Noise Impact Assessment

Heywood BESS

Atmos Renewables

Level 11, 550 Bourke Street,
Melbourne, VIC, 3000

Prepared by:

SLR Consulting Australia

SLR Project No.: 640.031635.00001

17 June 2025

Revision: 1.2

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.2	17 June 2025	Benjamin French	Gustaf Reutersward	Gustaf Reutersward
1.1	7 May 2025	Benjamin French	Gustaf Reutersward	Gustaf Reutersward
1.0	24 April 2025	Benjamin French	Gustaf Reutersward	Gustaf Reutersward
0.1	24 March 2025	Benjamin French	Gustaf Reutersward	Gustaf Reutersward

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Atmos Renewables (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Executive Summary

This technical report is an attachment to the Heywood BESS planning application submission on behalf of Atmos Renewables.

SLR Consulting Pty Ltd (SLR) was engaged by Atmos Renewables to provide a noise impact assessment of an up to 300 MW / 1,200 MWh Battery Energy Storage System (BESS), located at 100 Golf Course Road, Heywood.

The proposed site is situated within farmland approximately 1 km north of the Heywood Terminal Station.

Noise emission data of silenced batteries and inverter units provided by original equipment manufacturers (OEM) were used as a basis for the assessment. Although the OEM is not confirmed at this stage, this assessment demonstrates the feasibility of the BESS in the planned site and layout.

Predicted noise levels at the closest sensitive receivers were assessed against the various requirements of EPA Victoria (EP Act, EP Regulations, Environment Reference Standard (ERS) and Noise Protocol limits and GED):

- Compliance with the Noise Protocol is expected at all sensitive receivers for all time periods. A 3 dB exceedance during the night is predicted at the closest receiver, R1, however Atmos have an agreement to purchase the land. To ensure compliance at R1, Atmos will either vacate the dwelling or provide additional noise mitigation measures within the development, subject to detailed design noise modelling.
- Cumulative noise impacts of the Project and the existing Heywood Terminal Station were also assessed, with compliance expected at all noise sensitive receivers.
- Low frequency noise was assessed in accordance with the Low Frequency Guidelines and demonstrated that the risk of problematic low frequency noise is low.
- The existing sound quality within the Mount Clay State Forest was qualitatively evaluated with reference to the ERS. It is expected that the Project will be inaudible from the most accessible parts of the State Forest and no more intrusive than the existing Heywood Terminal Station at the northern portion of the forest.

All plant, equipment and design layout will be reviewed during the detailed design stage to ensure that compliance with the noise criteria, including cumulative noise is maintained as finalised OEMs are selected and the acoustic performance of the plant and layout is refined.

Table of Contents

Tables

Figures

1.0 Introduction

Atmos Renewables (the Proponent) proposes to develop a utility-scale battery energy storage system (BESS) north of the existing Heywood Terminal Station in Western Victoria.

SLR Consulting Pty Ltd (SLR) has been engaged by the Proponent to undertake a noise impact assessment to support a planning permit application. SLR has also undertaken noise modelling and testing to inform the site layout and project capacity, contributing to the development of the current compliant concept design.

2.0 Project Area

The proposed BESS is located at 100 Golf Course Road, approximately 5 km south of Heywood in the Glenelg Shire Council area.

The Project Area is adjacent to the north-west corner of the Mount Clay State Forest and includes the Heywood Terminal Station, but otherwise surrounded by rural land generally used for agriculture and some rural residences. There are three sensitive receptors within ~350m of the site boundary. **Figure 1** shows the extent of the Project Area and defines areas within.

Table 1 shows the closest identified receivers and their distance to the area for batteries and inverters and **Figure 2** shows the location of the identified receivers.

An existing residence in the north-west corner of the land parcel will be vacated when development proceeds and is therefore excluded from the assessment.

Atmos has an agreement to purchase the neighbouring land and dwelling (Receiver R1 in **Table 1** and **Figure 2**) on the western boundary. This dwelling with either be vacated, otherwise, Atmos will provide additional noise mitigation measures within the development, subject to detailed design noise modelling, to protect noise amenity at the dwelling.

- Directly north of Golf Course Road (running parallel to the northern boundary and connecting to Browns Lane and Henty Highway) is agricultural land and one dwelling located to the north-west of the site (Receiver R4).
- To the south is Mt Clay State Forest, which lies within the native title determination area of the Gunditj Mirring, and Heywood Terminal Station.
- To the east are three dwellings within 1 km and Heywood Golf Course (the closest two dwelling are assessed and identified as R2 and R3).
- To the west are three dwellings within 1km, a wetland area and Henty Highway (R1, R5 and R6).

The Primary Development Area is currently used for sheep grazing and is predominately cleared of native vegetation, containing exotic pasture grass paddocks. There are no waterways located within the site boundary. The land is relatively flat, with a downward slope from east to west. Across the BESS development area there is approximately four metres of fall.

The 500kV transmission line (Mortlake to Heywood) crosses north-south by the east boundary of the BESS development area. The proposed BESS would conceptually have a capacity of up to 300MW / 1,200MWh, with associated infrastructure including inverters, an on-site substation, an underground transmission cable connection to the Heywood Terminal Station, and associated works including access point and tracks, operations & maintenance building, security fencing, fire protection equipment, earthworks and landscape planting. A 4

to 5 m tall radiant heat barrier will be installed on the southern boundary of the BESS development area.

