D.2 Environmental Noise Assessment (ENA)

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Environmental Noise Assessment
Proposed Modifications to Approved Mulwala Solar Farm

Located at:-

255 Savernake Road

Mulwala, NSW 2640

Prepared for:-

NGH Consulting Pty. Ltd.
Suite 9.01, Level 9, 28 Foveaux Street
Sydney NSW 2010

Attention: Mr David Canterbury

Reference: 2509009E-R

Prepared by:-

Matthew Harwood MAAS
12th February 2026

Document Control Page

Revision	Prepared By	Reviewed By	Date
Draft	Matthew Harwood	-	01/12/2025
Draft 2	Matthew Harwood	Taine Baudy	04/02/2026
Final	Matthew Harwood	Matthew Harwood	12/02/2026

NGH Consulting Pty. Ltd. commissioned Harwood Acoustics Pty. Ltd. to carry out an Environmental Noise Assessment for proposed changes to an approved solar farm at 255 Savernake Road, Mulwala, NSW

Accordingly, Harwood Acoustics Pty. Ltd. has prepared this report for the exclusive use of the Client identified on the title page. The report is prepared in accordance with the brief and scope of works agreed between the Client and Harwood Acoustics Pty. Ltd. and may not be suitable for use beyond that scope.

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1. INTRODUCTION AND SUMMARY

NGH Consulting Pty. Ltd. on behalf of European Energy commissioned Harwood Acoustics Pty. Ltd. to carry out an Environmental Noise Assessment for proposed changes to an approved solar farm (the Mulwala Solar Farm) at 255 Savernake Road, Mulwala, NSW (the Site).

The Mulwala Solar Farm was approved by the NSW Government under consolidated approval reference SSD 9039 dated December 2018.

The Site is located approximately 2 kilometres north of the township of Mulwala, within the Federation Local Government Area, on land zoned RU1 Primary Production under the Corowa Local Environment Plan 2012 (LEP). The approved solar farm occupies two adjoining land parcels situated on either side of Lambruck Lane. The broader Site is bounded by Tocumwal Road to the south and Savernake Road to the east, with agricultural land surrounding the remaining boundaries.

Nearby residential receptors are located to the east, south-west, south and south-east of the Site. A location plan is provided in Figure 1.

Previous noise assessments were prepared for the Mulwala Solar Farm, including:-

- Environmental Noise Impact Assessment prepared by Harwood Acoustics Pty. Ltd. in association with Ray Walsh Acoustics, Noise & Sound reference 1802011 dated 2018 (the 2018 Report), and
- Operational Noise Assessment prepared by WSP Pty. Ltd. reference PS225027-ACO-REP-001 Rev3 dated August 2025 (the WSP Report).

The 2018 Report (of which I was the author) considered there would be approximately 400,000 solar photovoltaic modules located on either side Lambruck Lane and associated inverters. The WSP Report assessed the relocation of ancillary infrastructure including the substation and switch gear.

It is now proposed to seek approval for a modification to the approved Solar Farm which includes the installation of Battery Energy Storage Systems (BESS) and establishment of the farm on the northern side of Lambruck Lane. A proposed Site plan is provided in Figure 2, and a proposed layout of the BESS area is provided in Figure 3.

It is a requirement of the NSW Department of Planning, Housing and Infrastructure and Federation Council that an Environmental Noise Assessment be prepared to be submitted with the modification application. This Report provides that assessment.

Project specific noise trigger levels for the operation of the Mulwala Solar Farm are derived from the NSW EPA's *Noise Policy for Industry* 2017 and are based on minimum background noise levels in the vicinity of the closest residential receptors.

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The trigger level is tailored for each specific circumstance to take into account a range of factors that may affect the level of impact, including:

- the receiver's background noise environment
- the time of day of the activity
- the character of the noise

- the type of receiver and nature of the area.

Project Noise Trigger Levels (PNTLs) at the nearest residential receptors to the Site are:-

- 40 dBA $L_{eq,\ 15\ minute}$ during the day time period, and
- 35 dBA $L_{eq,\ 15\ minute}$ during the evening and night time periods.

Noise sources associated with the operation of the solar farm include:-

- *NEXTracker* motors for the tracking of the panels on the ground mounted frames,
- Six (6) PV Inverter Stations with a total of 19 PV inverters,
- 21 BESS Containers, and
- Seven (7) BESS inverters (power conversion stations)

Noise modelling was undertaken based on noise data established for each item from manufacturer's data.

Calculations and predictions demonstrate that the level of noise emission from the operation of the Mulwala Solar Farm will satisfy the EPA's project noise intrusiveness trigger levels at all residential receptors without the need for the additional noise mitigation as detailed in Section 5 of this Report.

