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Dear Dean,

**Nhill Solar Farm
Peer Review of Nhill Solar Farm Noise Impact Assessment**

1 Introduction

Resonate has been commissioned by Vibe Energy to undertake an independent peer review of the noise impact assessment submitted as part of the town planning application for the proposed Solar Farm on land off of Ervins Road, Nhill, VIC 3418.

Our review is based on the Vibe Energy *Nhill Renewable Energy Facility – Planning Report* (dated February 2019) document and associated appendices (Planning Report). We have also reviewed the manufacturer's data for the proposed inverters.

2 Review

2.1 Recommended maximum noise levels for Farming Zone

Recommended maximum noise levels for the nearest noise sensitive receptors have been determined in accordance with the Environment Protection Authority (EPA) Victoria NIRV Publications 1411 "Noise for Industry in Regional Victoria" and 1412 "SEPP N-1 and NIRV Explanatory Notes".

The assessment methodology used in the report is appropriate and has been accurately followed, however, there is a note on page 10 of the NIRV 1411 document which states for utilities:

Where the utility is in an FZ, RAZ or GWZ and the Step 2 distance adjustment is 0, then take the following levels to Step 4:

Day 45 dB(A)

Evening 39 dB(A)

Night 34 dB(A)

As the solar farm could reasonably be considered to be a utility and is in an FZ (farming zone), with a Step 2 distance adjustment for the three identified receptors of 0, the above stated levels should be carried forward to Step 4 as opposed to the values used in the report. These recommended maximum noise levels are detailed in Table 1.

Table 1 NIRV recommended maximum noise levels at identified receptors in Farming Zone

	Day	Evening	Night
Proposed noise limit at identified receptors in Farming Zone	45	39	34

Step 4 of NIRV details the background level assessment, which is used to adjust the base noise levels established in previous steps. No background noise survey has been undertaken, however the report correctly identifies that a background noise survey would likely increase the noise limits, due to the proximity of the Western Highway to the application site and receptors. Using the zoning recommended maximum noise levels is therefore expected to provide a robust assessment.

2.2 Additional receptors

There are also residential receptors to the north of the site, on Fritsh Street, at a distance of approximately 1.1 kilometres from the nearest boundary of the application site. These receptors are not identified in the Planning Report and an assessment has not been undertaken for these receptors.

While these are not the closest receptors, they are located in a General Residential Zone (GRZ) and separated from the Farming Zone by a Public Park and Recreation Zone (PPRZ), meaning they are likely to have a lower recommended maximum noise level under NIRV. Resonate has undertaken an assessment of the Fritsh Street receptors in accordance with the NIRV methodology, which is detailed in Table 2.

Table 2 NIRV recommend maximum noise level assessment for Fritsh Street receptors

NIRV step	Noise level for time period, dB(A)		
	Day	Evening	Night
Step 1 – Zoning Levels FZ to GRZ	46	41	36
Step 2 – Distance adjustment (770m receiver distance)	-7	-7	-7
Step 2 – Distance adjusted levels	39	34	29
Step 3 – Base noise levels	45	37	32
Step 3 – Base noise level check	45	37	32
Step 4 – background check (N/A)	45	37	32
Step 5 – High traffic noise areas (N/A)	45	37	32
Recommended maximum noise levels at Fritsh Street receptors	45	37	32

2.3 Proposed noise sources

Resonate has reviewed the manufacturer’s data for the two (2) proposed inverters to be installed at the application site, and agree that the inverters will be the dominant noise source at the site. The manufacturer’s data provides the sound power levels for the proposed inverters, measured in accordance with DIN EN ISO 9614-2: 1996 *Determination of sound power levels of noise sources using sound intensity Part 2 Measurement by scanning*. It is noted that the measurements were taken under nominal operating conditions for the inverters, with all inverter fans operating at maximum speed. The reported sound power levels are stated in Table 3.

Table 3 Manufacturer’s sound power data for proposed inverters

Inverter type	Sound power level mean value, L_{WA}
SC/SCS 2200	94
SC/SCS 2750-EV	92

No spectral values have been provided for the proposed inverters. Resonate has undertaken our own noise emissions assessment and have used measurement data for an inverter taken from a different site, and normalised the inverter spectral values to the manufacturer’s stated overall sound power levels. The spectrum used in the assessment is provided in Table 4.

Table 4 Sound power spectrum adapted from measurement data of a substation normalised to manufacturer’s stated level

Inverter type	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	dB(A)
SC/SCS 2200	88	92	98	91	87	83	75	94
SC/SCS 2750-EV	86	90	96	89	85	81	73	92

2.4 Assessment

The noise emissions assessment detailed in the Planning Report has been reviewed and is technically correct in terms of the attenuation of noise via geometric spreading. The calculations are considered simplistic, however, as they are based on simple sound propagation. Additional attenuation afforded by the site topography, and ground and air absorption between the source and receptors is not considered, although this would contribute to a reduction in predicted noise levels. In other words, the predicted noise levels in the Planning Report are conservative.

Resonate has generated a noise model using specialist acoustical modelling software, SoundPlan. The SoundPlan model incorporates the terrain topography and accounts for the ground and air absorption. A ground absorption value of 0.5 has been used in the model. Air absorption is calculated in accordance with ISO 9613. The predicted noise level at each of the four receptors is detailed in Table 5.

Table 5 Predicted noise levels at receptors

Receiver	Predicted sound pressure level, dB(A)
House A*	15
House B*	9
House C*	12
Fritsh Street receptor	15

*As referenced in the Planning Report to avoid confusion

The predicted noise levels at each of the receptors is significantly below the most stringent night-time noise recommended maximum noise levels. Therefore, noise from the proposed inverters are not expected to have an adverse impact on the nearest noise sensitive receptors.

2.5 Existing noise sources

In accordance with NIRV, cumulative noise emissions from all industries should be considered at each of the receptors. The site is located adjacent to some existing sources such as a substation and water treatment plant.

As the predicted noise levels from the proposed solar farm inverters are more than 15 dB below the noise emissions limits, noise from the inverters is not expected to contribute to the cumulative level experienced at the receptors.

2.6 Conclusion

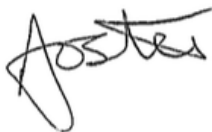
Resonate has undertaken a peer review of the noise impact assessment submitted as part of the Vibe Energy town planning application for the proposed Solar Farm at Nhill.

We note that the assessment requires some modification of the NIRV recommended maximum noise levels as well as requiring consideration of additional receptors within the GRZ. However, we note that these changes would not alter the conclusion of compliance with the NIRV recommended maximum noise levels even considering the conservative prediction methodology in the report.

Resonate has undertaken a more detailed and accurate noise impact assessment for the proposed development site. The results of this assessment predict that noise levels will be significantly below the NIRV recommended noise levels.

Please let me know if you have any queries or wish to discuss the above.

Yours sincerely,



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