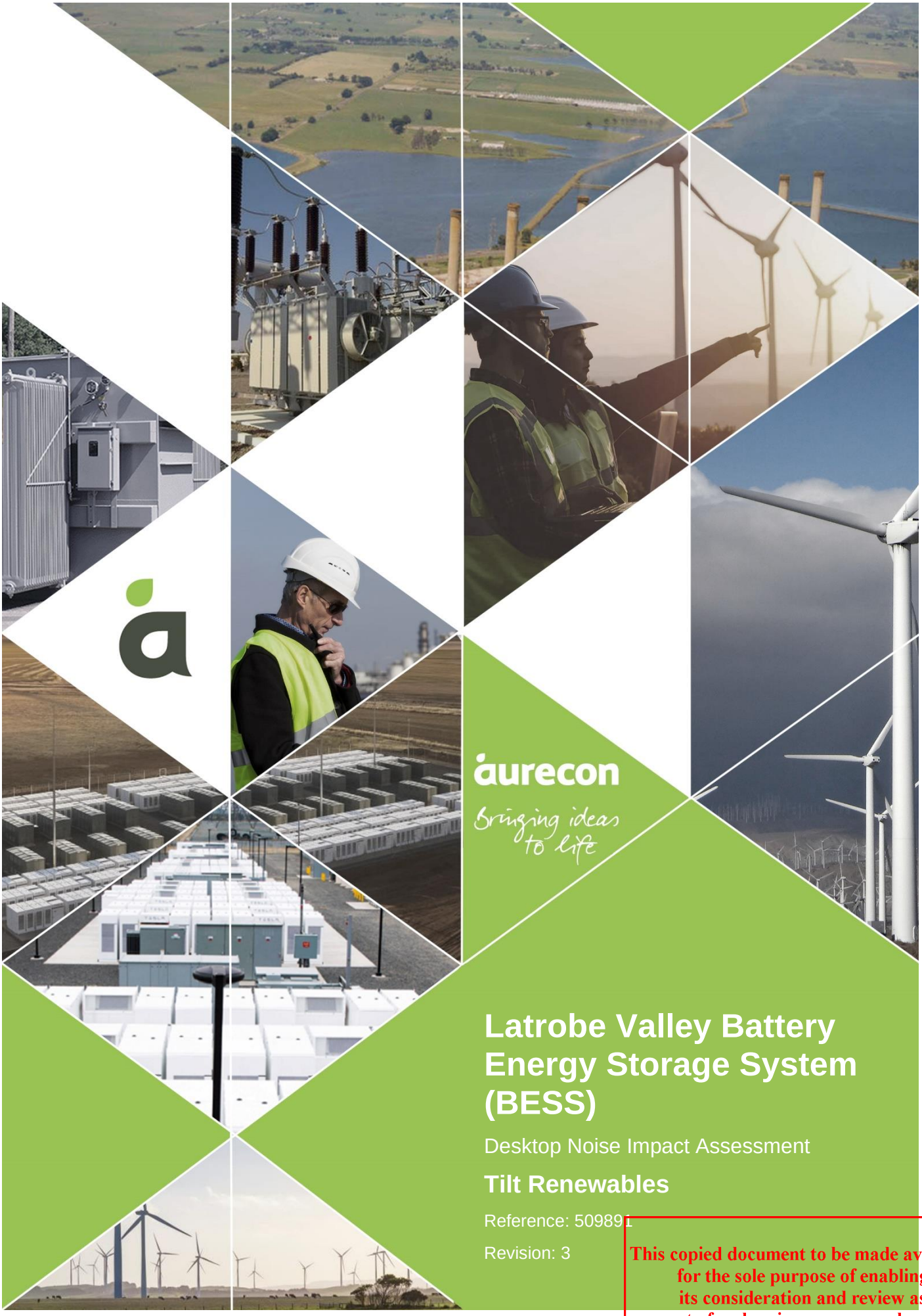

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Latrobe Valley Battery Energy Storage System (BESS)

Desktop Noise Impact Assessment

Tilt Renewables

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Executive summary

Aurecon has undertaken a preliminary noise impact assessment for the operation of the proposed Latrobe Valley BESS located on the Monash Way directly west of the existing Morwell Terminal Station (MWTS).

The Recommended Maximum Noise Levels (RMNLs) have been determined for the nearest noise sensitive area (NSA). Adjustments to the RMNL have been made to allow for potential cumulative industrial noise at the NSA in the absence of site investigation and measurements.

The assessment details the proposed Latrobe Valley BESS will not require additional mitigation as it's predicted to operate at 32 $dBL_{Aeq,30mins,}$ 1 dB less than the project noise goal of 33 $dBL_{Aeq,30mins}$ based on the calculated night RMNL minus 10 dB.

This assessment has been based on a 'worst-case' scenario, being the maximum amount of BESS plant within the current layout.

