Report

04 September 2026

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From	Matthijs Oosterlaken (GHD)	**Project no.**	12619020
Project name	Waratah Super Battery – Noise Modelling		
Subject	700 MW charging event – noise monitoring		

1. Introduction

1.1 Purpose of this report

Following the commissioning noise monitoring conducted during the HP5 test on 17 October 2025 and the subsequent long-term continuous monitoring program, Akaysha Energy requested further noise monitoring to capture noise emissions from the Waratah Super Battery operating at full service capacity (700 MW).

GHD conducted unattended noise monitoring over a two-day period from 3 August to 4 August 2026, deploying two noise loggers on site. Attended noise monitoring was also conducted at a nearby residence throughout the duration of the charge event. The monitoring program was designed to capture noise data during a targeted 700 MW charge event, representing the active operational capacity of the facility. During this period, the operations team identified a suitable window to charge the battery at 700 MW for approximately 15 minutes, enabling measurement of noise emissions at full power output.

The purpose of this report is to present the findings of the 700 MW noise monitoring survey and to characterise the noise emissions from the Waratah Super Battery at full service capacity.

1.2 Scope of work

GHD undertook the following scope of works:

– Travelled to site and deployed two noise loggers to measure noise levels continuously at two intermediate locations within the project site.
– Conducted operator attended noise monitoring at a nearby residential receiver for the duration of the test.
– Retrieved noise loggers and downloaded monitoring data upon completion of the monitoring period.
– Analysed and processed the monitoring data to determine the site's noise contribution at the nearest sensitive receivers, including comparison of noise data against operational data (charge and discharge cycles) supplied by the client.
– Prepared a short-form report detailing the noise monitoring methodology, results, and findings.

1.3 Limitations

This report: has been prepared by GHD for Munmorah Battery Project Co Pty Ltd and may only be used and relied on by Munmorah Battery Project Co Pty Ltd for the purpose agreed between GHD and Munmorah Battery Project Co Pty Ltd as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Munmorah Battery Project Co Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

2. Operational noise requirements

2.1 Conditions of approval

The Waratah Super Battery is subject to Infrastructure Approval for State Significant Infrastructure (SSI) number 48492458. Condition B13 (b) provides operational noise limits for the site and is reproduced below. As the battery could be operational at any time, the nighttime noise limit of 35 dB(A) is used to assess compliance.

B13. The Proponent must:

(b) take all reasonable and feasible steps to minimise operational noise and ensure that the noise generated by the operation of the development does not exceed the noise limits in Table 3 below to be determined in accordance with the procedures in the NSW Noise Policy for Industry (EPA, 2017) *at any non-associated residence.*

Table 3: Noise Limit Requirements

Location	Noise Limits in dB(A)		
	Day	Evening	Night
	$L_{Aeq,15min}$	$L_{Aeq,15min}$	$L_{Aeq,15min}$
Any residential receiver	40	40	35

2.2 Waratah Super Battery SIPS functional specification

The *Waratah Super Battery SIPS functional Specification 2022* contains the following requirements related to operational noise:

Noise emissions

As part of the EMP, the Service Provider is required to include in the EMP a plan for minimizing noise emissions during construction and commissioning.

The Service Provider must comply with its obligations under the Occupational Health and Safety Act and Regulations for the protection of its employees against noise-induced hearing damage.

Commissioning activities that can create high noise levels in construction areas and operator areas, as well as elevated environmental noise levels in off-Site areas must be programmed to occur at times to minimize exposure and annoyance to others. If required noise control systems shall be installed for management of noise in close proximity to the major emissions points. The Service Provider is to advise of methods for this control and the expected sound levels in affected operator areas.

Operational noise levels

The Facility shall comply with the requirements of the Environmental Protection (Residential Noise) Regulations.

In addition, the equivalent continuous "A" weighted sound pressure level produced by any plant shall not exceed 85 dB(A) at 1 m and at 1.5 m in elevation during normal plant operations be they continuous, cyclic or intermittent.

The referenced Environmental Protection Regulations are considered to be the operational noise limit as defined in Condition B13 (b) of the conditions of approval.