Figure 1 Concept Layout Areas Plan

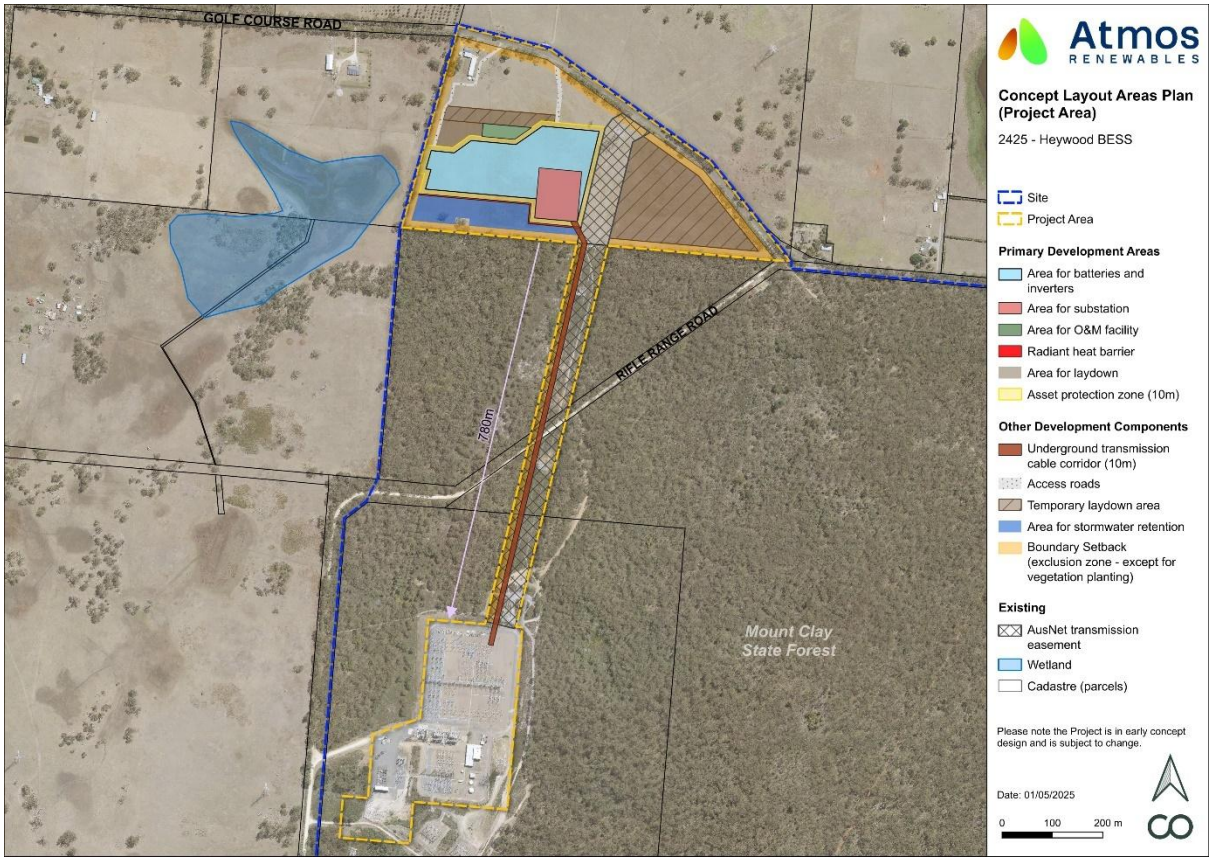


Table 1 Noise Sensitive Receivers

Receiver	Address	Land Use Zone	Easting, m	Northing, m	Distance to Area for Batteries and Inverters (m)
R1	82 Golf Course Rd	FZ	555807	5775163	190
R2	181 Golf Course Rd	FZ	556673	5774797	440
R3	211 Golf Course Rd	FZ	556916	5774773	670
R4	99 Golf Course Rd	FZ	555981	5775387	350
R5	11 Browns Lane	FZ	555170	5775170	800
R6	59 Browns Lane	FZ	555145	5774743	800

Figure 2 Noise Sensitive Receivers

3.0 Victorian Regulations - Project Criteria

3.1 General Environmental Duty

The general environmental duty (GED) is at the centre of the Environment Protection Act 2017 (EP Act), and it applies to all Victorians. GED states that a person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.

Under the EP Act, harm, in relation to human health or the environment, means an adverse effect on human health or the environment (of whatever degree or duration) and includes:

- an adverse effect on the amenity of a place or premises that unreasonably interferes with or is likely to unreasonably interfere with enjoyment of the place or premises; or
- a change to the condition of the environment to make it offensive to the senses of human beings; or
- anything prescribed to be harm for the purposes of the Act or the regulations; and
- should consider potential cumulative effect of harm arising from an activity combined with harm arising from other activities or factors.

To determine what is (or was at a particular time) reasonably practicable in relation to the minimisation of risks of harm to human health and the environment, regard must be had to the following matters:

- the likelihood of those risks eventuating,
- the degree of harm that would result if those risks eventuated,
- what the person concerned knows, or ought reasonably to know, about the harm or risks of harm and any ways of eliminating or reducing those risks,
- the availability and suitability of ways to eliminate or reduce those risks,
- the cost of eliminating or reducing those risks.

In the assessment of noise impacts with reference to GED, consideration must first be given to eliminating risks so far as reasonably practicable, and then to reducing those risks so far as reasonably practicable.

3.2 Noise Criteria

Certain types of noise within Victoria are regulated. The following sections provide an overview of how regulated noise is assessed in Victoria.

