

# *Baal Bone Colliery*

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*Annual Noise Monitoring*  
*August 2021*

*Prepared for*  
*Baal Bone Colliery*

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Noise and Vibration Analysis and Solutions

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## Baal Bone Colliery

### Annual Noise Monitoring August 2021

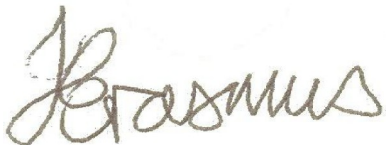
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Report date: 7 September 2021

#### Prepared for

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Baal Bone Colliery (BBC) to conduct a noise survey around its underground coal mining operations near Cullen Bullen, NSW. The purpose of the survey was to quantify and describe the acoustic environment around the site and compare results with the specified limits.

Attended environmental noise monitoring described in this report was undertaken during the day, evening and night periods of 18 August 2021. Figure 1 shows the monitoring locations.

## 1.2 Monitoring Locations

There were two monitoring locations during this survey as detailed in Table 1.1 and shown on Figure 1. It should be noted that this figure shows the actual monitoring position, not the location of residences.

Table 1.1: BBC MONITORING LOCATIONS

Report Descriptor	Monitoring Location
R1	Lot 95 DP 755759, Ben Bullen
R2/R3	Lot 3 and Lot 4 DP 724531, Ben Bullen



Figure 1: BBC Attended Noise Monitoring Locations

### 1.3 Operations

Historically, operations at BBC included underground extraction of coal using longwall machinery and underground conveyors, as well as surface coal handling and processing infrastructure.

BBC commenced closure activities in December 2019, after being in care and maintenance since 2012. The following activities were taking place during monitoring:

- Rock revetment work and highwall stabilisation in Reach 2 of Ben Bullen Creek. Topsoil was also being spread and batters reshaped in this area;
- Earthworks were taking place on the highwall end of Reach of Ben Bullen Creek, including rilling and erosion repairs to the bank;
- Short haul activities were taking place in the Southern Void Domain with topsoil being moved to cover a void;
- Chitter previously used as bunding beside the haul route was being removed and relocated to the Southern Void; and
- Various excavators, trucks, a dozer, a grader, and water cart in use during the day period.

There were no exceedances, complaints or noise related incidents recorded by BBC since the previous monitoring was carried out (July 2020).

## 1.4 Terminology & Abbreviations

Some definitions of terms and abbreviations, which may be used in this report, are provided in Table 1.2.

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L <sub>A</sub>	The A-weighted root mean squared (RMS) noise level at any instant
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period or for an event
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time
L <sub>A90</sub>	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period or for an event
L <sub>Aeq</sub>	The average noise energy during a measurement period
L <sub>pk</sub>	The unweighted peak noise level at any instant
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
ABL	Assessment background level (ABL), the 10 <sup>th</sup> percentile background noise level for a single period (day, evening or night) of a 24 hour monitoring period
RBL	Rating background level (RBL), the background noise level for a period (day, evening or night) determined from ABL data
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
IA	Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
NM	Not Measurable. If site only noise is noted as NM, this means some noise from the source of interest was audible at low-levels, but could not be quantified
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am



## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current project approval for activities at BBC is Project Approval 09\_0178 (MOD 2, December 2015). Schedule 3 of the project approval details specific conditions relating to noise generated by BBC. Relevant sections of the modified approval are included in Appendix A.

### 2.2 Environment Protection Licence

BBC holds Environment Protection Licence (EPL) No. 765 issued by the Environment Protection Authority (EPA) most recently on 22 June 2021. Relevant noise conditions are reproduced in Appendix A.

### 2.3 Noise Management Plan

The Baal Bone NMP has been prepared in accordance with Schedule 3, Condition 6 of PA 09\_0178. Relevant sections have been included in Appendix A.

Impact assessment criteria for BBC are detailed in Table 2.1. These criteria have been selected as the most appropriate criteria for each monitoring location and are consistent between the EPL and project approval.

Table 2.1: PROJECT SPECIFIC CRITERIA

Descriptor	Monitoring Location	Day/Evening/Night Assessment Criterion LAeq,15minute dB	Night Assessment Criterion LA1,1minute dB
R1	Muldoon Residence (Lot 95 DP 755759, Ben Bullen)	46	47
R2	Speirs Residence (Lot 4 DP 734531, Ben Bullen)	41	48
R3	Desch Residence (Lot 3 DP 734531, Ben Bullen)	41	48

### 2.4 Meteorological Conditions

Condition L4.3 of the EPL outlines meteorological conditions required for criteria to be applicable. Noise criteria detailed in the EPL apply under all meteorological conditions except for the following:

- Wind speeds greater than 3 metres/second at 10 metres above the ground level;
- Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- Stability category G temperature inversion conditions.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. For assessment of modifying factors, the NPfI immediately superseded the 'Industrial Noise Policy' (INP, 2000), as outlined in the EPA document 'Implementation and transitional arrangements for the Noise Policy for Industry' (2017). Assessment and reporting of modifying factors has been undertaken in accordance with Fact Sheet C of the NPfI.

## 3 METHODOLOGY

### 3.1 Overview

All noise monitoring was conducted at the nearest residences in accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise', relevant NSW EPA requirements and the BBC NMP. Meteorological data was obtained from the BBC automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured noise levels.

### 3.2 Attended Noise Monitoring

During this survey, annual attended monitoring was undertaken at two locations during the day, evening, and night period. Two consecutive measurements during each period were carried out. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location.

Attended monitoring was conducted by Ryan Bruniges. Ryan is a consultant with ten years of experience in environmental noise monitoring and sound power testing.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of BBC's contribution, if any, to measured levels. At each receptor location, BBC's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case BBC) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g. measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by

moving closer; and/or

- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{A\text{max}}$ , received from the site during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only  $L_{A\text{eq},15\text{minute}}$  level.

### 3.3 Modifying Factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site-only  $L_{A\text{eq}}$  was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB").

If applicable, modifying factors have been reported and added to measured site-only  $L_{A\text{eq}}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{A\text{eq}}$  levels if BBC was the only contributing low-frequency noise source.

### 3.4 Attended Monitoring Equipment

The equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix B.

Table 3.1: MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	003070304	24/11/2022
Pulsar 106 acoustic calibrator	81334	12/02/2022

## 4 RESULTS

### 4.1 Attended Noise Monitoring

Noise levels measured at each location during attended surveys are provided in Table 4.1, discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

Table 4.1: MEASURED NOISE LEVELS – AUGUST 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
<b>Day</b>								
R1	18/08/2021 16:51	63	50	42	40	32	27	21
R1	18/08/2021 17:07	61	50	43	39	33	27	22
R2/R3	18/08/2021 16:09	62	50	34	37	29	26	23
R2/R3	18/08/2021 16:26	61	49	37	37	29	25	20
<b>Evening</b>								
R1	18/08/2021 18:00	59	58	56	55	55	53	47
R1	18/08/2021 18:15	63	59	57	55	55	52	45
R2/R3	18/08/2021 21:18	55	46	39	36	30	26	22
R2/R3	18/08/2021 21:36	53	47	40	36	28	21	17
<b>Night</b>								
R1	18/08/2021 22:41	52	45	40	35	27	19	15
R1	18/08/2021 22:57	54	49	42	37	23	17	15
R2/R3	18/08/2021 22:00	49	43	37	32	25	20	17
R2/R3	18/08/2021 22:16	51	45	39	34	29	23	18

Notes:

1. Levels in this table are not necessarily the result of activity at BBC.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey.

