Guidance Document for Assessing

Noise Impact From Wind Turbine/s

This guidance note is not formal supplementary planning guidance but aims to provide information and advice to improve the quality of planning submissions, which will enable officers to provide consistent decision making.

Failure to provide the following information with the full planning application may lead to a delay in Public Health Team providing comment with respect to the application or even the Public Health Team objecting to the application due to insufficient information that has been provided, as the noise impact from the proposed development cannot be sufficiently assessed. Please note that the provision of noise contours or printouts from computer models alone are not considered as sufficient information.

1 Definitions

1.1 Small Turbine

A small turbine is defined in accordance with the Renewable UK (formally known as British Wind Energy Association) definition, which is contained in the BWEA Small Wind Turbine Performance and Safety Standard 29 February 2008, which can be accessed using the following link http://www.renewableuk.com/

The definition states that:

"a wind turbine having a rotor swept area of 200m^2 or less. In a horizontal axis wind turbine this equates to a rotor diameter of less than 16m.

1.2 Large Turbine

Large turbine is any one that does not fall within the above mentioned definition.

2. The key objective

The key objective of Carmarthenshire County Council is to try and ensure that the wind turbine noise levels (including cumulative noise from consented and existing turbines in the vicinity) at noise sensitive properties does not exceed:

1. **Small turbines - 35dB $L_{Aeq, t}$**
2. **Large Turbine - 35dB $L_{A90, 10mins}$**
3. **Financially involved - 45dB $_{LA90,mins}$**

3. Site Specific Desktop Noise Assessment

All applications submitted must include a desktop noise assessment which is specific to the development locality. The assessment must be undertaken by a suitably qualified and competent acoustician. The desktop noise assessment should contain all the following information;

- A twelve figure national grid reference for the precise location of the turbine
- Identification of the nearest noise sensitive premises and details of their respective distances from the proposed development. Property that is in ownership of the applicant should also be included. A statement should be provided as to whether any properties in ownership of the applicant are let to third parties.
- The make, model, hub height, declared apparent emission sound power level and rotor diameter of the proposed turbine.
- The most recent turbine-specific emission data (usually supplied by the turbine manufacturer) providing information on the derivation of the sound power level of the turbine, including the level of uncertainty.
    - For small wind turbines the assessment must comply with the BWEA Small Wind Turbine Performance and Safety Standard" 29 February 2008.
    - For large wind turbines the assessment must comply with the most recent version of IEC 61400-11.

- An appropriate modelled assessment must be undertaken detailing the predicted level of turbine noise for each identified receptor:

    - For small wind turbines the noise predictions must be undertaken in accordance with BWEA performance and safety standard, 29 February 2008, therefore the predictions must be based on a hemispherical sound propagation. The predictions should be based upon the declared sound power level up to and including wind speeds of 8m/s at hub height.

    - For large wind turbines the noise predictions must made in accordance with ISO 9613- 2 following the IOA guidance with regards the input parameters to be used. The predictions must be based upon the apparent sound power level (plus uncertainty) and a minimum wind speed range (10m Standardised) for background noise surveys;

        - For pitch-regulated turbines: between cut-in wind speed and the wind speed corresponding to its maximum sound power level.

        - For stall-regulated turbines: between cut-in and 12m/s

- Where multiple small or large turbines are proposed, a desktop noise assessment must be submitted that demonstrates that the cumulative noise emissions from the turbine will not exceed the lower fixed noise limits stipulated in ETSU-R-97.

- If the proposed development produces noise levels within 10dB of any existing turbine/s, consented turbine/s and any turbine/s currently the subject of an application at the same receptor location, then a cumulative noise impact assessment is necessary. In the first instance, the cumulative impact assessment must be based upon the consented levels of existing or approved turbines. We appreciate that there may be some circumstances where an alternative approach is more appropriate. If you wish to use an alternative approach, please contact the Public Health Team. Should there be no consented levels then the assessment should be based on the sound power level of the existing or approved turbines. A full explanation on how the cumulative impact has been determined should be submitted as part of the application. For assistance in completing this task then please contact the Carmarthenshire County Council's planning department on 01267 234567. Carmarthenshire County Council reserves the right to request a wider search radius where large scale developments are involved.

- In instances were wind shear has not been taken directly into account, it will be necessary to apply corrections to address this. Any such corrections should be clearly outlined and detailed in any noise assessment. The Institute of Acoustics "A Good Practice Guide to the Application of ETSU-R-97 For the Assessment and Rating of Wind Turbine Noise" provides examples of suitable methods to correct predictions to account for wind shear effects.

