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346 Old Sydney Road, Marinna

BESS Acoustic Assessment

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1 INTRODUCTION

Acoustic Logic (AL) has been engaged to conduct an acoustic assessment of potential noise impacts as a result of the proposed 17.6MW Battery Energy Storage System (BESS) to service the existing solar farm at 346 Old Sydney Road, Marinna.

AL have utilised the following documents and regulations in the noise assessment of the development inclusive of the original acoustic report for the approved wind farm (DA2018/11):

- Assured Monitoring Group *Junee Solar Farm– Noise and Vibration Impact Assessment* (dated December 2017).
- NSW Environment Protection Authority (EPA) *Noise Policy for Industry* (NPI) 2017.

This assessment has been conducted based on the current architectural configuration of the site.

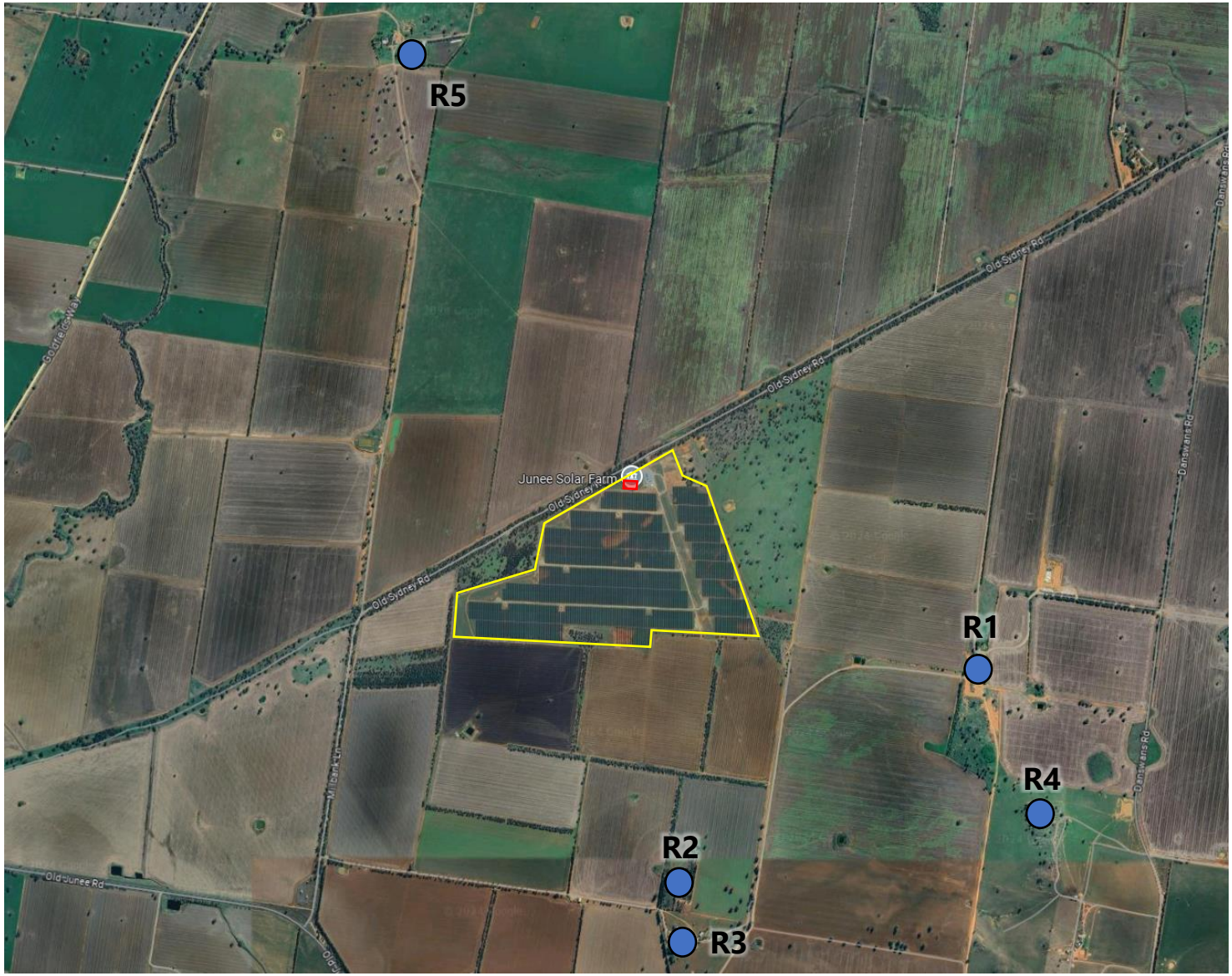
2 SITE DESCRIPTION

346 Old Sydney Road, Marinna, also known as Junee Solar Farm, is a currently operating solar farm bounding Old Sydney Road. The development is proposing to install a 17.6MW BESS system with ancillary services to provide further services within the development envelope.