Table 4.2 to Table 4.3 detail noise levels from BBC in the absence of other noise sources. Criteria are then applied if weather conditions are in accordance with BBC's EPL.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY BBC AGAINST IMPACT ASSESSMENT CRITERIA – AUGUST 2021**

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies? <sup>1</sup>	BBC $L_{Aeq,15min}$ dB <sup>2,3</sup>	Exceedance <sup>3,4</sup>
<b>Day</b>							
R1	18/08/2021 16:51	1.4	B	46	Yes	32	Nil
R1	18/08/2021 17:07	0.2	E	46	Yes	30	Nil
R2/R3	18/08/2021 16:09	0.8	A	41	Yes	<25	Nil
R2/R3	18/08/2021 16:26	0.9	B	41	Yes	<20	Nil
<b>Evening</b>							
R1	18/08/2021 18:00	1.3	F	46	Yes	<20	Nil
R1	18/08/2021 18:15	1.1	E	46	Yes	IA	Nil
R2/R3	18/08/2021 21:18	1.1	F	41	Yes	IA	Nil
R2/R3	18/08/2021 21:36	0.8	F	41	Yes	IA	Nil
<b>Night</b>							
R1	18/08/2021 22:41	0.0	E	46	Yes	<20	Nil
R1	18/08/2021 22:57	0.1	F	46	Yes	IA	Nil
R2/R3	18/08/2021 22:00	0.5	E	41	Yes	IA	Nil
R2/R3	18/08/2021 22:16	0.9	E	41	Yes	IA	Nil

Notes:

- Noise emission limits apply for all meteorological conditions except those detailed in Section 2.4;
- Site-only  $L_{Aeq,15minute}$  attributed to BBC, including modifying factors if applicable;
- Bold results in red indicate exceedance of the relevant criterion (if applicable); and
- NA in exceedance column means atmospheric conditions outside conditions specified in Section 2.4, therefore criterion was not applicable.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY BBC AGAINST IMPACT ASSESSMENT CRITERIA – AUGUST 2021**

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies? <sup>1</sup>	BBC $L_{A1,1min}$ dB <sup>2,3</sup>	Exceedance <sup>3,4</sup>
R1	18/08/2021 22:41	0.0	E	47	Yes	25	Nil
R1	18/08/2021 22:57	0.1	F	47	Yes	IA	Nil
R2/R3	18/08/2021 22:00	0.5	E	48	Yes	IA	Nil
R2/R3	18/08/2021 22:16	0.9	E	48	Yes	IA	Nil

Notes:

- Noise emission limits apply for all meteorological conditions except those detailed in Section 2.4;
- Site-only  $L_{A1,1minute}$  attributed to BBC, including modifying factors if applicable;
- Bold results in red indicate exceedance of the relevant criterion (if applicable); and
- NA in exceedance column means atmospheric conditions outside conditions specified in Section 2.4, therefore criterion was not applicable.

### 4.3 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS –AUGUST 2021

Location	Start Date and Time	Temperature Degrees	Wind Speed m/s <sup>1</sup>	Wind Direction Degrees <sup>1,2</sup>	Cloud Cover Eighths
<b>Day</b>					
R1	18/08/2021 16:51	13	0.0	-	0
R1	18/08/2021 17:07	11	0.0	-	0
R2/R3	18/08/2021 16:09	14	0.7	10	1
R2/R3	18/08/2021 16:26	17	0.0	-	1
<b>Evening</b>					
R1	18/08/2021 18:00	8	0.0	-	0
R1	18/08/2021 18:15	6	0.0	-	0
R2/R3	18/08/2021 21:18	2	0.7	190	0
R2/R3	18/08/2021 21:36	4	0.0	-	0
<b>Night</b>					
R1	18/08/2021 22:41	3	0.0	-	0
R1	18/08/2021 22:57	1	0.0	-	0
R2/R3	18/08/2021 22:00	3	0.0	-	0
R2/R3	18/08/2021 22:16	2	0.0	-	0

Notes:

1. "-" indicates calm conditions at monitoring location.

Meteorological data used for compliance assessment is sourced from the BBC AWS.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for  $L_{A1}$ ,  $L_{A10}$ ,  $L_{Aeq}$ ,  $L_{A50}$  and  $L_{A90}$  descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the  $L_{A1}$  result by a small margin but is entirely accurate for  $L_{Aeq}$ .

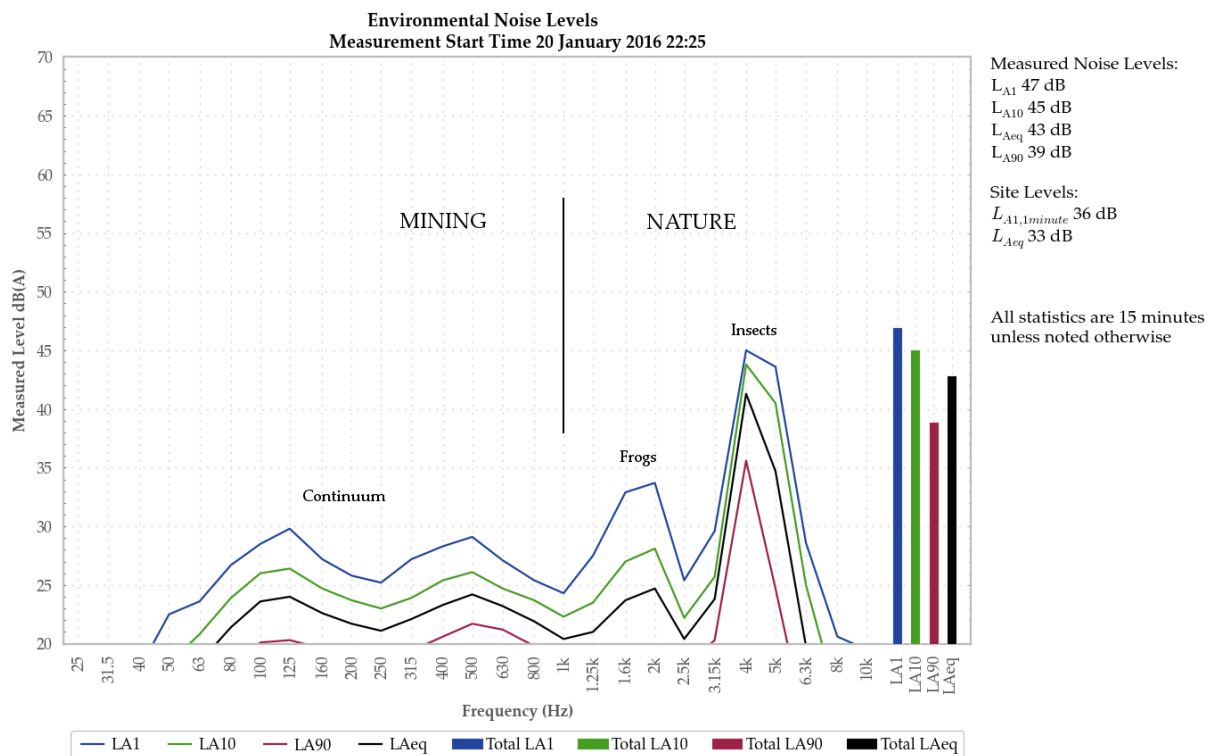
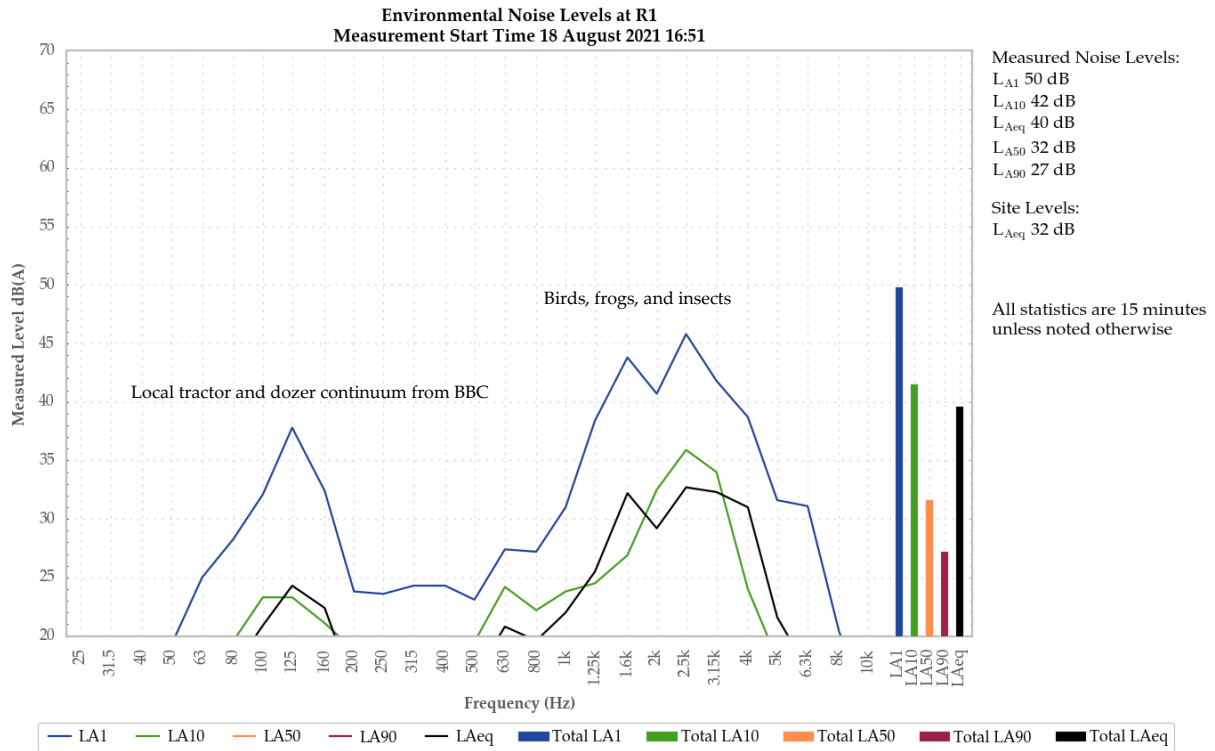