4. Site Specific Detailed Noise Assessment

Where the site specific desk top study demonstrates that the proposed wind turbine(s) do not meet the noise limits of:

1. **Small turbines - 35dB $L_{Aeq, t}$**
2. **Large Turbine - 35dB $L_{A90, 10mins}$**

then the applicant must undertake and submit a site specific detailed noise assessment.

This assessment should include the following:

- Predicted turbine(s) noise levels at the noise sensitive properties undertaken in accordance with the method detailed in point 3.
- A detailed background noise survey undertaken in accordance with requirements stipulated in ETSU-R-97, which are further explained in Institute of Acoustics' Good Practice Guide. Locations and details of which should be discussed and agreed with the local planning authority. Two weeks' notice of when the background noise measurements will be undertaken must be provided to the Public Health Team, so that they can attend where appropriate.
- Noise limits specified in ETSU-R-97 and the difference between the predicted noise levels and ETSU-R-97 derived noise limits.

Please Note that the Local Planning Authority of Carmarthenshire County Council so reserve the rights of specifying a single noise limit, which are not specified in ETSU-R-97.

Example Noise Conditions for Small Wind Turbines

- The rating level of noise emission from the wind turbines (including the application of any tonal penalty) should not exceed a sound pressure level of 35 $dBL_{Aeq,T}$ within the amenity space of any lawfully existing dwelling, at wind speeds up to an including 8m/s at hub height. Measurements should be made at least 3.5m away from the building facade or any reflecting surface except the ground.

  The measurement time period shall be based on BWEA blade length calculation (3.4.1):

  $$t = 4*D \text{ seconds}$$

  Where:

  t - measurement period in seconds (Subject to a minimum period of 10 seconds)

  D – rotor diameter in meters

- Within 21 days from the receipt of written request from the Local Planning Authority, the operator of the development shall, at its expense, employ an independent consultant approved by the Local Planning Authority to assess the level of noise imissions from the wind turbines using a method agreed with the Local Planning Authority, to ensure that the noise from the development meets the level specified in condition X.

- During the course of the investigation, should the wind turbine be identified as operating above the parameters specified in the above Condition the wind turbines will be modified, limited or shut down. These measures shall be applied until such time as maintenance or repair is undertaken sufficient to reduce the absolute noise level of the operating turbines to within the parameters specified in the above Condition.

- In the event that the operational turbine subsequently develops an audible tone, then a penalty shall be added to the measured sound levels in accordance with ETSU-R-97. This condition applies where no tone has been identified at the assessment stage and no penalty applied.

Example Noise conditions in relation to a large wind turbine

- The rating level of noise immission from the wind turbine/s (including the application of any tonal penalty) should not exceed a sound pressure level not exceeding 35dB $L_{A90,\ 10\ mins,}$ within the amenity space of any lawfully existing dwelling, at wind speeds up to an including 10m/s, standardised/measured to a height of 10m.

- The noise immision from the wind turbine shall not exceed a sound pressure level $L_{A90,\ 10\ mins}$ of 45dB at the financially involved noise-sensitive property at wind speeds up to and including 10m/s at 10m height.

Where this is not possible ETSU-R-97 conditions will apply, based on the background noise levels and predictions submitted.

- Within 21 days from the receipt of written request from the Local Planning Authority, the operator of the development shall, at its expense, employ an independent consultant approved by the Local Planning Authority to assess the level of noise imissions from the wind turbines using a method agreed with the Local Planning Authority, to ensure that the noise from the development meets the level specified in condition X.

- The assessment of the rating level of noise immissions shall be undertaken in accordance with an assessment protocol that shall previously have been submitted to and approved in writing by the Local Planning Authority. The protocol shall include the proposed measurement location where measurements for compliance checking purposes shall be undertaken, the method to assess the presence of any tonal component, and also the range of meteorological and operational conditions (which shall include the range of wind speeds, wind directions, power generation and times of day) to determine the assessment of rating level of noise immissions.

- During the course of the investigation, should the wind turbine be identified as operating above the parameters specified in the above condition the wind turbine/s will be modified, limited or shut down. These measures shall be applied until such time as maintenance or repair is undertaken sufficient to reduce the absolute noise level of the operating turbines to within the parameters specified in the above condition.

- In the event that the operational turbine subsequently develops an audible tone, then a penalty shall be added to the measured sound levels in accordance with ETSU-R-97. This condition applies where no tone has been identified at the assessment stage and no penalty applied.

Useful web links

1. IOA Good Practice Guide

   http://www.ioa.org.uk/pdf/ioa-gpg-on-wtna-issue-01-05-2013.pdf

2. ETSU-R-97

   http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/energy/sources/renewables/explained/wind/onshore-offshore/page21743.html

3. BWEA Small Wind Turbine Performance and Safety Standard 29 February 2008. http://www.renewableuk.com/