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10 May 2019

Chris Armit
Environment and Community Coordinator
Great Southern Energy Pty Ltd (trading as DeltaCoal)
Chain Valley Colliery
Off Construction Road (Off Ruttleys Road)
Mannering Park NSW 2259

**Re: EPL 1770 - Noise Compliance Assessment Report 2019**

Dear Chris,

# 1 Introduction

EMM Consulting Pty Limited (EMM) has been engaged by Great Southern Energy Pty Ltd (trading as DeltaCoal) to prepare this Noise Compliance Assessment Report for the period of 1 April 2018 to 31 March 2019 relevant to Chain Valley Colliery (CVC). The Noise Compliance Assessment Report is required as per Condition R4.1 of Environment Protection Licence (EPL) 1770 which is reproduced as follows:

> R4.1 The licensee must submit to the EPA a noise compliance assessment report at the end of each reporting period. The report must be submitted with the Environment Protection Licence Annual Return. The report must be prepared by a suitably qualified and experienced acoustical consultant which:
>
> (a) details the noise monitoring undertaken in accordance with condition M4;
>
> (b) assesses compliance with noise limits presented in condition L5.1 and condition 5.2; and
>
> (c) outlines any management actions taken within the monitoring period to address any exceedances of limits contained in condition L5.1 and condition L5.2.
>
> Note: The licensee must provide the EPA with one report, but this report may be a combination of the monitoring undertaken by the licensee as part of their quarterly monitoring program as required by the Project Approval SSD-5456 and must include LA1(1min).

# 2 Noise policy

Condition L5.9 of EPL 1770 states that noise generated by Chain Valley Colliery is to be measured in accordance with the relevant requirements of the EPA's Industrial Noise Policy (INP) (2000). It is of note that the EPA released the Noise Policy for Industry (NPfI) in October 2017, which supersedes the INP. As part of the NPfI implementation and transitional arrangements, the INP continues to apply when referenced in existing licences. There is one exception relating to INP Section 4 modification factors which have been transitioned to the NPfI Fact Sheet C through the INP application notes. The INP application notes state that Section 4 of the INP has been withdrawn and the modifying factor adjustments outlined in Fact Sheet C of the NPfI are to be applied when assessing the characteristics of a noise source (if relevant). This approach was adopted for the attended noise monitoring assessments undertaken following the release of the NPfI in October 2017, which included the quarterly monitoring periods for CVC during the reporting period.

# 3 Compliance

Quarterly attended noise monitoring was undertaken by Global Acoustics (Q2, Q3 and Q4 2018) and EMM (Q1 2019) for the period relevant to this report (refer Appendix A to Appendix D for complete noise monitoring reports).

As presented in the attached quarterly reports, results of routine attended monitoring indicate that noise emissions from CVC operations satisfied the relevant EPL noise limits (Condition L5.1 of EPL 1770), including $L_{Aeq,15\ minute}$ and $L_{A1,1\ minute}$, at all assessment locations during periods when noise limits were applicable.

# 4 Conclusion

Results of quarterly attended noise monitoring undertaken during the relevant reporting period (1 April 2018 to 31 March 2019) demonstrated that noise emissions from CVC operations satisfied the relevant limits at all monitoring points in accordance with the EPL 1770.

We trust the preceding meets your current requirements. If you have any questions or need anything further please do not hesitate to contact our office.

Yours sincerely

**Lucas Adamson**
Acoustic Consultant
ladamson@emmconsulting.com.au

Review: Katie Teyhan (10/05/2019)

Appendix A

# Quarterly attended noise monitoring report – Quarter 2 2018

# *Chain Valley Colliery*

*Environmental Noise Monitoring*

*Quarter 2 2018*

*Prepared for*

*LDO Group*

Global Acoustics

Noise and Vibration Analysis and Solutions

Global Acoustics Pty Ltd
PO Box 3115 | Thornton NSW 2322
Telephone +61 2 4966 4333
Email global@globalacoustics.com.au
ABN 94 094 985 734

# *Chain Valley Colliery*

## *Environmental Noise Monitoring*
## *Quarter 2 2018*

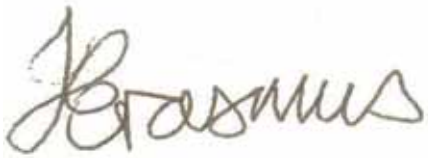
Reference: 18148_R01
Report date: 12 September 2018

### *Prepared for*

LDO Group
PO Box 174
Rutherford NSW 2330

### *Prepared by*

Global Acoustics Pty Ltd
PO Box 3115
Thornton NSW 2322



| | | | |
|---|---|---|---|
| Prepared: | Jason Cameron<br>Consultant | QA Review: | Jonathan Erasmus<br>Consultant |

*Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire*

# *EXECUTIVE SUMMARY*

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery (CVC), an underground coal mine at Chain Valley Bay, NSW.

The purpose of this noise survey is to quantify and describe the acoustic environment around the site and compare results with limits specified in the Chain Valley Extension Project Development Consent (SSD-5465).

Environmental noise monitoring described in this report was undertaken during day, evening and night of 28/29 June 2018.

CVC complied with the relevant noise limits at all locations during Quarter 2 2018. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

# Table of Contents

## Appendices

# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery (CVC), an underground coal mine at Chain Valley Bay, NSW.

Environmental noise monitoring described in this report was undertaken during day, evening and night periods on 28/29 June 2018.

The purpose of the survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

## 1.2 Monitoring Locations

There were nine attended monitoring locations during this survey as detailed in Table 1.1 and shown on Figure 1.

