Latrobe Valley Battery Energy Storage System

Environmental Noise Assessment

Planning Permit No. PA2101132-1 Condition 12

S6828.1C3

January 2023

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Client	Fluence
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1 INTRODUCTION

An environmental noise assessment has been prepared for the proposed Latrobe Valley Battery Energy Storage System (**BESS**), to be located adjacent the existing Morwell Terminal Station on Monash Way at Morwell.

The Planning Permit for the Latrobe Valley BESS was granted by the Minister for Planning on 16 November 2021 and an amendment to the Planning Permit approved on 24 June 2022 (Planning Permit PA2101132-1).

This environmental noise assessment has been prepared in accordance with Condition 12 of the Planning Permit that states:

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12. *Prior to the endorsement of plans in accordance with condition 1, an updated Predictive Noise Assessment report must be provided to the Responsible Authority that:*
    a. *Is modelled using the final design layout and electrical components for the entire facility (including all ancillary infrastructure and any battery cooling systems).*
    b. *Demonstrates the proposal will comply with the Noise Protocol at all times without relying on limiting the operating capacity of any part of the facility.*
    c. *Provides detail of the mitigation measures that need to be implemented to achieve compliance with the Noise Protocol, if required.*

This assessment considers the noise at the dwellings located in proximity to the Latrobe Valley BESS. The assessment has been based on the final BESS arrangement detailed in the Fluence drawing for the project "Latrobe Valley BESS", titled "Project Overall Site Electrical Layout" dated 15 December 2023, included as Appendix A.

The location of the Latrobe Valley BESS and the surrounding dwellings (each provided with a unique identification number and used for reference in this report) are shown in Figure 1 below.

Figure 1: *Subject land and locality.*

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2 CRITERIA

The base noise limits for the assessment of noise from facilities such as the BESS are set in Part 5.3 Division 3 of the Environment Protection Regulations 2021 (the **Regulations**). The Regulations make reference to the Noise Protocol in relation to the assessment of noise, which is understood to be the Victorian Environment Protection Agency publication 1826.4 titled "Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues", dated May 2021 (the **Noise Protocol**). The Noise Protocol provides guidance in determining specific noise limits for new and existing commercial, industrial and trade premises in Victoria. For the purpose of this assessment, the rural area method has been employed.

The Noise Protocol provides a method to determine noise criteria for utilities in rural areas, based on the Victoria Planning Provisions zone of the noise source and nearby residences. A method of assessing the background noise level is also provided, but is not necessary where the noise limits are achieved.

The subject site is located within an Industrial 1 Zone (IN1Z) of the Victoria Planning Provisions, while the surrounding residences are located within a Farming Zone – Schedule 1 (FZ1). Based on this, the Noise Protocol defines zoning noise levels for different periods of the day. These are as follows:

- 53 dB(A) (L_{Aeq}) during the day[1];
- 48 dB(A) (L_{Aeq}) during the evening[2]; and,
- 43 dB(A) (L_{Aeq}) during the night[3].

As the subject site and residences are located in different zones, the Noise Protocol requires a distance adjustment to be made to the zoning noise levels. This distance adjustment is based on the receiver distance, which is the distance the noise receiver is from the boundary of the Industrial 1 Zone. The distance adjustment reduces the zoning noise levels by 1 dB for every 100m of receiver distance, to a maximum reduction of 9 dB. The receiver distance and the distance adjustment factor for each residence can be seen in Table 1 below.

[1] 7:00am to 6:00pm Monday to Saturday, excluding public holidays.

[2] 6:00pm to 10:00pm Monday to Saturday and 7:00am to 10:00pm Sunday and public holidays.

[3] 10:00pm to 7:00am the following day, any day of the week.

Table 1: *Distance adjustment factors.*

Residence	Distance	Adjustment	Residence	Distance	Adjustment
Residence 1	80	0 dB(A)	Residence 8	570	5 dB(A)
Residence 2	360	3 dB(A)	Residence 9	530	5 dB(A)
Residence 3	400	4 dB(A)	Residence 10	590	5 dB(A)
Residence 4	130	1 dB(A)	Residence 11	640	6 dB(A)
Residence 5	240	2 dB(A)	Residence 12	90	0 dB(A)
Residence 6	480	4 dB(A)	Residence 13	110	1 dB(A)
Residence 7	370	3 dB(A)	Residence 14	100	1 dB(A)

It is noted that the zoning noise levels apply to the cumulative noise level of all noise sources within the zone. As the subject site is located in close proximity to a number of other industrial uses within the same zone, the noise from the subject site must take into account the potential noise from other sources. A conservative method of taking other noise sources into account is to assume that the existing noise from the industries is already at the limit and design the proposed BESS facility such that it does not increase the level at residences. In order to achieve this, the contribution of noise from the BESS facility will need to be at least 10 dB(A) below the distance adjusted level. The noise criteria have therefore been determined as the zoning level minus the distance adjustment, less 10 dB(A). This can be seen in Table 2 below. As the BESS will operate at all hours of the day, it is the criteria for the night period that are considered to be the most relevant.

