Appendix F

Noise Impact Assessment







Mt Hopeful Battery Project

Noise Impact Assessment

Final

September 2025





Mt Hopeful Battery Project

Noise Impact Assessment

Final

Prepared by Umwelt (Australia) Pty Limited

On behalf of Neoen Australia Pty Ltd (Neoen)

Project Director: Chris Lee
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Report No.: 31912 / R01
Date: September 2025





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Document Status

Rev No.	Reviewer Name	Date	Approved for Issue Name	Date
V1	Elliott Fairon	23/09/2025	Chris Lee	23/09/2025



Acronyms

Acronym	Definition	
AO	Acceptable Outcome	
AQO	Acoustic Quality Objectives	
BESS	Battery Energy Storage System	
CONCAWE	Conservation of Clean Air and Water in Europe	
EPP (Noise)	Environmental Protection (Noise) Policy 2019	
РО	Performance Outcome	
PSP	Planning Scheme Policy	
RRC	Rockhampton Regional Council	
TLPI	Temporary Local Planning Instrument	



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1.0 Introduction

Umwelt is engaged by Neoen Australia Pty Ltd (Neoen) to prepare a Noise Impact Assessment (NIA) to assess the potential noise level emissions from the proposed Battery Energy Storage System (BESS) facility. This Assessment is provided to support the lodgement of a development application to Rockhampton Regional Council (RRC) for the Mount Hopeful Battery Project (the Project).



2.0 Project Description

The Project is a proposed grid-scale battery energy storage system (BESS) in Central Queensland (the Project). With a planned capacity of up to 600 megawatts (MW) of power for a duration of up to four hours, the Project will enhance the delivery of clean, reliable electricity to the National Electricity Market (NEM), while supporting grid stability and flexibility.

The Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Project is mapped within the Rural Zone of the Rockhampton Region Planning Scheme 2015 (planning scheme) and predominately used for low intensity agricultural activities, including cattle grazing. The Project is proposed to occur within the bounds of the 'Study Area' which covers an area of 49 hectares (ha) and occurs across three freehold land parcels and two local roads, being South Ulam Road and an unnamed road reserve. The Study Area also accommodates a Powerlink transmission easement that comprises an existing 275 kilovolt (kV) transmission line, of which the Project will connect into. The Study Area is sparsely vegetated with predominately non-remnant vegetation and is intersected by an unnamed tributary of Eight Mile Creek. The Project gains access via South Ulam Road to the east of the Study Area.

The Project is proposed to be delivered over two stages, which are indicatively described as follows:

- Stage 1: 430 MW expected to commence mid-2026 and completed by end of 2028.
- Stage 2: Additional 170 MW expected to commence in 2028 and completed by end of 2029.

Key components of the Project include:

- Up to 650x Battery Modules
- Up to 170x Medium Voltage (MV) Transformers
- 2x High Voltage (HV) Transformers
- A HV Switching Station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- Site access track
- Overhead and underground electrical cables
- Inverters
- High voltage substation
- Earthing and lightning protection
- Security fencing, closed-circuit television (CCTV) and lighting
- O&M building
- Water retention pond
- Lay down areas.



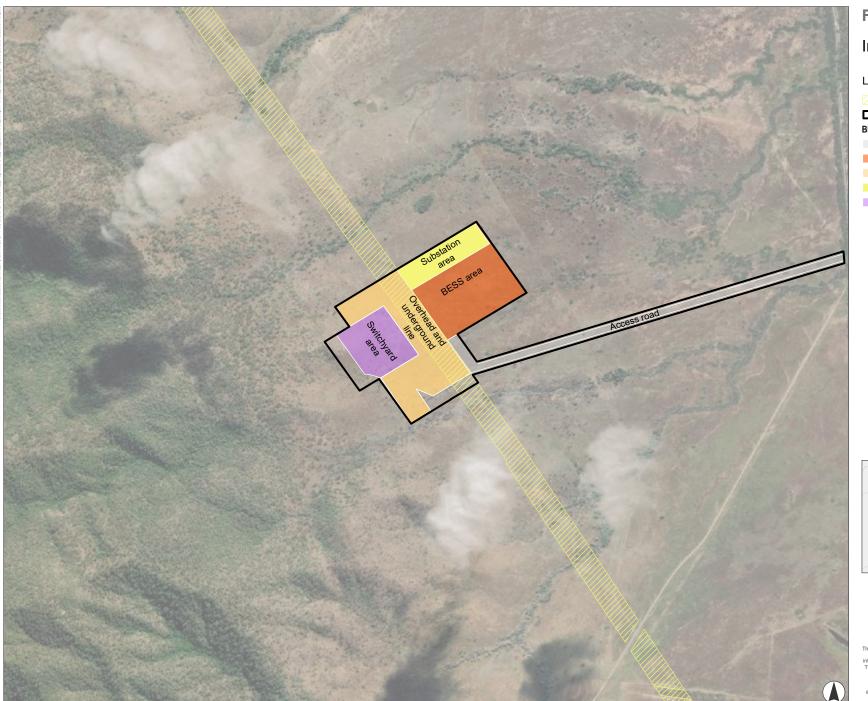


FIGURE 2.1

Indicative Project Layout

Legend

Easement

Study Area

BESS Layout

Access road

BESS area

Overhead and underground line

Substation area

Switchyard area





Scale 1:17,500 at A4 GDA2020

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3.0 Sensitive Receptors

Sensitive residential receptors within approximately 5 km of the proposed BESS facility were identified using publicly available aerial imagery (Google Earth) for inclusion in the noise model. These receptors have not been ground-truthed to understand if the structures identified in the aerial photography are residential or commercial, the assumption is that they are used for residential purposes. The nine sensitive receptors identified through aerial imagery for this assessment are shown in Figure 3.1, and their coordinates are provided in Table 3.1.

 Table 3.1
 Sensitive Receptor Coordinates

Receptor Label	GDA 2020 MGA Zo	ne56	
	X, m	Y, m	
Host Lot 5 - Involved dwelling	257573	7364136	
Non-Host Lot 2 - Uninvolved dwelling	259039	7362079	
R01	260657	7363297	
R02	260018	7365518	
R03a	258143	7368531	
R03b	258031	7368530	
R04	258774	7369501	
R05a	258787	7369911	
R05b	258825	7369899	



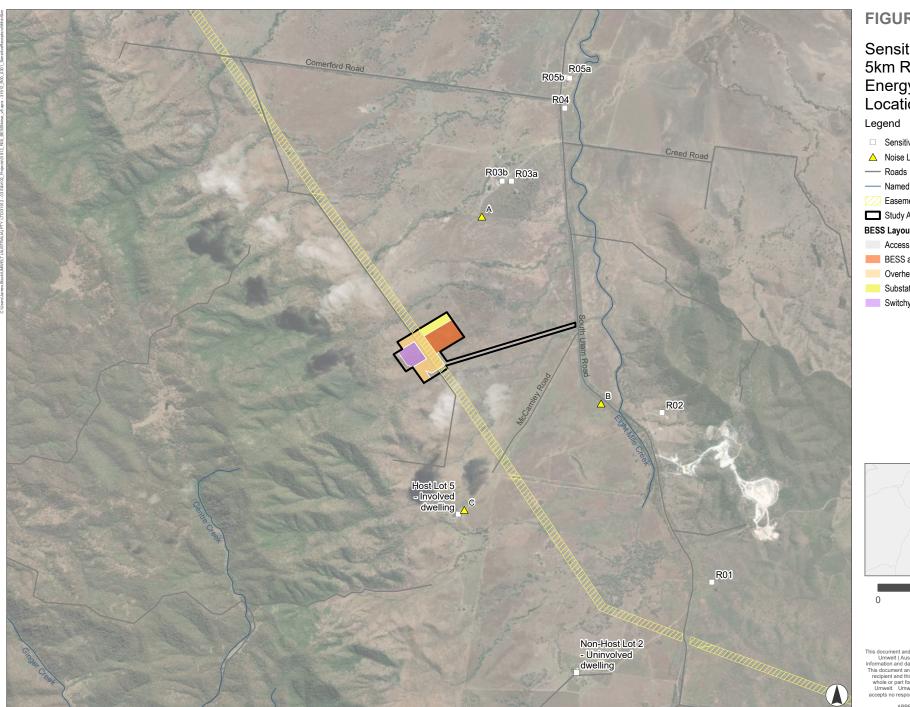


FIGURE 3.1

Sensitive Receptors within a 5km Radius of the Battery Energy Storage System Location