3.2.1 EP Act 2017

The EP Act prescribes that a person must not, from a place or premises that are not residential premises—

- emit an unreasonable noise; or
- permit an unreasonable noise to be emitted

Unreasonable noise means noise that—

- is unreasonable having regard to the following—
  - its volume, intensity, or duration

  - its character
  - the time, place, and other circumstances in which it is emitted
  - how often it is emitted
  - any prescribed factors, or
- is prescribed to be unreasonable noise

For the purposes of the above definition, 'frequency spectrum' is a prescribed factor.

The EP Act prescribes that, noise emitted from commercial, industrial and trade premises is prescribed to be aggravated noise if:

- in the case of noise emitted during the day period, the effective noise level exceeds the lower of the following:
  - 75 dBA
  - the noise limit plus 15 dB, and
- in the case of noise emitted during the evening period, the effective noise level exceeds the lower of the following:
  - 70 dBA
  - the noise limit plus 15 dB, and
- in the case of noise emitted during the night period, the effective noise level exceeds the lower of the following—
  - 65 dBA
  - the noise limit plus 15 dB.

3.2.2 EP Regulations and Noise Protocol 2021

The Environmental Protection Regulations 2021 (EP Regulations) support the EP Act by providing clarity and further detail for duty holders on how to fulfil their obligations. Regulations are used to deal with matters in detail and may contain their own penalties for breaches.

In Victoria, noise emissions from commercial, industrial and trade premises are not permitted to be unreasonable or aggravated, and are subject to the provisions of the Regulations, and the *"Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues"*, EPA Publication 1826.4 (the Noise Protocol).

The Noise Protocol presents the methodology for determining the noise limit (maximum allowable level of noise emitted from a premise) when measured in a noise sensitive area. Noise sensitive areas are defined in the Regulations as that part of the land within the boundary of a parcel of land that is within 10 m of the outside of the external walls of a place where people generally sleep (homes, dormitories, hotels, hospitals, correctional facilities etc.), schools (including childcare centres) and tourist establishments in rural areas (campgrounds, caravan parks, etc.).

Table 2 presents the assessment periods prescribed by the Regulations.

Table 2 Definitions of Day, Evening and Night (Environmental Protection Regulations 2021)

Period	Day	Time
Day	Monday to Saturday (except public holidays)	7:00 am – 6:00 pm
Evening	Monday to Saturday Sunday and public holidays	6:00 pm – 10:00 pm 7:00 am – 10:00 pm
Night	Monday to Sunday	10:00 pm – 7:00 am

Rural Method – Noise Limits

With regards to the Heywood BESS site, all noise sensitive receivers are located outside of the Major Urban Area, therefore the determination of noise criteria follows the Rural Method.

The Noise Protocol noise limits for receivers in a rural environment normally takes into consideration both influence of the zoning map categories (and changes in zoning categories), the background noise, and the distance between the zoning boundary and receiver (where different zones apply). Special consideration applies for utilities.

Noise Limits in Rural Areas for Utilities

Section 2.6 of the Protocol defines the method for determining noise limits in rural areas for utilities, which include electricity infrastructure, which is an appropriate classification for the BESS facility.

Paragraph (31) states that if the utility is located in a Farming Zone (FZ) and the distance adjustment is 0 dB (receiver is also in FZ), then the distance-adjusted level for each period is:

- Day: 45 dBA
- Evening: 39 dBA
- Night: 34 dBA

Since all receivers are located in Farming Zones, the project specific noise limits for Utilities apply.

3.2.3 Environment Reference Standard

The Environment Reference Standard (ERS) tool is defined in the EP Act. The ERS:

- identifies environmental values that the Victorian community want to achieve and maintain.
- provides a way to assess those environmental values in locations across Victoria.

The ERS is made up of four main components in relation to ambient sound:

- Environmental values: These are the central parts of the ERS. An environmental value is a statement about a desired outcome for human health and the environment. For example, an ambient sound environment that supports child development and learning. Environmental values are the uses, attributes, or functions of the environment that the Victorian community wants to achieve and maintain.

- Areas of application: The ERS defines the area or areas to which the environmental values, or specific indicators and objectives, apply. For example, most ambient sound indicators and objectives relate to specified land use planning zones.
- Indicators: These are usually defined in relation to each environmental value. The indicators are the parameters or markers used to assess whether environmental values are being achieved or maintained, or if they are threatened. For example 'outdoor LAeq' ('outdoor LAeq,16h from 6 am to 10 pm' or 'outdoor LAeq,8h from 10 pm to 6 am'), which is a key indicator used for ambient sound (ERS Table 3.3).
- Objectives: These are the evaluation benchmarks. An objective is the character, level, load, concentration, or amount of an indicator used to assess whether an environmental value (or several environmental values) is being achieved, maintained or threatened. Most objectives are scientifically derived quantitative assessment levels. However, some are more qualitative, for example, the ambient sound objective for 'natural areas' is 'a sound quality that is conducive to human tranquillity and enjoyment having regard to the ambient natural soundscape' (ERS Table 3.3).

Table 3 presents the ERS environmental values relating to the ambient sound environment.

Table 3 ERS environmental values relating to the ambient sound environment

Environmental Value	Description of Environmental value
Sleep during the night	An ambient sound environment that supports sleep at night
Domestic and recreational activities	An ambient sound environment that supports recreational and domestic activities in a residential setting
Normal conversation	An ambient sound environment that allows for a normal conversation indoors without the need to raise voices
Child learning and development	An ambient sound environment that supports cognitive development and learning in children
Human tranquillity and enjoyment outdoors in natural areas	An ambient sound environment that allows for the appreciation and enjoyment of the environment for its natural condition and the restorative benefits of tranquil soundscapes in natural areas
Musical entertainment	An ambient sound environment that recognises the community's demand for a wide range of musical entertainment

For the purposes of 'areas of application' the ERS outlines a framework for assessing the ambient sound environment over a period of time based on the land use category of the area of assessment. **Table 4** presents the land use categories relating to the ambient sound environment.