2. SITE AND DEVELOPMENT DESCRIPTION

2.1 Site Description

The Site is located approximately 2 kilometres north of the township of Mulwala, within the Federation Local Government Area, on land zoned RU1 Primary Production under the Corowa Local Environment Plan 2012 (LEP). The approved solar farm occupies two adjoining land parcels situated on either side of Lambruck Lane. The broader Site is bounded by Tocumwal Road to the south and Savernake Road to the east, with agricultural land surrounding the remaining boundaries.

Nearby residential receptors are located to the east, south-west, south and south-east of the Site.

The nearest receptors to the Site are shown in Figure 1 below, and addresses are shownin Table 1 below:-

Table 1 Closest Receptors [1]

Residential Receptors	
R1 – 290 Savernake Road	R2 – 61 Damian Crescent
R3 – 96 Corella Crescent	R4 – 3 Rose Drive
R5 – 279 Tocumwal Road	R6 – 93 Barooga Road
R7 – 511 Tocumwal Road	R8 – Landholder (associated with project) [2]
R9 – 139 Little Bull Plain Road	

1. Receptors are in keeping with the WSP Report for consistency,
2. Landholder associated with the project, excluded from assessment

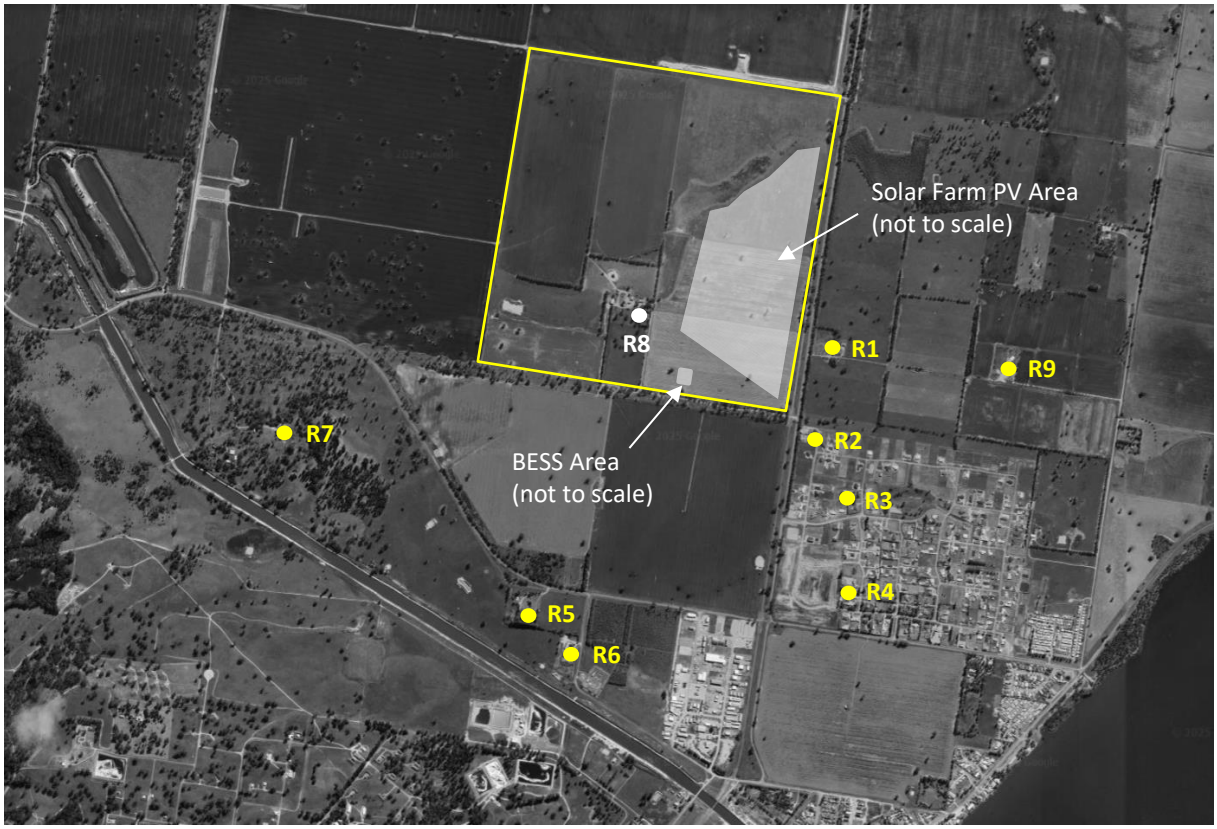

Figure 1. Location Plan – 255 Savernake Road, Mulwala, NSW

(source: www.metromap.com.au ©)

2.2 Development Description

The Mulwala Solar Farm was approved by the NSW Department of Planning, Housing and Infrastructure (DPHI) under Major Project Approval SSD-9093-PA-12.