Legend

□ Sensitive Receptors

Noise Logger

--- Named Watercourse

Easement

Study Area

BESS Layout

Access road

BESS area

Overhead and underground line

Substation area

Switchyard area



Kilometres Scale 1:50,000 at A4 GDA2020

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4.0 Existing Environment - Background Noise Levels

Baseline noise monitoring was undertaken at three locations (Locations A, B and C) in the vicinity of the BESS study area. The monitoring locations are presented in Figure 4.1.

The monitoring was undertaken over a period of two weeks, between 24/06/2025 and 09/07/2025. The instrumentation was field calibrated during installation. However, due to availability of calibration instrumentation a calibration check was unable to be taken at the completion of the monitoring period.

The meteorological data captured by the onsite weather station has been incorporated within the data analysis. Periods of elevated wind and rainfall have been excluded.

The noise monitoring results are summarised in Table 4.1, Table 4.2 and Table 4.3 for Locations A, B and C respectively. The Rating Background Level (RBL) for each period at each location is presented in Table 4.4. The noise monitoring locations are considered representative of acoustic environment of the sensitive receptors located in the vicinity of the project. The noise monitoring results and local weather conditions are presented graphically in Appendix A, Appendix B and Appendix C for Locations A, B and C respectively.

Based on observations during the site visit and the monitoring results, the acoustic environment can be characterised as a quiet, rural and agriculture scene, generally comprising bird and insect noise, animal or cattle noise, infrequent road traffic noise and wind-induced foliage noise related to wind in the trees and long grass.

Table 4.1 Summary Statistics – Location A

Parameter	Period	Statistic, dB(A)					
		Average	10 th %'ile	25 th %'ile	Median	75 th %'ile	90 th %'ile
LAmax	D	55	48	51	55	59	62
	Е	47	39	44	48	52	54
	N	45	29	40	47	51	58
LA10	D	41	34	37	40	44	47
	Е	40	24	35	42	47	51
	N	36	21	30	37	44	48
LAeq	D	39	32	35	39	42	45
	Е	37	23	31	38	45	49
	N	34	20	28	36	41	46
LA90	D	32	24	27	32	35	39
	Е	33	19	22	33	42	47
	N	29	19	21	28	36	44



Table 4.2Summary Statistics – Location B

Parameter	Period	Statistic,	dB(A)				
		Average	10 th %'ile	25 th %'ile	Median	75 th %'ile	90 th %'ile
LAmax	D	63	55	59	63	67	70
	E	51	40	43	51	57	63
	N	51	35	42	52	60	66
LA10	D	47	39	42	46	51	55
	E	42	28	32	44	50	55
	N	40	25	32	43	48	53
LAeq	D	46	39	42	46	49	53
	E	40	26	31	42	49	54
	N	39	24	29	42	47	51
LA90	D	36	27	30	35	41	46
	E	35	22	24	33	45	52
	N	32	20	23	30	42	47

Table 4.3 Summary Statistics – Location C

Parameter	Period	Statistic,	dB(A)				
		Average	10 th %'ile	25 th %'ile	Median	75 th %'ile	90 th %'ile
LAmax	D	66	57	61	65	71	76
	E	47	37	42	47	51	57
	N	45	32	37	44	53	60
LA10	D	44	38	41	45	48	50
	E	36	25	30	36	43	47
	N	34	21	25	35	43	48
LAeq	D	44	38	41	44	47	51
	E	35	25	29	34	41	46
	N	32	20	23	33	41	45
LA90	D	30	24	26	29	34	38
	Е	31	19	24	30	38	44
	N	28	18	19	27	36	40

Table 4.4 Rating Background Levels (RBL)

Parameter	Period	Location A	Location B	Location C
RBL, dB(A)	D	25	28	25
	Е	28	27	25
	N	25 (19) ¹	25 (22) ¹	25 (18) ¹

Note 1: A Rating Background Level (RBL) of 25 dB(A) has been adopted as the observed/measured RBL is lower than the minimum RBL of 25 dB(A) in accordance with the EcoAccess Guideline: Planning for Noise Control.



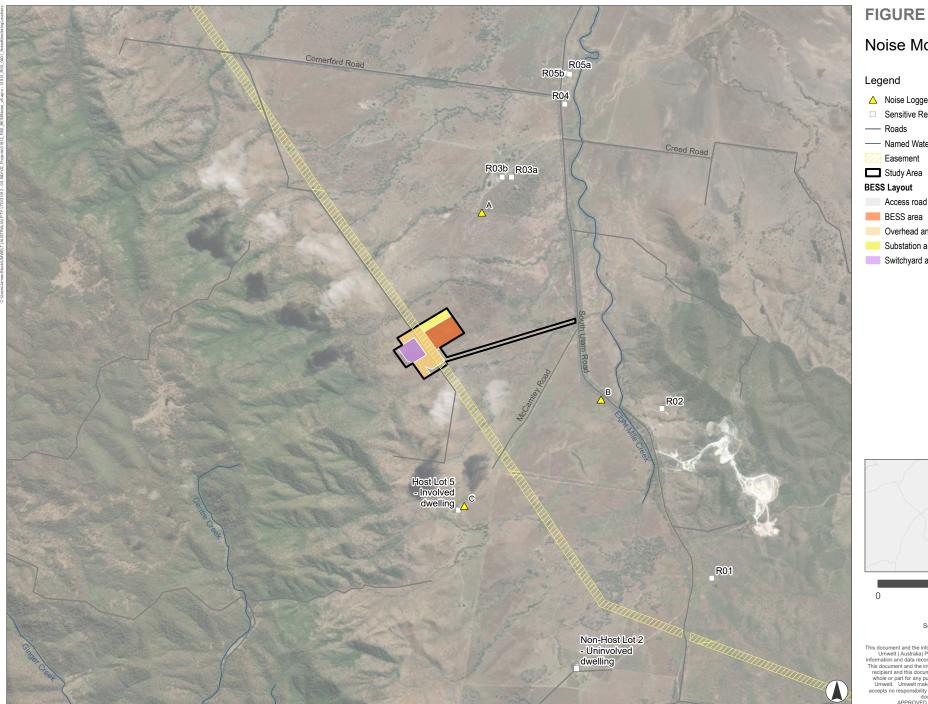


FIGURE 4.1

Noise Monitoring Locations

Legend

△ Noise Logger

Sensitive Receptors

--- Roads

--- Named Watercourse

Easement

Study Area

BESS Layout

BESS area

Overhead and underground line

Substation area

Switchyard area





Scale 1:50,000 at A4 GDA2020

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5.0 Project Noise Criteria

5.1 Rockhampton Region Planning Scheme 2015

The Rockhampton Region Planning Scheme 2015 (Planning Scheme) is the current planning scheme for the Rockhampton Region Local Government Area (LGA).