*Table 1.1: ATTENDED NOISE MONITORING LOCATIONS*

| Report Descriptor | Monitoring Location |
|---|---|
| ATN001 | 109 Griffith Street, Mannering Park |
| ATN002 | 35 Lakeshore Avenue, Kingfisher Shores, Chain Valley Bay |
| R12[1] | 20 Lakeshore Avenue, Kingfisher Shores, Chain Valley Bay |
| R13 | 33 Karoola Avenue, Kingfisher Shores, Chain Valley Bay |
| ATN003 | Short Street, Macquarie Shores, Chain Valley Bay |
| ATN004 | 20 Lloyd Avenue, Chain Valley Bay |
| ATN005 | 74 Teragalin Drive, Chain Valley Bay |
| ATN006 | 2 Sunset Parade, Chain Valley Bay |
| ATN007 | 275a Cams Boulevard, Chain Valley Bay |

*Notes:*

1. *Monitoring conducted in conjunction with ATN002 as monitoring location is representative of both ATN002 (R11) and R12.*

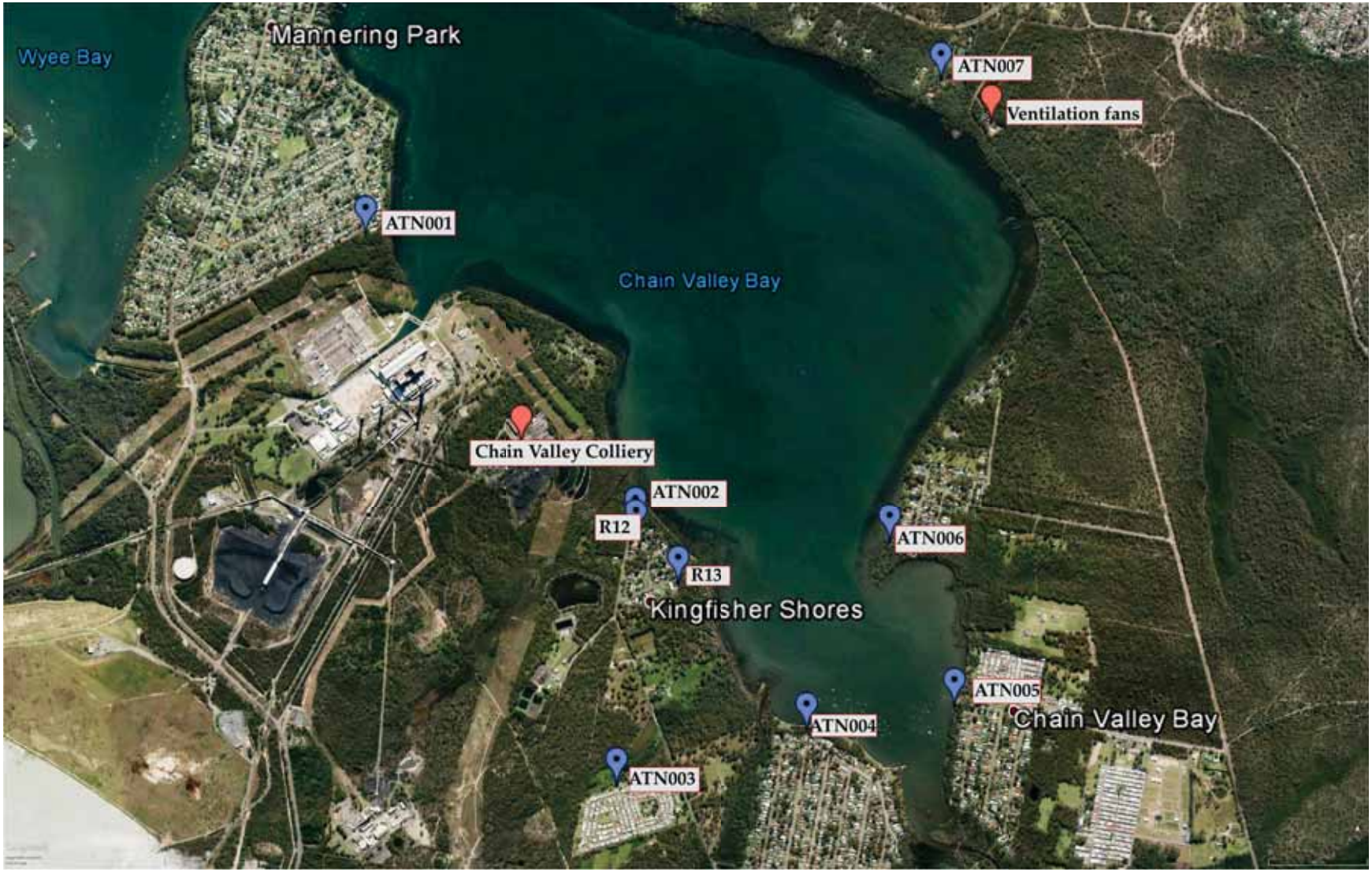



**Figure 1: CVC attended noise monitoring locations**

## 1.3 Terminology & Abbreviations

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

*Table 1.2: TERMINOLOGY & ABBREVIATIONS*

| Descriptor | Definition |
|---|---|
| $L_A$ | The A-weighted root mean squared (RMS) noise level at any instant |
| $L_{A1,1minute}$ | The noise level which is exceeded for 1 per cent of the specified time period of 1 minute |
| $L_{A10}$ | The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels |
| $L_{A90}$ | The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The $L_{A90}$ level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes. |
| $L_{Aeq}$ | The average noise energy during a measurement period |
| 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. |
| SEL | Sound exposure level (SEL), the A-weighted noise energy during a measurement period normalised to one second |
| 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. |
| SC | Stability Class. Estimated from wind speed and sigma theta data. |
| 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 |

## 1.4 Log of Operations

The client has advised that the following operations were being undertaken during Quarter 2 2018 monitoring:

- General surface plant movements (stores and workshop area – forklifts etc.);
- Light vehicle movements; and
- General drift haulage activities.