It is now proposed to seek approval for a modification to the development which includes the installation of Battery Energy Storage Systems (BESS) and construction and operation of the solar arrays within the approved development footprint north of Lambruck Lane.

A proposed Site plan is provided in Figure 2, and a proposed layout of the BESS area is provided in Figure 3.

The Mulwala Solar Farm will include the installation of 300,000 solar photovoltaic panels (PV Panels) mounted in arrays on single axis trackers. Noise sources associated with the operation of the Solar Farm will comprise:-

- *NEXTracker* motors for the tracking of the panels on the ground mounted frames,
- Six (6) PV Inverter Stations with a mix of 3 and 4 inverters per station totalling 19 inverters,
- 21 BESS Containers, and
- Seven (7) BESS Inverters Station (power conversion stations with 2 inverters per station).

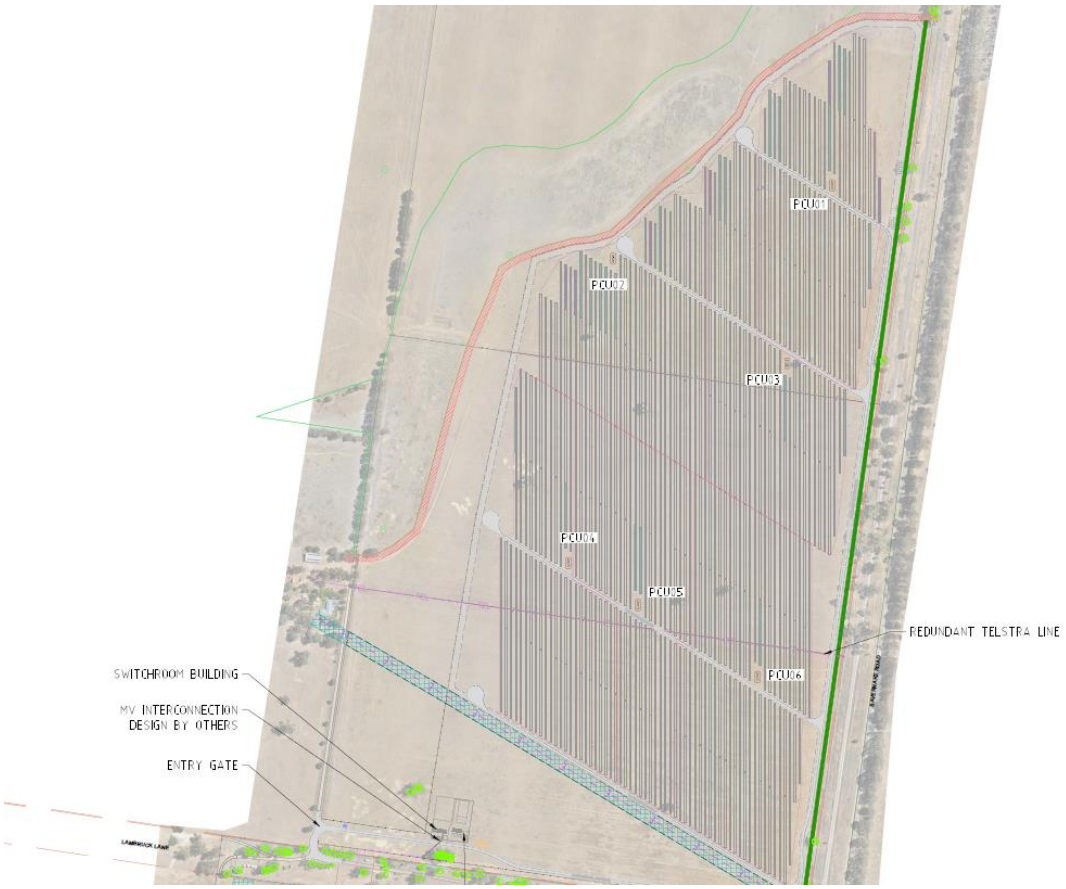

Figure 2. Electrical PV Overall Layout Plan (part)

(source: SMEC Australia Pty. Ltd. drawing no. MUSF-SME-SLF-ELE-GEN-DWG-0101, dated June 2025)