Investigation has been carried out by this office in regard to the existing properties and noise impacts surrounding the proposed development. The nearest noise receivers around the site include:

- **R1:** Residential receiver to the far east at 394 Danswans Road (Lot 2 in DP 546451).
- **R2:** Residential receiver to the far south north of 38 MillbankLane (Lot 24 in DP 1263462).
- **R3:** Residential receiver to the far south at 38 Millbank Lane (Lot 23 in DP 1263462).
- **R4:** Residential receiver to the far east at 273 Danswans Road (Lot 1 in DP 747293).
- **R5:** Residential receiver to the far north at 165 Millbank Road (Lot 1 in DP 226279).

A site map, measurement description and surrounding receivers are presented in Figure 1 below. The site plan is detailed in Appendix One – BESS Configuration.



Project Site

Residential Receivers

Proposed BESS Location

Figure 1 – Project Site
Source: Google Maps

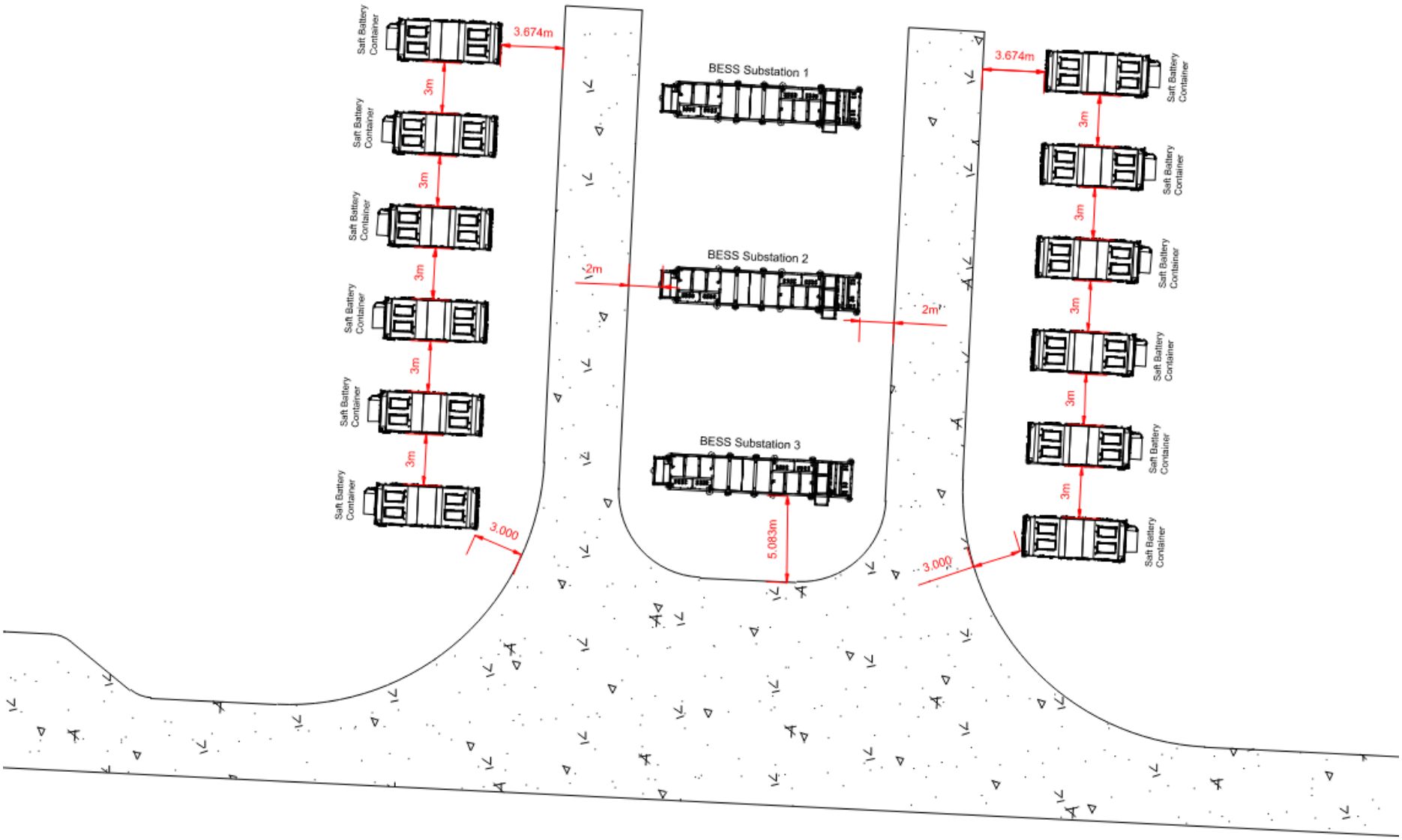


Figure 2 – Proposed BESS Installations Within Project Site (Close Up)
Source: Mytilineos RSD (See Appendix One – BESS Configuration for full site)

3 NOISE DESCRIPTORS

Ambient noise constantly varies in level from moment to moment, so it is not possible to accurately determine prevailing noise conditions by measuring a single, instantaneous noise level.

To quantify ambient noise, a 15-minute measurement interval is typically utilised. Noise levels are monitored continuously during this period, and then statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters obtained from the data are:

L_{eq} – represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources (such as traffic noise).

L_{90} – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L_{90} parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

L_{10} is used in some guidelines to measure noise produced by an intrusive noise source since it represents the average of the loudest noise levels produced at the source. Typically, this is used to assess noise from licenced venues.

L_{max} is the highest noise level produced during a noise event and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

L_1 is sometimes used in place of L_{max} to represent a typical noise level from a number of high-level, short-term noise events.

4 NOISE EMISSIONS CRITERIA