Figure 2: Example Graph (refer to section 5.1 for explanatory note)



### 5.1.1 RI – Day



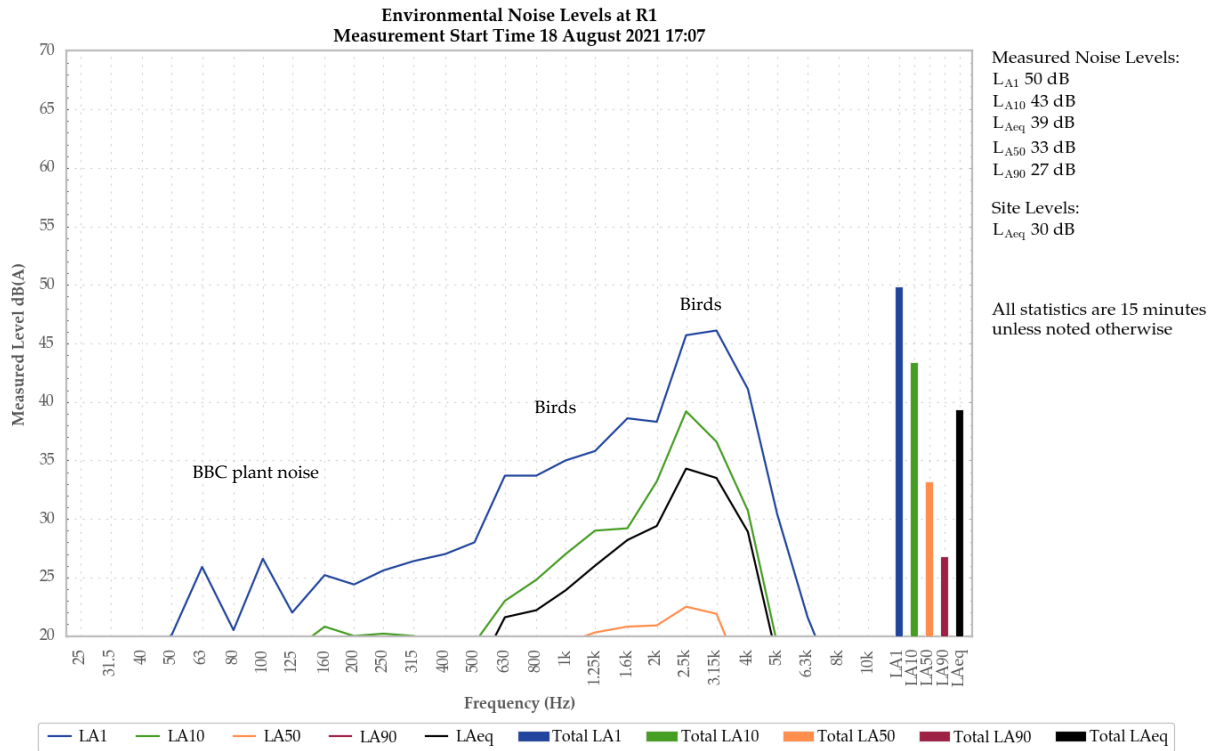
**Figure 3: Environmental Noise Levels, R1**

BBC bulldozer activity was audible throughout the measurement, generating the site-only LAeq of 32 dB. Trucks and reverse alarms were also noted.

Birds, frogs, and insects primarily generated the measured LA1, LA10, and LAeq. BBC noise sources generated the measured LA50 and LA90, and contributed to the measured LAeq.

Road traffic noise, a local tractor, and dogs were also noted.

### 5.1.2 R1 – Day



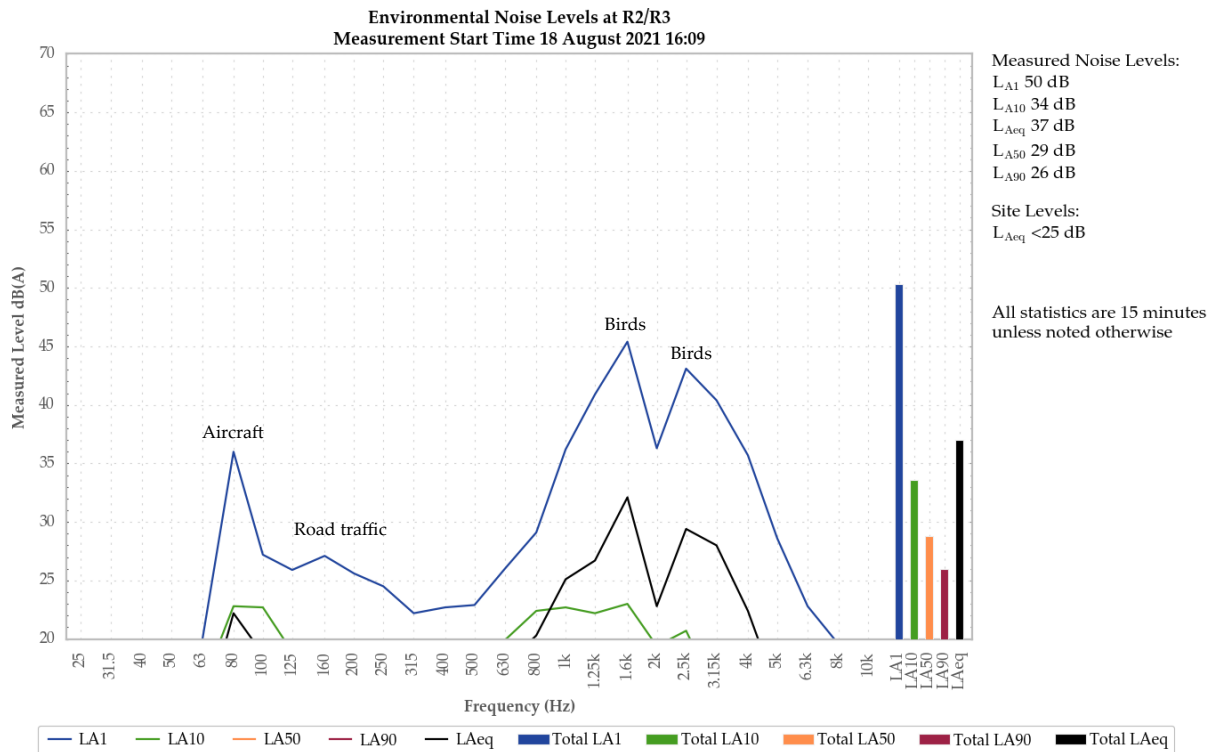
**Figure 4: Environmental Noise Levels, R1**

BBC mobile plant was audible for part of the measurement, generating the site-only LAeq of 30 dB.

Birds generated the measured noise levels.

Road traffic tyre noise was also noted.

