Hafotty Ucha Wind Farm Repowering
Comments on Letter (dated 26/09/17) from Mr Dever
for Axis
Tom Levet, Hayes McKenzie Partnership Ltd
3128_N02_EXT1, 05 October 2017

1. COMMENTS ON LETTER (DATED 26/09/17) FROM MR DEVER

1.1 In regards to planning application 0/44248 and the letter from Mr Dever (date received: 26/09/17), we have the following comments:

Paragraph 1

1.2 It is stated:

"In my objection I commented that the background noise data for amenity hours had been manipulated in size and shape to favour the wind farm. Hayes McKenzie replied that their manipulation of the background noise data is attributable to the 'good practice' of applying wind shear correction factors. Why, one wonders, didn't they employ 'good practice' back in 2015 for T5 application. Wind shear is not some new phenomenon it's been known about for decades. If they weren't using good practice for the T5 turbine are they to be trusted to assess this application."

1.3 As part of this noise impact assessment, the previous background noise measurements were reviewed. As part of that review process, it was noted that the previous measurements were referenced to a measured 10 m wind speed, rather than a standardised 10 m wind speed. Hence to provide a conservative assessment, that more strictly addresses current good practice guidance, and that takes account of potential wind shear, a rightwards shift of 2 $m.s^{-1}$ was applied.

1.4 To be clear, the correction applied has not resulted in an assessment that favours the wind farm. Rather, it has the opposite effect. The correction applied has resulted in a lower background noise level and hence lower limits. Therefore transposing the background noise levels 2 $m.s^{-1}$ rightwards, has resulted in a more conservative assessment than if no correction were applied.

Paragraphs 2 & 3

1.5 It is stated:

"As for it being 'good practice' the scientific community are highly sceptical of the application of wind shear to turbines. They view it as the latest Wind developer scam to reduce the separation distances to local dwellings.

Wind shear is basically the change in wind speed with height caused by atmospheric conditions dependent on topology. It affects the noise output from turbines but perversely is applied to the background noise. The wind shear factor applied to the amenity hours noise graph at my property is 2dB, this is a massive amount to apply to an amenity hours curve, wind shear is principally an evening or night effect and it is at a minimum during daylight hours. Hayes McKenzie should justify how they have arrived at this figure."

1.6 The correction for wind shear is based upon the guidance given within the Good Practice Guide published by the Institute of Acoustics[1]. We find that the Good Practice Guide is generally accepted and is endorsed by the Welsh Government[2]. Additionally, as part of the consultation process the local Environmental Health Officer suggested that the assessment should be carried in accordance with the Good Practice Guide.

1.7 In terms of wind shear, the Good Practice Guide provides guidance within Section 4.5 and states at Paragraphs 4.5.3 – 4.5.4:

"Examples of methods which can be used to correct predictions to account for wind shear effects, when only using a 10 m mast, are included in Supplementary Guidance Note 4 (wind shear). This note presents methods to calculate corrections on the basis of long-term data measured at different heights, but as such data may not be available for a specific site, typical shear values are also presented. Alternatively, similarly derived corrections representing typical (average) shear values can be applied to the wind speed reference used for the derived typical background noise levels.

[1] Institute of Acoustics, 2013. "A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise".

[2] Welsh Government, 2013. Wind Turbine Noise Guide (online). http://gov.wales/topics/planning/policy/guidanceandleaflets/wind-turbine-noise-guide/?lang=en (link valid 03/10/17).

The following simplified method is proposed for ease of use: applying a fixed correction by subtracting the following factors from the wind speed reference used in the turbine predictions: 1 m/s for turbine hub heights of up to 30 m, 2 m/s for hub heights of up to 60 m and 3 m/s for hub heights of more than 60 m. Such a generic approach would be suitable in the context of a study made using a 10 m mast to limit costs, in the absence of site-specific data."

1.8 Consequently, in the absence of site-specific data, the simplified method of applying a fixed correction of 2 m/s was applied. In order to facilitate a comparison with the existing noise limits (that are referenced to a standardised 10m wind speed), the correction was applied to the background noise levels rather than the predicted turbine noise levels. In essence, the same effect is achieved, whether the predicted turbine noise levels are corrected leftwards 2 m/s, or whether the background noise levels are corrected rightwards 2 m/s.