The project site is designated as a Rural Zone under the planning scheme, therefore RRC's Rural Zone Code is applicable to the project. However, the Rural Zone Code doesn't include any specific noise-related performance outcomes relevant to this project. Although it is noted that the general intent of the Rural Zone Code in relation to noise is to *not cause adverse impacts on sensitive land use(s) in relation to traffic, noise and air quality.* In achieving this general intent, the Rural Zone Code points to the Environmental Protection (Noise) Policy 2019 (EPP (Noise)) when addressing the acceptability of noise emissions from other use types. The intent, as drawn from A07.11, is that the project noise levels do not exceed the Acoustic Quality Objectives (AQO) under the EPP (Noise).

In addition to the Rural Zone Code, the Planning Scheme also includes Planning Scheme Policy (PSP) (SC6.3 Air, noise and hazard assessments planning scheme policy) that considers noise. Subsection SC6.3.2 Noise impact assessment requirements of the PSP provides a methodology for assessing the noise impacts from industry uses onto sensitive uses. More specifically, the PSP states the following in relation to the conclusions from the noise impact assessment:

- (3) Conclusion:
- (a) The conclusion should include a description about:
 - (i) the current industry noise impacts;
 - (ii) forecast noise impacts from the proposed development;
 - (iii) proposed mitigation measures; and
 - (iv) discussion of the likely effectiveness of the objectives in the Environmental Protection (Noise) Policy 2019.
- (b) This will include:
 - (i) an explanation of noise mitigation measures used to achieve the indoor noise objectives of the Environmental Protection (Noise) Policy 2019; and
 - (ii) a statement of limitation of noise mitigation treatments and, if applicable, explanation of why some treatments may not be reasonable, feasible or cost effective.

Based on the Rural Zone Code and the noise section of PSP, it is considered that the AQO under the EPP (Noise) represent the benchmarks for the noise impact assessment for this project.

5.2 Environment Protection (Noise) Policy 2019

The noise criteria applicable to the development are the AQO under the EPP (Noise). The noise limits derived in accordance with the AQO are presented in Table 5.1. Due to the nature of the noise source, the LAeq represents an appropriate assessment parameter.



Table 5.1 Noise Limits Derived in Accordance with EPP (Noise) Acoustic Quality Objectives

Period	Acoustic Quality Objective Internal Noise Level	Noise Limits ¹ LAeq,adj,1hr dB(A)
Day (7am – 6pm)	35	40
Evening (6pm – 10pm)	35	40
Night (10pm – 7am)	30	35

Note 1: Allowing for 5 dB(A) noise reduction across the building façade in accordance with the EcoAccess Guideline: Planning for Noise Control. Typically, the reduction achieved across a semi-open façade is in the order of 5 dB(A) to 10 dB(A). In a contemporary setting, a correction of 5 dB(A) is commonly adopted as a conservative outcome.

5.3 RRC DRAFT TLPI Renewable Energy and Battery Storage

RRC has proposed a draft Temporary Local Planning Instrument (TLPI) – Renewable Energy and Battery Storage, this includes assessment benchmarks in relation to noise emissions from projects. Following pre-lodgement discussions with RCC it is understood that the assessment benchmarks relating to noise emissions are unlikely to be implemented in its current form.

Overall, it is considered that the AQO is the more appropriate criteria for BESS developments, noting its application in the recent State Code 26: Solar Farm Development of the SDAP. This is consistent with the pre-lodgement advice received from Council. State Code 26 makes reference to achieving the AQO under the EPP (Noise) at the sensitive receptors and is presented in Table 5.2.

Table 5.2 State Code 26: Solar Farm Development - Noise Limits

Section	Performance Outcome
Acoustic	PO11
Amenity	Development is located, designed, constructed and operated to meet the acoustic quality objectives for sensitive receptors on or adjoining the site identified in the Environmental Protection (Noise) Policy 2019.



6.0 Noise Modelling Methodology

Noise modelling has been undertaken to assess the potential impacts of the operation BESS facility at nearby sensitive receptor locations. The noise levels from the BESS have been predicted using the proprietary noise modelling software SoundPLAN (v9.1). The CONCAWE noise level prediction methodology adopted for this project. Terrain information for the area has incorporated project elevation information and 1-second Shuttle Radar Topography Mission (SRTM) Digital Elevation Model.

To represent worst-case results, downwind noise enhancing meteorological conditions were modelled and are represented by:

- neutral conditions: Atmospheric Stability Class 'D', wind speed 3 m/s; or equivalent
- temperature inversion conditions: Atmospheric Stability Class 'F', wind speed 2 m/s.

The preliminary BESS facility layout has been incorporated into the noise model and multiple individual noise sources for the battery modules and transformers. The supplier for the battery modules has not yet been selected. The modelling has been prepared using information from Tesla Megapack MP2 XL, which are considered as a conservative battery model for noise modelling purposes. The battery modules were modelled as building structures with the noise energy located on top of the structure, approximately 2.8 m above ground level.

The indicative sound power levels used in the model are presented in Table 6.1 and have been estimated from supplier datasheets and correspondence with Neoen. Spectral data was supplied, which allowed for the assessment of tonal penalties.

Table 6.1 Indicative Operational Equipment Sound Power Levels

Noise Source	Quantity	Indicative Sound Power Level per unit (dB(A) / dB(Z))	
Tesla Megapack (Battery and Inverter unit) (MP2 XL 5-fan (4h)) ¹	650	Day-time 7 am – 10 pm (refer to Note 2): 94 dB(A) / 104 dB(Z) ²	
		Night-time 10 pm – 7 am (refer to Note 3): 84 dB(A) / 94 dB(Z) ³	
HV Transformer	2	89 dB(A) / 97 dB(Z)	
MV Transformer	163	82 dB(A) / 95 dB(Z)	

Note: 1. Indicative noise level data was sourced from information supplied to Umwelt by Neoen, including the document Tesla MP2XL FN03 – 03'2024.

^{2.} Fan speed modelling undertaken for record hottest day and 10 hottest consecutive days indicates that the worst-case day time mode (between 7 am and 10 pm) is likely to be represented by the following combination of fan speeds for the two primary components - 100% for battery fans and 100% for PE fans.

^{3.}Fan speed modelling undertaken for record hottest day and 10 hottest consecutive days indicates that the worst-case night time mode (between 10 pm and 7 am) is likely to be represented by the following combination of fan speeds for the two primary components - 60% for battery fans and 20% for PE fans.



7.0 Predicted Noise Levels

The noise model was used to predict levels from the BESS facility at the surrounding sensitive receptors under enhancing meteorological conditions. The noise modelling results have been presented utilising sound power levels associated with day-time and night-time operational modes. The results for all receptors were assessed for the applicability of tonality penalties under the EcoAccess Guideline: Planning for Noise Control. A tonality penalty of 5 dB(A) has been applied to the predicted noise levels for all receptors.

The noise level predictions for the BESS facility including +5 dB tonality penalty at different fan speeds are shown in Table 7.1.