There were no coal stockpiling activities (conveyors, loaders or dozers) or truck haulage during the monitoring periods.

# 2 PROJECT APPROVAL & CRITERIA

## 2.1 Project Approval & Consent

Lake Coal Pty Ltd obtained a project approval on the 23rd January 2012 (MP10_0161) for CVC, with no prior project approval, and therefore noise limits, existing before that date. A further application was approved on 23 December 2013 for the Chain Valley Extension Project SSD-5465 (the Consent). Schedule 3, Conditions 7 to 9 of the Consent detail the conditions pertaining to noise. The noise sections of the Consent are reproduced in Appendix A.

## 2.2 Noise Management Plan

A Noise Management Plan (NMP) for CVC as required under Schedule 3, Condition 9 of the consent was approved by the Department of Planning and Infrastructure on 12 March 2014 and details the monitoring requirements associated with the then approved operational phase of the mine as well as any construction activities. The monitoring locations outlined in the NMP are listed in Table 2.1.

## 2.3 Project Specific Criteria

Activities have been assessed against criteria from Table 1 of the Consent, as set out in Table 2.1.

*Table 2.1: CVC IMPACT ASSESSMENT CRITERIA, dB*

| Location | Reference ID | Day $L_{Aeq,15min}$ | Evening $L_{Aeq,15min}$ | Night $L_{Aeq,15min}$ | Night $L_{A1,1min}$ |
|---|---|---|---|---|---|
| ATN001 | R9 | 35 | 35 | 35 | 45 |
| ATN002 | R11 | 49 | 49 | 49 | 54 |
| R12 | R12 | 49 | 49 | 49 | 53 |
| R13 | R13 | 43 | 43 | 43 | 49 |
| ATN003 | R15 | 36 | 36 | 36 | 45 |
| ATN004 | R14 | 35 | 35 | 35 | 45 |
| ATN005 | R17 | 35 | 35 | 35 | 45 |
| ATN006 | R19 | 37 | 37 | 37 | 45 |
| ATN007 | R22 | 46 | 46 | 46 | 46 |

*Notes:*

1. *Day: 7:00am to 6:00pm ~ Evening: 6:00pm to 10:00pm ~Night: 10:00pm to 7:00am.*

CVC long term noise goal criteria are set out in Table 2.2.

*Table 2.2: CVC LONG TERM NOISE GOALS, dB*

| Location | Reference ID | Day $L_{Aeq,15min}$ | Evening $L_{Aeq,15min}$ | Night $L_{Aeq,15min}$ |
|---|---|---|---|---|
| ATN002 | R11 | 41 | 41 | 41 |
| ATN007 | R22 | 40 | 40 | 40 |

*Notes:*

1. *Day: 7:00am to 6:00pm ~ Evening: 6:00pm to 10:00pm ~Night: 10:00pm to 7:00am.*

## 2.4 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017, and supersedes the EPA's Industrial Noise Policy (INP, 2000). Assessment and reporting of modifying factors is to be carried out in accordance with Fact Sheet C of the NPfI.

NPfI modifying factors, as they are applicable to mining noise, are described in more detail below.

### 2.4.1 Tonality and Intermittent Noise

As defined in the NPfI:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.*

### 2.4.2 Low Frequency Noise

As defined in the NPfI:

> *Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.*

The NPfI contains the current method of assessing low frequency noise, which is a 2 step process as detailed below:

> *Measure/assess source contribution C-weighted and A-weighted $L_{eq}$,T levels over the same time period. The low frequency noise modifying factor correction is to be applied where the C-A level is 15 dB or more and:*
>
> • *where any of the 1/3 octave noise levels in Table C2 are exceeded by* ***up to and including*** *5 dB and cannot be mitigated, a 2 dBA positive adjustment to measured A weighted levels applies for the evening/night period; and*
>
> • *where any of the 1/3 octave noise levels in Table C2 are exceeded by* ***more than*** *5 dB and cannot be mitigated, a 5 dBA positive adjustment to measured A weighted levels applies for the evening/night period and a 2 dBA positive adjustment applies for the daytime period.*

Table C2 and associated notes from the NPfI is reproduced below:

**Table C2: One-third octave low-frequency noise thresholds.**

| Hz/dB(Z) | One-third octave $L_{Zeq,15min}$ threshold level | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency (Hz) | 10 | 12.5 | 16 | 20 | 25 | 31.5 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| dB(Z) | 92 | 89 | 86 | 77 | 69 | 61 | 54 | 50 | 50 | 48 | 48 | 46 | 44 |

**Notes:**

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for

wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.

- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

# 3 METHODOLOGY

## 3.1 Overview

All noise monitoring was conducted at locations representative of the nearest residences in accordance with Australian Standard AS1055 ' Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements.

Meteorological data was obtained from the Mannering Colliery meteorological station, which is adjacent to CVC. This allowed correlation of atmospheric parameters and measured noise levels. Sigma theta is used to calculate vertical temperature gradient (VTG) in accordance with procedures detailed in the NPfI.

## 3.2 Attended Noise Monitoring

During this survey, attended monitoring was undertaken during the day, evening and night periods. A single measurement was taken at each location with the duration of each measurement being 15 minutes.

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest, in this case CVC.

If the exact contribution of the source of interest 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 levels, for example, $L_{A10}$, $L_{A50}$ or $L_{A90}$. 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 as per the NPfI (e.g. measure closer and back calculate) to determine a value for reporting.

Therefore, 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 or reasonable to employ NPfI 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 $L_{A1,1minute}$ corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this was quantified by measuring or estimating the highest noise level emitted from a site noise source during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

## 3.3 Modifying Factors

Years of monitoring have indicated that noise levels from mining operations, particularly those measured at significant distances from the source are relatively continuous and broad spectrum. Given this, noise levels from CVC at the monitoring locations are unlikely to be intermittent or tonal.

