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## **MELLOCK HILL WIND FARM**

### **ENVIRONMENTAL STATEMENT 2005**

#### **Comments on Noise Section of Revised Application**

**28th September 2005**  
**Dick Bowdler**



## MELLOCK HILL WIND FARM

### ENVIRONMENTAL STATEMENT 2005

#### Comments on Noise Section of Revised Application

##### SUMMARY

- S1. The purpose of this report is to review the Noise Section of the Environmental Statement for the proposed windfarm at Mellock Hill and to provide an opinion as to the impact of the windfarm on local residents. This review relates to the revised ES submitted in 2005.
- S2. The method of assessment used by the applicant, which I will call the ETSU method, is commonly used to assess windfarm noise and is incorporated into Planning Advice Note, PAN45 Renewable Energy Technologies. However, it is not a method of assessing the impact of noise on neighbours but a framework for achieving a balance between a reasonable degree of protection to neighbours and reasonable restrictions on developers. In addition to commenting on the ETSU assessment, I have assessed the impact of turbine noise on neighbours.
- S3. The Executive Summary is clear and precise and the text of the noise section sets out the methodology and assumptions made. However, at four of the six background noise locations, there are faults with the background noise data (which is the same data as presented in the original assessment) to the extent that they are not usable. This has been acknowledged only at one location.
- S4. I have no significant disagreement with the stated method of calculation of turbine noise or with the results.
- S5. Notwithstanding problems with background noise data I confirm that all sensitive properties meet the ETSU lower guideline of 35dB during the day.
- S6. I have assessed the likely loss of amenity at surrounding properties. There are five properties that will suffer a marginal loss of amenity. I do not think that this is sufficient for refusal on the grounds of noise.
- S7. I am not aware that this is an area used significantly for walking or other recreation.
- S8. If planning permission is granted for this and other wind farms nearby there may be a cumulative effect on some residents.

## 1 INTRODUCTION

This report is prepared on the instructions of Perth and Kinross Council. The purpose is to examine and comment on the Noise Section (Chapter 11 and Appendix 11) of the Environmental Statement for the proposed windfarm at Mellock Hill and to provide an opinion as to the impact of the windfarm on local residents. References to the Environmental Statement refer only to the noise section.

The ES considered here accompanies a revised application for a reduced number of turbines following the refusal of permission for the previous application. It is assumed that the current noise section completely supersedes the previous one.

I have not been asked to comment on construction noise.

The applicant's consultant has agreed that "2005" in two places in section 11.4.9 should read "2004" and that all the noise levels in table 11.3 should have 5.2dB deducted from them. I have also assumed that "Coulsknowe" in section 11.4.12 should read "Craighead".

## 2 METHODS OF ASSESSMENT

The method of assessment used by the applicant is set out in *The Assessment and Rating of Noise from Wind farms* (ETSU-R-97). This is commonly used to assess windfarm noise and is incorporated into PAN45 *Renewable Energy Technologies*. However, it is not a method of assessing the impact of noise on neighbours. This is not merely a personal view but is clearly stated in the first paragraph of the Executive Summary of ETSU-R-97 where it explains that the report *describes a framework for the measurement of wind farm noise and gives indicative noise levels thought 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 local authorities*. Section 3 of this report contains my comments on the Environmental Statement in terms of ETSU-R-97.

The most commonly used method of assessment of the impact of a new noise is by comparing the new noise with the pre-existing background noise by the method set out in British Standard 4142. At low noise levels there is some controversy about using this method but, for all its faults, BS4142 has been around for nearly 40 years and is widely used in rural Scotland even for low background levels. The Appendix sets out the issues in more detail.

Since the Environmental Statement does not clearly set out the noise impacts on neighbouring properties I have used BS4142 to do this in Section 4.

### 3 ETSU-R-97 ASSESSMENT

This is the method used in the Environmental Statement. The ETSU method compares the predicted noise from turbines with the background noise or, where background noise is low, with a fixed noise level. This requires that measurements of background noise are made, turbine noise levels are calculated, and a comparison is made of the two.