3. Noise monitoring

3.1 Methodology

Continuous noise monitoring was conducted between 3 August 2026 and 4 August 2026 to quantify noise emissions from the Waratah Super Battery during the 700 MW test. Details of the noise monitoring program and equipment are outlined in Table 1 and locations are shown in Figure 1. Noise sensitive receiver locations from the noise and vibration impact assessment undertaken for the environmental impact statement have been included in the figure for reference and to provide spatial context relative to the current monitoring positions. The monitoring methodology included the following:

- Noise monitoring was undertaken using three Svantek SV977 environmental noise loggers. Each noise logger was programmed to accumulate L_{A90}, L_{A10}, and L_{Aeq} noise descriptors continuously over the entire monitoring period with a 15-minute integration period. Noise monitoring was conducted at the following locations:
  - Two intermediate locations (I1 and I2) were surveyed to quantify noise levels in close proximity to the Waratah Super Battery and correlate operating modes to measured noise levels.
  - One residential receiver location (M1 – Off the corner of Ulana Avenue and Walu Avenue, Halekulani), which was considered a representative receiver location close to the Waratah Super Battery. This location corresponded to receiver R06 in the environmental impact statement.
- A calibration check was performed on the noise monitoring equipment using a sound level calibrator with a sound pressure level of 94 and 114 dBA at 1 kHz. At completion of the measurements, the meter's calibration was re-checked to ensure the sensitivity of the noise monitoring equipment had not varied. Noting that I2 calibration drift was high, but that this drift is considered to have had a minor influence on measured noise levels as it was located at the site.
- All monitoring activities were undertaken with consideration of the specifications outlined in Australian Standard AS 1055 (2018) *Description and Measurement of Environmental Noise*.
- Monitoring at the intermediate locations was carried out in the free field with microphones positioned at a height of 1.5 metres above the ground.
- The data collected by the loggers was downloaded and analysed, and any invalid data was removed. Invalid data generally refers to periods of time where average wind speeds were greater than 5 m/s (adjusted for ground level), or when rainfall occurred.
- Meteorological data was sourced from Norah Head AWS (ID: 61366), which is approximately 8 km southeast from the monitoring site.
- Operational data detailing the charge and discharge rates was provided by the client and correlated against the measured noise levels to characterise noise emissions during various operating modes.

Table 1 Noise monitoring details

Location	Equipment details	Equipment settings	Site photos
I1: East of the site Designated Waratah 1	**Sound Level Meters** Svan 977 Class 1 sound level meter IEC 61672-3:2013 compliant Manufactured prior to 2019 **Calibrator** GRAS 42AG Class 1 sound level calibrator IEC 61672-3:2013-compliant Manufactured prior to 2017	Serial Number: 97528 A-weighted Fast time response 15-minute intervals Pre and post calibration variation: 0.01 dBA	

Location	Equipment details	Equipment settings	Site photos
I2: South of the site Designated Waratah 2	SN: 278663	Serial Number: 99442 A-weighted Fast time response 15-minute intervals Pre and post calibration variation: 1.31 dBA	
M1: Off the corner of Ulana Avenue and Walu Avenue, Halekulani. This is nearby receiver R06 as defined in the environmental impact statement. Designated Waratah 3		Serial Number: 97592 A-weighted Fast time response 15-minute intervals Pre and post calibration variation: 0.33 dBA	



Legend

- Project Site
- Sensitive receivers

Monitoring locations

- Intermediate
- Residential

Paper Size ISO A4

0 200 400 m

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

GHD

Akaysha Energy
Waratah Super Battery
700MW test - noise monitoring

Project site and noise monitoring locations

Project No.	**12619020**
Revision No.	**1**
Date.	**10/08/2026**

FIGURE 1

Document Path: \\ghdnet\ghd\AU\Sydney\Projects\21\12619020\Tech\03_GIS\WSB.qgz

Data Source: Nearmap imagery

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Whilst every care has been taken to prepare this map, GHD, LIST and Nearmap™ make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete, or unsuitable in any way and for any reason.

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3.2 Results

3.2.1 Near-field unattended measurements

Analysis of the noise data at the intermediate locations demonstrates a clear correlation between Waratah Super Battery operational activity and measured noise levels at I1 and I2. Noise levels at both positions are observed to rise and fall in response to charge and discharge cycles.

This pattern was observed on 3 August 2026, when a sustained high-power discharging event between approximately 5:30 pm and 7:00 pm produced a corresponding rise and fall in measured noise levels at both intermediate locations. Discharging power spiked, reaching about 450 MW by 6:30 PM.

However, not all measured noise variations align with the operation of the Waratah Super Battery. On 4 August between approximately 8:00 AM and 11:00 AM, noise levels at I1 were notably higher than the levels at I2. This was attributed to the construction activity at the site's high voltage transformers. Construction works were observed to be in progress during the collection of the logger at I1 at 1:15 PM.

This noise source likely influenced measured levels at I1 during the morning period/ After approximately 11:00 AM, noise levels at both I1 and I2 follow the same trend, suggesting the construction influence had ceased by that time. The higher baseline noise at I1 compared to I2 is also due to the closer proximity of I1 to the battery units.