Assessment of low-frequency modifying factors is necessary when application of the maximum correction could potentially result in an exceedance of the relevant site-only $L_{Aeq}$ criterion. Low-frequency analysis is therefore undertaken for measurements in this report where:

- meteorological conditions resulted in criteria being applicable;
- contributions from CVC were audible and directly measurable, such that the site-only $L_{Aeq}$ was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB");
- contributions from CVC were within 5 dB of the relevant $L_{Aeq}$ criterion, as 5 dB is the maximum penalty that can be applied by low-frequency modifying factors; and
- CVC was the dominant low-frequency noise source.

All measurements meeting these conditions were evaluated for possible low frequency penalty applicability in accordance with the NPfI.

## 3.4 Monitoring Equipment

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

*Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT*

| Model | Serial Number | Calibration Due Date |
|---|---|---|
| Rion NA-28 Sound Level Analyser | 00370304 | 16/11/2018 |
| Rion NA-28 Sound Level Analyser | 30131882 | 14/03/2019 |
| Pulsar 106 Acoustic Calibrator | 81334 | 18/12/2019 |
| Pulsar 106 Acoustic Calibrator | 78226 | 14/03/2019 |

# 4 RESULTS

## 4.1 Modifying Factors

Measured CVC only levels were assessed for the applicability of modifying factors in accordance with the EPA's NPfI.

There were no intermittent noise sources from site during the survey. In addition, there is no equipment on site that is likely to generate tonal noise as defined in the NPfI. None of the measurements satisfied the conditions outlined in Section 3.3 when assessing low frequency noise.

Therefore no further assessment of modifying factors was undertaken.

## 4.2 Attended Noise Monitoring

Overall noise levels measured at each location during attended measurements are provided in Table 4.1.

*Table 4.1: MEASURED NOISE LEVELS – QUARTER 2 2018[1,2]*

| Location | Start Date and Time | $L_{A1}$ (dB) | $L_{A10}$ (dB) | $L_{Aeq}$ (dB) | $L_{A90}$ (dB) |
|---|---|---|---|---|---|
| | | Day | | | |
| ATN001 | 29/06/2018 14:13 | 56 | 49 | 49 | 47 |
| ATN002 | 29/06/2018 12:24 | 50 | 47 | 45 | 42 |
| ATN003 | 29/06/2018 11:32 | 54 | 46 | 45 | 40 |
| ATN004 | 29/06/2018 11:07 | 61 | 53 | 50 | 39 |
| ATN005 | 29/06/2018 10:32 | 54 | 49 | 47 | 42 |
| ATN006 | 29/06/2018 10:02 | 57 | 54 | 52 | 42 |
| ATN007 | 29/06/2018 09:20 | 49 | 45 | 44 | 42 |
| R13 | 29/06/2018 12:45 | 58 | 48 | 47 | 41 |
| | | Evening | | | |
| ATN001 | 28/06/2018 19:17 | 50 | 49 | 48 | 48 |
| ATN002 | 28/06/2018 20:57 | 46 | 45 | 44 | 43 |
| ATN003 | 28/06/2018 20:09 | 46 | 44 | 42 | 40 |
| ATN004 | 28/06/2018 20:36 | 48 | 41 | 40 | 37 |
| ATN005 | 28/06/2018 20:01 | 53 | 43 | 43 | 38 |
| ATN006 | 28/06/2018 19:22 | 44 | 42 | 41 | 39 |
| ATN007 | 28/06/2018 18:34 | 48 | 46 | 45 | 44 |
| R13 | 28/06/2018 21:05 | 48 | 42 | 40 | 38 |
| | | Night | | | |
| ATN001 | 29/06/2018 03:50 | 48 | 47 | 47 | 46 |
| ATN002 | 29/06/2018 03:11 | 48 | 47 | 46 | 45 |
| ATN003 | 29/06/2018 02:53 | 44 | 43 | 41 | 40 |
| ATN004 | 29/06/2018 00:40 | 48 | 40 | 39 | 37 |
| ATN005 | 29/06/2018 02:23 | 48 | 46 | 44 | 43 |
| ATN006 | 29/06/2018 02:02 | 42 | 41 | 40 | 38 |
| ATN007 | 29/06/2018 01:20 | 49 | 48 | 47 | 46 |
| R13 | 29/06/2018 03:27 | 45 | 44 | 43 | 42 |

*Notes:*

1. *Noise levels in this table are not necessarily the result of activities at CVC; and*
2. *All measurements are 15 minutes duration.*

Table 4.2 compares measured levels with $L_{Aeq,15minute}$ impact assessment criteria detailed in the Consent.