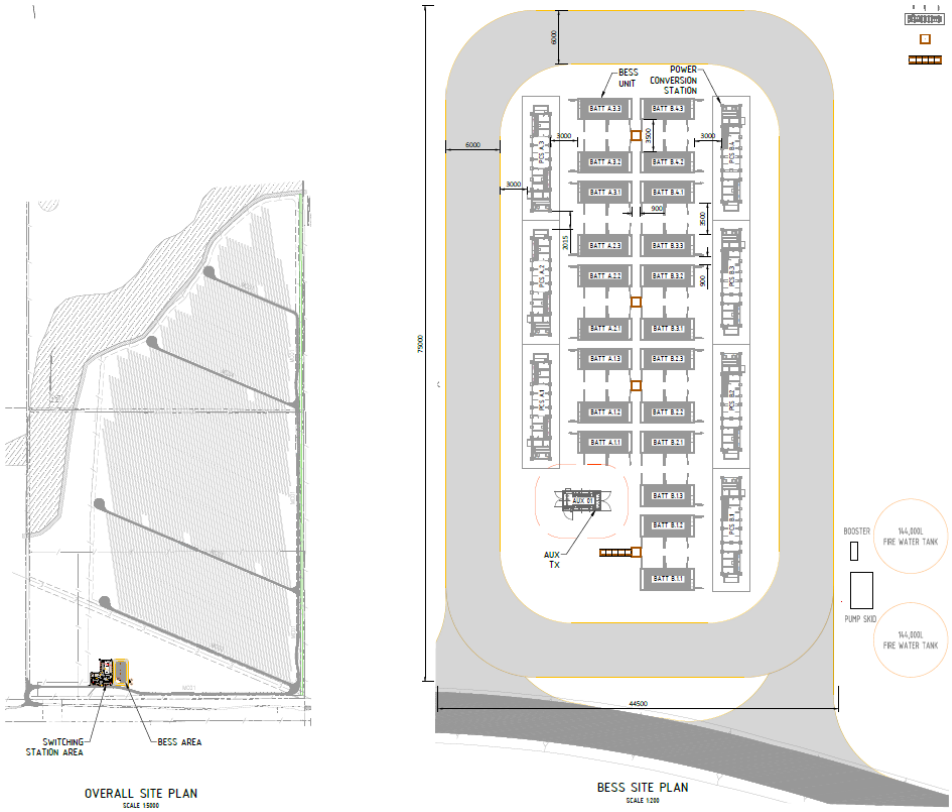

Figure 3. BESS Layout Plan (part)

(source: Beyond Electrical Engineering Pty. Ltd. drawing no. 250533-MU-EL-LAY-001, dated August 2025)

3. NOISE CRITERIA

This section outlines the noise guidelines applicable to this proposal and establishes the project specific noise trigger levels and noise design goals.

3.1 NSW EPA's Noise Policy for Industry 2017

3.1.1 Introduction

The NSW Environment Protection Authority (EPA) published the NSW *Noise Policy for Industry* in October 2017 (the Policy). This Policy has now replaced the *Industrial Noise Policy* (INP) 2000.

The Policy sets out the NSW Environment Protection Authority's (EPA's) requirements for the assessment and management of noise from industry in NSW. It aims to ensure that noise is kept to acceptable levels in balance with the social and economic value of industry in NSW.

The Policy is designed to assist industry and authorities to ensure that potential noise impacts associated with industrial projects are managed effectively.

The purpose of the policy is to ensure noise impacts associated with particular industrial developments are evaluated and managed in a consistent and transparent manner. It provides noise levels for assessing the potential impact of noise from industry and includes a framework for considering feasible and reasonable noise mitigation measures.

The objectives of the policy are to:

- provide the noise levels that are used to assess both change in noise level and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;
- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified;
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, taking into account the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy is designed for large industrial and agricultural sources and specifies substantial monitoring and assessment procedures that may not always be applicable to the types of sources councils need to address.

However, local government may find the policy helpful in assessing noise from premises it regulates and in the carrying-out of its land-use planning responsibilities.

3.1.2 Project Noise Trigger Level

Section 2 of the *Noise Policy for Industry* 2017 sets out the procedure to determine the **project noise trigger levels** relevant to a particular industrial development.

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The project noise trigger level, feasible and reasonable mitigation, and consideration of residual noise impacts are used together to assess noise impact and manage the noise from a

proposal or site. It is the combination of these elements that is designed to ensure that acceptable noise outcomes are determined by decision makers.

The **project noise trigger level** is defined as the lower (that is, the more stringent) value of the project **intrusiveness noise level** and project **amenity noise level**.

3.1.3 Project Intrusiveness Noise Level

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the **L_{Aeq} descriptor**), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.

The intrusiveness noise level is determined as follows:

$L_{Aeq,\ 15\ minute}$ = rating background noise level (RBL) + 5 dB

Where:

$L_{Aeq,\ 15\ minute}$	*Represents the equivalent continuous energy average A-weighted sound pressure level of the source over 15 minutes.*

And:

Rating background noise level	*Represents the background level to be used for assessment purposes, as determined by the method outlined in Fact Sheets A and B.*

Intrusiveness noise levels are not used directly as regulatory limits. They are used in combination with the amenity noise level to assess the potential impact of noise, assess reasonable and feasible mitigation options and subsequently determine achievable noise requirements.

Minimum assumed Rating Background Levels (RBLs) are applied in the Policy and these result in minimum intrusiveness noise levels. These are shown in Table 2.1 in the Policy and are replicated in Table 2 below.

