Hayes McKenzie
Consultants in Acoustics

Rothes III

Environmental Noise Impact Assessment

Report HM: 3714_R01_EXT3

13 June 2024

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1. INTRODUCTION

1.1 Rothes III Wind Farm, located west of Rothes, Moray was consented in October 2021. The consented development was for 3 turbines with a tip height of 149.9 m, 8 turbines with a tip height of 200m and 17 turbines with a tip height of 225 m. It is proposed that the tip height is increased for 3 turbines from 149.9 to 200 m, resulting in a proposed development of 11 turbines with a tip height of 200 m and 17 turbines with a tip height of 225 m.

1.2 A noise assessment has been undertaken to assess the impacts of increasing the overall tip height of these three turbines on the predicted operational levels of the consented development.

1.3 Predicted operational noise levels for a candidate wind turbine have been compared with the noise limits specified in the decision notice 19/00156/S36 for the consented Rothes III Wind Farm.

2. NOISE IMPACT ASSESSMENT CRITERIA

2.1 The noise limits applicable to operational noise from the consented Rothes III Wind Farm (the consented development) can be found in the decision notice for the consented development, and are reproduced in Table 1.

Table 1 – Decision Notice Noise Limits, for Standardised 10 m Height Wind Speeds up to 12 m/s

Location	Noise Limit (dB L_{A90})
Burn of Rothes	31
Heatherlea	34
Lynes	34
Knocknagore	33
Lyne of Knockando	32
Aldivonie	32

2.2 The decision notice only refers to these six properties, so in this report, other properties are considered to have no significant noise effects if they meet the lowest presented limit (i.e. 31 dB L_{A90}).

2.3 The consented noise limits were set at such levels that would ensure that cumulative operational noise levels would remain acceptable. Therefore, it is considered that an additional cumulative operational noise impact assessment is not required, and the proposed development has been assessed against the consented development noise limits.

2.4 The planning conditions for the consented development, at Note 4 of the guidance notes attached the noise planning conditions, contains a condition related to amplitude modulation (AM). It states that where Excess Amplitude Modulation (EAM), which is AM that is above that envisaged by ETSU-R-97[1], is considered by the planning authority to be a factor in the compliant a scheme for its assessment should be submitted to and approved by the planning authority. AM was considered in the original Environmental Impact Assessment Report[2] (EIAR) at paragraphs 13.3.20 to 13.3.23 which concluded that most wind farms operate without significant AM but that it can be controlled, if necessary, by a suitably worded planning condition. In this case, and the discussion on AM within the EIA remains relevant, and as the existing consent contains a planning condition on AM, it is not considered further in this assessment.

2.5 The noise assessment presented in the EIAR was carried out in accordance with the assessment methodology prescribed by Scottish Government, namely ETSU-R-97, *The Assessment and Rating of Noise from Wind Farms* and the Institute of Acoustics document, *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*. There has been no change to the required assessment methodology, and therefore no additional assessment beyond an assessment against the existing planning condition noise limits is necessary.

3. OPERATIONAL NOISE PREDICTIONS

3.1 Updated operational noise predictions have been carried out for the proposed change in

[1] ETSU-R-97, The Assessment and Rating of Noise from Wind Farms, ETSU for the UK DTI, 1996
[2] Rothes III Wind Farm Environmental Impact Assessment Report, 2018

tip heights (the proposed varied development) using the same methodology set out in the original EIAR in paragraphs 13.5.1 to 13.5.18. The proposed varied development consists of a combination of wind turbines of two different dimensions, as shown in Table 2, and candidate turbines that fit the dimensions have been assumed. The original EIAR assumed a candidate turbine with a smaller rotor diameter for the lower tip height proposed turbines, and, due to the higher tip heights now proposed, the same turbine model has been assumed for all turbines. In this case, Vestas V150 5.6 MW turbines with serrated trailing edges and hub heights of 125 and 150 m have been assumed, with 2 dB added to the manufacturers noise data which is likely to be guaranteed. Where sound power level data is not available for standardised 10 m height wind speeds for the relevant hub height, the values have been calculated from hub height sound power level data.