*Table 4.2: $L_{Aeq,15minute}$ GENERATED BY CVC AGAINST IMPACT ASSESSMENT CRITERIA – QUARTER 2 2018*

| Location | Start Date and Time | Wind Speed (m/s) | VTG (°C per 100m)[1] | $L_{Aeq}$ Criterion (dB) | Criterion Applies?[2] | CVC $L_{Aeq}$ (dB)[3,4] | Exceedance (dB)[4,5] |
|---|---|---|---|---|---|---|---|
| | | | Day | | | | |
| ATN001 | 29/06/2018 14:13 | 3.0 | -2.0 | 35 | Yes | IA | Nil |
| ATN002 | 29/06/2018 12:24 | 1.9 | -2.0 | 49 | Yes | IA | Nil |
| ATN003 | 29/06/2018 11:32 | 1.8 | -2.0 | 36 | Yes | IA | Nil |
| ATN004 | 29/06/2018 11:07 | 2.4 | -2.0 | 35 | Yes | IA | Nil |
| ATN005 | 29/06/2018 10:32 | 2.5 | -2.0 | 35 | Yes | IA | Nil |
| ATN006 | 29/06/2018 10:02 | 2.8 | -2.0 | 37 | Yes | IA | Nil |
| ATN007 | 29/06/2018 09:20 | 2.7 | -2.0 | 46 | Yes | 42 | Nil |
| R13 | 29/06/2018 12:45 | 2.6 | -2.0 | 43 | Yes | IA | Nil |
| | | | Evening | | | | |
| ATN001 | 28/06/2018 19:17 | 0.4 | 3.0 | 35 | Yes | IA | Nil |
| ATN002 | 28/06/2018 20:57 | 0.4 | 3.0 | 49 | Yes | IA | Nil |
| ATN003 | 28/06/2018 20:09 | 0.5 | 3.0 | 36 | Yes | IA | Nil |
| ATN004 | 28/06/2018 20:36 | 0.2 | 3.0 | 35 | Yes | <30 | Nil |
| ATN005 | 28/06/2018 20:01 | 0.6 | 0.5 | 35 | Yes | <30 | Nil |
| ATN006 | 28/06/2018 19:22 | 0.4 | 3.0 | 37 | Yes | NM | Nil |
| ATN007 | 28/06/2018 18:34 | 0.6 | 3.0 | 46 | Yes | 44 | Nil |
| R13 | 28/06/2018 21:05 | 0.2 | 3.0 | 43 | Yes | NM | Nil |
| | | | Night | | | | |
| ATN001 | 29/06/2018 03:50 | 1.1 | 0.5 | 35 | Yes | IA | Nil |
| ATN002 | 29/06/2018 03:11 | 0.8 | 0.5 | 49 | Yes | IA | Nil |
| ATN003 | 29/06/2018 02:53 | 1.1 | 0.5 | 36 | Yes | IA | Nil |
| ATN004 | 29/06/2018 00:40 | 0.5 | 3.0 | 35 | Yes | IA | Nil |
| ATN005 | 29/06/2018 02:23 | 2.1 | 0.5 | 35 | Yes | IA | Nil |
| ATN006 | 29/06/2018 02:02 | 1.2 | 3.0 | 37 | Yes | IA | Nil |
| ATN007 | 29/06/2018 01:20 | 0.4 | 3.0 | 46 | Yes | 44 | Nil |
| R13 | 29/06/2018 03:27 | 0.8 | -1.0 | 43 | Yes | IA | Nil |

*Notes:*

1. *Sigma theta data used to calculate Vertical Temperature Gradient (VTG) in accordance with procedures detailed in the NPfI;*
2. *Noise emission limits do not apply for winds greater than 3 metres per second (at a height of 10 metres); or temperature inversion conditions greater than 3°C/100m;*
3. *These are results for CVC in the absence of all other noise sources;*
4. *Bold results in red are those greater than the relevant criterion (if applicable); and*
5. *NA in exceedance column means atmospheric conditions outside conditions specified in the Consent and so criterion is not applicable.*

Table 4.3 compares measured levels with $L_{A1,1minute}$ impact assessment criteria detailed in the Consent.

*Table 4.3: $L_{A1,1minute}$ GENERATED BY CVC AGAINST IMPACT ASSESSMENT CRITERIA – QUARTER 2 2018*

| Location | Start Date and Time | Wind Speed (m/s) | VTG (°C / 100m)[1] | $L_{Aeq}$ Criterion (dB) | Criterion Applies?[2] | CVC $L_{A1,1minute}$ (dB)[3,4] | Exceedance (dB)[4,5] |
|---|---|---|---|---|---|---|---|
| ATN001 | 29/06/2018 03:50 | 1.1 | 0.5 | 45 | Yes | IA | Nil |
| ATN002 | 29/06/2018 03:11 | 0.8 | 0.5 | 53 | Yes | IA | Nil |
| ATN003 | 29/06/2018 02:53 | 1.1 | 0.5 | 45 | Yes | IA | Nil |
| ATN004 | 29/06/2018 00:40 | 0.5 | 3.0 | 45 | Yes | IA | Nil |
| ATN005 | 29/06/2018 02:23 | 2.1 | 0.5 | 45 | Yes | IA | Nil |
| ATN006 | 29/06/2018 02:02 | 1.2 | 3.0 | 45 | Yes | IA | Nil |
| ATN007 | 29/06/2018 01:20 | 0.4 | 3.0 | 46 | Yes | 45 | Nil |
| R13 | 29/06/2018 03:27 | 0.8 | -1.0 | 49 | Yes | IA | Nil |

*Notes:*

1. *Sigma theta data used to calculate VTG in accordance with procedures detailed in the NPfI;*
2. *Noise emission limits do not apply for winds greater than 3 metres per second (at a height of 10 metres); or temperature inversion conditions greater than 3°C/100m;*
3. *These are results for CVC in the absence of all other noise sources;*
4. *Bold results in red are those greater than the relevant criterion (if applicable); and*
5. *NA in exceedance column means atmospheric conditions outside conditions specified in the Consent and so criterion is 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 or hail.

*Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – QUARTER 2 2018[1,2]*

| Location | Start Date and Time | Temperature (°C) | Wind Speed (m/s) | Wind Direction (°MN) | Cloud Cover (1/8s) |
|---|---|---|---|---|---|
| | | Day | | | |
| ATN001 | 29/06/2018 14:13 | 18 | 0.7 | 5 | 2 |
| ATN002 | 29/06/2018 12:24 | 16 | 0.0 | - | 1 |
| ATN003 | 29/06/2018 11:32 | 18 | 1.7 | 225 | 1 |
| ATN004 | 29/06/2018 11:07 | 15 | 0.8 | 280 | 1 |
| ATN005 | 29/06/2018 10:32 | 14 | 1.4 | 270 | 1 |
| ATN006 | 29/06/2018 10:02 | 13 | 2.0 | 270 | 2 |
| ATN007 | 29/06/2018 09:20 | 16 | 0.0 | - | 0 |
| R13 | 29/06/2018 12:45 | 14 | 2.3 | 240 | 1 |
| | | Evening | | | |
| ATN001 | 28/06/2018 19:17 | 13 | 0.0 | - | 8 |
| ATN002 | 28/06/2018 20:57 | 11 | 0.0 | - | 1 |
| ATN003 | 28/06/2018 20:09 | 9 | 0.0 | - | 3 |
| ATN004 | 28/06/2018 20:36 | 11 | 0.0 | - | 1 |
| ATN005 | 28/06/2018 20:01 | 11 | 0.7 | 40 | 3 |
| ATN006 | 28/06/2018 19:22 | 13 | 0.0 | - | 7 |
| ATN007 | 28/06/2018 18:34 | 12 | 0.0 | - | 8 |
| R13 | 28/06/2018 21:05 | 11 | 0.0 | - | 1 |
| | | Night | | | |
| ATN001 | 29/06/2018 03:50 | 9 | 0.0 | - | 0 |
| ATN002 | 29/06/2018 03:11 | 10 | 0.0 | - | 0 |
| ATN003 | 29/06/2018 02:53 | 8 | 0.0 | - | 0 |
| ATN004 | 29/06/2018 00:40 | 8 | 0.3 | 220 | 0 |
| ATN005 | 29/06/2018 02:23 | 10 | 0.0 | - | 0 |
| ATN006 | 29/06/2018 02:02 | 10 | 0.0 | - | 0 |
| ATN007 | 29/06/2018 01:20 | 9 | 0.0 | - | 0 |
| R13 | 29/06/2018 03:27 | 7 | 1.1 | 230 | 0 |

*Notes:*

1. *"-" indicates calm conditions during monitoring.*

# 5 DISCUSSION

## 5.1 Noted Noise Sources

Table 4.2 and Table 4.3 present data gathered during attended monitoring. These noise levels are the result of multiple 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 CVC's contribution, if any, to measured levels. At each monitoring location, CVC's $L_{Aeq,15minute}$ and $L_{A1,1minute}$ (in the absence of any other noise) was, where possible, measured directly or determined by frequency analysis. Time variations of noise sources in each measurement and their temporal characteristics, have been taken into account via statistical descriptors.

From these observations summaries have been derived for each location. This discussion provides these summaries. Statistical 1/3 octave band analysis of environmental noise was undertaken, and the figures following this section display the frequency ranges for various noise sources at each location for $L_{A1}$, $L_{A10}$, $L_{A90}$ and $L_{Aeq}$. 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; mining noise is at frequencies less than 1000 Hz (this 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; this can be dogs, cows, or, most commonly, road traffic. The local power station directly adjacent to CVC's pit top facilities was identified as a source of low frequency noise.

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 considered accurate for $L_{Aeq}$.