Table 4 Land use categories for the ambient sound environment

Land use Category	General Description	Planning Zones
Category I	An urban form with distinctive features or characteristics of taller buildings, high commercial and residential intensity, and high site coverage.	Industrial Zone 1 (IN1Z) Industrial Zone 2 (IN2Z) Port Zone (PZ) Road 1 Zone (RDZ1) Capital City Zone (CCZ) Docklands Zone (DZ)
Category II	Medium rise building form with a strong urban or commercial character. Typically	Industrial Zone 3 (IN3Z) Commercial 1 Zone (C1Z)

Land use Category	General Description	Planning Zones
	contains mixed land uses including activity centres and larger consolidated sites, and an active public realm.	Commercial 2 Zone (C2Z) Commercial 3 Zone (C3Z) Activity Centre Zone (ACZ) Mixed Use Zone (MUZ) Road 2 Zone (RDZ2)
Category III	Lower rise building form including lower density residential development and detached housing typical of suburban residential settings or in towns of district or regional significance.	Residential Growth Zone (RGZ) General Residential Zone (GRZ) Neighbourhood Residential Zone (NRZ) Urban Floodway Zone (UFZ) Public Park and Recreation Zone (PPRZ) Urban Growth Zone (UGZ)
Category IV	Lower density or sparse populations with settlements that include smaller hamlets, villages and small towns that are generally unsuited for further expansion. Land uses include primary industry and farming.	Low Density Residential Zone (LDRZ) Township Zone (TZ) Rural Living Zone (RLZ) Green Wedge A Zone (GWAZ) Rural Conservation Zone (RCZ) Public Conservation and Resource Zone (PCRZ) Green Wedge Zone (GWZ) Farming Zone (FZ) Rural Activity Zone (RAZ)
Category V	Unique combinations of landscape, biodiversity, and geodiversity. These natural areas typically provide undisturbed species habitat and enable people to see and interact with native vegetation and wildlife	Natural areas are classified as land within Category V irrespective of the planning zones that apply to that land. **Note: Mt Clay Forest is classified as Category V**
Category I, II, III or IV depending on surrounding land uses and the intent of the specific planning zone (which may have a diversity of uses) as specified in a schedule to the planning zone		Comprehensive Development Zone (CDZ) Priority Development Zone (PDZ) Special Use Zone (SUZ) Public Use Zone (PUZ)

For the ambient sound environment, for each land use category, the ERS sets out indicators and objectives. The objectives for each land use category are typical ambient sound level values and are neither noise limits nor noise design criteria. **Table 5** presents the indicators and objectives relating to the ambient sound environment.

Table 5 Indicators and objectives for the ambient sound environment

Land use Category	Indicators	Objectives
Category I	Outdoor LAeq,8h from 10pm to 6am	55 dBA
	Outdoor LAeq,16h from 6am to 10pm	60 dBA
Category II	Outdoor LAeq,8h from 10pm to 6am	50 dBA
	Outdoor LAeq,16h from 6am to 10pm	55 dBA
Category III	Outdoor LAeq,8h from 10pm to 6am	40 dBA
	Outdoor LAeq,16h from 6am to 10pm	50 dBA
Category IV	Outdoor LAeq,8h from 10pm to 6am	35 dBA
	Outdoor LAeq,16h from 6am to 10pm	40 dBA
Category V	Qualitative	A sound quality that is conducive to human tranquillity and enjoyment having regard to the ambient natural soundscape

Where non-regulated noise is generated as part of the Project, it will be evaluated against the ERS in accordance with the guidance provided in EPA Publication 1992: “Guide to the Environment Reference Standard”.

The applicable noise objective for the natural area of the Mount Clay State Forest is Category V (See **Table 5**). Refer to **Section 4.4.3** for assessment.

3.2.4 Low Frequency Noise Guidelines

EPA Publication 1996 “Noise guidelines: Assessing low frequency noise” (LFNG) provides guidance for acoustic consultants and other qualified professionals who assess low frequency noise (10Hz – 160Hz).

Frequency spectrum is a prescribed factor under the EP Act and subordinate legislation. The assessment of frequency spectrum applies to noise from commercial, industrial and trade premises only.

Low frequency noise emitted from commercial, industrial and trade premises should be assessed by comparing its frequency spectrum to the relevant threshold levels. Specifically, Z-frequency weighted (unweighted or linear) measurements in one-third octave bands from 10 Hz to 160 Hz are compared with low frequency threshold levels.

The threshold levels are not set limits. Rather, they are levels that indicate a potential risk of problematic low frequency noise. The disturbance from low frequency noise depends on the:

- noise level,
- characteristics that can increase annoyance with the noise, for example, tonality, frequency modulation,

- baseline noise levels in the absence of the noise of concern.

Table 6 details the outdoor low frequency noise threshold levels, which would apply for levels measured outdoors and based on the assumed façade noise reductions given in Downey and Parnell (2017).

Table 6 Outdoor Low Frequency Noise Threshold Levels

Outdoor 1/3 Octave Low Frequency Noise Threshold Levels													
Freq, Hz	**10**	**12.5**	**16**	**20**	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
Leq, dB	92	89	86	77	69	61	54	50	50	48	48	46	44

4.0 Noise Assessment

A 3D noise model was constructed within the modelling software SoundPLAN 8.2 to predict noise levels at the nearby sensitive receivers.