All noise levels in this section are shown as  $L_{A90}$  unless otherwise stated, in accordance with ETSU-R-97.

#### 3.1 General Comments

11.1 Executive Summary is clear and precise.

All the methodology and assumptions are clearly set out.

In Table 11.1 it states that the noise level of a windfarm at 350m is 35 to 45 dB. This is misleading. At this wind farm it is about 50dB.

#### 3.2 Background Noise

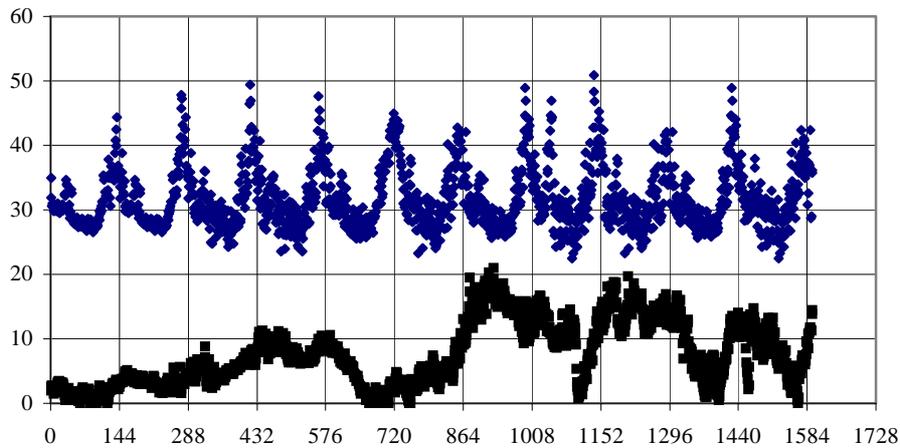
Background noise measurements have been made at six positions near to neighbouring residential properties. These measurements are the same ones as were used in the original ES.

At the time of my first report I pointed out that there were anomalies of concern in the background noise measurements. I repeat these below for convenience.

##### 3.2.1 Earnieside

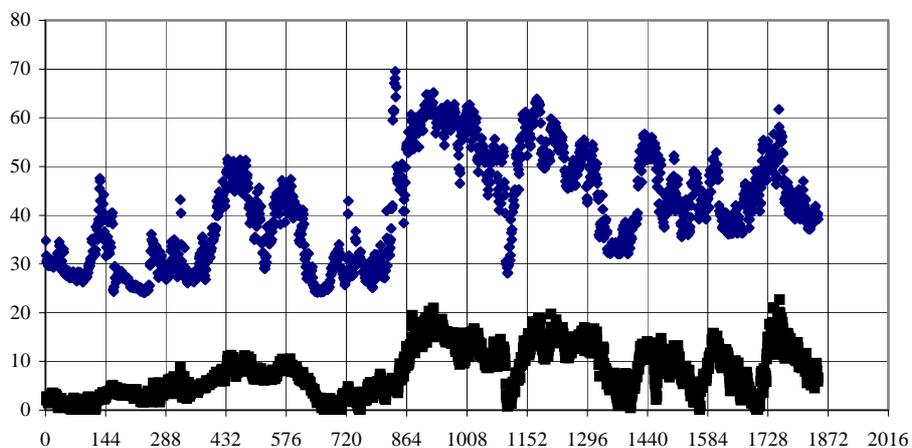
At Earnieside the dominant feature is a diurnal variation that peaks strongly on most days at ten minutes past ten in the morning.

In the graph below the figures along the bottom are the 10 minute time periods and the vertical lines represent 24 hours. The top set of data is noise level in decibels and the bottom set is wind speed in metres per second.



It may be that this is a true picture of day time noise but the night time noise shows no correlation with wind. The noise level in the middle of the night stays resolutely below 30dB even in winds of 20m/s. Gale force starts at 17.5m/s.

We can compare this with Coulsknowe, which shows a typical pattern of wind noise.

