



INTERIM PLANNING
GUIDANCE NOTE
*Assessment of wind
turbine noise*



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INTERIM PLANNING GUIDANCE NOTE

Assessment of wind turbine noise

This advice note provides guidance for applicants on the noise information required to allow a full assessment of the potential noise impacts of individual wind turbines. It also considers the appropriate methodology and criteria to determine turbine noise impacts at noise sensitive receptors.



Small wind turbines

This advice note applies to planning applications for **small wind turbines**. For this advice note this applies to turbines with a rotor diameter of up to 16m for a horizontal axis wind turbine.

Minimum information

Applications for developments which include the installation of a small wind turbine must include the following information.

1. A grid reference for the exact turbine location and the distance between this point and the nearest noise sensitive receptor, usually taken to be the curtilage of the nearest noise sensitive property.
2. The make, model and tower height of the proposed turbine.
3. A Declared Apparent Emission sound power level and noise slope figure for the turbine equipment. This must be derived by a competent independent third party in accordance with part 3 of the document *Small Wind Turbine Performance & Safety Standard 29 Feb 2008* published by the British Wind Energy Association (BWEA).

The above data will be used to assess the potential impact of noise from the turbine.

Noise assessment

Assessing the impact of noise from wind turbines is complex and must be site specific to achieve an accurate prediction. National guidance on noise is aimed at larger wind farms and requires extensive monitoring and assessment, which can be disproportionate to the cost of a small development. This advice note allows applicants for smaller development to avoid this if proposals are within defined thresholds.

An acceptable stand off distance for the turbine from noise sensitive receptors shall be determined in accordance with the following methodology and criteria;

either

- (a) The methodology contained in BWEA Appendix 1 using a V_{90} wind speed and a turbine noise limit of 40-45 dB(A)

or/

- (b) The methodology contained in BWEA Appendix 1 using a V_{avgH} wind speed (average wind speed at hub height) and a turbine noise limit of $L_{Aeq} 35dB(A)$ for wind speed up to 8m/s and $L_{Aeq} 40 dB(A)$ for wind speed 8m/s to 10m/s OR Background +5dB(A) whichever is greater at noise sensitive receptors.

Where noise levels at the nearest noise sensitive receptor are predicted in accordance with (a) above, to be below 40dB(A), it is unlikely that noise will be a problem in the determination of the planning application.

Where noise levels at the nearest noise sensitive receptor are predicted in accordance with (a) above to exceed 40dB(A), noise is likely to be a problematic issue.

Predicted noise levels in the region 40-45dB may be acceptable depending on local circumstances and whether background noise may mask the turbine noise.

If the applicant wishes to pursue an application on the grounds that the background noise level might mask the turbine noise, they will be required to submit a background noise survey undertaken by a competent person to a minimum specification (see Appendix 1). However, the applicant should be aware that there is no guarantee that the evidence from a survey will demonstrate such a claim.

Non wind related background noise

Where there is a permanent background noise source such as a busy road or a river, wind measurements may not be necessary if it can be satisfactorily demonstrated that the noise from such a source will mask the turbine noise regardless of wind speed.

Larger turbines

The methodology for measuring the sound power level of larger turbines is set out in IEC 61400-11. There is no definition in this guidance as to what turbines might be included. It is considered that *large turbines* in this context should be defined as upwind horizontal axis turbines with three aerofoil shaped blades, a tubular metal tower and a rotor diameter of 21m or more.

A methodology for propagation is set out in an article in part 3 of the *Prediction and Assessment of Wind Turbine Noise* as published in the Institute of Acoustics Bulletin Mar/Apr 2009. This article outlines a generally agreed approach to a number of topics, drawing upon research experience and good practice which has been widely adopted.

In this document *measured* levels should be interpreted as *apparent sound power levels* and *warranted levels* as *declared apparent sound power levels* as defined in IEC 61400 part 11 and IEC 61400 part 14.

Where noise levels at the nearest noise sensitive receptor are predicted to be below LA90 (10min) 35dB(A) or background plus 5dB whichever is greater, it is unlikely that noise will be an issue in determining the planning application.

Where the applicant considers that the background +5dB is the more appropriate criteria a full background survey must be undertaken as highlighted in Appendix 1.



Noise assessment requirements

The following information will be required at the time of application;

- A full sound power level test report for the proposed turbine carried out by an independent test laboratory or consultancy with expertise in the field in accordance with:
- In the case of small turbines, the BWEA methodology set out in part 3 of *Small Wind Turbine Performance and Safety Standard* published in Feb 2008.
- In the case of large turbines, IEC 61400 part 11.

An assessment of the noise level from the turbine or turbines at the nearest noise sensitive receptor carried out by a competent person using:

- In the case of small turbines, hemispherical sound propagation and no air absorption.
- In the case of large turbines the methodology set out in part 3 of the IOA Bulletin Mar/Apr 2009 *Prediction and Assessment of Wind Turbine Noise*. In this document *measured* levels should be interpreted as *apparent sound power levels* and *warranted levels* as *declared apparent sound power levels*. The methodology is based on octave band prediction method of International standard ISO 9613-2

Other turbines

Turbines between 16m and 21m rotor diameter shall use either of the methods highlighted above setting out the reasons for using the selected methodology. It is recommended that a decision on which method to use is agreed with Environmental Health.

For the purpose of turbine noise prediction at noise sensitive receptors, no distinction is made between any properties which have a financial interest in the turbine development and those that do not. Noise sensitive receptors shall be taken to be residential premises, hospitals, care homes etc.

Noise emissions from the turbine shall be predicted free-field at noise sensitive receptors (>3.5m) from the nearest façade.



Cumulative impacts

Where up to two turbines are proposed the combined turbine noise will be required to meet the relevant noise limit. Applications for more than two turbines will be regarded as a wind farm and will require to be assessed in terms of *The Assessment & Rating of Noise from Wind Farms* (ETSU-R-97) guidance.

In addition cumulative noise impacts on noise sensitive receptor shall take into consideration any turbine noise existing or proposed not associated with the development which may impact upon the relevant noise sensitive receptors.

APPENDIX 1

Background survey

The survey shall be undertaken in accordance with the document *The Assessment & Rating of Noise from Wind Farms* (ETSU-R-97) with the following clarifications:

1. Noise monitoring should be undertaken at the location to which the noise limits apply. This will usually mean the curtilage of the nearest noise sensitive receptor. If access to a property is not available, a nearby surrogate site must be chosen which is representative in terms of landscaping, locality, shelter etc.
2. Wind measurements should be taken at the site of the proposed turbine.
3. The background noise survey should be taken over a sufficient period of time to enable a reliable assessment of the prevailing background noise levels to be made. The actual duration will depend on weather conditions, in particular wind conditions. Measurements should be taken over a range of wind speeds up to the 90% wind speed as calculated using the BWEA document *Small Wind Turbines Performance & Safety Standard*.
4. Acoustic measurements shall be taken in accordance with Section 1.2.1 of the *Supplementary Guidance Notes to the Planning Obligation* in ETSU-R-97.
5. Wind speed and direction measurements should be undertaken in accordance with section 1.2.2 of the *Supplementary Guidance Notes to the Planning Obligation* in ETSU-R-97 taking into account site specific wind shear. Reference should be made to the article published in the Institute of Acoustics Part 3 Bulletin Mar/Apr 2009; *Prediction and Assessment of Wind Turbine Noise*.
6. Data should be presented in accordance with section 1.2.3 of the *Supplementary Guidance Notes to the Planning Obligation* in ETSU-R-97.



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