Table 2 Minimum Assumed RBLs and Project Intrusiveness Noise Levels (Derived from EPA Table 2.1)

Time of Day	Minimum Assumed Rating Background Level dBA	Minimum Project Intrusive Noise Level ($L_{eq,\ 15\ minute}$, dBA)
Day (7 am to 6 pm)	**35**	**40**
Evening (6 pm to 10 pm)	**30**	**35**
Night (10 pm to 7 am)	**30**	**35**

3.1.4 Amenity Noise Levels and Project Amenity Noise Levels

To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise levels within an area from **all** industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. (EPA Table 2.2 is replicated in Table 3 below).

The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance.

The recommended amenity noise levels represent the objective for **total** industrial noise at a receiver location, whereas the **project amenity noise level** represents the objective for noise from a **single** industrial development at a receiver location.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a **project amenity noise level** applies for each new source of industrial noise as follows:

> **Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB**

Amenity noise levels are not used directly as regulatory limits. They are used in combination with the project intrusiveness noise level to assess the potential impact of noise, assess reasonable and feasible mitigation options, and subsequently determine achievable noise requirements.

Table 3 Amenity Noise Levels (EPA Table 2.2)

Receiver	Noise Amenity Area	Time of Day	L_{Aeq}, dBA
(see Table 2.3 to determine which residential receiver category applies)			**Recommended amenity noise level**
Residential	Rural	Day Evening Night	50 45 40
	Suburban	Day Evening Night	55 45 40
	Urban	Day Evening Night	60 50 45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks *	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom – internal	All	Noisiest 1-hour period when in use	35 (see notes for table)
Hospital ward internal external	All	 Noisiest 1-hour Noisiest 1-hour	 35 50
Place of worship – internal	All	When in use	40
Area specifically reserved for passive recreation (e.g. national park)	All	When in use	50
Active recreation area (e.g. school playground, golf course)	All	When in use	55
Commercial premises	All	When in use	65
Industrial premises	All	When in use	70
Industrial interface (applicable only to residential noise amenity areas)	All	All	Add 5 dB(A) to recommended noise amenity area

Relevant Notes:

Time of day is defined as follows:

- day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays
- evening – the period from 6 pm to 10 pm
- night – the remaining periods.

3.1.5 Assessment Locations

For a **residence**, the project noise trigger levels are to be assessed at the reasonably most-affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the reasonably most-affected point within 30 metres of the residence, but not closer than 3 metres to a reflective surface and at a height of between 1.2–1.5 metres above ground level. This should not be read to infer that the project noise trigger level (or a limit in a statutory document) applies only at the reasonably most-affected location.

3.2 Background Noise Levels

In order to establish the project intrusive noise levels, it is necessary to determine the background noise levels in the vicinity of all potentially affected residential receptors.

The background noise level is defined by the EPA as 'the underlying level of noise present in ambient noise when all unusual extraneous noise is removed' and is considered to be represented by the $L_{A90,\ 15\ minute}$ descriptor. This is a statistical measure of the sound pressure level that is exceeded for 90 % of the time. The Rating Background Level is the single-figure background noise level derived from monitoring $L_{A90,\ 15\ minutes}$ over a representative period of time. The Rating Background Level is established for the day, evening and night time periods and is used for assessment purposes.

The NSW EPA's minimum background noise levels were adopted for the establishment of project specific noise goals in the 2018 Report and WSP Report. Given the rural and agricultural nature of the environment at the nearest receptors, the minimum background noise levels are considered appropriate for this assessment.

3.3 Project Specific Noise Goals

When all the above factors are considered, the most stringent noise design goals are as shown in Table 4 below.

Table 4 Noise Design Goals for All Receptors

Receptor Location	Assessment Criteria dBA		
	Project Intrusiveness Noise Trigger Levels $L_{eq,\ 15\ minute}$		
	Day Time (7 am to 6 pm)	Evening Time (6 pm to 10 pm)	Night Time (6.30 to 7 am)
All Residential Receptors	**40**	**35**	**40**

4. MODIFYING FACTOR ADJUSTMENTS

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level. On the other hand, some sources may cause less annoyance where only a single event occurs for a limited duration.

Fact Sheet C of the *Noise Policy for Industry* 2017 outlines the correction factors to be applied to the source noise level at the receiver before comparison with the project noise trigger levels, to account for the additional annoyance caused by these modifying factors.

The modifying factor corrections should be applied having regard to:

- the contribution noise level from the premises when assessed/measured at a receiver location, and
- the nature of the noise source and its characteristics (as set out in this fact sheet).