The noise criteria for this site are established from the NSW Environment Protection Authority (EPA) *Noise Policy for Industry* (NPI) 2017.

4.1 NSW EPA NOISE POLICY FOR INDUSTRY 2017

The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI sets out acceptable noise levels for various localities. The policy indicates four categories to assess the appropriate noise level at a site. They are rural, suburban, urban and urban/industrial interface. Under the policy the nearest residential receivers would be assessed against the rural criteria.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

4.1.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

AL have elected to take the minimum background noise levels as presented in Table 2.1 in the NPI. Noise emissions from the Site should comply with the noise levels presented below when measured at nearby property boundaries.

4.1.2 Project Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA's NPI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the surrounding land zoning, the Noise Policy for Industry suggests the adoption of the 'rural' categorisation.

The NPI requires project amenity noise levels to be calculated in the following manner:

$$L_{Aeq,15min} = \textit{Recommended Amenity Noise Level} - 5\ dB(A) + 3\ dB(A)$$

The amenity levels appropriate for the receivers surrounding the site are presented in Table 4-1.

Table 4-1 – EPA Amenity Noise Levels

Type of Receiver	Time of Day	Project Amenity Noise Level dB(A)$L_{eq(15\ minute)}$
Residential (**R1-R5**) (Rural)	Day	48
	Evening	43
	Night	38

4.1.3 Sleep Arousal Criteria

The Noise Policy for Industry recommends the following noise limits to mitigate sleeping disturbance:

Where the subject development / premises night -time noise levels at a residential location exceed:

- *$L_{eq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{Fmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*

a detailed maximum noise level even assessment should be undertaken.

Table 4-2 – Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
Residential (**R1-R5**)	30 dB(A) L_{90}	40 dB(A)$L_{eq, 15min}$; 52 dB(A)$L_{f,max}$

4.2 SUMMARISED NOISE EMISSION CRITERIA

An assessment has been conducted based on the minimum assumed rating background noise levels that apply per Table 2.1 of the NPI. This has been adopted as a conservative assessment basis. The summarised noise emissions criteria is therefore presented below.