### 5.1.3 R2/R3 – Day



**Figure 5: Environmental Noise Levels, R2/R3**

Track noise and exhaust surges from BBC were audible at times during the measurement, generating the site-only LAeq of less than 25 dB.

Birds generated the measured LA1 and LAeq, and contributed to the measured LA10. Road traffic noise also contributed to the measured LA10, and generated the measured LA50 and LA90.

An aircraft was also noted.

5.1.4 R2/R3 – Day

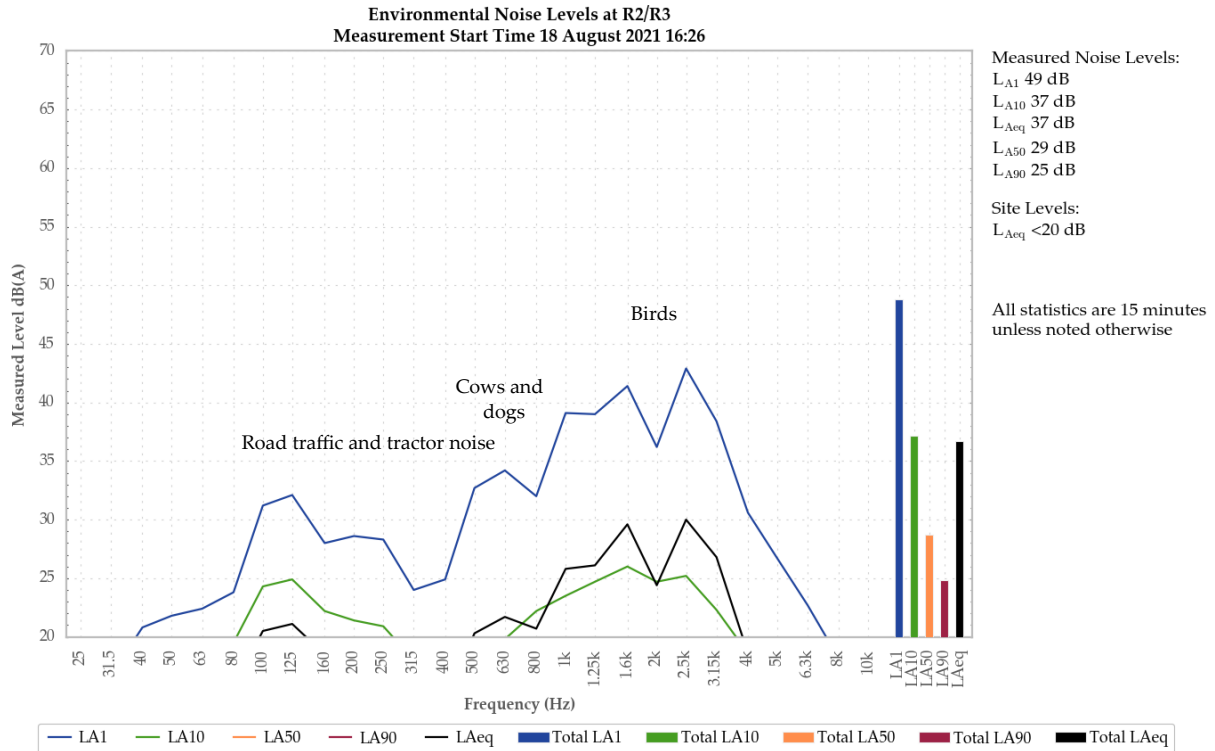


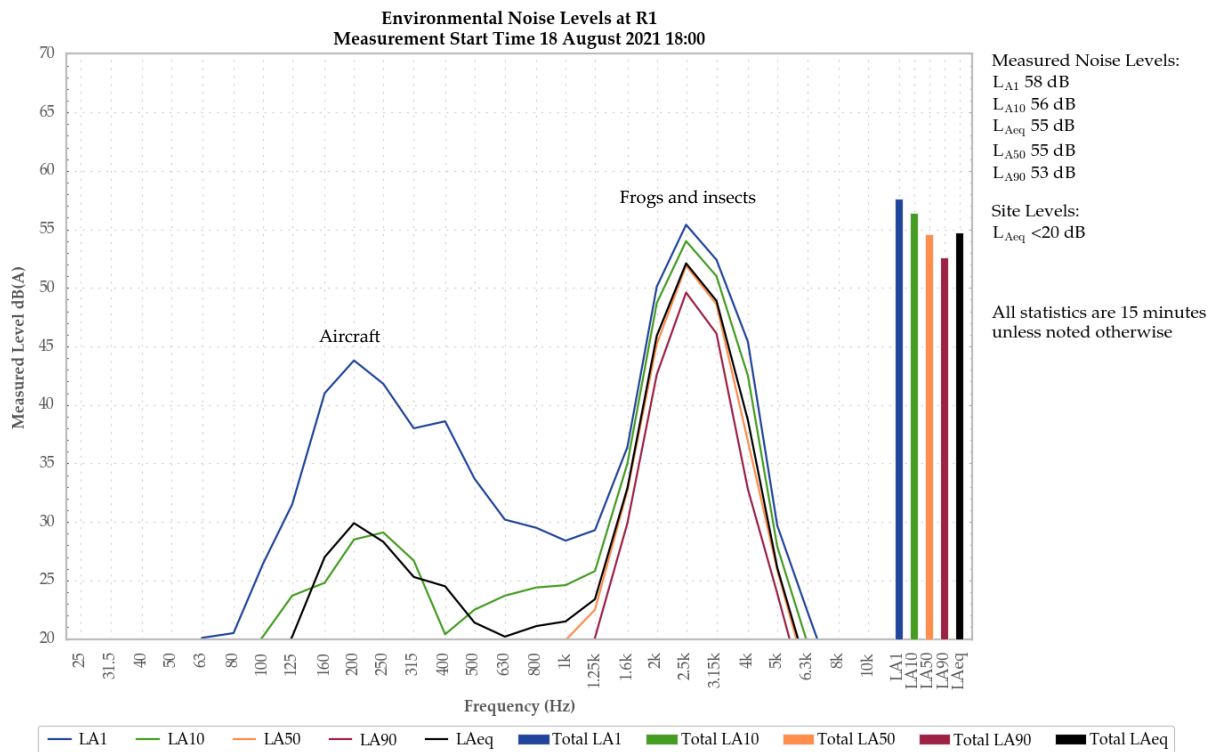
Figure 6: Environmental Noise Levels, R2/R3

Exhaust noise from BBC was occasionally audible at low levels during the measurement, generating the site-only LAeq of less than 20 dB.

Birds and dogs generated the measured LA1. Birds, road traffic noise, and a tractor were responsible for the measured LA10, LAeq, LA50, and LA90.

Livestock and other farm noise were also noted.

### 5.1.5 R1 – Evening



**Figure 7: Environmental Noise Levels, R1**

A low-level continuum from BBC was audible throughout the measurement, generating the site-only LAeq of less than 20 dB.

Frogs and insects generated the measured noise levels.

An aircraft, road traffic, livestock, and dogs were also noted.

