

Solar Farm – Baddaginnie, VIC

Noise Impact Assessment

Prepared for: Birdwood Energy

Project No: MEL3349
Date: 4 August 2023
Revision: 01

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Project: Solar Farm – Baddaginnie, VIC
Location: Lot-1-TP106246
 Baddaginnie-Benalla Road
 Baddaginnie, VIC 3670
Prepared by: ADP Consulting Pty Ltd
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Project No: MEL3349
Revision: 01
Date: 4 August 2023

Rev	Date	Comment	Author	Signature	Technical Review	Signature	Authorisation & QA	Signature
01	04.08.2023	Issue	ML		WG		WG	

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Introduction

1.1 Document purpose

ADP Consulting has been engaged by Tetris Energy to conduct a noise impact assessment for a proposed solar farm, to be located at Lot-1-TP106246 Baddaginnie-Benalla Road, Baddaginnie VIC 3670 (the Site).

This document may be submitted to a relevant authority in support of a planning application.

1.2 References

The following drawings, conditions and other project-specific information have been referenced in the preparation of this report:

- > SunGrow Power Supply, Generating Unit (Inverter) SG2475HV Noise test report, dated 08 May 2020
- > SunGrow Power Supply, CATL energy storage container Noise test report, dated TBC
- > Birdwood Energy, BA2 – Baddaginnie Concept Layout, dated 17 July 2023

The following guidelines, standards and regulatory requirements have been used in defining the site-specific acoustic criteria and for conducting the acoustic assessment:

- > EPA Victoria, Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (Publication 1826.4), dated 4 May 2021 (EPA Noise Protocol)
- > ISO 9613.1:1993 Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere, dated 1 June 1993 (ISO 9613-1)
- > ISO 9613.2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation, dated 15 December 1996 (ISO 9613-2)
- > NSW EPA's Industrial Noise Policy, dated January 2000 (NSW INP)