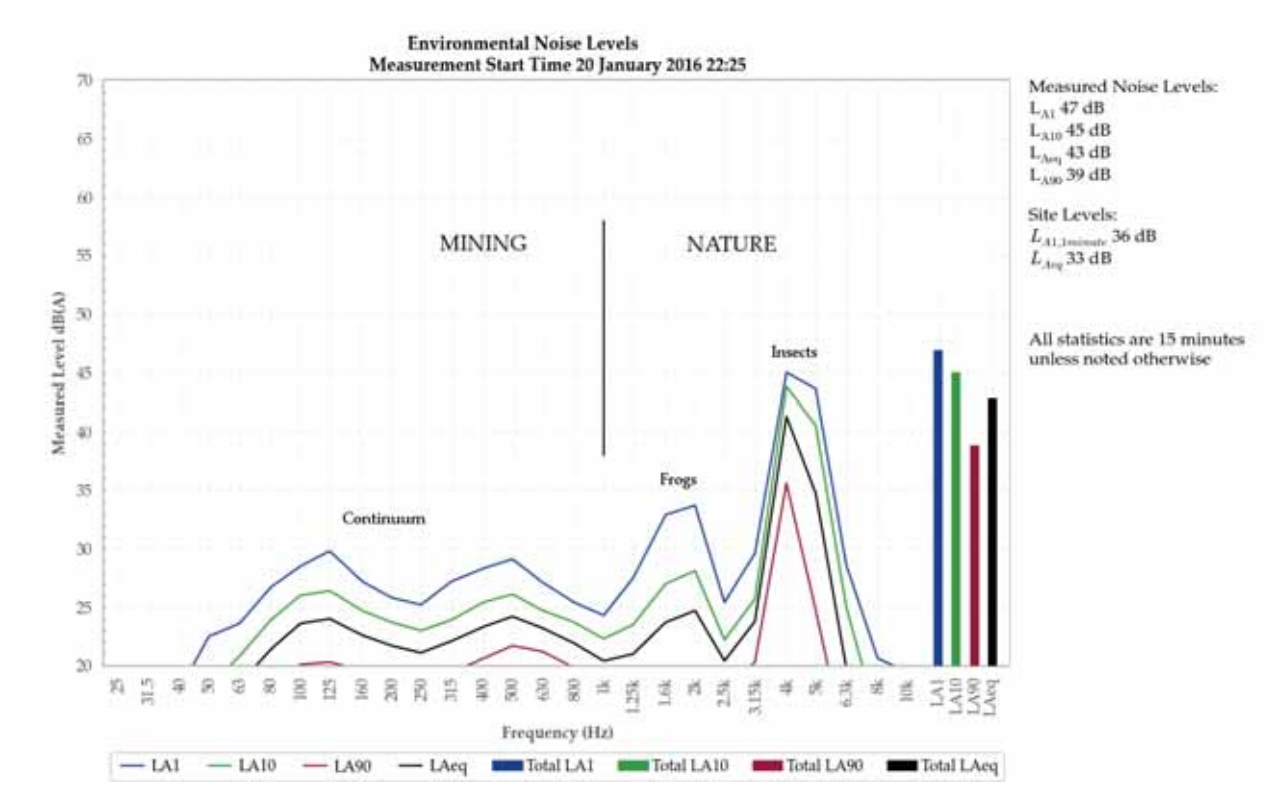



**Figure 2: Sample Graph (see Section 5.1 for explanatory note)**

### 5.1.1 ATN001, Day

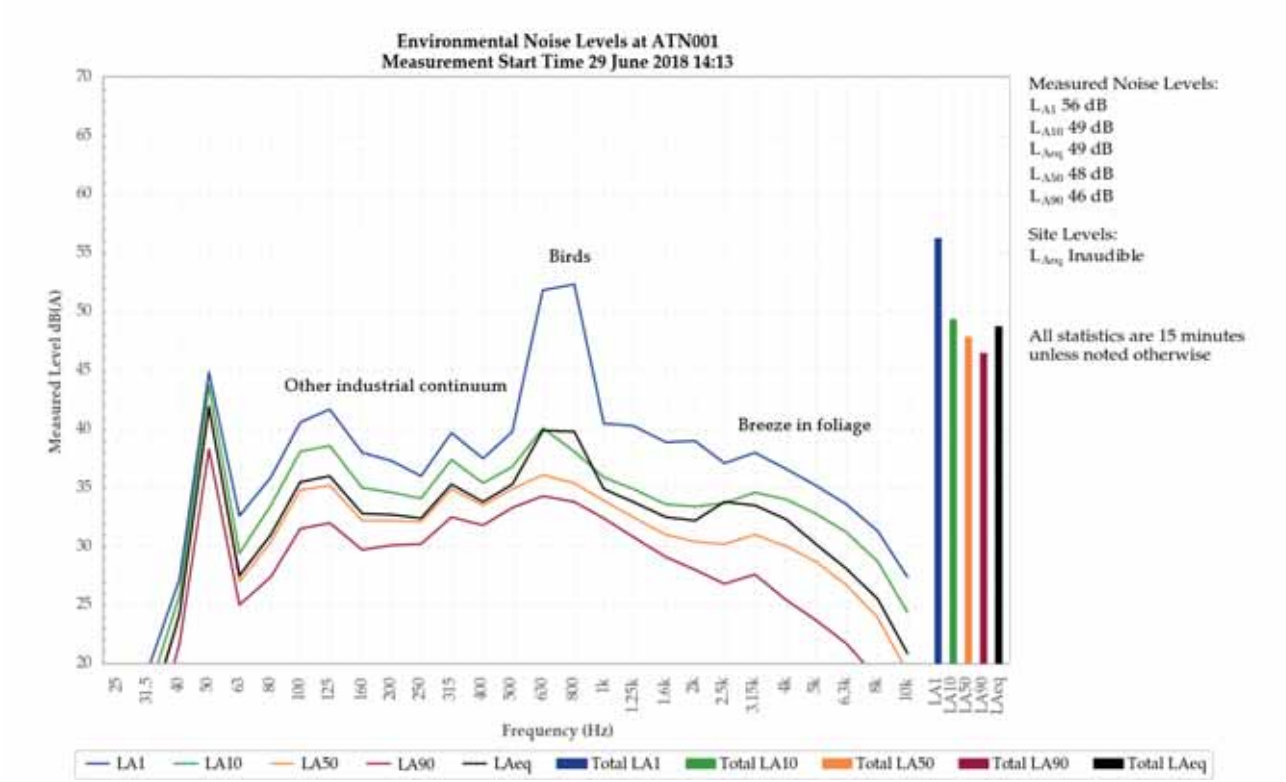



**Figure 3: Environmental Noise Levels, ATN001 - 109 Griffith Street**

CVC was inaudible during the measurement.

A power station continuum was primarily responsible for the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$ and $L_{A90}$. Birds primarily generated the measured $L_{A1}$. Breeze in foliage contributed to some levels.

Residential noise was also noted.