Noise modelling was conducted using the ISO 9613-2[1] algorithms incorporated in the noise modelling software. The ISO 9613-2 algorithm predicts the A-weighted sound pressure levels under meteorological conditions favourable to propagation from sources of known sound power levels. This enhanced propagation is equivalent to downwind propagation or a moderate ground-based temperature inversion. The model also includes attenuation due to air absorption, ground attenuation and shielding.

4.1 General Modelling Assumptions

The following general assumptions are made based on best-practice modelling method to suit the project:

- The reflection-order of other buildings was set to three (3), indicating that the noise model allowed for three (3) reflections off façades.
- Source heights were set according to the source item.
- Receivers were set in the free field, 1.5 m above ground level.
- All equipment is assumed to be in operation for the entire 30 minute assessment period.
- Ground topography within 3 km of the proposed site was sourced from publicly available 5 metre digital elevation data from Geoscience Australia.
- Ground absorption is modelled by a single number parameter between 0 (hard – reflective) and 1 (soft – absorptive). The substation and BESS infrastructure was modelled as hard ground, all other ground surfaces were modelled with a ground absorption parameter of 0.6, suitable for rural farmland.

4.2 Noise Sources

Sound power levels (SWL) and quantities of noise producing equipment shown in **Table 7** are based on OEM data. The inverter and battery containers are installed with OEM

[1] ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*

developed silencing equipment. Note that the OEM and battery layout has not yet been finalised. The noise assessment will be updated in the event of changes to the OEM and layout to ensure that the modelled noise emissions match the final detailed design.

All equipment items are assumed to be in operation for the entirety of a 30-minute assessment period. Noise emissions of the BESS equipment is typically dominated by cooling noise sources, which can be variable depending on the percentage of maximum power (charge/discharge) and the subsequent temperatures, both ambient and that being generated by the equipment.

Table 7 Equipment and Sound Power Levels

Qty	Item	Sound Power Level (SWL), per unit $L_{eq\ 30\ min}$, dBA
235	Battery Container	78
94	Inverter	83
2	High Voltage Transformer	88

4.3 Noise Assessment

4.3.1 Noise Characteristics

The Noise Protocol contains provisions for adjustments for undesirable noise characteristics such as tonality, impulsiveness and intermittency. If one or more of these characteristics are present at the receiver, then an adjustment is applied to the overall level.

The following outlines the noise characteristics and discusses whether the adjustments are relevant to this assessment.

Tonality

Data provided by the OEM suggests that the battery fans do have tonal characteristics. Tonality is judged (subjectively) at the receiver in context with the ambient environment.

The modelled inverters exhibit a high frequency tone at 3.15 Hz. The battery container chillers show a minor tone at 250 Hz.

Given the propagation distances to the receivers (of the order of 300 m) and the fact that the cooling plant of the batteries and inverters operate independently with varying speeds and noise spectra at any given moment, combined with local ambient noise, it is expected that tonal characteristics of the BESS will not be significant at the closest noise sensitive receivers.

Impulsiveness

The impulsiveness characteristic refers to a dominant sudden pressure peak, or series of peaks, or a single burst with multiple pressure peaks whose amplitude decays with time or a sequence of bursts. Noise due to cooling the BESS is not impulsive in nature.

Intermittency

Intermittency is present when the noise increases in level rapidly, and by at least 5 dB, on at least two occasions during a 30-minute period and maintains the higher level for at least one-minute.

The cooling fans are expected to cycle up and down as required to cool the batteries and power electronics. However, the duty cycle period exceeds 30 minutes and is not considered

intermittent. Therefore, no characteristic adjustments have been applied to the following results.

4.3.2 Low Frequency Noise

Low frequency noise contains significant acoustic energy in one-third octave bands ranging from 10 Hz to 160 Hz. The OEM provided noise spectra for their units between 25 Hz to 10 kHz. Depending on the duty cycle, the cooling fans of the battery units contain significant acoustic energy in the mid-frequencies; 250 Hz to 400 Hz.

The Noise Guidelines: *Assessing Low Frequency Noise* (Publication 1996) adopts a low frequency threshold level as a screening tool to identify the potential risk of problematic low frequency noise. Given the incomplete supplier data and limitations of modelling low frequency noise with ISO9613 algorithm, exceedances of the 25 to 160 Hz frequency bands were not identified at any receivers in the modelling and since the acoustic energy of the sources are most dominant around the mid-frequencies, low frequency noise is not expected to be problematic for this project.

The low frequency noise assessment should be revisited if the OEM is changed.

4.4 Assessment Results

The predicted noise levels at the identified representative sensitive receivers, assessed against the most stringent night-time criterion. **Table 8** shows the predicted noise levels and margin of compliance with the relevant night criteria. Demonstrating compliance at night ensures compliance during the day and evening periods as well. The noise contour plot for this scenario is shown in **Figure 3.**