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1 Introduction

1.1 Project Background

Aurecon Australasia Pty Ltd (Aurecon) has been engaged by Tilt Renewables (the Proponent) to prepare a preliminary desktop noise impact assessment to support the planning permit application for the proposed Latrobe Valley Battery Energy Storage System (BESS) at Morwell, Victoria (the Project).

The Proponent is proposing to install a BESS in Morwell to help maintain reliable and affordable energy supply for Victoria. The intention is to combine the operation of the Project with renewable energy generation to support Victoria's transition away from reliance on fossil fuels. The concept design site layout is shown in Figure 1-1. This assessment has been based on a 'worst-case' scenario, being the maximum amount of BESS plant within the current layout.

For this project, a desktop noise assessment will be assessed via the Environment Protection Authority (EPA) Victoria's *Noise from Industry in Regional Victoria* (NIRV). This assessment will include:

- Predict noise emissions from the proposed site infrastructure against "the NIRV Recommended Maximum Noise Levels (RMNLs) minus 10 dB". Assessing the BESS 10 dB under the RMNLs should result in no increase in existing noise levels
- Provide high-level mitigation advice, if applicable
- Prepare a noise impact assessment report

As vibration dissipates quickly over distance, and there are no vibration intensive sources proposed on site, vibration from infrastructure is considered negligible and is therefore not assessed in this document.

1.2 Documentation

The documentation used in reference for this assessment is as follows:

- Latrobe Valley BESS Site Layout Plan (Dated: 23/03/2021)

Figure 1-1: Concept design site layout for Latrobe Valley BESS

2 Criteria

2.1 Noise Criteria

The applicable noise criteria for the Project is the *Noise from Industry in Regional Victoria* (NIRV), a guideline document written and owned by EPA Victoria. This document provides guidance on deriving *Recommended Maximum Noise Levels* (RMNLs), which are not “noise limits”, but are considered noise targets.

It should be noted that for this assessment, no site investigations have been conducted and the existing noise conditions are unknown.

NIRV considers the cumulative industrial noise at a Noise Sensitive Area (NSA) which are areas for the purposes of accommodation. As shown in Figure 2-1, there are potential significant noise sources in proximity to the nearest NSA, some of which are located closer to the NSA than the Project. It is likely that these sites were introduced prior to NIRV, and may have their own applicable noise permit, and it is unknown if these sites are currently exceeding the RMNLs at the NSA (as each site may have its own RMNL).

Based on the guidance procedure set out in the *SEPP N-1 and NIRV Explanatory Notes* (Appendix F, Publication 1412, October 2011), the design goal for the project shall be the derived RMNL minus 10 dB for the site. This advice provided by EPA Victoria for considering noise from multiple premises states that where there are new individual sources, they should be selected such that the noise contribution is 10 dB below the noise limit. This minus 10 dB factor should result in no increase in existing noise levels (assuming they are compliant to their applicable RMNL). If existing noise levels are exceeding the RMNLs, the Project would not require further mitigation treatment to reduce noise levels if a complaint was made, as the Project would have measurable lower noise emissions than surrounding industry, demonstrating they are not contributing to the cumulative noise impact.

Figure 2-1: Nearest Noise Sensitive Area (30 Church Road, Hazelwood North) to the proposed BESS site (red), and nearby possible noise emitting sites

To determine the RMNL, the source and receiving planning zones are identified, which determine the "zone levels". In this case, the source (i.e. the Project) is located in an *Industrial Zone 1 (*IN1Z), and the receiver is located in a *Farming Zone* (FZ), and the distance between the two sites is approximately 900 m. The distance between the receiver and the IN1Z boundary is 100 m.

Table 2-1 provides a step-by-step derivation of the RMNLs for the nearest NSA.

Table 2-1: Derivation of the RMNLs

Recommended Maximum Noise Level Criteria ($dBL_{Aeq,30mins}$) **Address:** 30 Church Road, Hazelwood North, VIC			
NIRV Steps for General Industry	**Time Period:**		
	Day (0700 - 1800 Monday to Friday) (0700 – 1300 Saturdays)	**Evening (1800 - 2200 All Days) (1300 – 1800 Saturdays) (0700 – 1800 Sundays and Public Holidays)**	**Night 2200 - 0700**
Step 1 – Determination of the Zoning Level Zone Level – Table 1 Generating Zone – IN1Z Receiver Zone – FZ	53	48	43
Step 2 – Distance Adjusted Level Adjust the Step 1 Zone Levels, accounting for the distance between the zone where the noise emitter is located and the location of the noise receiver As the NSA is less than 100 m from the residential boundary and the IN1Z boundary, no correction is applied.	53	48	43
Greater of the adjusted Zone Level and Distance Adjusted Level	50	45	40
Step 3 – Base Noise Level Check Check the distance-adjusted levels from Step 2 against the following 'base noise levels' for each period of the day:	45	37	32
Greater of the Zone Level and Base Noise Level	53	48	43
Recommended Maximum Noise Level	53	48	43

As this site is expected to operate continuously over a 24-hour period, the Night RMNL is applicable, as compliance with the Night RMNL will ensure compliance with the day and evening periods.

