. [5.1]

Source of noise from wind turbines

S.13 The principal sources of noise are from the blades passing through the air (aerodynamic noise) and mechanical noise associated with the internal plant, i.e. gear box, hydraulic pumps, yaw gear etc.. [5.4]

Prediction of operational wind turbine noise

S.14 Predictions of the incident noise from the wind turbines have been based upon a number of assumptions which are designed to ensure that the predicted noise levels are the highest which are likely to occur during the operation of the wind turbines. These assumptions have been identified within the EIA and SEI [CD SWF 1.2]and [CD SWF 1.2] . [5.5 – 5.6]

S.15 I have undertaken compliance measurements of wind farm noise subsequent to construction where I have used the above assumptions to determine the level of noise at neighbouring noise receptors. I have found that in all cases where I have used these assumptions, wind turbine noise has not exceeded the predicted noise levels even when directly down wind of the nearest wind turbines. [5.6]

Wind Turbine Source Noise Level

S.16 The final selection of turbine for installation at the site has not been finalised as this would potentially limit the type of wind turbine for installation. It is not uncommon, however, to use a generic sound power level thus allowing a developer to select the best available technology at the time of purchasing the wind turbines. Where this has given rise to concerns in the past, it has been agreed with the Local Planning Authority that a noise prediction report based upon the final wind turbine selection be supplied¹, to demonstrate that the wind farm will meet the agreed Planning Conditions dealing with noise or that predicted levels are equal to or below those reported within the EIA/SEI. [5.7 – 5.10]

Assumption of Down Wind propagation Condition

S.17 It has been assumed when undertaking operational noise predictions for the EIA and SEI [CD SWF 1.2] and [CD SWF 1.2] that a receptor location will be down wind of all the wind turbines. [5.11]

¹ Boyndie Wind Farm, Aberdeenshire: Project West Wind, Wellington, New Zealand.

Ground Condition

- S.18 When undertaking predictions of the incident noise at a receptor location, it has been assumed that the ground will be acoustically hard. This assumption will normally lead to predictions of incident noise which is higher than that found above grass land. [5.12 – 5.14]

Temperature and Humidity Assumptions

- S.19 When undertaking noise predictions, I have made assumptions with respect to the temperature and humidity of the atmosphere through which the sound will propagate. This has been on the basis of a worst-case absorption of the sound energy as it propagates through the air. [5.15 – 5.16]

Wind Shear Correction

- S.20 The prediction of wind turbine noise levels at receptor locations and reported within the EIA and SEI, has been based upon an assumed wind shear profile for day and night-time operation. The assumed wind shear profiles for the noise predictions are 0.12 and 0.35, respectively. Subsequent historical measurements undertaken since the original background noise survey indicate that these assumptions are correct. [5.17 – 5.18]

Acceptability of proposed wind farm

- S.21 The potential noise impact associated with the operation of the wind turbines has been predicted to meet the requirements of HTSU-R-97 for dwellings neighbouring the proposed Steadings Wind Farm. Tables 6.2 and 6.3 within the SEI [CD SWF 1.7] detail this compliance. [6.1 – 6.3]

Construction Noise

Borrow Pit

- S.22 It has been identified within the SEI that it is proposed to locate a single borrow pit to the north of Great Bavington. I have undertaken noise predictions of the potential noise associated with the operation of a Borrow Pit at this new location. Table 1 in my proof details the noise source information and Table 2 provides a prediction of the noise levels at neighbouring properties associated with this activity. [7.1 – 7.3]
- S.23 The placement of the Borrow Pit to the North of Great Bavington will result in predicted noise levels that are unlikely to exceed 55 dB L_{Aeq} during the period of operation. A level of 55 dB $L_{Aeq, 16\text{ hour}}$ is identified within the WHO *Guidelines for Community Noise* [CD SWF 14.7] as a level at which the onset of serious annoyance may be considered to occur. The design criteria for construction noise within The Department of the Environment Advisory Leaflet (AL) 72 “*Noise control on building sites*” states that during the daytime period (defined as 07.00 to 19.00 hrs), the noise level outside the nearest occupied room should not exceed: 75 dB(A) in urban areas close to main roads; and 70 dB(A) in rural, suburban and urban areas away from main road traffic and industrial noise sources. The proposed location of the Borrow Pit will not result in noise levels which exceed these guideline values. [7.4 – 7.5]
- S.24 The potential for blasting noise associated with the Borrow Pit should form part of an agreed Noise Management Plan with the Local Authority responsible for such works. [7.6]

Movement of Access Track to Turbines 1 - 3

- S.25 Some have suggested that the access track to Turbines 1 – 3 be moved to avoid archaeological features. Were this course adopted, movement of the track will have a minimal effect upon the construction noise associated with this track construction. [7.7]

Third Party Responses to Proposed Steadings Wind Farm

S.26 With the submission of the EIA and SEI, responses have been received from concerned members of the public with respect to the subject of noise.