1.9 For clarity, the wind shear factor that has been applied to the amenity hours background noise level is not 2 dB, but rather 2 m/s. Table 1.1 below details the background noise level used in the recent 2017 assessment, in comparison to that previously assumed in the 2014 assessment[3] for T5 (and the previous two applications for T2 & T3, and for T4). This shows that the curve has been shifted rightwards, and effectively results in a reduction of the background noise level of approximately 5 dB at the majority of wind speeds.

1.10 Therefore curve A) has been assumed and accepted three times previously. Then to induce more conservatism into the assessment and take stricter accordance of good practice, the same curve has been utilised this time, but effectively reduced by 5 dB.

Table 1.1: Bryn-ffynon – Assumed Prevailing Background Noise Level

Wind Speed at 10m agl (m/s)	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
A) Amenity Hours Prevailing Background Noise Level (dB L_{A90}) – 2014 ASSESSMENT	25.7	27.9	30.3	32.9	35.5	38.2	40.9	43.4	45.8	48.0
B) Amenity Hours Prevailing Background Noise Level (dB L_{A90}) – 2017 ASSESSMENT	25.7	25.7	25.7	27.9	30.3	32.9	35.5	38.2	40.9	43.4
Difference (dB)	0.0	-2.2	-4.6	-5.0	-5.2	-5.3	-5.4	-5.2	-4.9	-4.6

[3] Axis, 2014. "Bryn Ffynnon Wind Turbine. Planning Supporting Statement". Dated December 2014.

1.11 It is correct to conclude that the wind shear factor applied to the amenity hours curve is a large amount. That is the intention. The 2 m/s value suggested by the Good Practice Guide represents a wind shear value towards the upper end of the potential range, and is equivalent to a wind shear exponent in the range of 0.26 – 0.45, for wind speeds 5 – 12 m/s.

1.12 Supplementary Guidance Note 4 of the Good Practice Guide provides guidance on wind shear, and within Figures 4 & 5 and Table 2, gives illustrative examples of typical wind shear exponent values for different types of sites. These indicate that a value of approximately 0.3 – 0.5 is likely to be a conservative assumption, especially when the values for the 'High Ridgeline/Tall Hill Location' example are considered (which are in the range of 0.13 – 0.22, for 5 – 12 m/s for amenity hours).

1.13 Therefore it is suspected that, given the site is located amongst undulating and relatively hilly terrain, the 2 m/s shift to account for wind shear (i.e. a wind shear exponent of 0.3 – 0.5), is likely to be conservative, and that in reality the measured 10 m wind speed is likely to be reasonably similar to a standardised 10 m wind speed (i.e. a wind shear exponent approaching 0.16). Nevertheless, when assuming a conservative wind shear exponent, the predictions suggest that noise levels will be compliant with the Upper Amenity Hours and Night-time Hours Noise Criteria suggested by ETSU-R-97.

Paragraph 6

1.14 It is stated:

"In response to my complaint that the background noise data used is from a neighbouring farm and not relevant to my dwelling, Hayes McKenzie maintain that because the background noise figures were used on previous application they can be used now, but as wind shear factors are now being applied the background noise this can no longer be considered valid. Wind shear is massively affected by topological and ground cover considerations. The property used for the background noise data is located at the bottom of a hill, with shelter from nearby woodland, whereas my dwelling is located near the top of a hill in bare country. The two properties are not in close proximity and I maintain that the background noise data is not now applicable."

1.15 For the reasons given above, it isn't considered that applying a conservative wind shear correction means that the assumed background noise levels are invalid. The background noise levels have been assumed and accepted three times previously, and a conservative (and probably unrealistic) shift to account for a large wind shear has been applied on this occasion. Such an approach does not mean the resulting assumed background noise levels are invalid.

1.16 The background noise levels are based upon measurements at Bryn-ffynon, which as stated, is located further down the hill than Hendre Uchaf. The fact that Bryn-ffynon is in a more sheltered location means that it is likely to have a quieter noise environment than that at the more exposed Hendre Uchaf. Therefore it is considered that the assumption for the existing noise environment is appropriate.