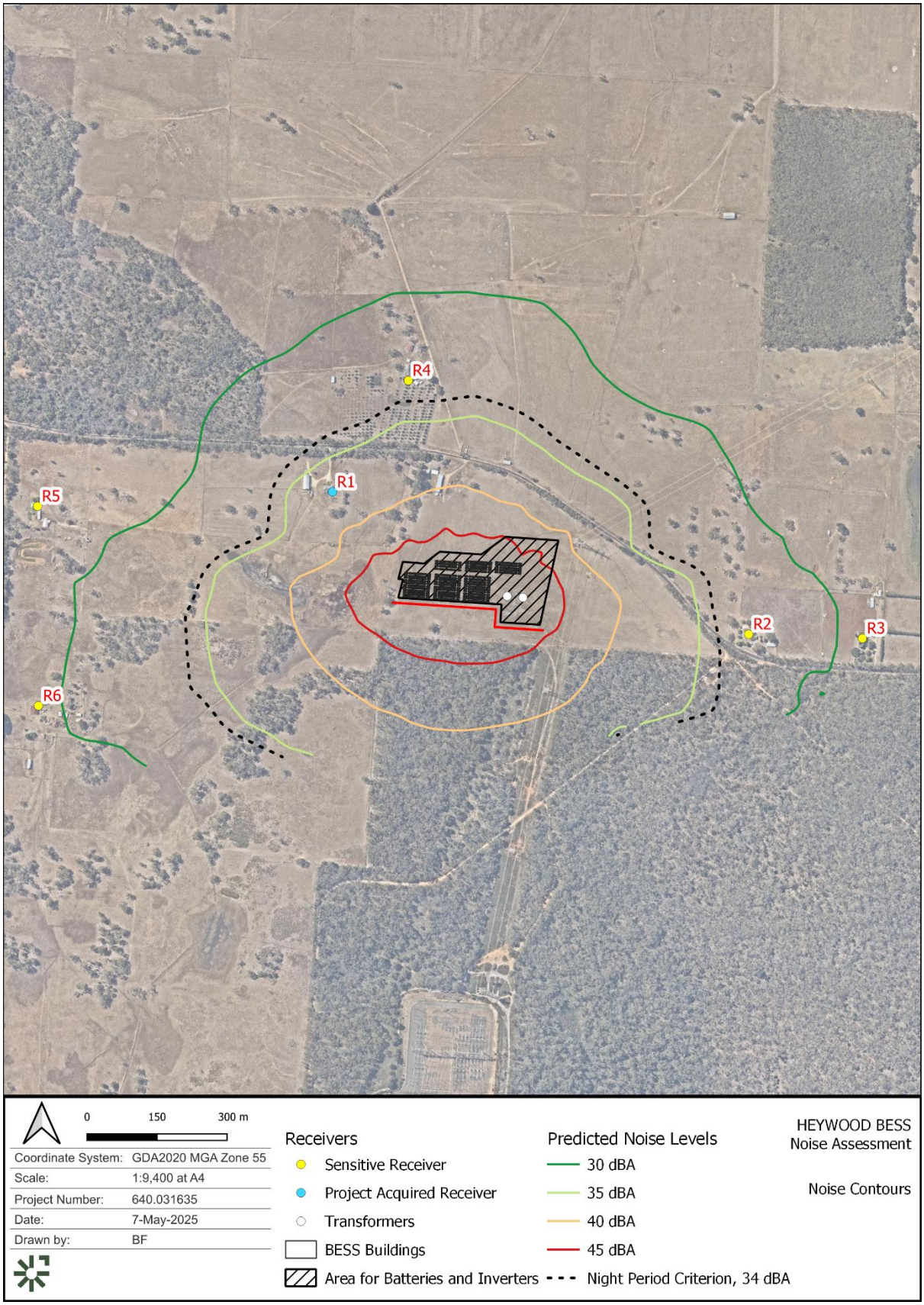
Table 8 Predicted Noise Levels from BESS Operations

Receiver	Predicted Noise Level, dBA	Night-Time Criterion, dBA	Margin of Compliance dBA
R1[1]	37	34	**-3**
R2	33	34	1
R3	29	34	5
R4	33	34	1
R5	27	34	7
R6	29	34	5

Note 1: Atmos has entered an agreement to purchase R1.

A 3 dBA exceedance at night is predicted at the closest receiver R1, however, Atmos have an agreement to purchase the land. To ensure compliance at R1, Atmos will either vacate the dwelling or provide additional noise mitigation measures within the development, subject to detailed design noise modelling. Compliance with the Noise Protocol is expected at all other sensitive receivers for all time periods.

Figure 3 Operational Noise Contours



4.4.1 Mitigation Option: R1

In the event that R1 becomes a noise sensitive receiver in the future, compliance with the Noise Protocol can be established by constructing a 4 m noise wall along the western and part of the northern boundary, as shown in **Figure 4**.

Table 9 shows the predicted noise levels and margin of compliance with the inclusion of the 4 m boundary wall; compliance is achieved at R1.