Table 2: *Project noise limits.*

Residence	Day	Evening	Night	Residence	Day	Evening	Night
Residence 1	43 dB(A)	38 dB(A)	33 dB(A)	Residence 8	38 dB(A)	33 dB(A)	28 dB(A)
Residence 2	40 dB(A)	35 dB(A)	30 dB(A)	Residence 9	38 dB(A)	33 dB(A)	28 dB(A)
Residence 3	39 dB(A)	34 dB(A)	29 dB(A)	Residence 10	38 dB(A)	33 dB(A)	28 dB(A)
Residence 4	42 dB(A)	37 dB(A)	32 dB(A)	Residence 11	37 dB(A)	32 dB(A)	27 dB(A)
Residence 5	41 dB(A)	36 dB(A)	31 dB(A)	Residence 12	43 dB(A)	38 dB(A)	33 dB(A)
Residence 6	39 dB(A)	34 dB(A)	29 dB(A)	Residence 13	42 dB(A)	37 dB(A)	32 dB(A)
Residence 7	40 dB(A)	35 dB(A)	30 dB(A)	Residence 14	42 dB(A)	37 dB(A)	32 dB(A)

3 ASSESSMENT

3.1 Noise Prediction Model

Noise predictions have been made using the CONCAWE[4] noise propagation model in the 'SoundPLAN' noise modelling program. The CONCAWE noise propagation model is widely accepted as an appropriate model for ground-based sources and has the ability to take into account relevant influences, including:

- sound power levels of each individual noise source;
- the location of noise sources;
- separation distances between noise sources and sensitive receptors;
- the influence of barriers;
- influence of the ground and topography; and,
- atmospheric absorption.

The CONCAWE model has considered the worst-case meteorological conditions in terms of noise propagation. Specifically, this is weather category 6 conditions, which corresponds to a light breeze from the source to the receiver at night with little to no cloud cover.

For a conservative assessment, the noise model has assumed hard ground for the BESS facility and soft ground in all other areas.

3.2 Proposed Battery Storage Noise Sources

It is understood that the site is proposed to have a capacity of 100MW. This assessment has considered the following equipment distributed throughout the site as per the provided site plan.

- 316 single 'Fluence Cube' battery units;
- 32 inverters;
- 32 MV transformers associated with the battery units, each with a rating of 4MVA;
- 2 auxiliary transformers, with a rating of 2MVA; and,
- 1 main transformer located in the Morwell terminal station yard, with a rating of 120MVA.

[4] CONCAWE Conservation of clean air and water in Europe – Report 4/81 *The propagation of noise from petroleum and petrochemical complexes to neighbouring communities*, Manning, C.J. et al.

Table 3 below summarises the sound power levels for the various pieces of equipment considered as part of this assessment. The levels and spectra have been primarily based on the provided data, with additional data used from previous assessments of similar facilities where required. In addition, the sound power levels for transformers have been determined in accordance with the "standard" level derived from the *Australian/New Zealand Standard AS/NZS60076.10:2009, Power transformers - Determination of sound levels (IEC 60076-10, Ed. 1(2001) MOD)*.

Table 3: *Equipment sound power levels.*

Equipment	Sound power level per unit
Single Fluence Cube battery	84 dB(A)
Inverter	94 dB(A)
MV transformer	74 dB(A)
Auxiliary transformer	70 dB(A)
Main transformer	95 dB(A)

3.3 Predicted Noise Levels

The noise level at the surrounding noise sensitive residences has been predicted based on the proposed quantity of equipment, as noted above. The predicted noise levels can be seen in Table 4 below, along with the relevant noise criteria.

Table 4: *Predicted noise levels.*

Residence	Prediction	Criteria	Residence	Prediction	Criteria
Residence 1	28 dB(A)	33 dB(A)	Residence 8	23 dB(A)	28 dB(A)
Residence 2	25 dB(A)	30 dB(A)	Residence 9	23 dB(A)	28 dB(A)
Residence 3	25 dB(A)	29 dB(A)	Residence 10	22 dB(A)	28 dB(A)
Residence 4	26 dB(A)	32 dB(A)	Residence 11	22 dB(A)	27 dB(A)
Residence 5	26 dB(A)	31 dB(A)	Residence 12	23 dB(A)	33 dB(A)
Residence 6	25 dB(A)	29 dB(A)	Residence 13	22 dB(A)	32 dB(A)
Residence 7	25 dB(A)	30 dB(A)	Residence 14	22 dB(A)	32 dB(A)

It is noted that, based on previous assessments of other similar facilities, there is the potential for BESS facilities to attract a penalty for special audible characteristics, such as tonality. This however relies on the characteristic being prominent within the acoustic environment. As the facility has been designed to noise levels 10 dB(A) below the applicable criteria to account for the influence of other industrial noise sources in the area, the noise character from the facility, even if it were to feature special audible characteristics, would be masked by other noise sources. As such, a penalty is not considered warranted in this case. It is also noted that if there were no masking noise from other industrial sources and a penalty were to be applied, the facility would be assessed against the distance adjusted levels without the 10 dB(A) adjustment. In this case, the goal noise levels would still be easily achieved.

