Our ref: NIA/5450/14/5118/v2/Dyson Cote Farm

20th August 2014

Mr Charles Ashton
DC21 Limited
Dene House
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Kirkburton
Huddersfield
HD8 0RW

Dear Sirs,

NOISE ASSESSMENT FOR PROPOSED ENDURANCE E-3120 (50 KW) WIND TURBINE LAND AT DYSON COTE FARM, DYSON COTE LANE, SNOWDEN HILL, SHEFFIELD

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited (ENS) has been commissioned to undertake a noise assessment for an Endurance E-3120 50 kW wind turbine on a 36.6 metre tower on land at Dyson Cote Farm, Dyson Cote Lane, Snowden Hill, Sheffield.

1.02 This report has been prepared for DC21 Limited for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult ENS and DC21 Limited as to the extent to which the findings may be appropriate for their use.

2.00 ETSU-R-97

2.01 Principles and guidelines for the environmental assessment of wind turbine related noise are given in the report entitled ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms', based on the findings of the Working Group on Noise from Wind Turbines.

2.02 ETSU-R-97 recommends the imposition of noise limits set relative to the existing background noise (except in low noise environments, where lower absolute noise limits apply) at the nearest noise sensitive receptors, taking into consideration the variation in both turbine source noise and background noise with wind speed.

Table 2.1 – ETSU-R-97 Noise Limits for Wind Turbine Related Noise

Period	Lower Limit dB L_{A90}	Relative Limit dB L_{A90}
Daytime (07:00–23:00)	35 – 40	5 dB(A) above background noise
Night time (23:00–07:00)	43	5 dB(A) above background noise

Note: At low wind speeds (where background noise is expected to be quieter), the lower absolute noise limits apply, until the background noise has risen to within 5 dB of this level (as wind speed increases) wherein the relative noise limits come into force.

2.03 ETSU-R-97 recommends a simplified assessment method for situations where it can be demonstrated that noise limits will be met until quite high wind speeds even if there is no increase in the background noise levels. It is considered that if noise immissions from the wind turbine are limited to 35 dB L_{A90} up to a wind speed of 10 metres per second (at 10 metres height), then this condition alone is deemed sufficient to provide an adequate level of protection against noise. It is considered that this type of condition may be suitable for single wind turbine developments (as is the case here).

2.04 ETSU-R-97 also recommends that for financially involved properties, relatively higher noise limits may be appropriate. It is recommended that both the daytime and night time lower fixed limits may be relaxed to 45 dB(A) and that consideration should also be given to increasing the permissible margin above background noise levels (at higher wind speeds).

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3.00 PROPOSED DEVELOPMENT

3.01 The proposed development consists of the erection of an Endurance E-3120 (50 kW) wind turbine on a 36.6 metre tower on land at Dyson Cote Farm, Dyson Cote Lane, Snowden Hill, Sheffield.

3.02 For reference, there is an existing Endurance E-3120 (50 kW) wind turbine on a 24.6 metre tower circa 170 metres to the east of the proposed wind turbine at Dyson Cote Farm.

3.03 The proposed wind turbine is to be located at grid reference **E425738 N400325**. The nearest noise sensitive receptors are understood to be:

- NSR1 Dyson Cote Farm (financially involved) located circa 155 metres to the north north east of the proposed wind turbine and 150 metres (but screened) to the north west existing wind turbine
- NSR2 a non-associated residential dwelling located circa 435 metres to the north east of the proposed wind turbine and 275 metres to the north east of the existing wind turbine



3.04 The noise immission data for an Endurance E-3120 50 kW wind turbine has been provided by the manufacturer of the wind turbine in the form of Hayes McKenzie report HM2300/R1.

3.05 The noise immission data illustrates that the apparent sound power level (L_{WA}) of the wind turbine is 94.3 dB(A) under a wind speed of 10 metres per second at a reference height of 10 metres. The noise immissions associated with the turbine are not tonal.

3.06 The information reported herein has been based on the wind turbine manufacturer's noise immission data and has been accepted in good faith as being accurate and valid.

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4.00 PREDICTED NOISE IMMISSIONS

4.01 Of particular importance is the way noise propagation from wind turbines is modeled since this is not covered by the ETSU-R-97 guidance which only deals with assessment of any such predicted noise levels. This issue is covered by the Institute of Acoustics 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (IOAGPG) published on 20th May 2013.

4.02 In accordance with the methodology set out in the IOAGPG, the following data has been modeled:

- The adoption of 94.3 dB L_{WA} sound power level for the Endurance E-3120 (50 kW) wind turbine at a 10 metres per second wind speed at a reference height of 10 metres
- The addition of a further 2 decibels uncertainty
- The assumption of intervening semi-porous ground (G=0.5)
- Due to intervening buildings preventing a line of sight, a– 2 decibel screening correction from NSR1 to the existing wind turbine

4.04 The noise immissions associated with the proposed and existing Endurance E-3120 (50 kW) wind turbines are set out in the following table (rounded to the nearest decibel).

Table 4.1 – Predicted Noise Immission Levels

Wind Speed 10 m height	**Modelled Sound Power Level Includes 2 decibels uncertainty**	**NSR1**	**NSR2**
10 m/s	96.3 dB L_{WA} (94.3 dB L_{WA} + 2 dB)	Proposed 39 dB L_{A90} Existing 38 dB L_{A90} Cumulative 42 dB L_{A90}	Proposed 29 dB L_{A90} Existing 34 dB L_{A90} Cumulative 35 dB L_{A90}
ETSU-R-97 Lower Absolute Fixed Limits		**45 dB L_{A90}**	**35–40 dB L_{A90} day** **43 dB L_{A90} night**

5.00 CONCLUSIONS

5.01 It is evident that noise immissions do not exceed 45 dB L_{A90} at a wind speed of 10 metres per second at 10 metres height at the nearest financially involved noise sensitive receptors. In accordance with the simplified '35 dB rule' for financially involved noise sensitive receptors set out in ETSU-R-97, this condition alone is deemed satisfactory with respect to noise.

5.02 It is evident that noise immissions do not exceed 35 dB L_{A90} at a wind speed of 10 metres per second at 10 metres height at the nearest non-associated noise sensitive receptors. In accordance with the simplified '35 dB rule' for non-associated noise sensitive receptors set out in ETSU-R-97, this condition alone is deemed satisfactory with respect to noise.

5.03 It is therefore considered that the noise immissions associated with the proposed and existing Endurance E-3120 (50 kW) wind turbines should not cause any unacceptable loss of amenity to the occupants of any of the nearby noise sensitive receptors.

5.04 It should be noted that the predicted noise immission levels are based on the Endurance E-3120 (50 kW) wind turbine. In the event that an alternative candidate wind turbine is proposed, the stated noise immissions (including any tonal penalty if applicable) will not be exceeded.

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I trust the foregoing is to your satisfaction. If you have any queries please do not hesitate to contact me.

Yours sincerely

Daniel Bailey
Environmental Noise Solutions Limited
AMIOA, Diploma in Acoustics & Noise Control, BSc (Hons)

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