Figure 2 and Figure 3 overlay the noise levels from each monitoring location on each day to show the response to the site's operating conditions.

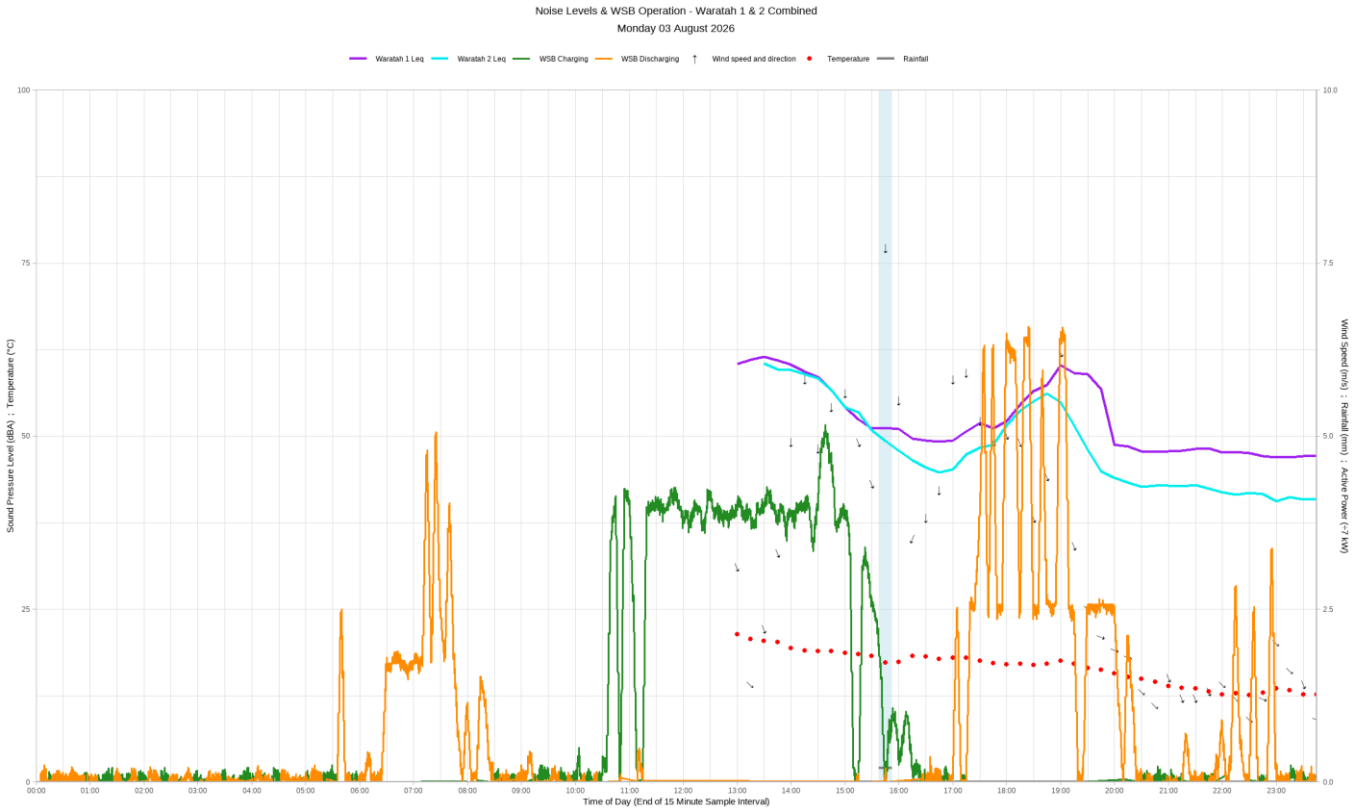


Figure 2 Comparison of intermediate noise measurements, 3 August

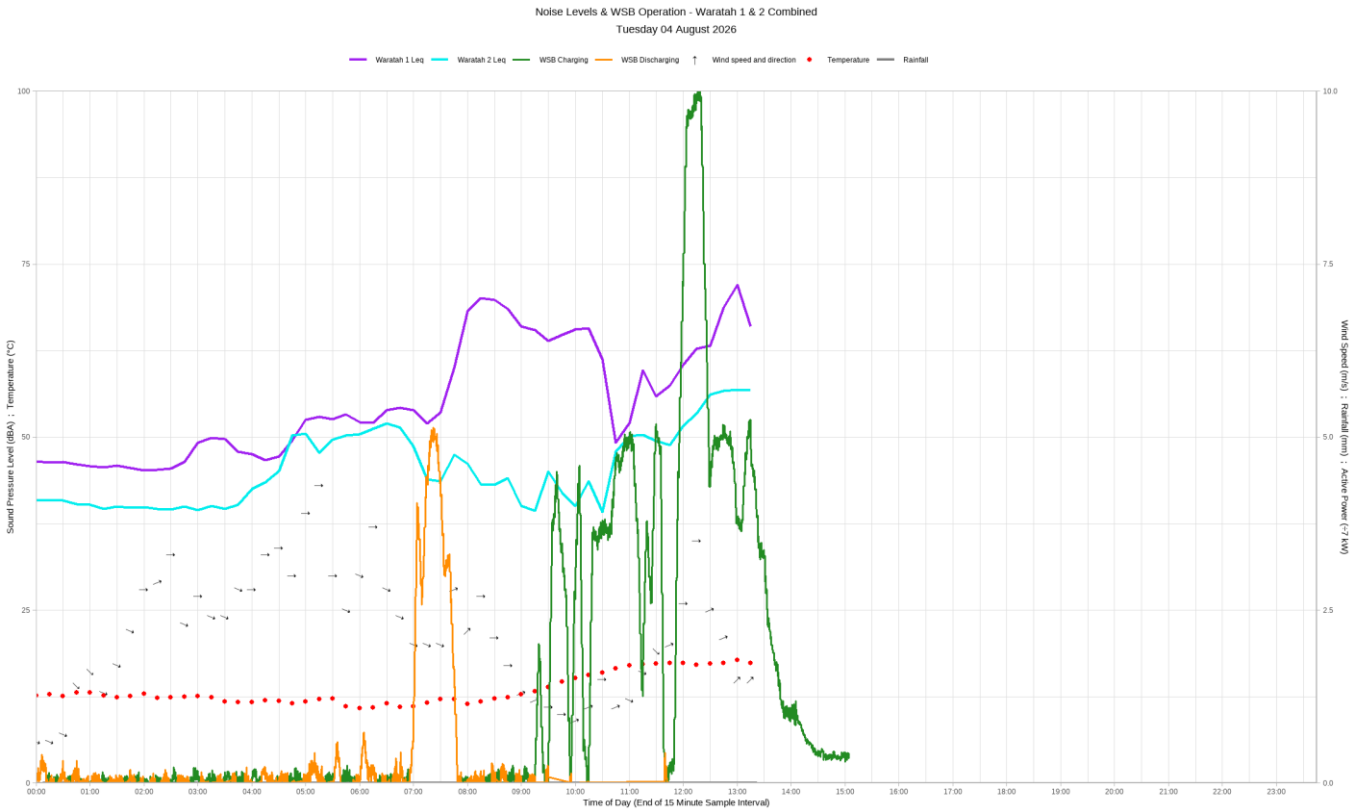


Figure 3 *Comparison of intermediate noise measurements, 4 August*

3.2.2 Far-field attended measurement

The attended noise measurement data was used to determine whether noise emissions from Waratah Super Battery propagate to nearby sensitive receivers at levels sufficient to affect the ambient noise environment.

A comparison of measured noise levels (1-second time steps) and operational data (15 samples per second) during the 700 MW charging event is shown in Figure 4. Noise levels at the intermediate locations (purple and cyan) gradually increase in response to the charging event, whereas noise at the attended receiver (shown in black) maintains a consistent level with no discernible contribution from Waratah Super Battery operations. This confirms that operational noise from Waratah Super Battery does not produce a measurable increase in daytime ambient noise levels at the nearest sensitive receiver, even during the highest charging output.

During the attended measurement, noise generated by the operational charging event was mostly inaudible at the monitoring location. A distant high-frequency whirring noise was barely audible for brief periods, however, for the majority of the measurement it was not perceptible. The ambient noise environment was dominated by wind noise in surrounding trees, with occasional audible road traffic from Walu and Ulana Avenues and distant traffic from the Central Coast Highway. General neighbourhood noise consisting of dogs barking in the distance and intermittent bird noise was also noted. During the attended monitoring it was generally wind still, with occasional gusts.

Additionally, charging events would typically occur during the daytime period, when background noise levels are elevated and applicable noise criteria are higher. Discharging events are more likely to occur during the evening or night periods when background noise levels are lower. However, noise emissions from the battery units are similar during charging and discharging of the site.

Based on the attended noise monitoring, Waratah Super Battery was found to be barely audible at the nearest sensitive receiver during the 700 MW charging event and is therefore considered to have a negligible contribution to daytime ambient noise levels at residential receivers.