5.1.6 R1 – Evening

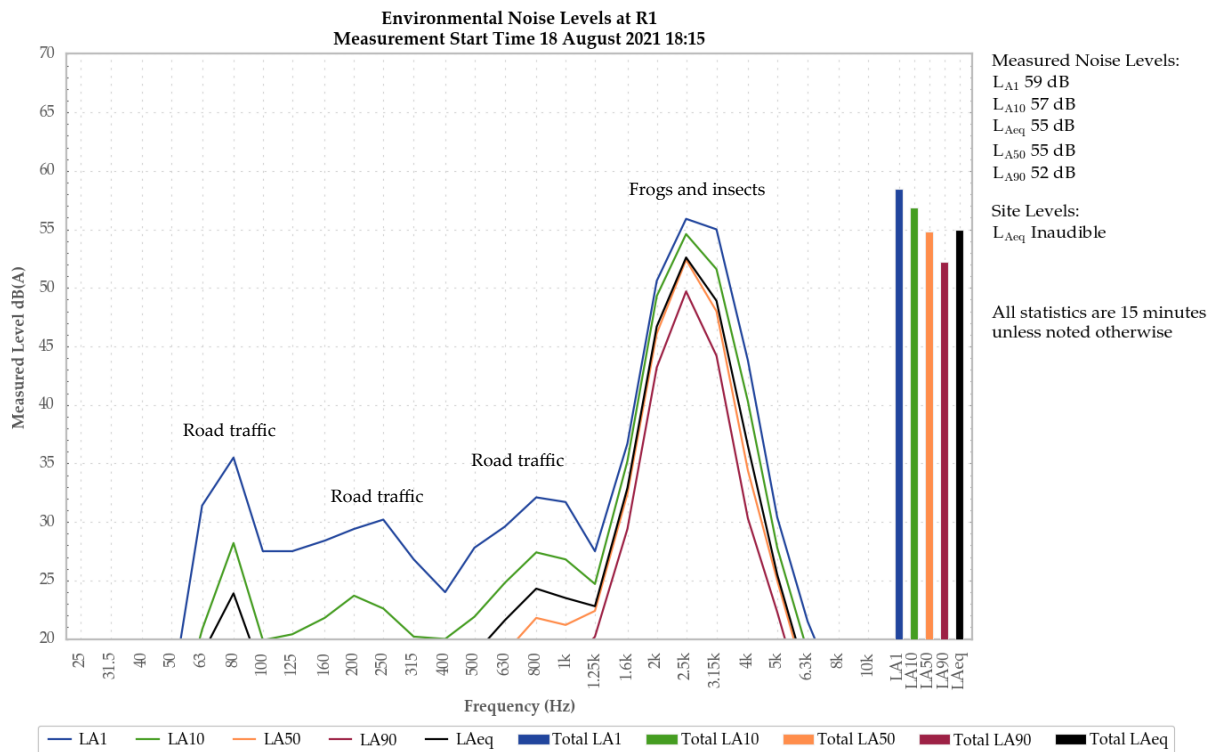


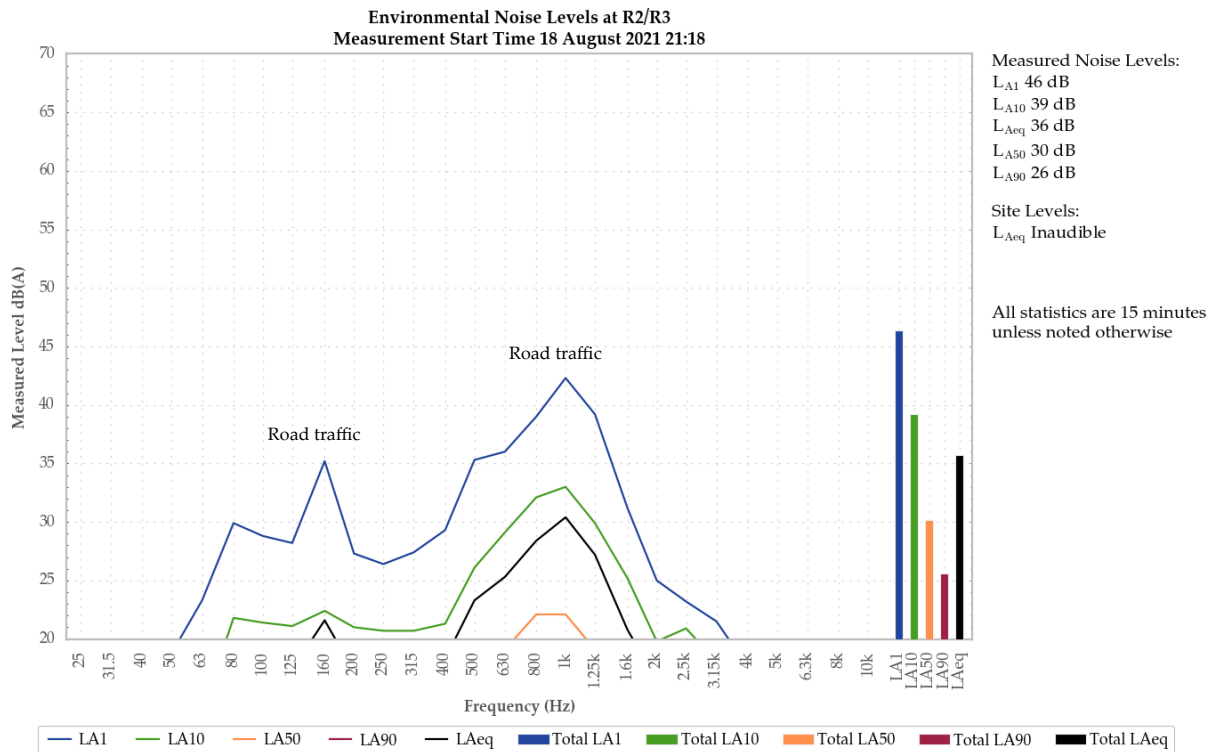
Figure 8: Environmental Noise Levels, R1

BBC was inaudible during the measurement.

Frogs and insects generated the measured noise levels.

Birds and road traffic noise were also noted.

### 5.1.7 R2/R3 – Evening

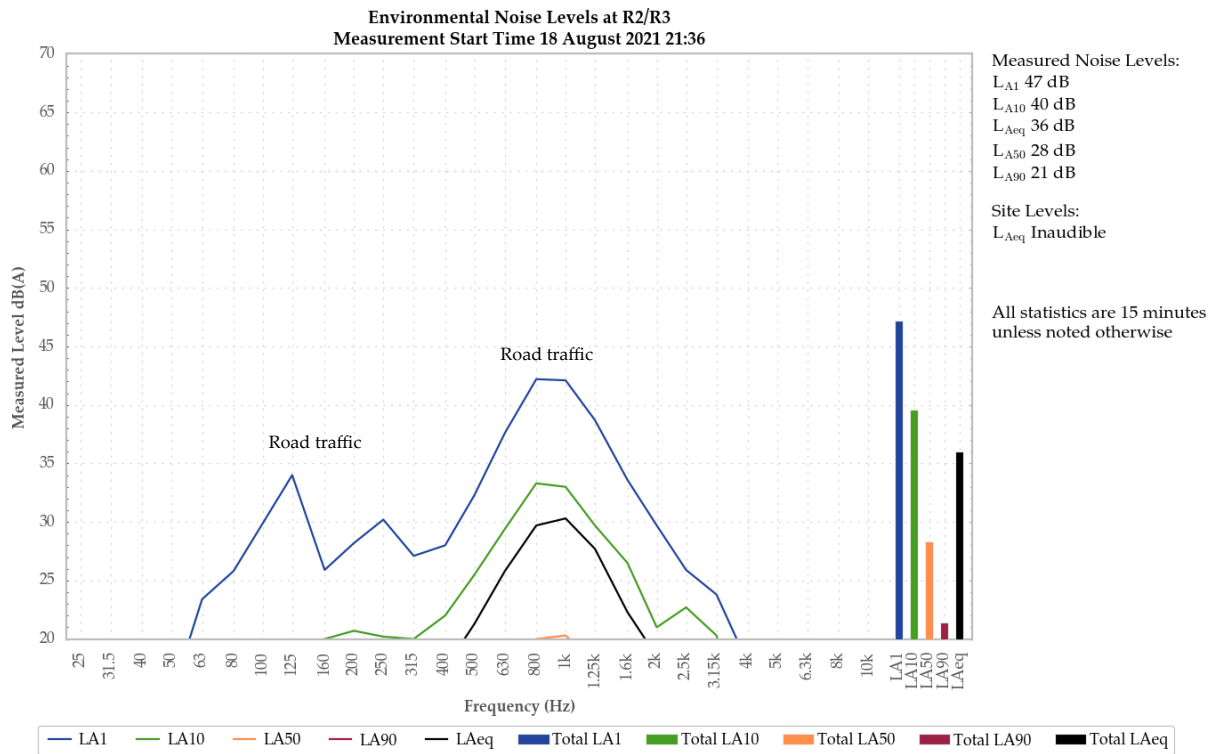


**Figure 9: Environmental Noise Levels, R2/R3**

BBC was inaudible during the measurement.

Road traffic generated the measured LA1, LA10, LAeq, and LA50. Road traffic and insects were responsible for the measured LA90.

