

Q1. We would like if possible the calculations or similar for the collective noise impacts of all units.

The modelling was conducted using iNoise V2020 noise mapping software, which follows the methodology of ISO 9613-2 Acoustics - Attenuation of sound during propagation outdoors – Part 2: General method of calculation. For this project, we have adopted soft ground between the source and residential receivers, and the default downwind propagation (as per the British Standard).

The table below confirms the contribution of each source at each receiver, and the overall combined predicted noise levels.

Source	R1 - Rownall Ridge		R2 - Rownall Stables		R3 - Rownall Hall Farm	
	Ground	1 st Floor	Ground	1 st Floor	Ground	1 st Floor
Batteries	17	17	16	16	16	17
Inverters	21	20	18	18	18	19
Sub Station	18	16	16	16	17	18
Overall Noise Level	24	23	22	22	22	23

Predicted Façade Noise Levels, dB(A)

To validate these predictions., the table below indicates the simplest ‘back of an envelope’ calculation, based on simple corrections for distance and line-of sight screening. It is not offered as a prediction, merely a common-sense check of the computer modelling:

Source	SWL*	No. of Sources	Correction for No. of Sources	Directivity dB	Distance to House	Distance Correctn	Line of sight screening	Façade Reflect.	Sub Total
	dB		dB	dB	m	dB	dB	dB	dB
Batteries	59	21	13	-11	165	-44	-10	3	10
Inverters	60	105	20	-11	165	-44	-10	3	18
Substation	85	1	0	-11	165	-44	-10	3	23
							Combined Level		24

Simple Check of Prediction at R1

Q2. The tonal penalty you have proposed is +2db, can you provide the reasoning for this. Have you witnessed noise from this type of development for example and if so where was the location or are you basing your calculation on the noise data provided by manufacturers?

The manufacturers only provide data at an octave band level of detail. We do not have one-third octave band or finer analysis, and are therefore unable to conduct an objective assessment in accordance with Annex C or D of BS4142. However, it is recognised that electrical equipment can be associated with low frequency hum (substations/transformers) or higher frequency tones (inverters).

Noise can be calculated noise propagation in the octave band frequencies, and the following table shows the predicted octave band spectrum for at each receptor, at ground and first floor levels:

PREDICTED RECEIVER OCTAVE BAND FREQUENCY SPECTRUMS, Hz									
	63	125	250	500	1000	2000	4000	8000	dB(A)
R1 - Rownall Ridge	40	29	25	21	18	13	6	-12	24
	39	28	24	20	17	13	6	-11	23
R2 - Rownall Stables	38	27	23	18	16	12	2	-20	22
	38	27	22	18	16	12	3	-20	22
R3 - Rownall Hall Farm	40	28	22	18	16	10	1	-23	22
	40	29	24	21	17	11	1	-23	23

At an octave band level, the predictions would suggest a concentration of energy at the low frequencies, but no noticeable step at higher frequencies. The former does not demonstrate tonality, merely offers the possibility of one. Conversely, the latter does not preclude the possibility of a tone at the higher frequency, but does suggest a lack of anything particularly prominent.

In respect of the subjective test offered by BS4142, we have considered how any noise, whether tonal or broadband, might be masked by the existing ambient noise levels.

The following shows the octave band spectrum for the measured night-time L90.

MEASURED L90 OCTAVE BAND FREQUENCY SPECTRUM, Hz								
63	125	250	500	1000	2000	4000	8000	dB(A)
35	30	21	20	17	12	12	14	23

This clarifies that the predicted levels at 63hz will be at most 5dB higher than background and between 1-4dB higher at 250hz. On that basis, we would conclude that the additional noise might be perceptible when observed against the quietest background conditions (and obviously much less so at all other times of the day or night).

It is perhaps worth highlighting that, were one to take a more pessimistic view on the tonality (that it was clearly perceptible and that a 4 dB correction is appropriate), the BS4142 assessment of impact would not be materially changed. During the day, the Rating would be -5 dB, still suggesting significantly less than a low impact, depending on context. During the night, the Rating would increase from -1 dB to +1dB. A Rating of zero indicates a low impact depending on context and we would therefore move from an assessment of fractional below a low impact to fractionally above a low impact.

I hope that this provides all the clarification you require but please do not hesitate to contact me with any further queries.

With kind regards