Table 7.1 Predicted Noise Levels

Period	Predicted Noise Level LAeq,adj,1hr dB(A)		
	Day-time mode	Night-time mode	
Host Lot 5 - Involved dwelling	39	30	
Non-Host Lot 2 - Uninvolved dwelling	26	17	
R01	27	18	
R02	36	26	
R03a	40	31	
R03b	40	31	
R04	33	24	
R05a	31	22	
R05b	39	30	

As indicated in **Table 7.1**, the highest predicted noise level is 40 dB(A) LAeq,adj at R03a, based on Day-time mode for the Telsa battery modules. This reduces to 31 dB(A) with Night-time mode. Noise level contours (including the +5 dB tonality penalty) for the Tesla Megapack noise predictions are shown in **Figure 7.1** to **Figure 7.2** for Day-time and Night-time modes respectively.

The predicted noise levels indicate that the AQO Daytime noise limit of 40 dB(A) can be achieved with Day-time operational mode, similarly the AQO Night-time noise limit of 35 dB(A) can be achieved with Night-time operational mode. Based on these noise level predictions the AQO noise limits can be achieved through the adoption of the representative fan speeds during the day and night periods.



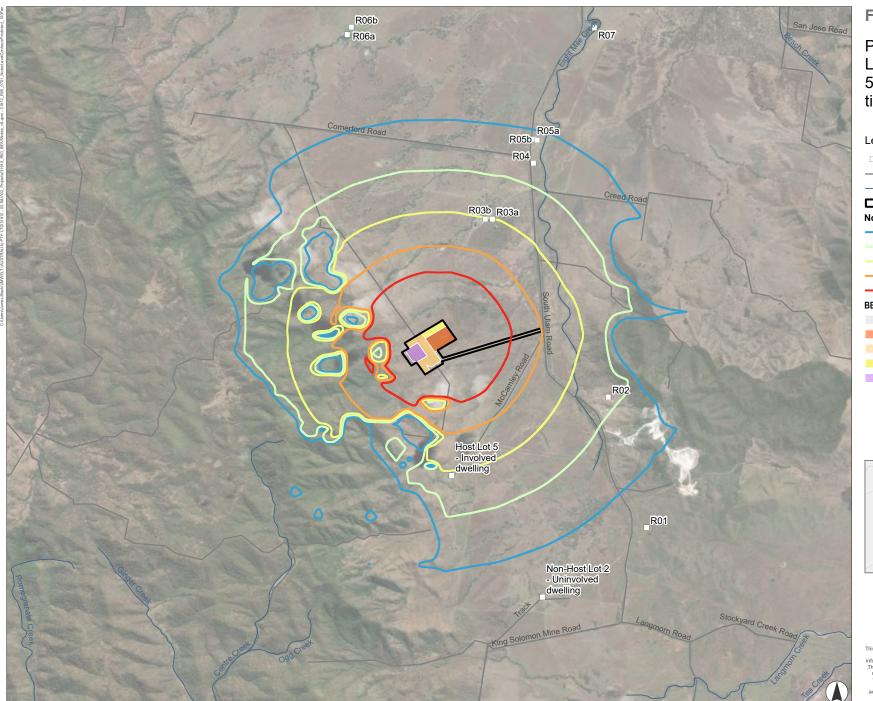


FIGURE 7.1

Predicted LAeq,adj Noise Level Contours (Including + 5 dB Tonality Penalty) - Daytime Mode

Legend

- Sensitive Receptors
- --- Roads
- --- Named Watercourse
- Study Area

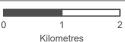
Noise Contours

- --- 30dBA
- 35dBA
- OOGD
- 40dBA
- ____ 45dBA
- 50dBA

BESS Layout

- Access road
- BESS area
 - Overhead and underground line
- Substation area
- Switchyard area





Scale 1:65,000 at A4 GDA2020

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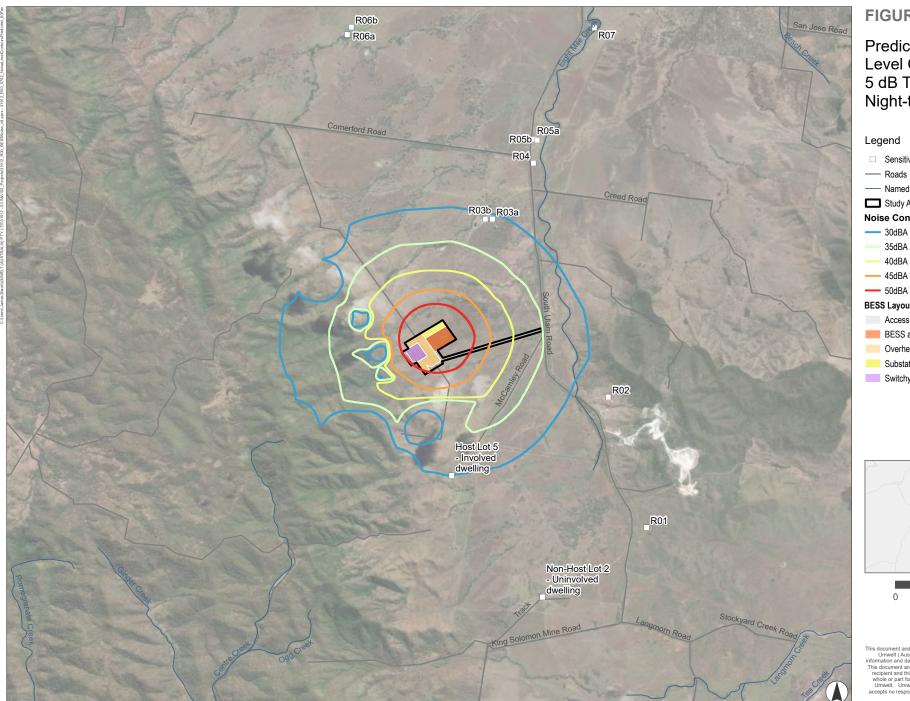


FIGURE 7.2

Predicted LAeq, adj Noise Level Contours (Including + 5 dB Tonality Penalty) -Night-time Mode

Legend

- Sensitive Receptors
- --- Roads
- --- Named Watercourse
- Study Area

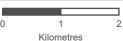
Noise Contours

- --- 30dBA
- 35dBA
- 40dBA
- --- 45dBA

BESS Layout

- Access road
- BESS area
 - Overhead and underground line
- Substation area
- Switchyard area





Scale 1:65,000 at A4 GDA2020

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8.0 Conclusions

Based on the noise modelling assumptions and results presented in the assessment for the Day-time and Night-time operational modes, the BESS facility is predicted to comply with the AQO during the day, evening and night periods without the need for additional noise mitigation measures. The prediction results (including a +5dB tonality penalty) indicate that the AQO Daytime noise limit of 40 dB(A) can be achieved with Day-time operational mode, similarly the AQO Night-time noise limit of 35 dB(A) can be achieved with Night-time operational mode. Based on these noise level predictions the AQO noise limits can be achieved through the adoption of the representative fan speeds during the day and night periods.