Based on EPA Victoria's guidance for addressing cumulative noise from industry, the project noise goal is 33 $dBL_{Aeq,30mins}$.

It should be noted that as part of the updated environmental legislation, NIRV will be replaced by the *Noise Protocol*[1], at which the RMNLs will be replaced with "noise limits".

[1] *Noise limit and assessment protocol for the control of noise from commercial. Industrial and trade premises and entertainment values*, EPA Victoria, dated June 2020.

3 Methodology

3.1 Calculation method

For this assessment, noise emissions from the proposed BESS site are calculated using ISO 9613-2[2] via hand calculations. This calculation method incorporates the following:

- Noise attenuation over distance
- Frequency dependent air absorption
- Frequency dependent ground absorption
- 1/1 octave band frequency source noise levels (63 – 8000 Hz)

For this exercise, the following limitations apply:

- Topography between the source and receiver was not considered (online street view imagery show the area is relatively flat)
- Shielding between on-site noise sources was not considered
- Rather than assessing true distance between each on site noise source, the distance between the "north" and "south" BESS perimeter to the nearest NSA were used

3.2 Inputs

The following inputs have been considered for the site:

- Distance between the NSA and the "South" BESS site is approximately 1620 m
- Distance between the NSA and the "North" BESS site is approximately 1900 m
- Air absorption is based on 10°C (favourable propagation) and extrapolated over the above distances
- Ground absorption factor of 1.0 (absorptive ground) was adopted due to the open farming fields between the source and receptor.
- A receptor height of 1.5 m was adopted
- All noise sources on site run concurrently over a 24-hour period

Table 3-1: Reference sound power levels

Noise Source	Location	Number of sources	Octave Band Frequency, Hz Sound Power Level, dB								Total sound power level, dBA
			63	125	250	500	1k	2k	4k	8k	
Step-up Transformer (150 MVA), 66/33kV [3,4]	Northern BESS	17 (15x 2.9m high, 1x 8m high, 1x 16m high)	99	101	96	96	90	85	80	73	97
	Southern BESS	20 (18x 2.9m high, 1x 8m high, 1x 16m high)									

Table 3-2: Reference sound pressure levels

Noise Source	Location	Number of sources	Octave Band Frequency, Hz Sound Power Level, dB								Total sound pressure level @ 'x' metres
			63	125	250	500	1k	2k	4k	8k	

[2] ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*
[3] Overall sound power level derived from AS 60076.10:2009 – *Power transformers – Determination of sound levels*
[4] Octave band sound power level derived from Table 11.26 in Bies and Hansen *Engineering Noise Control*

Battery container (HVAC) [5,6]	Northern BESS	90	68	69	69	68	66	62	58	52	70 dBA @ 3 m
	Southern BESS	84									
Invertor container [7]	Northern BESS	30	79	83	89	82	78	74	66	66	85 dBA @ 1 m
	Southern BESS	28									

4 Results

Table 4-1 presents the predicted noise level at the nearest NSA from the Project.

Table 4-1: Predicted noise levels at nearest NSA

Equipment	Predicted sound pressure level at NSA $dBL_{Aeq,30mins}$
Transformers – Northern site	21
Transformers – Southern site	23
Invertors – Northern site	24
Invertors – Southern site	26
Battery containers – Northern site	24
Battery containers – Southern site	26
Total	32

Based on the above inputs, the predicted combined noise level at the nearest NSA is 32 $dBL_{Aeq,30mins}$. This complies with the noise target of 33 $dBL_{Aeq,30mins}$.

It is assumed that as the existing industry is operating at the RMNLs at the nearest NSA, a tonality correction is not required for this assessment.

As a result, noise mitigation is not required for site to achieve the noise goal.

5 Conclusion

A preliminary desktop noise study has been undertaken for the Project. The preliminary results predicted a noise level of 32 $dBL_{Aeq,30mins}$ at the nearest NSA (approximately 1.6 km away), which is a 1 dB below the project noise target of 33 $dBL_{Aeq,30mins}$.

Compliance with the noise target has been predicted for the Project and consequently compliance with the RMNL is also achieved based on this assessment.

This assessment has been based on a 'worst-case' scenario, being the maximum amount of BESS plant within the current layout.

[5] Overall sound pressure level noted in technical data sheet (RSU4000)
[6] Octave band sound pressure level derived from *Noise Control for Buildings and Manufacturing Plants* - Packaged HVAC outdoor unit
[7] Based on 2500-EV invertor units, as per *Murra Warra Solar Farm and Battery Storage Facility – Environmental Noise Assessment S4453.1C6,* dated September 2017

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