The NPI Table C1 sets out the corrections to be applied. The corrections specified for tonal, intermittent and low-frequency noise are to be added to the measured or predicted noise levels at the receiver before comparison with the project noise trigger levels. The adjustments for duration are to be applied to the criterion. Table C1 of the NPI Fact Sheet C is replicated in the attached Appendix A.

Consideration is given to the potential for tonal noise characteristics to be associated with the transformer in noise modelling in Section 5 of this Report.

5. OPERATIONAL NOISE EMISSION

5.1 Operational Source Noise Level Predictions

Noise data was supplied by the manufacturer of the inverters and BESS and was used to establish the 'A' frequency weighted sound power levels, in decibels re: 1 pW, shown in Table 5 below.

Table 5 $L_{eq,\ 15\ minute}$ Sound Power Levels – Plant & Equipment

Equipment Description	Individual Sound Power Level $L_{eq,\ 15\ minute}$ (dBA)
PV Inverters (Ingecon Sun Power B Series) x 6	**95**
BESS Inverters (Ingecon Sun 3Power) x 7	**95**
CATL EnerX BESS Container (with cooling fans)	**87**
NEXTracker motors	**49**

A noise model has been developed using *SoundPLAN* Essential version 6.0.

Table 4 below provides details on the specific parameters used to develop the noise model.

Table 5 Computer Noise Model Parameters

Parameter	Details
Noise Sources	Inverters • Assumes that inverters operate a nominal power with 100% fan speed at any given time, • Manufacturer's stated height of 2.3 metres is given to the noise source in the model • Modelled as point sources at each specified location, BESS Container • Modelled as an area source (per unit) across the single façade at the narrow end of each container at which the bank of cooling fans are installed, • Operating at full sound power of 95 dBA ($L_{eq,\ 15\ minute}$) at any given time NEXTracker motors and mounted PV arrays • Modelled as an area source (per m^2) over the PV area – day and evening time only
Algorithm & Meteorological conditions	Noise sources are modelled in accordance with the International Standard ISO 9613-2 (2024-01) *'Acoustic – Attenuation of sound during propagation outdoors Part 2 General method of calculation'*. The method described in the Standard is general in the sense that it may be applied to a wide variety of noise sources, and covers the major mechanism of attenuation. The method allows for downwind propagation conditions namely:- • wind direction within an angle of ± 45° of the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and • wind speed between approximately 1 m/s and 5 m/s measured at a height of 3 m to 11 m above the ground, The equations for calculating downwind sound pressure level, including the equations for attenuation… are the average for meteorological conditions within these limits. These equations also hold, equivalently, for average propagation under well-developed moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights.

Table 6 below shows the predicted noise levels at each receptor for the ongoing operation of the facility for comparison against the Project Noise Trigger Levels (PNTL) at each receptor for each period.

Table 6 Predicted $L_{eq,\ 15\ minute}$ Noise Levels at Receptor Locations

Details	Predicted $L_{eq,\ 15\ minute}$ Sound Pressure Level (dBA)							
	R1	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R9**
PNTL – Day time period	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**
Operation – Day time	31	29	<20	<20	<20	<20	<10	<20
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PNTL – Evening time period	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**
Operation – Evening time	28	28	<20	<20	<20	<20	<10	<20
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PNTL – Night time period	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**
Operation – Night time	<25	27	<20	<20	<20	<20	<10	<20
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Predictions in Table 6 assume the following:-

- Distance loss to each receptor,
- Sound power levels for each item of plant and equipment shown in Table 5,
- Operational scenarios:-
  - Day – BESS at 100 % & PV at 100 % capacity
  - Evening – BESS at 100 % & PV at 50 %
  - Night – BESS at 100 % & PV at 0 %

Diagrammatical representations of the predicted noise levels from the *SoundPLAN* models are provided in the attached Appendixes B, C, D & E.

The predicted L_{eq} noise levels for the operational phase of the facility are well below the EPA's project noise trigger levels at all receptor locations without the need for noise controls.

Modifying Factor Adjustments

It is unlikely that noise emission from the operation of the Site will be audible, at least clearly audible at the majority of receptors. Consequently it is unlikely that noise levels, when measurable, would display annoying characteristics requiring modifying factor adjustments.

Notwithstanding this, the predicted noise levels with the inclusion of a + 5 dB penalty for potential tonal characteristics are provided in Table 7 below.

Table 7 Predicted $L_{eq,\ 15\ minute}$ Noise Levels at Receptor Locations with + 5 dB Penalty

Details	Predicted $L_{eq,\ 15\ minute}$ Sound Pressure Level (dBA)							
	R1	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R9**
PNTL – Day time period	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**
Operation – Day time	36	35	<25	<25	<25	<25	<20	<25
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PNTL – Evening time period	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**
Operation – Evening time	33	33	<25	<25	<25	<25	<20	<25
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PNTL – Night time period	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**
Operation – Night time	<30	32	<25	<25	<25	<25	<20	<25
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

6. CONCLUSION

An assessment of the potential noise emission arising from proposed modifications to the approved Mulwala Solar Farm located at 255 Savernake Road, Mulwala, NSW was undertaken.