9.0 References

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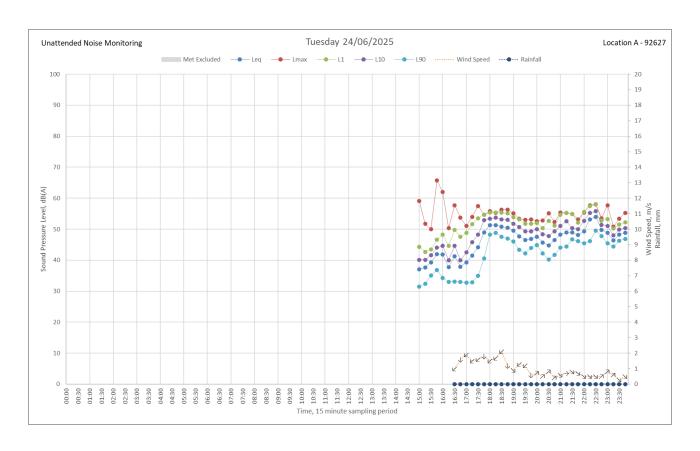
Appendix A

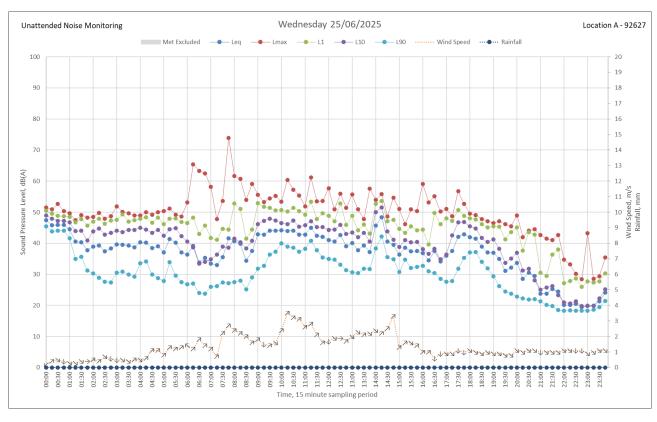
Monitoring Results - Location A



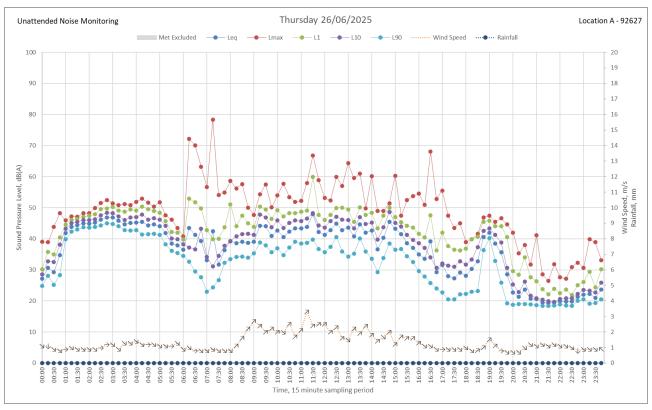


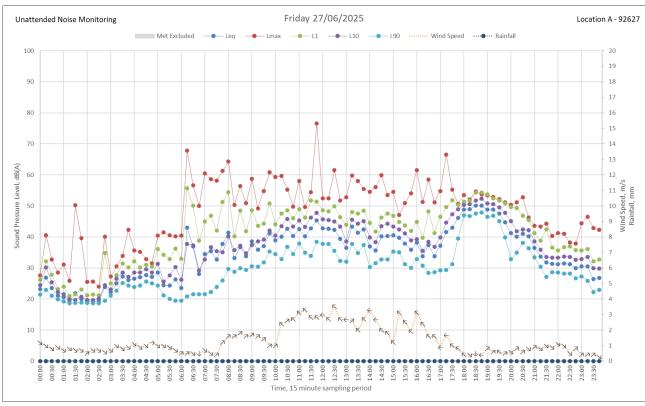




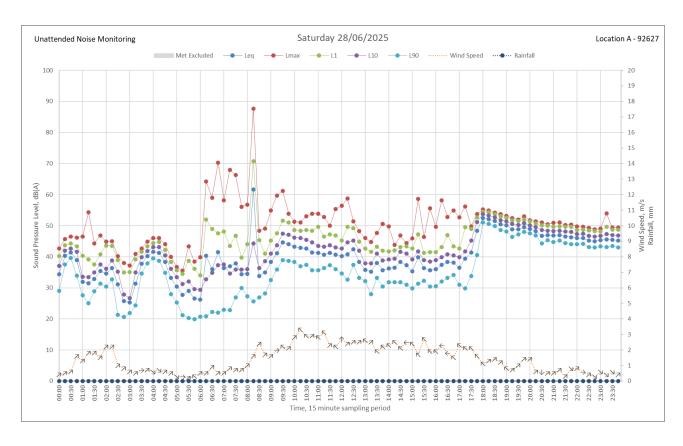


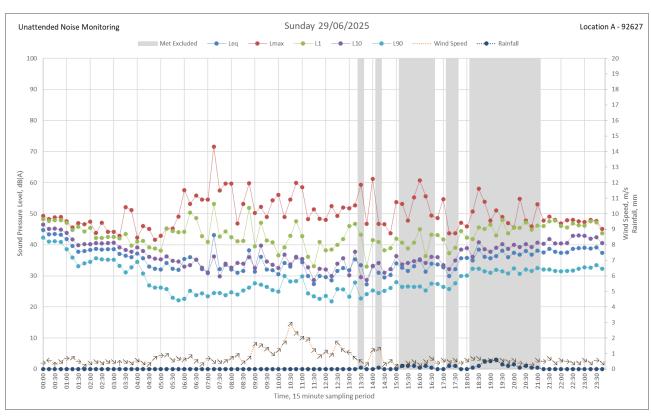




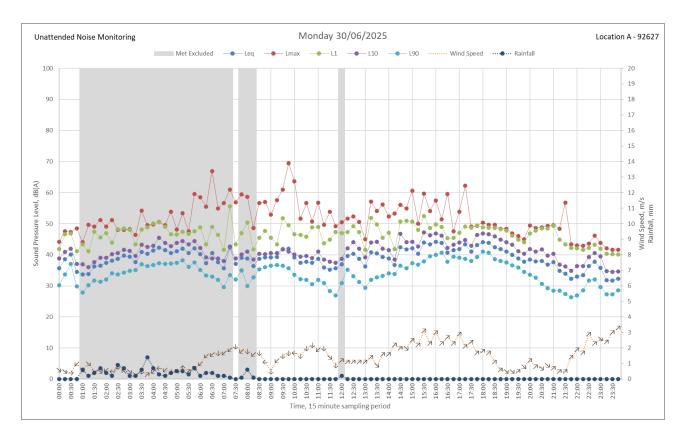