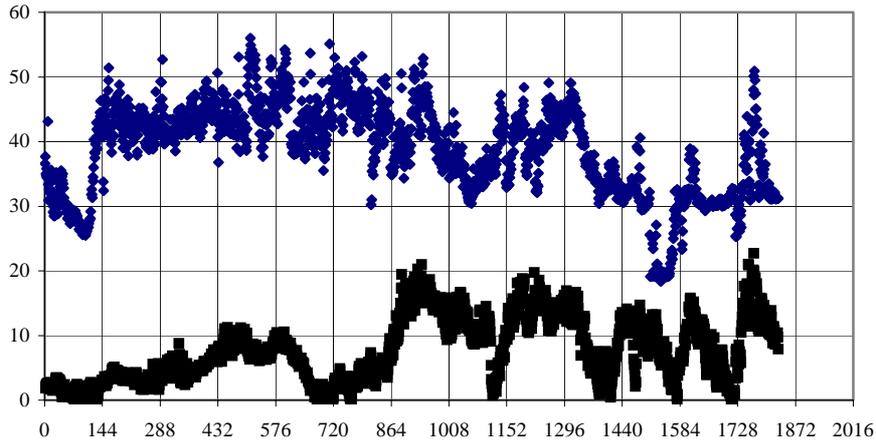


Here the noise level and wind speed follow the same pattern with the noise level rising and falling with wind speed.

### 3.2.2 Golland

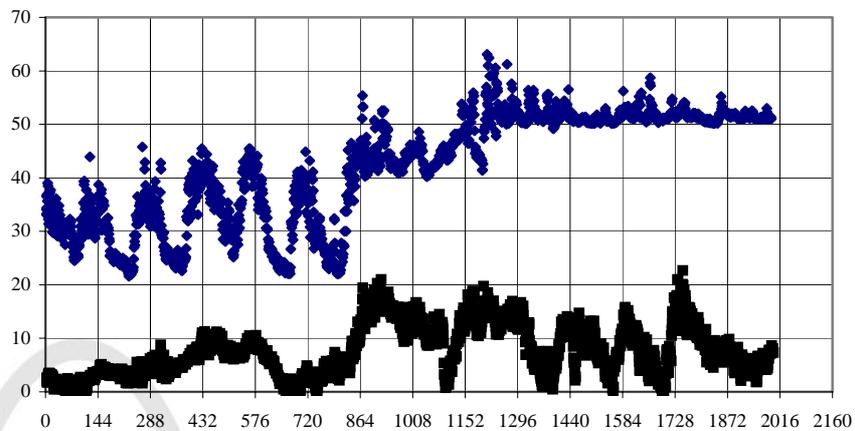
The measurements at Golland also show no correlation with wind speed (except perhaps on the last day) to the extent that they cannot be relied upon. For example, on the night of 18<sup>th</sup>

and 19<sup>th</sup> March (between 1440 and 1584 on the graph), when wind speeds were in the order of 10m/s, noise levels of around 20dBA were recorded – much lower than at any other time during the measurement period. Yet for most of days 2 to 7 the noise level hardly dropped below 40dB, even when there was no wind.



### 3.2.3 Craighead

At Craighead, for the first six days there is a strong diurnal variation with very little correlation with wind speed even at night. For the next two days the noise level never drops below 40dB even when the wind speed drops almost to zero in the middle of the night. Thereafter the noise level stays fairly consistently just above 50dB with no correlation with wind speed even maintaining this level when wind speeds drop to zero.

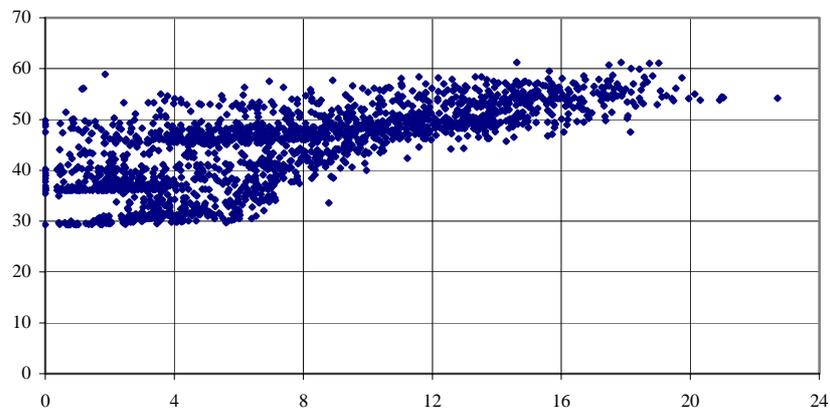


This seems to suggest that there are significant noise sources other than wind.