Calculations and predictions show that the level of noise emission from the operation of the Solar Farm and newly proposed Battery Energy Storage Systems is below the NSW EPA's *Noise Policy for Industry* 2017 project noise trigger levels at all receptor locations without the need for noise controls.

Matthew Harwood, MAAS

Director & Principal Consultant

Harwood Acoustics Pty. Ltd.

Attachments: -
Important note & disclaimer
Appendix A – NSW EPA's Modifying Factors
Appendix B – *SoundPLAN* $L_{eq,\ 15\ minute}$ noise model all periods – single points
Appendix C – *SoundPLAN* $L_{eq,\ 15\ minute}$ noise model day time operation – contours
Appendix D – *SoundPLAN* $L_{eq,\ 15\ minute}$ noise model evening time operation – contours
Appendix E – *SoundPLAN* $L_{eq,\ 15\ minute}$ noise model night time operation – contours

Important Note

All products and materials suggested by Harwood Acoustics Pty. Ltd. are selected for their acoustical properties only.

Recommendations made in this report are intended to resolve acoustical problems only, therefore all other properties such as aesthetics, air flows, chemical, corrosion, combustion, construction details, decomposition, expansion, fire rating, fumes, grout or tile cracking, loading, shrinkage, smoke, ventilation etc. are outside Harwood Acoustic's fields of expertise and ***must*** *be checked with the supplier or suitably qualified specialist before purchase.*

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Modifying Factor Corrections (EPA 2017) | Appendix A

Table C1 Modifying Factor Corrections (from Table C.1 of the NSW Noise Policy for Industry 2017)

Factor	Assessment/ Measurement	When to Apply	Correction	Comments
Tonal Noise	One-third octave band analysis using the objective method for assessing the audibility of tones in noise – simplified method (*ISO1996.2-2007 – Annex D*).	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: • 5 dB or more if the centre frequency of the band containing the tone is in the range 500–10,000 Hz • 8 dB or more if the centre frequency of the band containing the tone is in the range 160–400 Hz • 15 dB or more if the centre frequency of the band containing the tone is in the range 25–125 Hz.	5 dB	Third octave measurements should be undertaken using unweighted or Z-weighted measurements. **Note:** Narrow-band analysis using the reference method in *ISO1996-2:2007, Annex C* may be required by the consent/regulatory authority where it appears that a tone is not being adequately identified, e.g. where it appears that the tonal energy is at or close to the third octave band limits of contiguous bands.
Low Frequency Noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10–160 Hz	Measure/assess source contribution C- and A-weighted Leq,T levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: • where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2-dB(A) positive adjustment applies for the daytime period.	2 or 5 dB	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Table C1 Modifying Factor Corrections (from Table C.1 of the NSW Noise Policy for Industry 2017) *Cont…*

Factor	Assessment/ Measurement	When to Apply	Correction	Comments
Intermittent Noise	Subjectively Assessed but should be assisted with measurement to gauge the extent of change in noise level.	The source noise heard at the receiver varies by more than 5 dB(A) and the intermittent nature of the noise is clearly audible.	5 dB	Adjustment to be applied for **night-time only**.
Duration	Single-event noise duration may range from 1.5 m to 2.5 h	One event in any 24-hour period	0 to -20dBA	The acceptable noise trigger level may be increased by an adjustment depending on duration of noise (see Table C.3)
Maximum adjustment	Refer to individual modifying factors	Where two or more modifying factors are indicated	Maximum correction of 10 dBA[2] (excluding duration correction)	