Table 4-3 – EPA NPI Noise Emission Criteria (Residences Surrounding Project Site

Receiver	Time Period	Assessment Background Noise Level dB(A)L_{90}	Intrusiveness Criteria $L_{eq(15min)}$	Project Amenity Criteria dB(A) L_{eq}	NPI Criteria for Sleep Disturbance
R1-R5	Day	35	**40**	48	N/A
	Evening	30	**35**	43	N/A
	Night	30	**35**	38	**40 dB(A)$L_{eq, 15min}$; 52 dB(A)$L_{f,max}$**

The project noise trigger levels are indicated by the bolded values in the table above.

5 NOISE EMISSIONS ASSESSMENT

Noise emissions predictions were calculated to determine compliance with the noise emission requirements. Assessment was conducted to the reasonably most-affected point at local receivers.

Noise emissions will be assessed with reference to the relevant criteria outlined in Section 4.2.

5.1 PLANT NOISE LEVELS

This assessment has been based off the following noise data provided by the Client as of July 2024.

Table 5-1 – Plant Noise Levels

Plant Item	Sound Power Level dB(A)
Battery Enclosures	83
PCU/Invertor	93
MV Transformer	79
HV Transformer	84
Combined Noise Level for each BESS Substation	**94.1**

Based on discussions from the Client, each plant item above is incorporated within one BESS substation. The combined noise levels of each substation have therefore been used in the noise emissions assessment with the 3x BESS substations positioned as shown in the Figure 2 close up and Appendix One – BESS Configuration. The Client has also advised that the Saft Battery Containers make no noise.

5.2 PREDICTED NOISE LEVELS

The predicted noise levels from BESS operation are presented in the following table. Predicted noise levels are based on the dimensions of the building/ noise sources, factor in losses due to distance attenuation and barrier effects (where applicable).

Table 5-2 – Predicted External Noise Levels from Operation

Noise Source	Time of Day	Receiver Location	Predicted Noise Level $L_{eq(15min)}$ dB(A)	External Noise Criteria $L_{eq(15min)}$ dB(A)	Complies?
3x BESS Substations	Evening/ Night Time (6pm – 7am)	**R1**	25	35	Yes
		R2	25	35	Yes
		R3	24	35	Yes
		R4	23	35	Yes
		R5	23	35	Yes

All predicted noise levels at nearby receivers are compliant with the noise emissions requirements above.

6 CONCLUSION

This report presents the results of the acoustic assessment of potential noise impacts associated with the proposed 17.6MW Battery Energy Storage System (BESS) to service the existing solar farm at 346 Old Sydney Road, Marinna.

External noise emissions criteria have been established in this report to satisfy the requirements from the following documents:

- Assured Monitoring Group *Junee Solar Farm– Noise and Vibration Impact Assessment* (dated December 2017).
- NSW Environment Protection Authority (EPA) *Noise Policy for Industry* (NPI) 2017.

Noise emissions to all nearby developments are predicted to be compliant with the requirements above.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Pty Ltd
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APPENDIX ONE – BESS CONFIGURATION

BESS Configuration

Battery Type	Intensium Max 20 High Energy Saft Battery Container
Power Convertion Group 1 - 3: MV Twin Skid Ingeteam	
PCS	1 x Ingecon 7770 FSK HV C Series (T/F: 5892kVA @30°C)
Inverters	2 x Ingecon Sun Storage 3930TL HV C630 (2946kVA @30°C
Racks	20 (x 24mod)
Capacity	20 Racks (480mod) = 9,200.00kWh
TOTALS	
Banks	12
Battery Containers	12
Racks	3 x 20 = 60
Capacity	60 Racks (1440mod) = 27,600.00kWh
	17.676 MVA

Voltage Level	Frequency	PF
22kV	50Hz	

MYTILINEOS
RENEWABLES & STORAGE DEVELOPMENT BUSINESS UNIT

MYTILINEOS RSD TECHNICAL & PROCUREMENT DPT

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Version	Date	Revised By	Reviewed By	Approved By	Description and Notes
R02	20.02.2023	TKA	MVA	PKL	T/F rating updated
R01	21.12.2022	TKA	MVA	PKL	Inverter Model changed from 3885TL to 3930TL
R00	06.12.2022	TKA	MVA	PKL	

Project Name:
Junee BESS, 17.676MVA, 27.6MWh

PRELIMINARY

Scale: 1:120

Drawing Name:
General Layout

Drawing Number:
AUS-JUN 008-11

Drawing Revision
R02

Date: 02/06/2023

Sheet No: 1/1