### 3.2.4 Greenhill

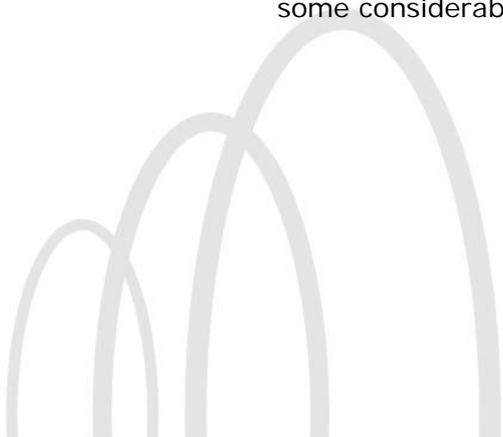
In the case of Greenhill much of the data seems to be reasonably satisfactory but there are some horizontal bands of data.

This time the graph shows noise level, on the vertical axis, plotted against wind speed on the horizontal axis. The bands can be seen between 0 and 4 m/s at about 30 and at about 36dB and at higher wind speeds at just under 50dB. These bands show there are other significant sources other than wind.



The band at 30dB is probably water noise and this is part of the natural environment. The band at around 36dB is partly made up of the data between 2000hrs on 8<sup>th</sup> and 0540 on 9<sup>th</sup> March when all the readings were exactly 36.1dBA. This is of concern because it suggests a meter fault near the beginning of the measurement period. Although it is not apparent at other times it does cast some doubt on the value of the remaining measurements. There is another band at about 47dB which may be due to non-wind associated noise or possibly a further problem with the meter.

Apart from Craighead none of these problems has been addressed. The background noise levels are therefore in some considerable doubt.



### 3.3 Turbine Noise

I have no significant disagreement with the stated method of calculation of turbine noise or with the results for turbine noise set out in Table 11.5.

### 3.4 Proposed Turbine Noise Standards

The maximum permitted noise level of turbines is set out in paragraphs 21 and 22 of ETSU R-97. This permits levels of 5dBA above background noise except where background noise is low when there is an absolute limit of 35 to 40dBA during the day and 43dBA at night.

### 3.5 Assessment

The assessment states that all properties meet the ETSU standard. Table 11.5 sets out this position. There are some important omissions from the table. It is unsatisfactory that Knowhead, which has the third highest turbine noise level, is not even mentioned. Other properties that are nearer than many of those assessed are the Cottage at Earnieside, two unoccupied properties at Corb, Greenhill Cottage and Blaeberry Toll.

Notwithstanding my reservations about background noise I agree that all properties will meet the ETSU lower daytime standard as well as the night standard.

## 4 NOISE IMPACT ASSESSMENT

I have set out in this section my assessment of the likely loss of amenity to residents using the spirit of British Standard 4142.

Unless otherwise stated in this section, turbine noise is in  $L_{Aeq}$  and background in  $L_{A90}$  as provided for in BS4142. I have no evidence that there are any tonal components in windfarm noise and so the  $L_{Aeq}$  value is the same as the rating level described in BS4142. Wind speeds are those at 10m height.

As a rule of thumb I think that all properties within 2km of a turbine should be assessed. This is less than the minimum distance for these turbines in the Wind Energy Policy Guidelines produced by Perth and Kinross Council.