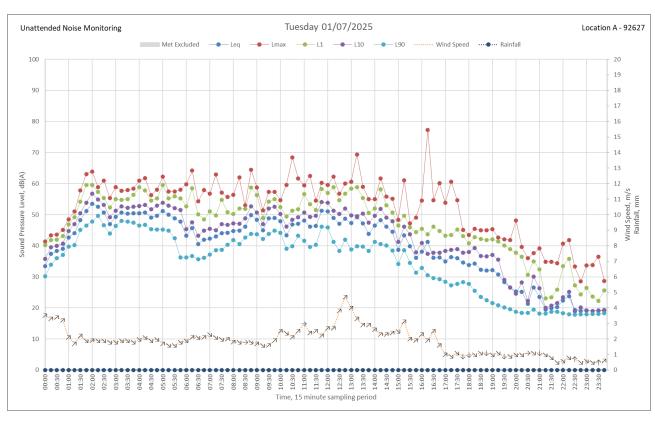




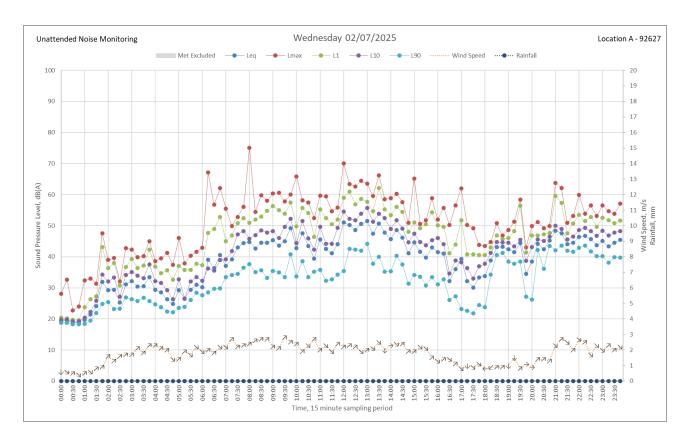


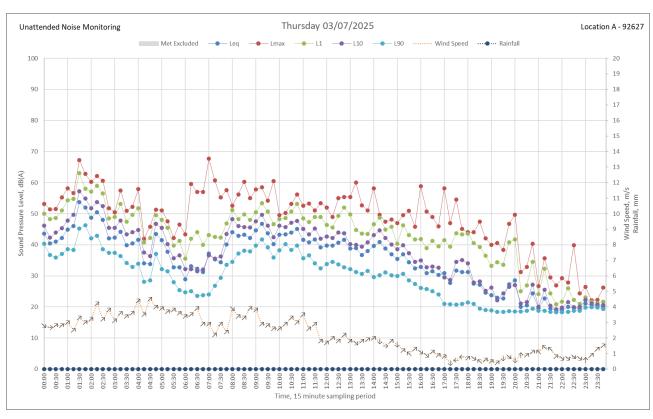




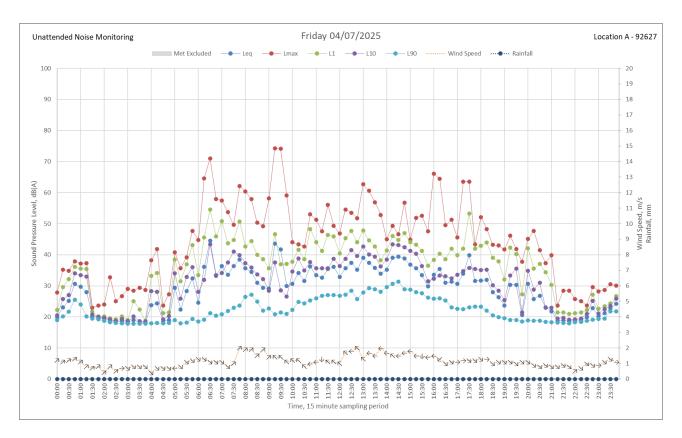


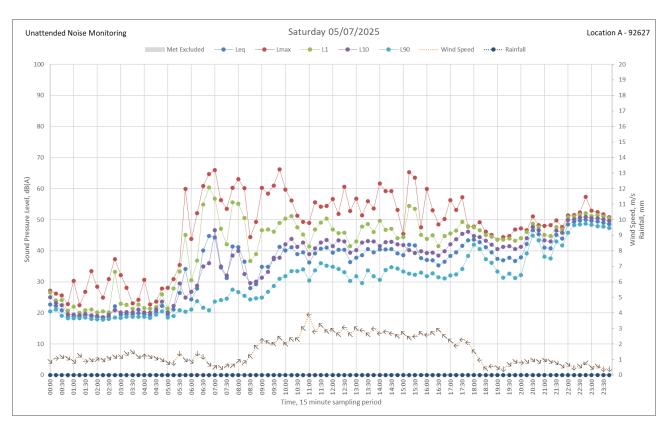




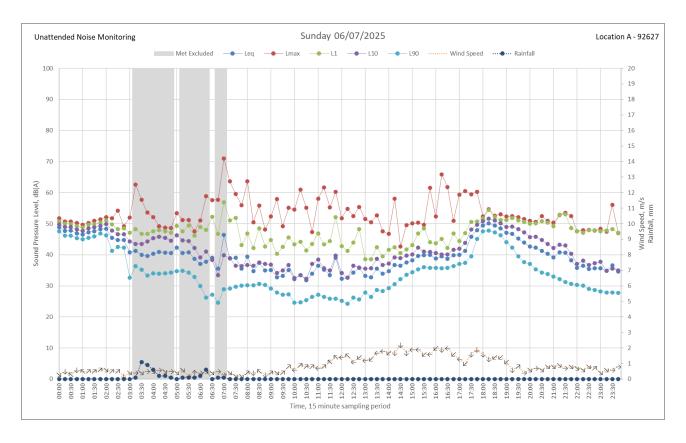


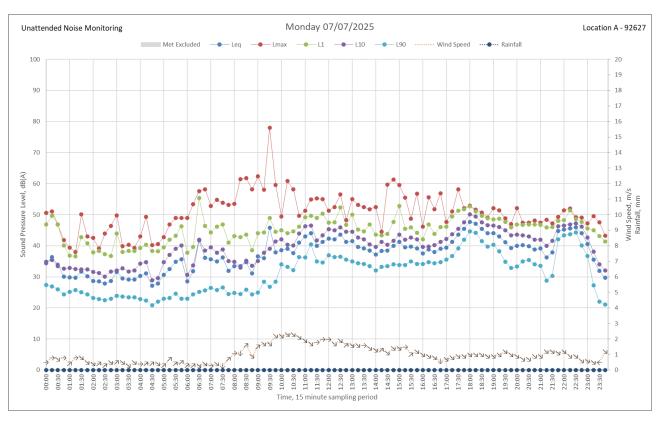




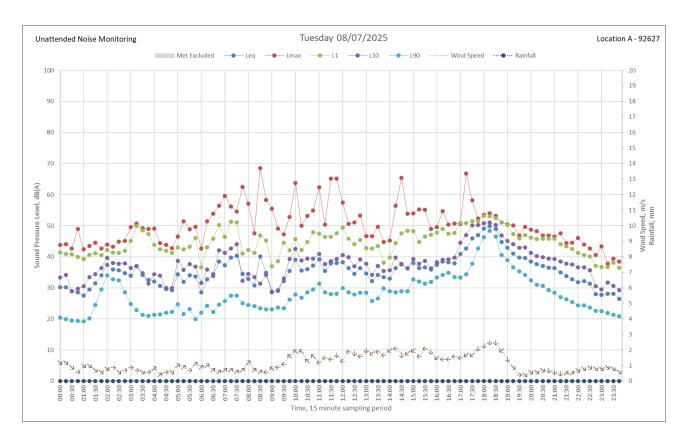


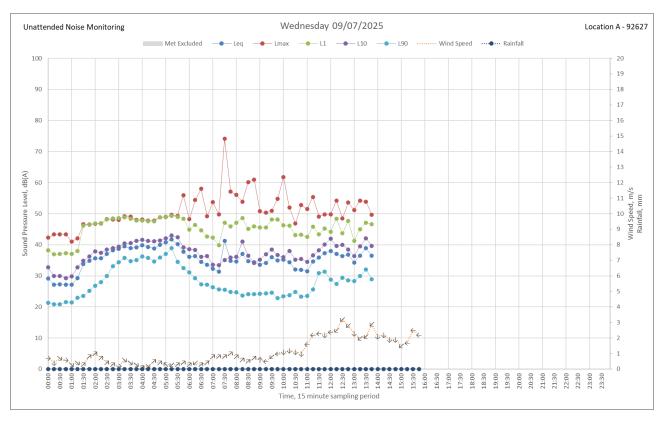