4 CONCLUSION

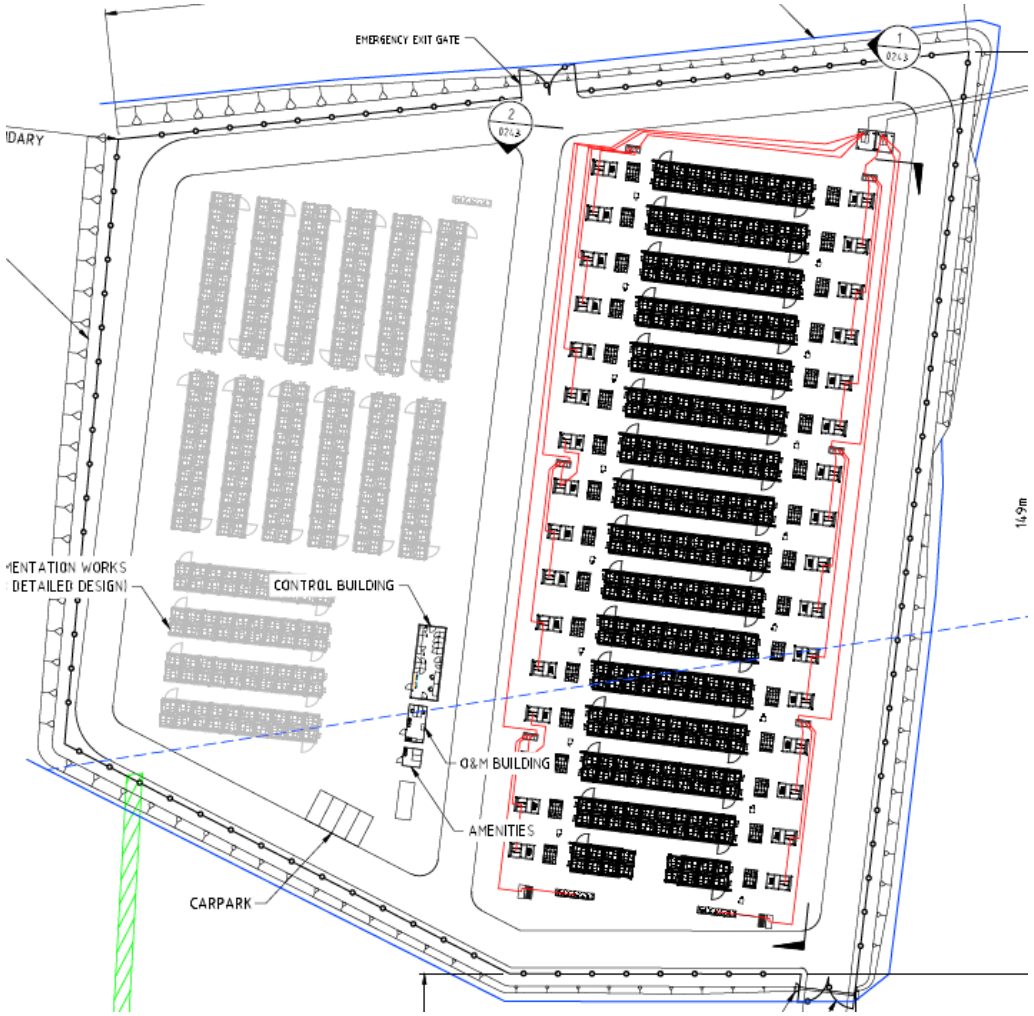
This environmental noise assessment has been prepared in accordance with Condition 12 of the Planning Permit for the Latrobe Valley BESS, to be located adjacent the existing Morwell Terminal Station on Monash Way at Morwell.

This assessment considers the noise at the dwellings located in proximity to the Latrobe Valley BESS. The assessment has been based on the final design layout and all electrical components of the facility, and has considered criteria determined in accordance with the *Environment Protection Regulations 2021*, and the *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*.

Based on the assessment of the proposed Latrobe Valley BESS, the noise requirements of the Noise Protocol will be achieved at all nearby residences. Mitigation measures are therefore not required to be implemented to achieve compliance with the Noise Protocol.

In accordance with Condition 3 of the Planning Permit, this environmental noise assessment will be updated to consider development of any further stages of the Project.

APPENDIX A



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