Tyndale Council Environmental Health Department

S.27 A response has been received from the Environmental Health Officer for Tynedale Council which is contained within memo's dated 23rd May 2006 {Ref: WPC/65921/LC} [CD SWF 1.6] & 8th October 2007 [CD SWF 1.8]. The officer has indicated that the proposed location of the wind farm is appropriate for the development of a wind farm and that noise associated with the construction, operation and decommissioning of the wind farm may be controlled through the agreement of conditions dealing with noise. [8.2 – 8.5]

Mr Short

S.28 A detailed response was received dealing with noise from Mr William Short when the original application was made. A meeting was held on 4th December 2006, between myself, Mr Edgar (TNEI), Mr Williams (Banks) and Mr Short to discuss the issues which he raised within his objection. I believe that a lot of this discussion was useful as it allowed Mr Short to understand my methodologies when assessing noise associated with then operation of wind turbines. I have dealt with specific issues raised by Mr Short in more detail within my proof of evidence which cover the issue of calibration of sound level measuring equipment, the assumed temperature and humidity for the site, ground conditions and wind shear. [8.6 – 8.9]

Kirkwhelpington Parish Council

S.29 Kirkwhelpington Parish Council has raised the issue of low frequency noise from the proposed wind turbines. I deal with these concerns within paragraphs 8.10 – 8.12. Predicted noise levels external of a dwelling in Kirkwhelpington are sufficiently low as to ensure that internal noise levels are below the DEFRA Internal Night-time Low Frequency Noise Criterion. [8.10 – 8.12]

Cornhills

- S.30 I have undertaken an analysis of the potential noise impact at Cornhills which indicates that wind turbine noise will meet the requirements of ETSU-R-97 for a dwelling that is not associated with the development. On this basis, I consider that the potential operational noise impact will be acceptable. [8.13 – 8.14]

Kirkwhelpington Parish Council- St. Oswald's Way

- S.31 Kirkwhelpington Parish Council has indicated that there may be an adverse effect upon the long distance footpath known as St. Oswald's Way. I have considered the potential noise impact of the wind farm upon this footpath and my calculations indicate that the highest levels predicted along any section of the footpath are no more than 47 dB L_{Aeq} . This is below the onset of moderate annoyance defined within WHO *Guidelines for Community Noise* [CD SWF 14.7]. [8.15 – 8.16]

The Benefice of Chollerton: The Parish of Thockrington

- S.32 Predicted noise levels at St. Aidan's Church in Thockrington are unlikely to exceed 37.7 dB L_{Aeq} . The construction of the church is such even for a condition of high wind speeds, internal noise levels are unlikely to exceed 25 dB L_{Aeq} , and will generally be below 20 dB L_{Aeq} . During periods of low, internal noise levels will be at or below the threshold of hearing. Finally, the church is located upwind of the proposed wind turbines for a majority of the time which will result in an even lower level of potential noise impact at this location. [8.17]

Cumulative Noise Effects of Proposed Wind Farms

- S.33 A Statement of Common Ground has been agreed between the developers' noise experts that deals with the cumulative noise impact of the three proposed wind farms of Steadings, Ray and Green Rigg. When assessing the acceptability of all three wind farms, the relevant noise criterion to determine compliance for a non-associated receptor with the requirements of ETSU-R-97 is as follows:

Amenity Hours

The greater of 40 dB L_{A90} of background + 5 dB

Night-time Hours

The greater of 43 dB L_{A90} or Background + 5 dB

- S.34 When a receptor is associated with a specific wind farm, then the Amenity Hours Criterion shall be increased to 45 dB L_{A90} for day and night-time operation. [9.1 – 9.2]
- S.35 The tables detailed within Appendix 3 [SWFL 5.3] are a worst-case prediction and assessment. The tables detail the predicted noise levels from the Steadings Wind Farm (Table 3.1) and cumulative effect of Steadings and Green Rigg Operating together (Table 3.2), Steadings and Ray (3.3) and Steadings, Green Rigg and Ray together, (Table 3.4). The predicted noise levels for each of the situations indicate that the wind farms may be operated to ensure compliance with the requirements of ETSU-R-97 for the Amenity Hours of operation. With the exception of locations associated with the Steadings Wind Farm, the ETSU-R-97 night-time noise criterion of 43 dB L_{A90} will not be exceeded at any dwelling neighbouring the three sites.
- S.36 I consider that this is indicative that the proposed operation of the three wind farms will meet the requirements of ETSU-R-97 for Amenity and Night-time operations.

Conclusion

- S.37 My analysis indicates that the noise criteria identified within ETSU-R-97 will be complied with either with Steadings alone or cumulatively when added to a baseline that includes the Ray Wind Farm and/or the Green Rigg Wind Farm.

Declaration

- S.38 This evidence is given on the understanding that it is my duty as an expert to help the Inquiry on the matters within my expertise and that this duty overrides any obligation to the persons from whom I have received instructions or by whom I am remunerated.