### 4.1 Background Noise

Because of my reservations about background noise I have used alternative figures. As there are a number of windfarm applications in the area, data is available from several sources for Greenhill Farm and Littlerig. I have used the lowest of all the average noise levels at each wind speed at these two locations. I have used the Greenhill figures for

Greenhill Cottage. Elsewhere I have taken the typical background noise levels incorporated into Perth and Kinross Supplementary Planning Guidance, May 2005. The table below shows these background noise measurements.

Background Noise	Wind Speed m/s				
	6	7	8	9	10
Knowhead	27	29	31	33	35
Cottage at Earnieside	27	29	31	33	35
Littlerig	32	33	34	35	36
Corb	27	29	31	33	35
Greenhill	29	31	33	34	35
Greenhill Cottage	29	31	33	34	35
Blaeberry Toll	27	29	31	33	35

#### 4.2 Turbine Noise at Neighbours

I have used the noise levels at the neighbouring properties as calculated by the CONCAWE method, which takes account of different meteorological conditions. The conditions taken are Category 6, which is favourable to downwind propagation. In practice the results from this method are usually within about 1dBA of those obtained using ISO 9613-2, which is the applicant's model. In accordance with BS4142 the values are  $L_{Aeq}$  so the noise levels are typically 2dBA higher than the ETSU figures.

The table below shows the turbine noise levels at neighbouring properties.

Turbine Noise	Wind Speed m/s				
	6	7	8	9	10
Knowhead	34	34	34	35	35
Cottage at Earnieside	29	30	30	30	31
Littlerig	37	38	38	38	39
Corb	31	32	32	32	33
Greenhill	34	35	35	35	36
Greenhill Cottage	33	33	34	34	34
Blaeberry Toll	28	29	29	29	30

#### 4.3 Assessment of Impact

BS4142 says that *A difference of around 10dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance.*

An increase in noise level of up to 3dB is not readily detectable.

Based on the principles above, I suggest an assessment of loss of amenity as shown below. This is included in Perth and Kinross Wind Energy Guidelines June 2004.

- A difference of 3dB or less – insignificant
- A difference of 4 to 6dB – marginal loss of amenity
- A difference of 7 to 9dB – significant loss of amenity
- A difference of 10dB or more – major loss of amenity

The old planning guidance (Circular 24/73) provided some justification for this in the case of industrial noise generally. It says (in common with the Welsh guidance quoted on page 21 of ETSU-R-97) that *where, by the standards established in BS4142, "the noise from the development is likely to give rise to complaints" it will hardly ever be right to give [planning] permission.* PAN 56 is less specific but says in relation to wind farms that *Good acoustical design and siting of turbines is essential to ensure there is no significant increase in ambient noise levels as they affect the environment and any nearby noise-sensitive property.*

Taking the two tables above I have deducted the background noise level from the turbine noise level to obtain the values in the table below.

Difference	Wind Speed m/s				
	6	7	8	9	10
Knowhead	6	5	3	2	0
Cottage at Earnieside	2	1	-1	-3	-4
Littlerig	5	4	4	3	2
Corb	4	3	1	-1	-2
Greenhill	5	3	2	1	0
Greenhill Cottage	4	2	0	0	-1
Blaeberry Toll	1	0	-2	-4	-5

Cream (pale grey if this is printed in black and white) denotes conditions where there is a marginal loss of amenity.

Five properties will suffer a marginal loss of amenity though at three of these the marginal category is only just reached at one wind speed. It is unfortunate that there are no figures for turbine noise below 6m/s. However, the limited information I have suggests that the noise level of the turbine falls off quickly below 6m/s and so the position will be no worse at lower wind speeds.

Bearing in mind that I have taken the worst case (lowest) background noise levels I do not think that there are noise grounds for refusing the application.

I am, however, concerned at all the affected properties about the possibility of a cumulative effect from other potential wind farms.

## **5 OTHER MATTERS**

I am not aware that this area is used extensively for walking or other recreational purposes.

Should the proposal be granted planning permission then there should be conditions attached that limit noise levels at surrounding properties at each wind speed. This is because alternative turbines may have higher noise levels than the presently proposed turbines and to protect residents from any turbine noise in excess of the design levels.