Table 2 – Turbine Coordinates

Turbine ID	Easting	Northing	Tip Height (m)	Hub Height (m)
T1	318889	849248	200	125
T2	318848	848801	200	125
T3	319318	848898	200	125
T4	319793	849194	200	125
T5	318694	848185	200	125
T6	319206	848337	200	125
T7	319837	848715	200	125
T8	320320	849349	225	150
T9	319126	847808	200	125
T10	319797	848164	225	150
T11	320362	848509	225	150
T12	320600	849021	225	150
T13	319990	847630	200	125
T14	319501	847630	200	125
T16	321353	848360	225	150
T17	320135	847094	225	150
T18	321062	847574	225	150
T19	321545	847962	225	150
T20	322127	848307	225	150
T21	320664	847055	225	150
T22	321383	847259	225	150
T23	321890	847726	225	150
T24	321021	846715	225	150
T25	321649	846943	225	150
T26	322086	847360	225	150
T27	321554	846445	225	150
T28	322185	846568	225	150
T29	322407	847117	200	125

3.2 The source sound power levels assumed are set out at Table 3 below.

Table 3 – Wind Turbine Sound Power Levels (dB L_{WA})

Turbine Type	Standardised 10 m height wind speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
Vestas V150 5.6 MW (150 m hub)	95.0	99.0	103.5	106.0	106.6	106.9	106.9	106.9	106.9	106.9

Turbine Type	Standardised 10 m height wind speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
Vestas V150 5.6 MW (125 m hub)	94.8	98.6	103.0	105.8	106.4	106.9	106.9	106.9	106.9	106.9

3.3 The octave band data assumed for the candidate turbine is set out at Table 4 below for a standardised 10 m height wind speed of 10 m/s.

Table 4 – Wind Turbine Octave Band Levels (dB $L_{WA,eq}$)

Octave Band Centre Frequency (Hz)							
63	125	250	500	1000	2000	4000	8000
87.9	95.4	100.0	101.9	101.0	97.2	90.7	81.3

3.4 Operational noise predictions have been carried out for the residential properties assigned limits in the decision notice, with results and coordinates shown below at Table 5 for a standardised 10 m height wind speed of 10 m/s (i.e. corresponding to a wind speed when the turbines are operating at their maximum sound power level). The predicted noise contours for the same wind speed, and assuming downwind propagation in all directions, are shown in Figure 1 attached to this report.

Table 5 – Predicted Operational Noise Levels (dB L_{A90})

Location	Easting	Northing	Predicted Noise Level (dB L_{A90})
Burn of Rothes	325273	847814	29
Heatherlea	322947	844545	32
Lynes	321693	844349	33
Knocknagore	318143	845004	31
Lyne of Knockando	317602	845267	30
Aldivonie	317063	845397	29

3.5 Table 6 shows the comparison of the results from Table 5 to the limits presented in Table 1, a positive number indicates the margin below the limit.

Table 6 – Comparison to Noise Limits

Location	Noise Limit (dB L_{A90})	Predicted Noise Level (dB L_{A90})	Margin
Burn of Rothes	31	29	2
Heatherlea	34	32	2
Lynes	34	33	1
Knocknagore	33	31	2
Lyne of Knockando	32	30	2
Aldivonie	32	29	3

3.6 Table 6 shows that the predicted operational noise levels meet the limits set out in the original decision notice. The proposed varied development is therefore able to operate within the noise limits applied to the consented development.

3.7 It can be seen at Figure 1, that all other residential properties have predicted levels at or below 31 dB L_{A90}, and therefore they meet the lowest limit presented in the decision notice.

3.8 It considered that the existing planning conditions on noise for the proposed development can be applied to the proposed varied development should it be consented. This will ensure that operational noise levels from the proposed development will be suitably controlled thorough the lifetime of the wind farm.

4. CONCLUSIONS

4.1 Operational noise predictions have been undertaken for increasing the tip height of three turbines in the consented Rothes III layout for a candidate wind turbine that fit the dimensions of the proposed development.

4.2 Predicted operational noise levels were compared with the limits set out in the decision notice for the consented Rothes III Wind Farm and were shown to meet these limits.

4.3 It is considered that, as the relevant consented development noise limits are predicted to be met, there should be no objections to the proposed varied development on noise grounds, and that the existing planning conditions on noise can be applied to the proposed development to suitably control operational noise.