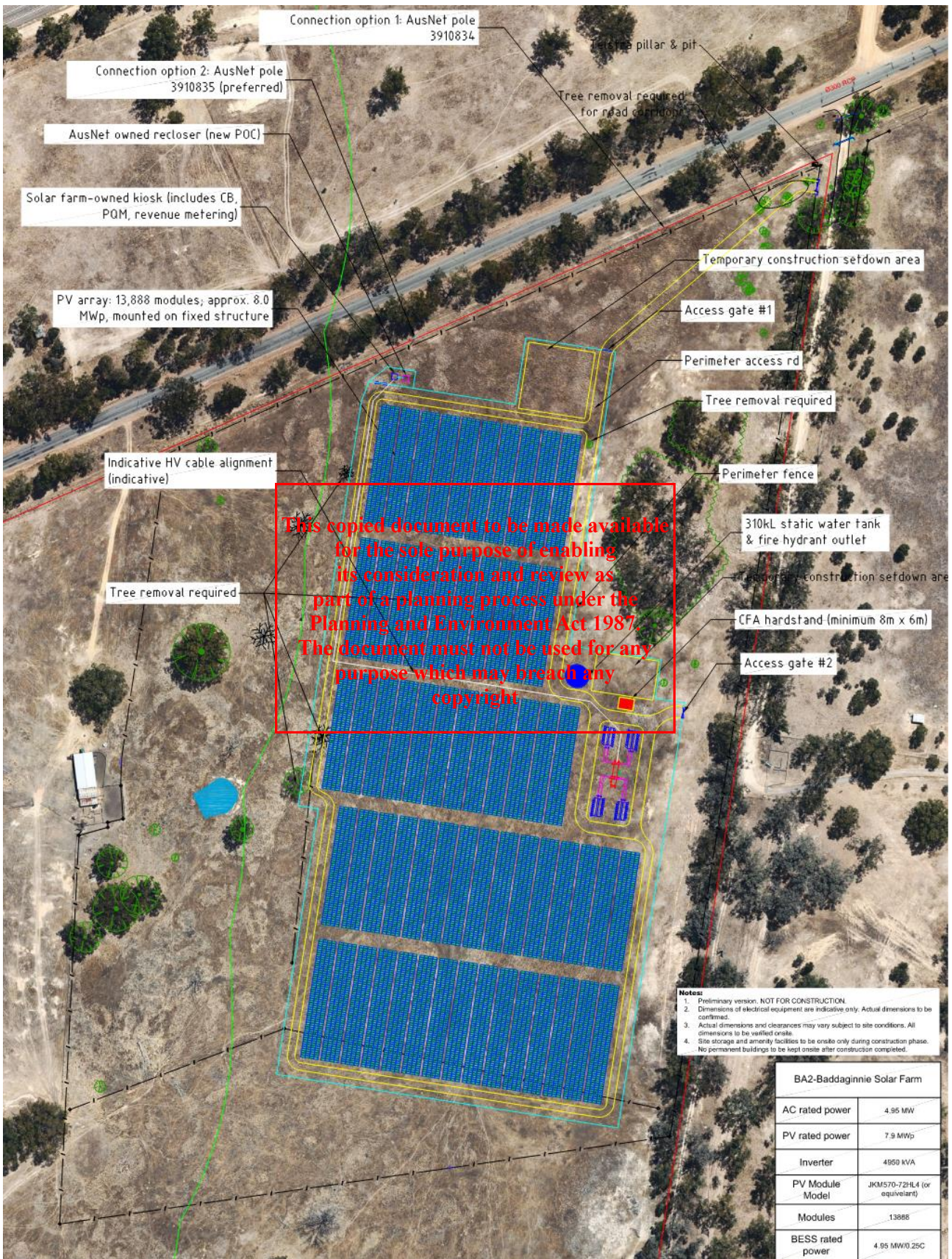
1.3 Project description

The proposed solar farm will have a power generation system that consists of PV modules, an inverter system and battery energy storage system (BESS). The modules will be connected to two (2) central inverters: inverters located to the east side of the PV module rows (Figure 1). The BESS will contain up to four (4) SunGrow 2 MW Megapack units, the PV array consist of 13,888 modules and are mounted on fixed structure.

Figure 1 Site layout containing PV modules, central inverter locations, as well as the location of the energy storage system. From Site Layout

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Site investigations

2.1 Sensitive receivers

The nearest noise-sensitive receivers to the proposed site are dwellings at the following addresses:

- > 764 Baddaginnie-Benalla Rd, Baddaginnie VIC 3670 approx. 700m to the W.
- > 37 Forshaw Rd, Baddaginnie VIC 3670 approx. 273m to the E.
- > 623 Baddaginnie-Benalla Rd, Baddaginnie VIC 3670 approx. 460m to the NE.

2.2 Planning zones

The Site and nearest noise-sensitive areas all lie contiguously in a Farming Zone (FZ). The location of the Site and identified receivers and their zone types is provided in Figure 2.

Figure 2 Identified residential dwellings nearest to the subject site. Planning zones from Victoria ELWP 11/01/2022.



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Criteria

3.1 Noise criteria – EPA Noise Protocol

Noise emission criteria for the Baddaginnie Solar Farm have been determined based on the methodology contained in the EPA Noise Protocol for commercial, industrial and trade premises.

The Baddaginnie Solar Farm project site and the identified nearest noise-sensitive receivers are located contiguously in a Farming Zone (FZ). The Noise Protocol noise emission criteria for the nearest noise-sensitive receivers have been determined and are scheduled in Table 1.

The cumulative noise emissions from the operations of the proposed development are to meet the specified noise criteria. The Noise Protocol provides requirements for standby generators, standby boilers and fire pumps for emergency noise emission conditions.

Table 1 EPA Noise Protocol zone levels, noise-sensitive receivers

Time of Operation	EPA Noise Protocol, Criteria dB(A)	
	Operational	Emergency
Day (7am to 6pm)	46	56
Evening (6pm to 10pm)	41	46
Night (10pm to 7am)	36	41

The most stringent criteria of 36 dB(A) (during the night-time period for cases where sunrise is before 7am) will be used as the site-specific noise emission criteria for this development because the operation of the facility will be continuous.

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Assessment

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4.1 Equipment noise levels

The sound power levels of major equipment proposed are provided in Table 2.

Inverter options have been considered for the two operational scenarios of our assessment, where either string inverters or one central inverter are installed. In some instances the sound power levels of equipment have been estimated.