Figure 4 Noise Wall Indicative Location

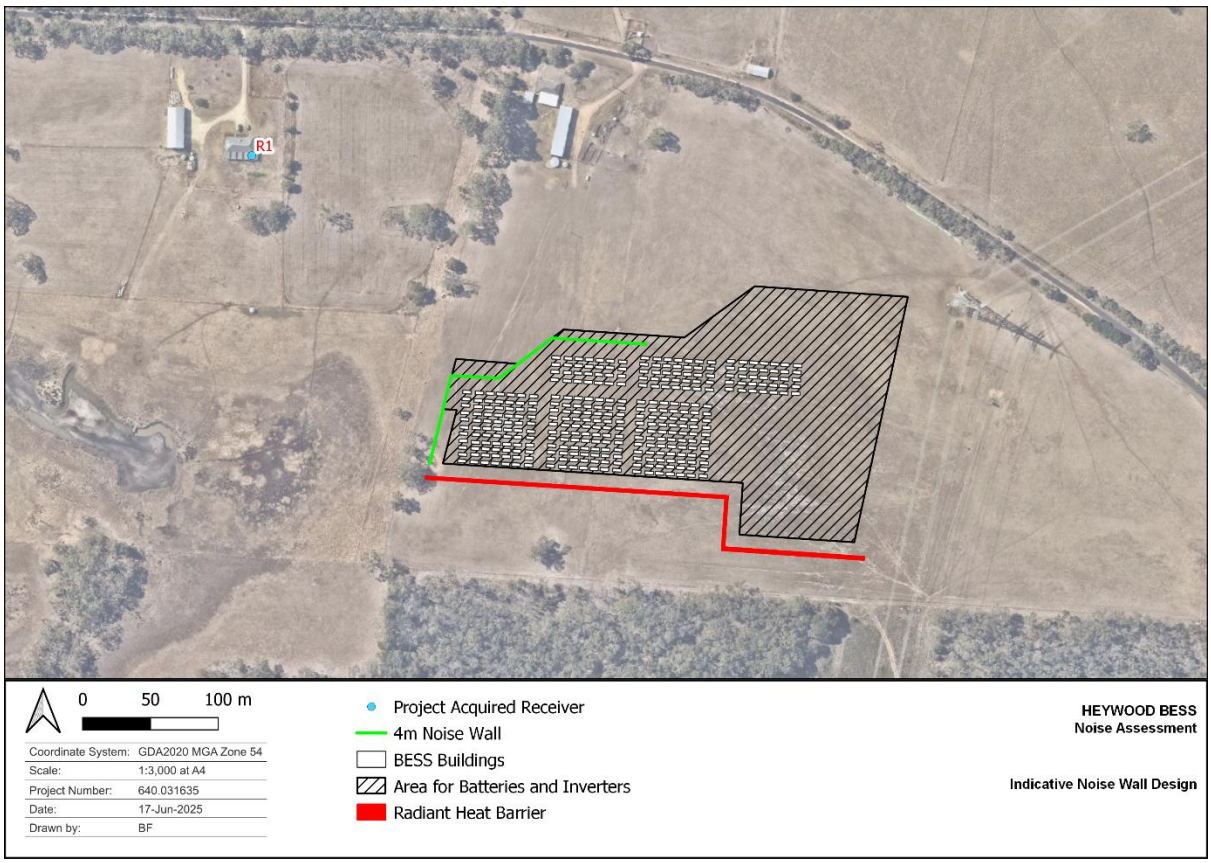


Table 9 Predicted Noise Levels from BESS Operations – 4m Wall

Receiver	Predicted Noise Level, dBA	Night-Time Criterion, dBA	Margin of Compliance dBA
R1	34	34	0
R2	33	34	1
R3	29	34	5
R4	32	34	2
R5	25	34	9
R6	28	34	6

4.4.2 Cumulative Noise

As noted in **Section 2.0**, the Project site is 1 km north of the existing Heywood Terminal Station. Noise contributions from the Terminal Station to all assessed receiver was predicted using measured high voltage transformer data from a similar substation. Three high voltage transformers were modelled with an overall sound power level of 97 dBA each.

Table 10 shows the predicted noise contributions from the Heywood Terminal Station and the Project assessed against the night period Rural Utilities limit of 34 dBA. Compliance is demonstrated at all receivers.

Table 10 Cumulative Noise Assessment

Receiver	Predicted Noise Contribution from Individual Projects		Cumulative Predicted Noise Level, dBA
	Heywood BESS	Heywood Terminal Station	
R1[1]	37	25	37
R2	33	26	34
R3	29	24	30
R4	33	23	33
R5	27	23	28
R6	29	26	31

Note 1 Atmos has entered an agreement to purchase R1.

4.4.3 Environment Reference Standard – Natural Areas

Potential noise intrusion to natural areas is not assessed under the Noise Protocol, they instead have a qualitative indicator through the Environment Reference Standard (ERS), with an objective to achieve a sound quality that is *'conductive to human tranquillity and enjoyment having regard to the ambient natural soundscape'* (Land Use Category V).

The closest part of the Mount Clay State Forest is approximately 50 m south of the BESS area, extending to approximately 8.5 km at its furthest point.

It is anticipated that most human activity would be concentrated around the Sawpit Campground area at the southern extent of the State Forest, 8.5 km from the Project. The area is commonly used for camping, hiking, horse riding, mountain biking and four-wheel driving.

Heywood Terminal Station is located on the northern side of the Mount Clay State Forest, approximately 1 km south of the Project. There are unsealed roads and tracks within the forest and the high voltage easement to the terminal station. These tracks appear to be used for recreational cycling and dirt biking.

The Narrawong Flora Reserve is located within in the Mount Clay State Forest, approximately 2 km south of the Project.

The sound scape across the Narrawong Flora Reserve and Mount Clay State Forest is likely to be a combination of natural noise sources (e.g. birds, insects, frogs, wind in foliage etc.) combined with anthropogenic (human-generated) noise sources (e.g. Princes Highway traffic, freight trains on the Portland line, farming activity, overhead aircraft etc.).

It is anticipated that the Project may be audible at locations in the north-western parts of the Mount Clay State Forest (which is unlikely to be regularly accessed by the public) during

charging and discharging cycles, depending on prevailing weather conditions and other existing noise sources, natural and anthropogenic. The Project will be inaudible from the Sawpit Campground and nearby bike tracks and hiking paths at the southern part of the forest.