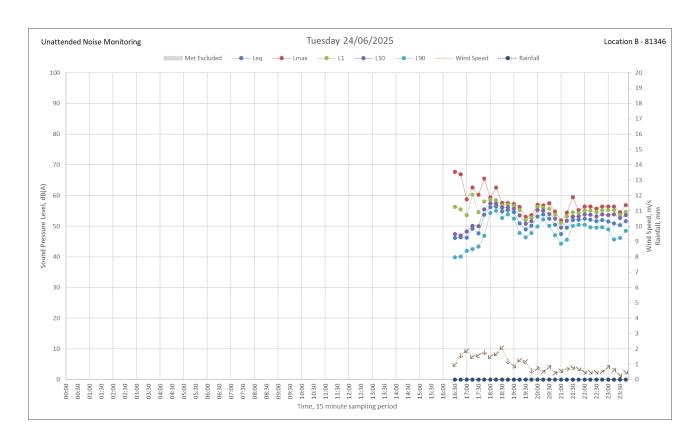
Appendix B

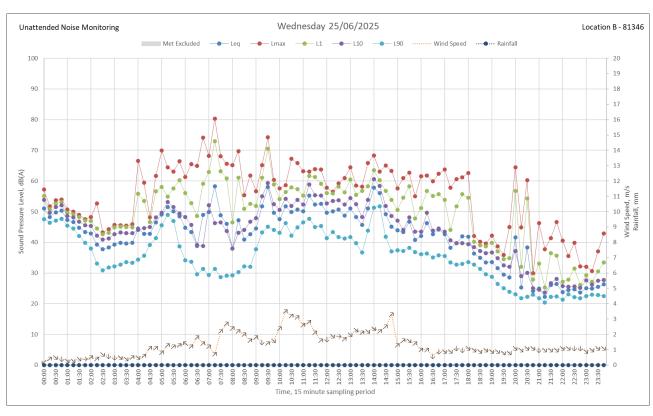
Monitoring Results - Location B



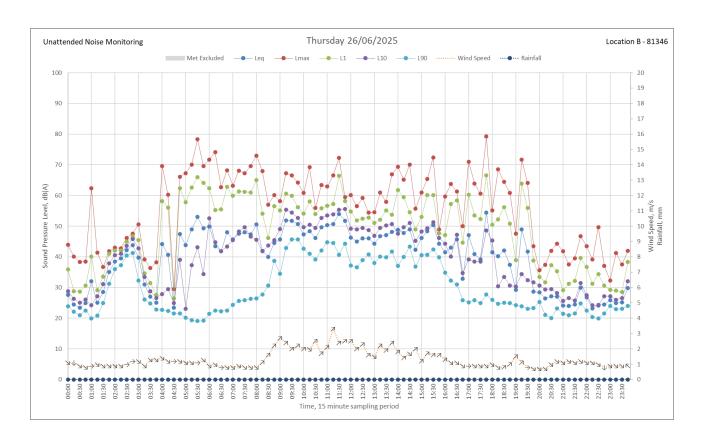


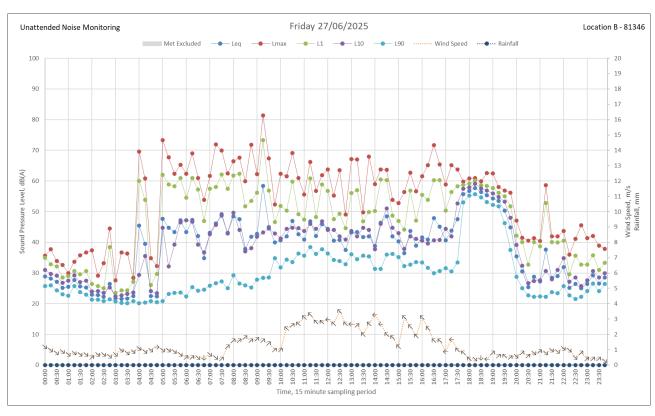




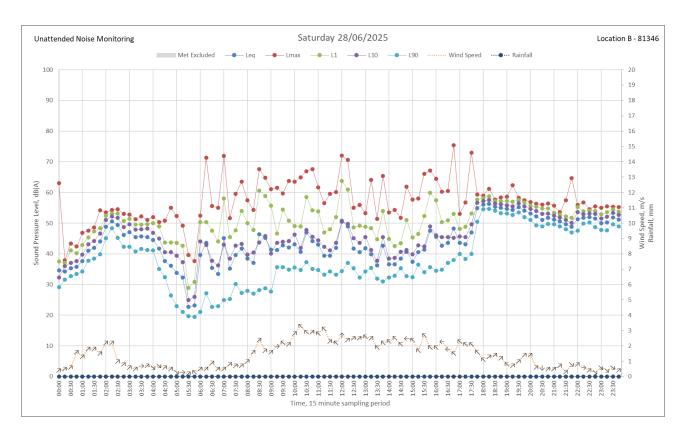


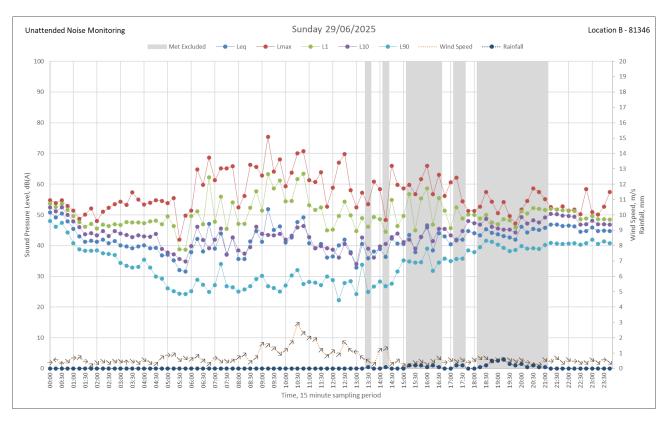




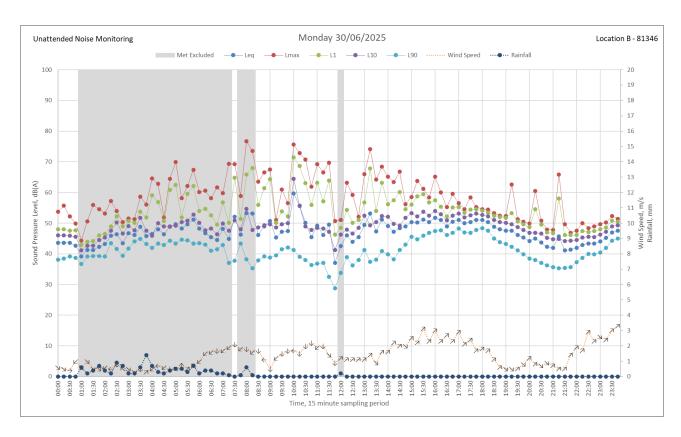


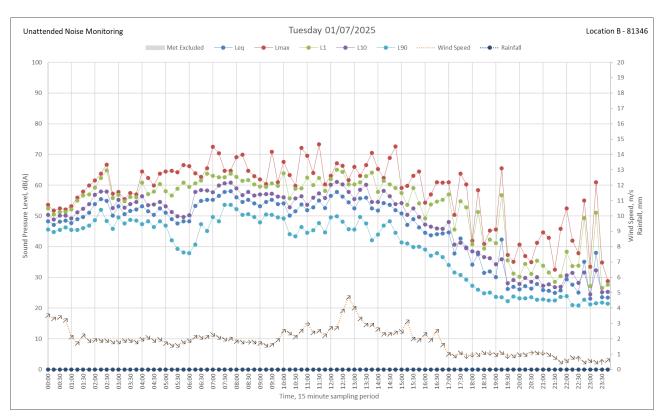