Table 2 Sound power levels of major plant and equipment

Equipment	Sound Pressure Level
Inverter	
SUNGROW 2.75 MW (SG2475HV) (each, 2off)	77dB @1m
BESS	
SUNGROW liquid-cooled CATL energy storage containers 2.5 MW (each, 4off)	100% capacity: 75dB(A) @ 1m

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The inverters and BESS units generate noise which can be characterised as being tonal in nature (as defined by the EPA Noise Protocol). The inverter tonality is expected due to transformer noise centred at twice the overhead grid frequency (typically 125 Hz), and for the BESS units due to mechanical fans on the top of the enclosure. A +6 dB and +5 dB tonality adjustment for the BESS units and inverters respectively has been applied to reflect the effective noise level tonality adjustments in the EPA Noise Protocol.

4.2 Noise assessment

The predicted noise emission from the proposed equipment operating at the Site is compliant with the EPA Noise Protocol criteria established in Section 3.1.

The following has been considered in our assessment:

- > The maximum effective noise levels of all equipment, scheduled in Section 4.1.
- > That the inverters will operate during the night-time period (particularly in summer) before 7am.
- > Noise emission penalties apply due to tonal characteristics of the photovoltaic inverters and the BESS.
- > BESS will operate at full capacity.
- > A conservative distance sound attenuation for the equipment in an unshielded free field condition (i.e., free from buildings, barriers, mounds or hills, etc.).
- > Atmospheric and ground attenuation effects described by ISO 9613 for BESS units. Ground effects have been modelled using a ground factor of 0.7 for compacted field or gravel.
- > Calculations considered unfavourable meteorological conditions at temperatures of 20° C and relative humidity 70%.
- > Temperature inversions for adverse acoustic conditions at night (per Appendix D of the NSW INP)

Table 3 schedules the calculated noise levels at the worst affected noise-sensitive receivers for assessment with the Noise Protocol criteria. Both inverter options have been shown to comply with the Noise Protocol criteria at the nearest sensitive receivers.

Table 3 Noise emission assessment, compliance check with EPA Noise Protocol criteria

Receiver	Predicted Level, L _{Aeq,t} dB(A)* <i>BESS</i>	Predicted Level, L _{Aeq,t} dB(A)* <i>Central Inverters</i>	EPA Criteria dB(A)	Complies? Y/N
Dwellings, 700m to the W				
764 Baddaginnie-Benalla Rd, Baddaginnie VIC 3670	25	21	36	Y
Dwellings, 273m to the E				
37 Forshaw Rd, Baddaginnie VIC	36	33	36	Y
Dwellings, 460m to the NE				
623 Baddaginnie-Benalla Rd, Baddaginnie VIC 3670	30	26	36	Y

In accordance with the Noise Protocol, we have included a 6dB tonality penalty for the BESS and a 5dB tonality penalty for the inverters.

Compliance at these locations is indicative of compliance at receivers located further away.

4.3 Recommendations

The noise levels presented in Table 3 are based on the following recommendations/assumptions:

- > Orientation of the BESS and Inverters should be determined so that the noisy component is facing away from the residential dwellings where practical.
- > If orientating the BESS and Inverters with the noisy side away from the nearest residence is not possible, then an acoustic barrier will be required. Barriers with need to be constructed as follows:
 - no more than 5m from the BESS and SVG units
 - at the same height of the BESS and SVG units
 - Gap free and solid for their length and may be constructed with materials such as Colourbond or blockwork.
- > Further assessment may be required for any equipment changes or additional acoustic data.
- > Construction noise mitigation from EPA 1834 section 4.3.3 – 4.3.5 should be followed and the no work should be conducted between 8 pm to 7 am (Monday to Friday); 8 pm to 9am on Saturdays, Sundays and public holidays

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Summary

Current regulations and standards associated with the proposed development have been reviewed and assessed in accordance with existing site constraints.

Noise emissions have been predicted at the nearest noise-sensitive receivers using a conservative approach and are compliant with site-specific EPA Noise Protocol criteria.

We believe that there are no site conditions or statutory requirements that would preclude this development from complying with the noise criteria presented in this report.

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