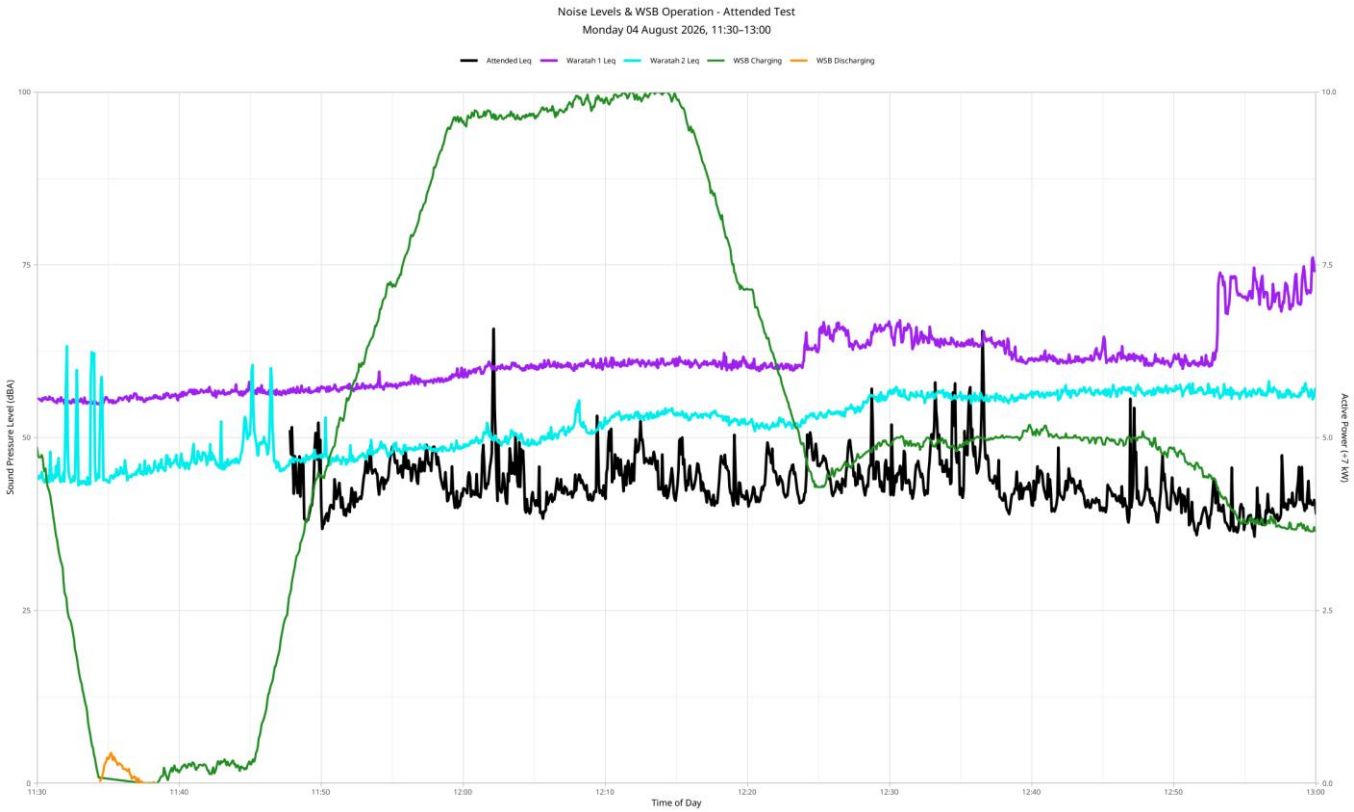


Figure 4 ***Comparison of noise measurements during the 700 MW charging event***

4. Conclusion

Noise monitoring was conducted at the Waratah Super Battery during a 700 MW charging event on 4 August 2026, representing the active operational capacity of the facility. Unattended noise loggers at two intermediate locations recorded increases of approximately 5 dBA in a gradual response to the charging event, confirming a clear correlation between operational activity and noise levels in close proximity to the site.

Attended monitoring at a nearest sensitive receiver, conducted simultaneously with the 700 MW charging event, demonstrated that noise levels remained stable and did not reflect the increases observed at the intermediate locations. Noise from the facility was mostly inaudible at the receiver, with only a faint high-frequency whirring noise barely perceptible for brief periods.

The monitoring results demonstrate that operational noise from the Waratah Super Battery was barely audible and has a negligible contribution to the daytime ambient noise levels at the nearest sensitive receiver, even during the active operational 700 MW charging output.

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