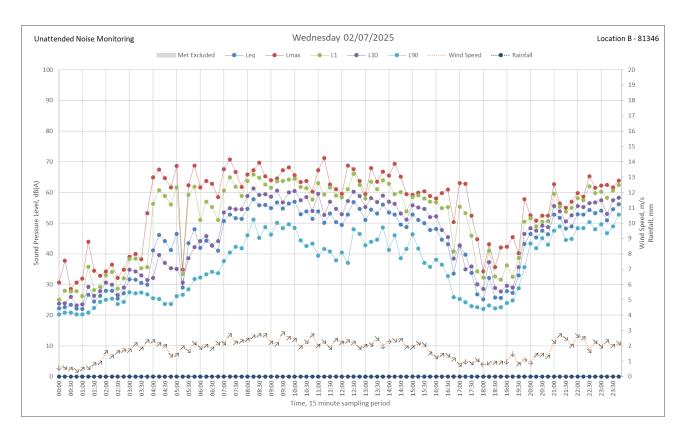


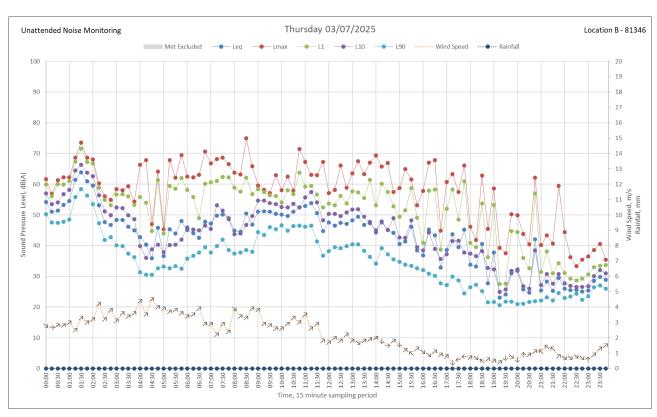




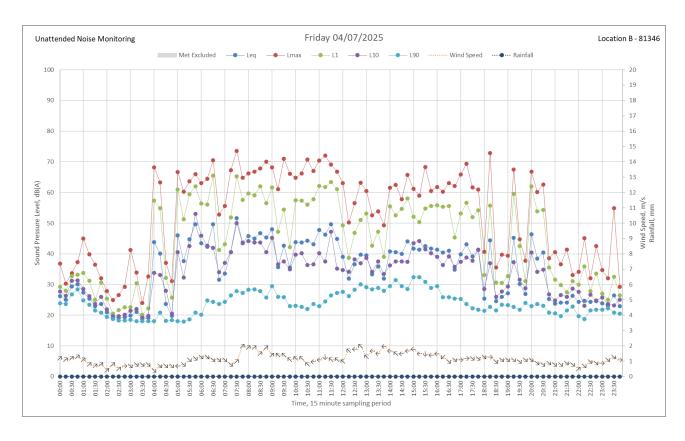


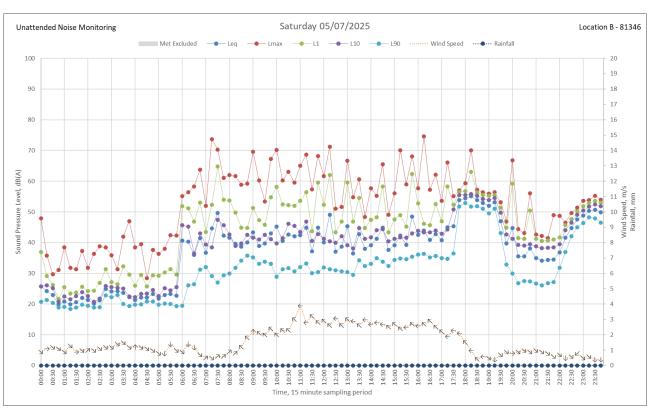




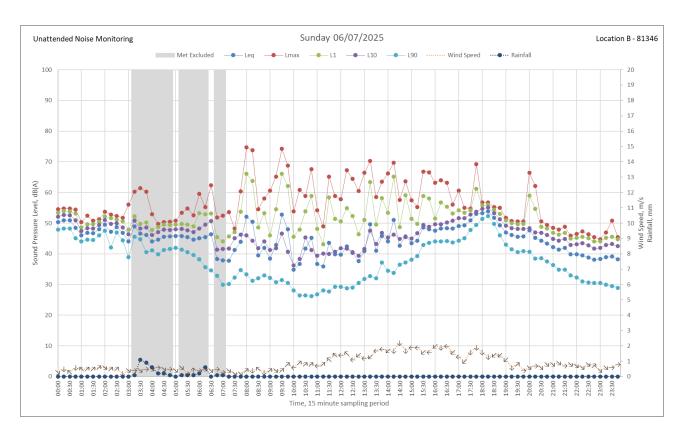


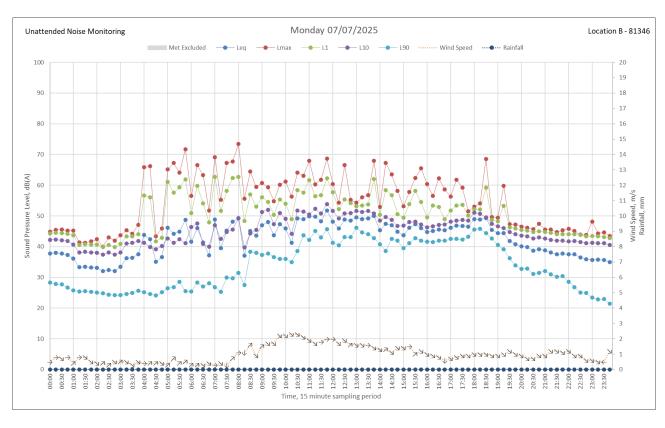




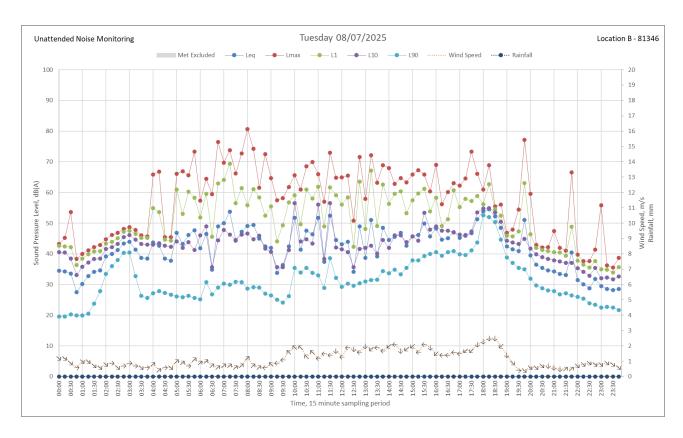


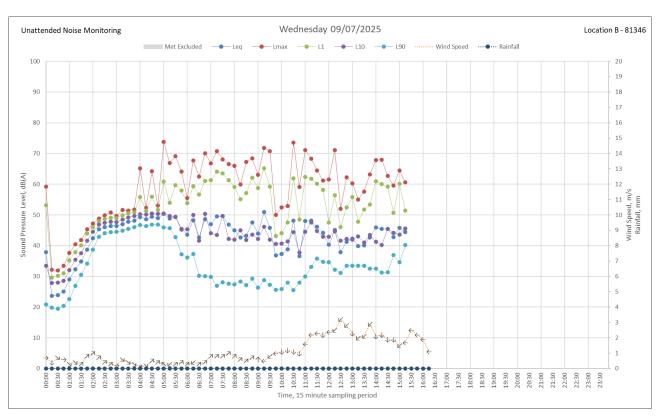












Appendix C

Monitoring Results - Location C