Noise levels due to operation of the Project at the Heywood Terminal Station are predicted to be less than 25 dBA. The soundscape near the Terminal Station will be dominated by the Terminal Station noise emissions, therefore the presence of the Project is not expected to adversely impact on wildlife inhabiting the northern part of the Mount Clay State Forest or the Narrawong Flora Reserve.

5.0 Conclusions

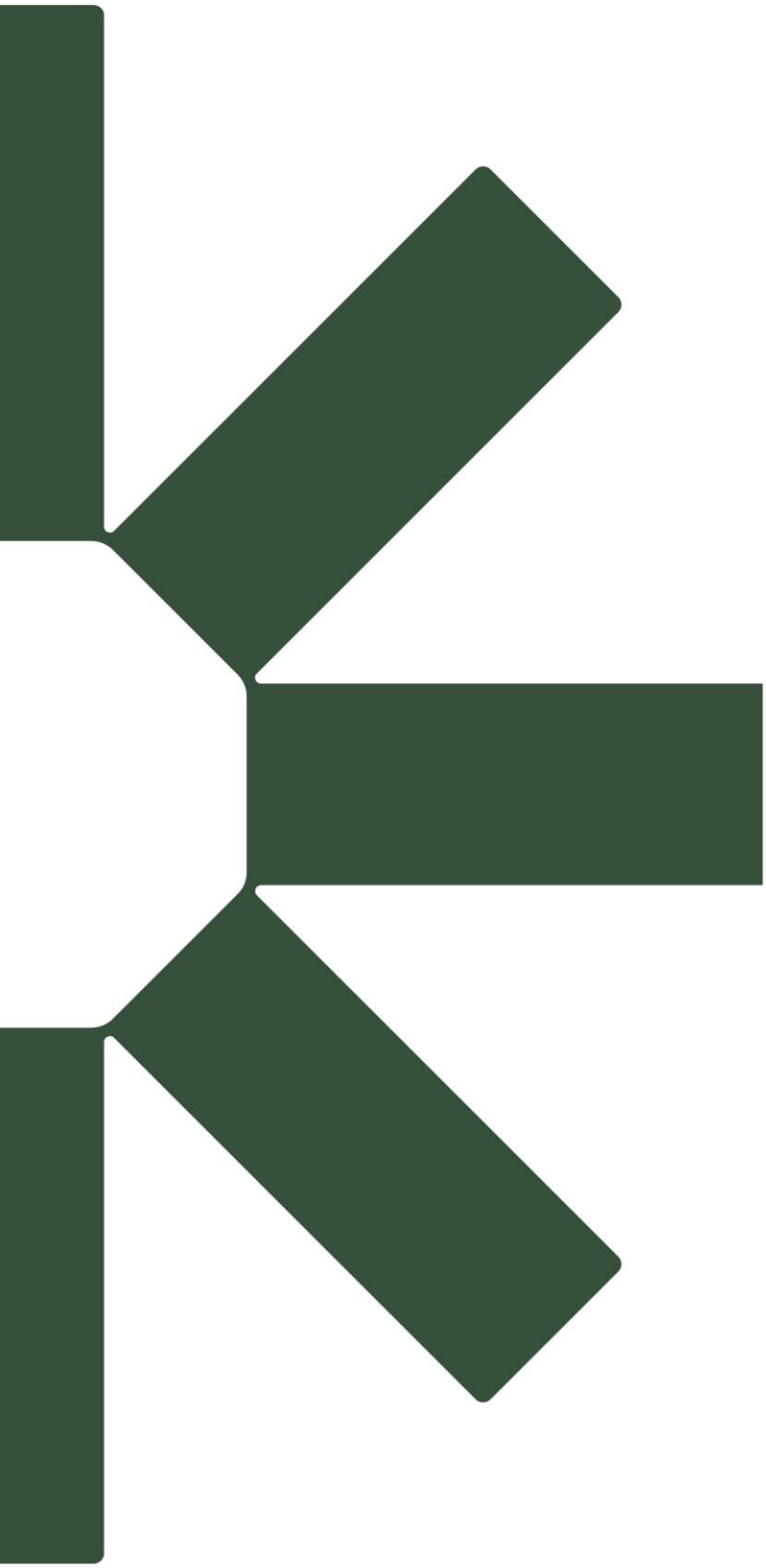
This Noise Impact Assessment was prepared to support a planning permit application for the Heywood BESS at 100 Golf Course Road, Heywood. This report presents applicable noise criteria, assessment methodology, and results to demonstrate compliance with the noise limits as prescribed by the Noise Protocol at all assessed receivers. A 3 dBA exceedance at night is predicted at the closest receiver R1, however, Atmos have an agreement to purchase the land. To ensure compliance at R1, Atmos will either vacate the dwelling or provide additional noise mitigation measures within the development, subject to detailed design noise modelling.

Cumulative noise was considered from the Project together with the existing Heywood Terminal Station. The high voltage transformers were modelled based on field measurements of a similar substation and compliance with the rural area utilities limits is predicted at all assessed receivers, during day, evening and night.

Low frequency noise was assessed in accordance with the Low Frequency Guidelines and demonstrated that risk of problematic low frequency noise at the closest receiver is low.

The anticipated sound scape within the Mount Clay Forest was qualitatively evaluated. With the addition of the Project, it is expected that the BESS will be inaudible from the more utilised and accessible southern parts of the State Forest and it is not expected to noticeably alter or negatively impact the existing soundscape in other parts of the forest.

All plant, equipment and design layout will be reviewed during the detailed design stage to ensure that compliance with the noise criteria, including cumulative noise, is maintained as the acoustic performance of the plant and layout is refined.



Making Sustainability Happen