### 5.1.8 R2/R3 – Evening



**Figure 10: Environmental Noise Levels, R2/R3**

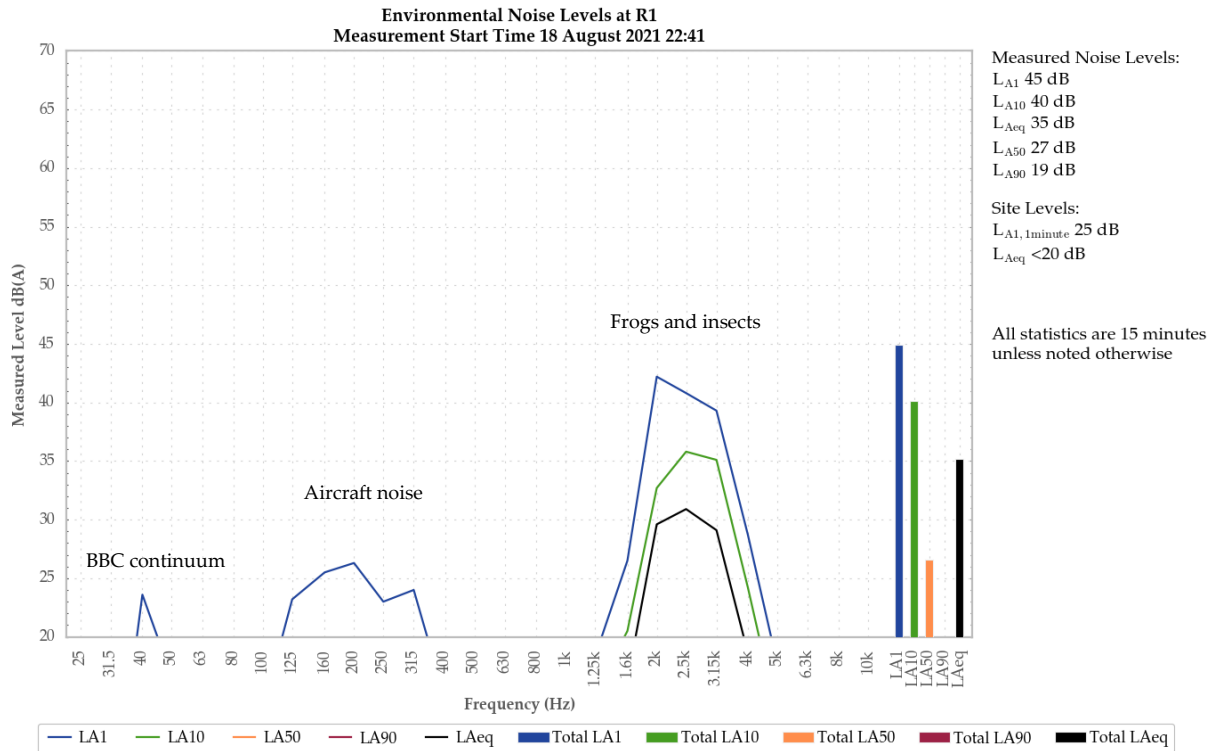
BBC was inaudible during the measurement.

Road traffic generated the measured LA1, LA10, LAeq, and LA50. Road traffic, frogs, and insects were responsible for the measured LA90.

Livestock were also noted.



### 5.1.9 R1 – Night



**Figure 11: Environmental Noise Levels, R1**

A low-level continuum from BBC was audible throughout the measurement, generating the site-only LAeq of less than 20 dB.

Frogs and insects generated the measured noise levels.

An aircraft and dogs were also noted.

5.1.10 R1 – Night

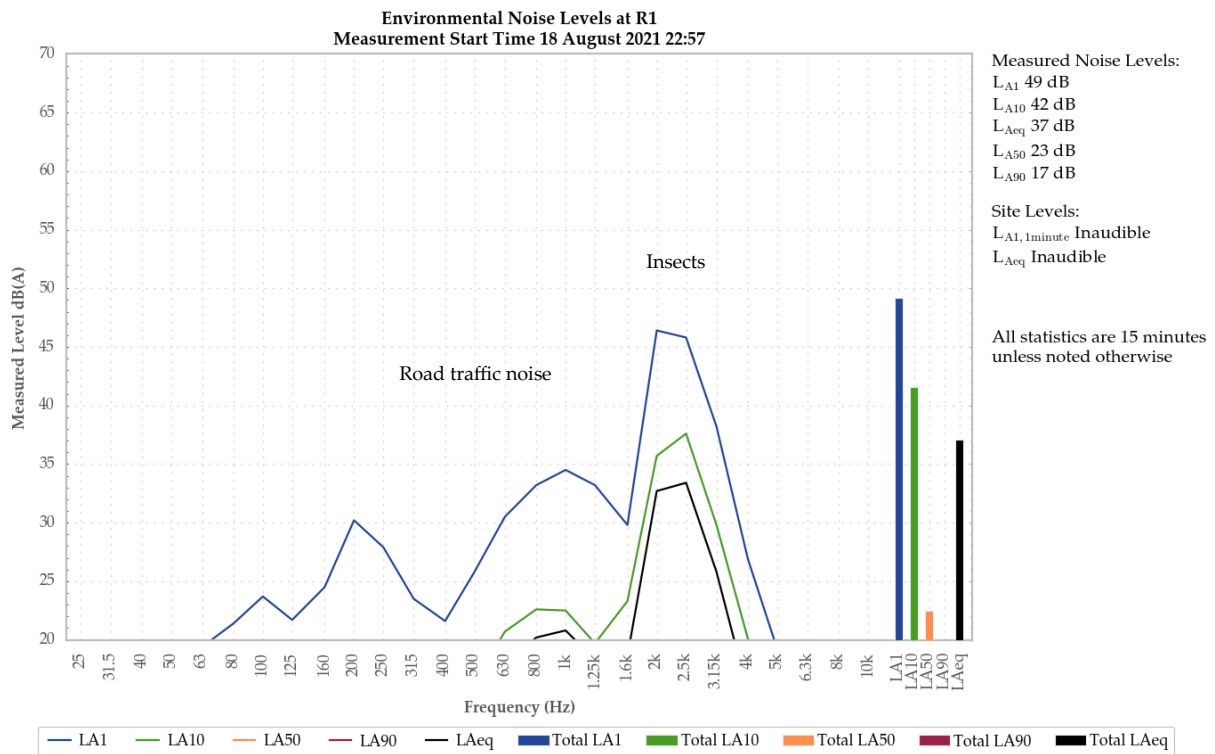


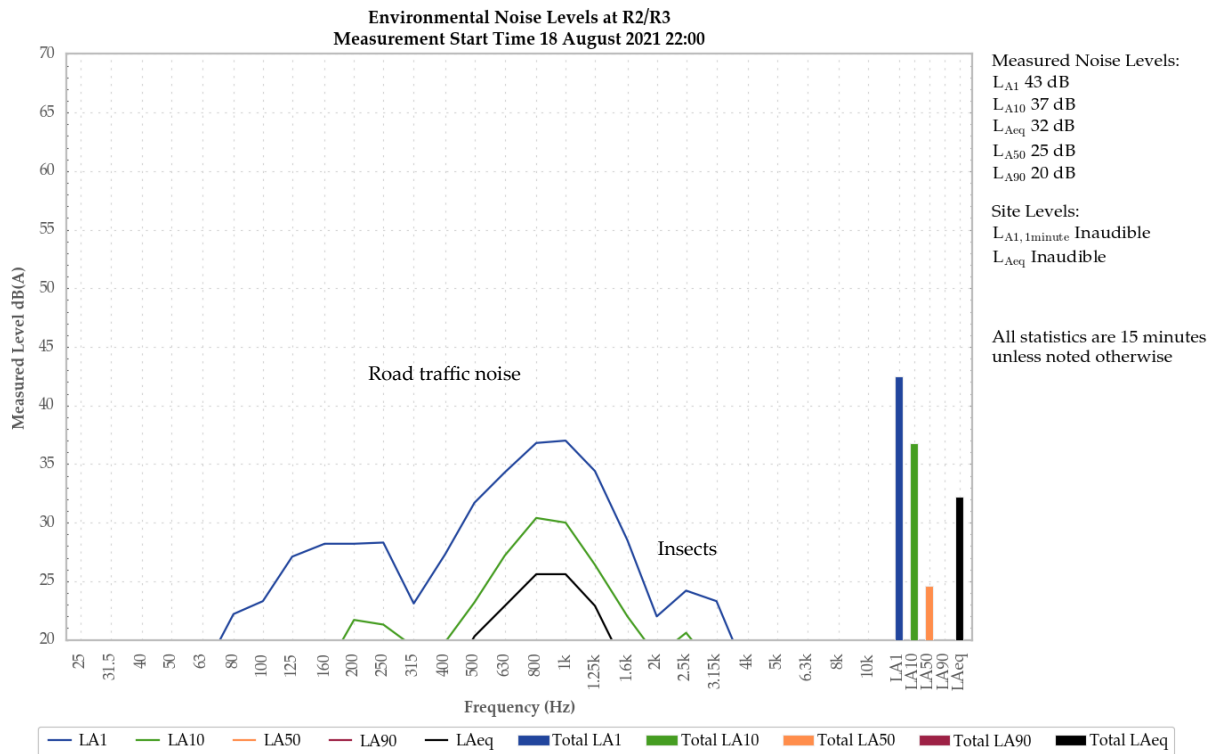
Figure 12: Environmental Noise Levels, R1