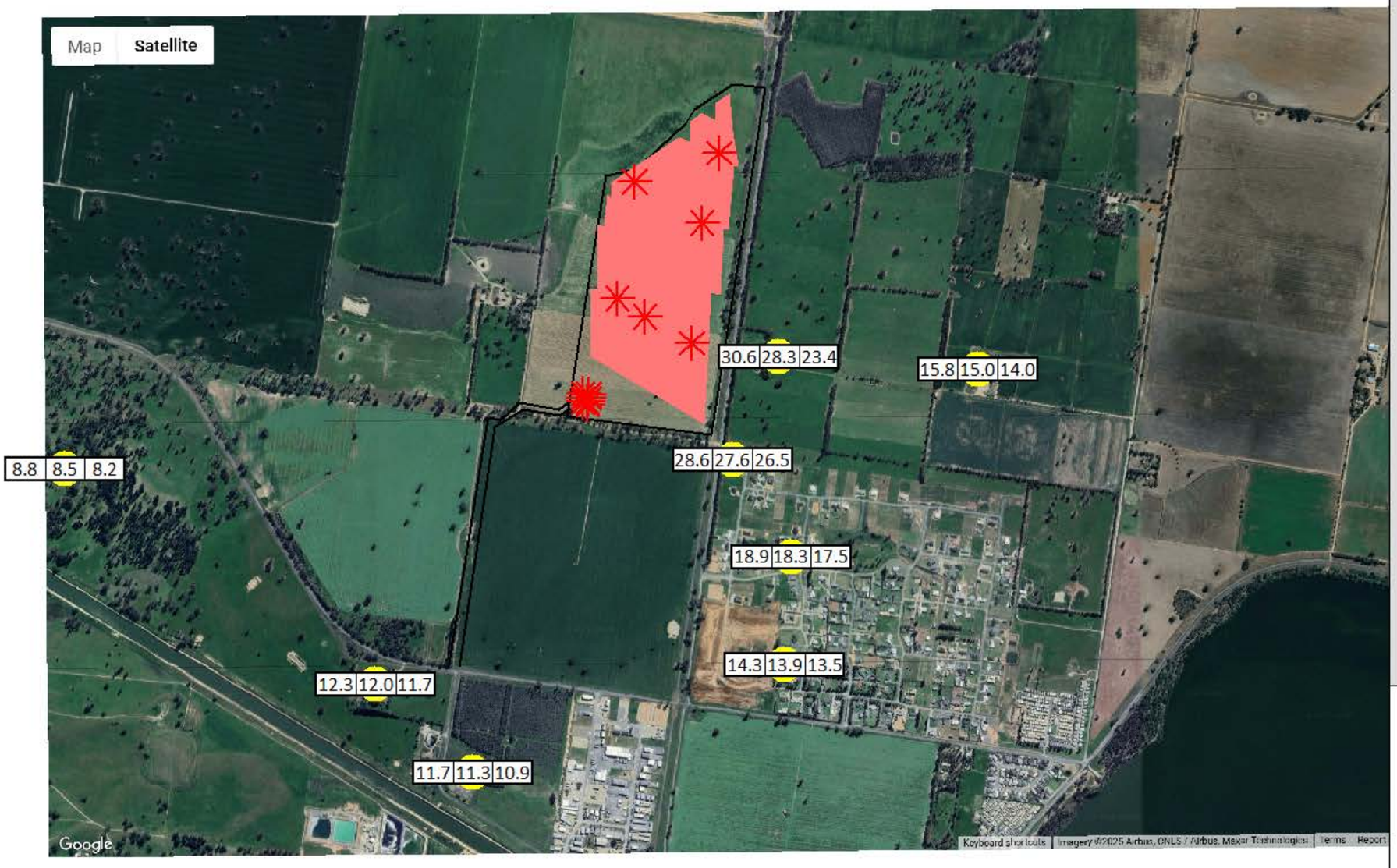
Notes:

1. Corrections to be added to the measured or predicted levels, except in the case of duration where the adjustment is to be made to the criterion.

2. Where a source emits tonal and low-frequency noise, only one 5-dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.

3. Where narrow-band analysis using the reference method is required, as outlined in column 5, the correction will be determined by the ISO1996-2:2007 standard.

Mulwala Solar Farm
Savernake Road, Mulwala
Predicted Noise Levels
Leq, 15 minute



Signs and symbols

- Modified area
- Receiver
- Inverters & Bess
- Arrays (Nextracker motors)

1 : 27342

0 125250 500 750 1000 m

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Mulwala Solar Farm
Savernake Road, Mulwala
Predicted Noise Levels
Leq, 15 minute - Day time period

Signs and symbols

- Modified area
- Receiver
- Inverters & Bess
- Arrays (Nextracker motors)

Levels in dB(A)

- = 40
- = 42
- = 44
- = 46
- = 48
- = 50
- = 52
- = 54
- = 56
- = 58
- = 60

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0 125250 500 750 1000 m

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Mulwala Solar Farm
Savernake Road, Mulwala
Predicted Noise Levels
Leq, 15 minute - Evening time period

Signs and symbols

- Modified area
- Receiver
- Inverters & Bess
- Arrays (Nextracker motors)

Levels in dB(A)

- = 35
- = 37
- = 39
- = 41
- = 43
- = 45
- = 47
- = 49
- = 51
- = 53
- = 55

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0 125250 500 750 1000 m

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Mulwala Solar Farm
Savernake Road, Mulwala
Predicted Noise Levels
Leq, 15 minute - Night time period

Signs and symbols

- Modified area
- Receiver
- Inverters & Bess
- Arrays (Nextracker motors)

Levels in dB(A)

- = 35
- = 37
- = 39
- = 41
- = 43
- = 45
- = 47
- = 49
- = 51
- = 53
- = 55

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0 125250 500 750 1000 m

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