BBC was inaudible during the measurement.

Frogs and insects and road traffic generated the measured LA1. Insects generated the measured LA10, LAeq, LA50, and LA90.

Birds were also noted.

5.1.11 R2/R3 – Night



**Figure 13: Environmental Noise Levels, R2/R3**

BBC was inaudible during the measurement.

Road traffic generated the measured LA1, LA10, LAeq, and LA50. Insects generated the measured LA90.

Dogs and a local farming continuum were noted.

5.1.12 R2/R3 – Night

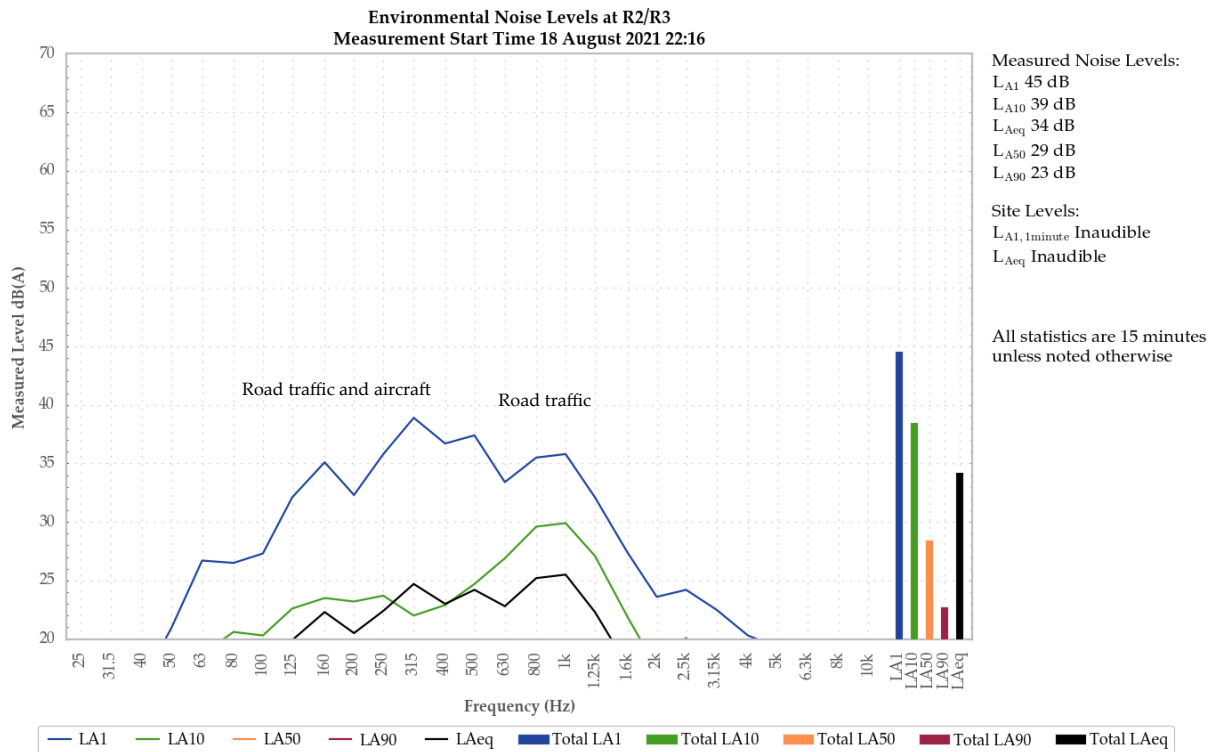


Figure 14: Environmental Noise Levels, R2/R3

BBC was inaudible during the measurement.

Road traffic and an aircraft generated the measured LA1, LA10, and LAeq. Road traffic generated the measured LA50. Insects generated the measured LA90.

## 6 SUMMARY

The following summaries apply to annual attended noise monitoring conducted for Baal Bone Colliery. Attended environmental noise monitoring described in this report was undertaken during the day, evening, and night periods of 18 August 2021. The purpose of the survey is to quantify and describe the acoustic environment around the site and compare with specified limits.

There were no exceedances, complaints or noise related incidents recorded by BBC since the previous monitoring was carried out (July 2020).

Noise levels from BBC complied with the relevant noise limits during the August 2021 survey. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### **A**     *REGULATOR DOCUMENTS*

## Project Approvals

The most recent version of the project approval was approved in December 2015. Sections relating to noise are reproduced below.

### NOISE

#### Noise Impact Assessment Criteria

- By 31 December 2011, the Proponent shall ensure that the noise generated by the project does not exceed the long term noise impact assessment criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2: Long Term Noise Impact Assessment Criteria

<b>Location</b>	<b>All periods</b>	<b>Night</b>
	<i>dB(A) L<sub>Aeq</sub> (15 min)</i>	<i>dB(A) L<sub>A1</sub> (1 min)</i>
R1	46	47
R2	41	48
R3	41	48
All other privately-owned land	35	45

- Until 31 December 2011, the Proponent shall ensure that the noise generated by the project does not exceed the interim noise impact assessment criteria in Table 3 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land.

Table 3: Interim Noise Impact Assessment Criteria

<b>Location</b>	<b>All periods</b>	<b>Night</b>
	<i>dB(A) L<sub>Aeq</sub> (15 min)</i>	<i>dB(A) L<sub>A1</sub> (1 min)</i>
R1	48	47
R2	43	48
R3	43	48
All other privately-owned land	35	45

Notes to Tables 2 and 3:

- To interpret the locations referred to in Table 2, see the applicable figure in Appendix 2;
- Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy; and
- These noise impact assessment criteria do not apply if the Proponent has an agreement with the relevant owner/s to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

### Noise Management Plan

6. The Proponent shall prepare a Noise Management Plan for the project, to the satisfaction of the [Secretary](#). The plan must:
  - (a) be prepared in consultation with [EPA](#), and submitted to the [Secretary](#) for approval within 6 months of the date of this approval; and
  - (b) include a Noise Monitoring Program, that uses a combination of real-time and supplementary attended monitoring measures, and includes a protocol for determining exceedances with the relevant conditions of this approval.

### Operating Conditions

7. The Proponent shall:
  - (a) implement best practice noise management, including all reasonable and feasible noise mitigation measures to minimise the operational, low frequency, rail, and road traffic noise generated by the project;
  - (b) regularly assess the real-time noise monitoring and meteorological forecasting data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this approval,  
to the satisfaction of the [Secretary](#).

### Road Haulage Management Plan

8. The Proponent shall prepare and implement a Road Haulage Management Plan for the project to the satisfaction of the [Secretary](#). This plan must:
  - (a) be submitted to the [Secretary](#) for approval 3 months prior to any proposal to truck more than 5,000 tonnes of coal per month from the mine;
  - (b) detail the procedures for the ongoing assessment of noise impacts on residences as a result of road haulage of coal from the project; and
  - (c) detail the procedures for the ongoing identification and implementation of reasonable and feasible noise mitigation works at residences adversely impacted by road haulage noise directly attributable to the project.



## Environment Protection Licence

BBC holds EPL No. 765. The relevant sections are reproduced below.

### L4 Noise limits

L4.1 Noise generated from the premises must not exceed the noise limits in the table below. The locations referred to in the table below are indicated on Project Approval 09\_0178, Baal Bone Coal Project, Appendix 2, Figure 2 - Noise Receivers.

Location	All Periods	Night
	dB(A) LAeq (15 min)	dB(A) LA1 (1 min)
R1 (Muldoon residence Lot95 DP755759 Ben Bullen)	46	47
R2 (Speirs residence Lot4 DP734531 Ben Bullen)	41	48
R3 (Desch residence Lot3 DP734531 Ben Bullen)	41	48
All other privately-owned land	35	45

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner regarding the applicable noise limit.

L4.2 For the purposes of condition L4.1:

- a) All Periods refers to day, evening and night time; and
- b) Night is defined as the period between 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L4.3 Noise limits set out in condition L4.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- c) Stability category G temperature inversion conditions.

L4.4 For the purposes of condition L4.3:

- a) Data recorded by the meteorological station identified as EPA Licence Point 13 must be used to determine meteorological conditions; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L4.5 To determine compliance:

a) with the Leq(15 minute) noise limits in condition L4.1, the noise measurement equipment must be located:

- (i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
- (ii) within 30 metres of a dwelling facade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
- (iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve.

b) with the noise limits in condition L4.1, the noise measurement equipment must be located:

- (i) at the most affected point at a location where there is no dwelling at the location; or the property boundary closest to the premises; or
- (ii) at the most affected point within an area at a location prescribed by condition L4.5(a).

L4.6 A non-compliance of condition L4.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- a) at a location other than an area prescribed by condition L4.5(a); and/or
- b) at a point other than the most affected point at a location.

L4.7 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

## Noise Management Plan

The relevant sections of the BBC Noise Management Plan related to the noise monitoring program are reproduced below.

### 5. NOISE MONITORING PROGRAM

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The NMP has been developed to address assessment procedures normally required by the EPA and DP&E; noise exposure for three residential receptors (R1, R2 and R3); and, assess compliance status with the noise conditions in PA 09\_0178.

#### 5.1 Attended Noise Monitoring

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While Baal Bone is not an operating mine (from January 2013), attended monitoring frequency will be annual, provided that no significant changes in noise trends are identified.

Attended monitoring will be undertaken at receptors R1 and R2/R3 annually or as required to address reported noise incidents. As R2 and R3 are within 50 meters proximity of each other, monitoring for these locations will be concurrent and be taken at the midway point between them.

Scheduled operator attended noise monitoring will be undertaken during day, evening and night time assessment periods. Noise measurements at each assessment location will be undertaken over two consecutive 15 minute periods. The measurement results reported will include the  $L_{Amax}$ ,  $L_{A1}$ ,  $L_{Aeq}$  and  $L_{A90}$  levels and measured/calculated  $L_{Amax}$  and  $L_{Aeq}$  contributions from Baal Bone Colliery.

When direct measurement is not feasible to verify Baal Bone Colliery noise contributions, modelling will be undertaken to confirm the contribution. The measured or calculated contributed noise level will be adopted to assess against the criteria of PA 09\_0178.

Attended noise monitoring will be increased in frequency to quarterly prior to the recommencement of mining operations.

#### 5.2 Noise Measurement

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Noise measurements will be undertaken in accordance with the Australian Standards AS1055-1997 'Acoustics - Description and Measurement of Environmental Noise' and the EPA's INP.

Noise from Baal Bone Colliery will be measured or predicted as an  $L_{Aeq 15min}$  level at the most affected point on or within the residential property boundary or if this is more than 30 m from the residence, at the most affected point within 30 m of the residence.  $L_{Amax}$  noise from Baal Bone Colliery will be measured or predicted to outside a residential bedroom window during the night-time period between 10.00 pm and 7.00 am.

Noise measurements for the purpose of assessing compliance will be undertaken with instrumentation calibrated by a NATA Certified Laboratory. Instrumentation calibration levels will be checked with a portable calibrator immediately before and after the measurements, with the variation in calibration levels not exceeding  $\pm 0.5$  dB. Copies of the meter calibration certificates will be attached to the attended noise monitoring report.

## 5.4 Meteorological Conditions

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Meteorological conditions will be determined from the Baal Bone Colliery weather station. The station is programmed to provide mean and maximum parameters at 15 minute intervals. The reported parameters will include wind speed, wind direction, temperature, and humidity data. In the event the Baal Bone Colliery weather station data is not available, data from the Lithgow Meteorological Station located in Birdwood St, Lithgow will be used.

### 6.1 Reporting Attended Noise Monitoring Results

The attended noise monitoring reports will include the following:

- Date and time of the monitoring,
- Details and qualifications of person(s) who conducted the monitoring,
- A map identifying noise measurement locations,
- Details of meteorological conditions,
- Confirmation of site operating conditions,
- Measured LA<sub>max</sub>, 15min, LA<sub>1</sub>, 15min, LA<sub>10</sub>, 15min, LA<sub>50</sub>, 15min, LA<sub>90</sub>, 15min and LA<sub>eq</sub>, 15min levels,
- Measured/calculated LA<sub>eq</sub>, 15min and LA max contributions from Baal Bone Colliery,
- Description of noise sources identified during the monitoring,
- Noise compliance/non-compliance status of Baal Bone Colliery during the monitoring, and
- Summary of noise incidents reported at Baal Bone Colliery since the previous report.

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## APPENDIX

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### ***B CALIBRATION CERTIFICATES***



Unit 36/14 Loyalty Rd  
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Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

## Sound Level Meter IEC 61672-3:2013 Calibration Certificate

Calibration Number C20674

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	00370304
<b>Microphone Serial Number :</b>	10421
<b>Pre-amplifier Serial Number :</b>	60313
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
<b>Ambient Temperature :</b> 22°C	<b>Ambient Temperature :</b> 21.9°C
<b>Relative Humidity :</b> 50.6%	<b>Relative Humidity :</b> 50.1%
<b>Barometric Pressure :</b> 100.08kPa	<b>Barometric Pressure :</b> 100.09kPa
<b>Calibration Technician :</b> Lucky Jaiswal	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 24 Nov 2020	<b>Report Issue Date :</b> 25 Nov 2020
<b>Approved Signatory :</b>	Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	Pass
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Least Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.12dB	Temperature	±0.2°C
1kHz	±0.11dB	Relative Humidity	±2.4%
8kHz	±0.13dB	Barometric Pressure	±0.015kPa
Electrical Tests			
	±0.10dB		

*All uncertainties are derived at the 95% confidence level with a coverage factor of 2.*



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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**Sound Calibrator  
IEC 60942-2017**

**Calibration Certificate**

Calibration Number C20082

**Client Details** Global Acoustics Pty Ltd  
12/16 Huntingdale Drive  
Thornton NSW 2322

**Equipment Tested/ Model Number :** Pulsar Model 106  
**Instrument Serial Number :** 81334

**Atmospheric Conditions**  
**Ambient Temperature :** 24.6°C  
**Relative Humidity :** 48.9%  
**Barometric Pressure :** 99.8kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 12 Feb 2020  
**Secondary Check:** Max Moore  
**Report Issue Date :** 13 Feb 2020

**Approved Signatory :**  Ken Williams

Characteristic Tested	Result
Generated Sound Pressure Level	Pass
Frequency Generated	Pass
Total Distortion	Pass

	Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
Measured Output	94.0	1000.0	94.1	1000.35

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement - Environmental Conditions			
Specific Tests		Environmental Conditions	
Generated SPL	±0.14dB	Temperature	±0.2°C
Frequency	±0.01%	Relative Humidity	±2.4%
Distortion	±0.5%	Barometric Pressure	±0.015kPa

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

\* The tests <1000 kHz are not covered by Acoustic Research Labs Pty Ltd NATA accreditation.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - calibration.

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