### 5.1.2 ATN002, Day

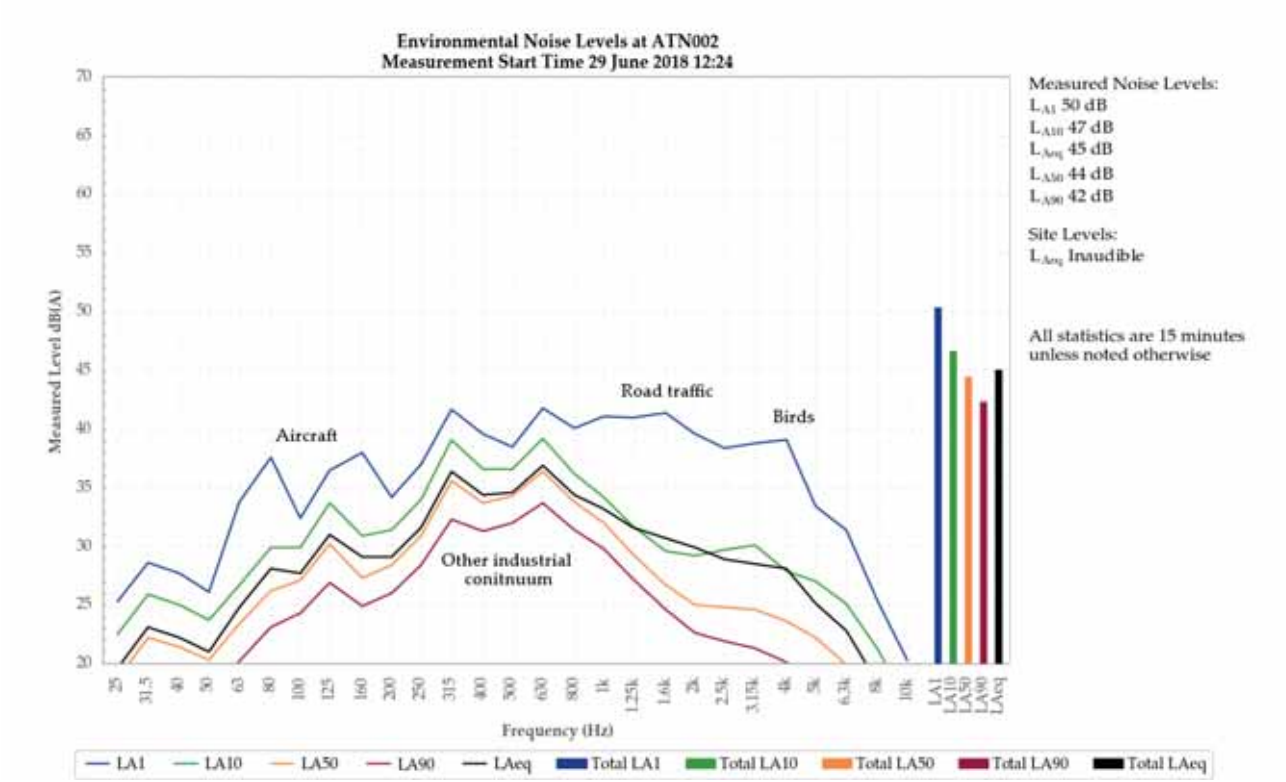



**Figure 4: Environmental Noise Levels, ATN002 – 35 Lakeshore Avenue**

CVC was inaudible during the measurement.

Other industrial continuum primarily generated all measured levels. Road traffic and birds contributed to the measured $L_{A1}$.

Aircraft and breeze in foliage were also noted.

### 5.1.3 ATN003, Day

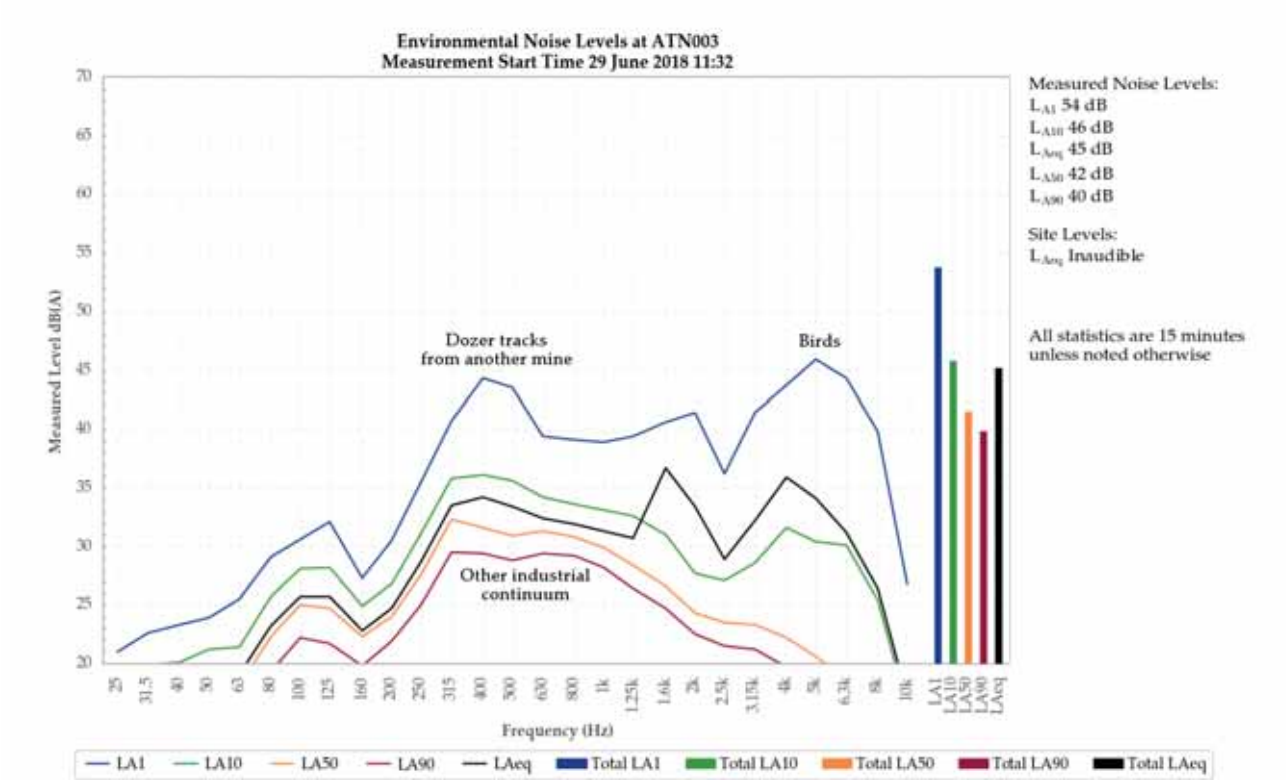



**Figure 5: Environmental Noise Levels, ATN003 – Short St**

CVC was inaudible during the measurement.

Other industrial continuum generated the measured $L_{A50}$ and $L_{A90}$, and contributed to the measured $L_{A10}$ and $L_{Aeq}$. Birds and track noise from another mining operation generated the $L_{A1}$. Birds contributed to the $L_{A10}$ and $L_{Aeq}$.

Road traffic and breeze in foliage was also noted.

### 5.1.4 ATN004, Day

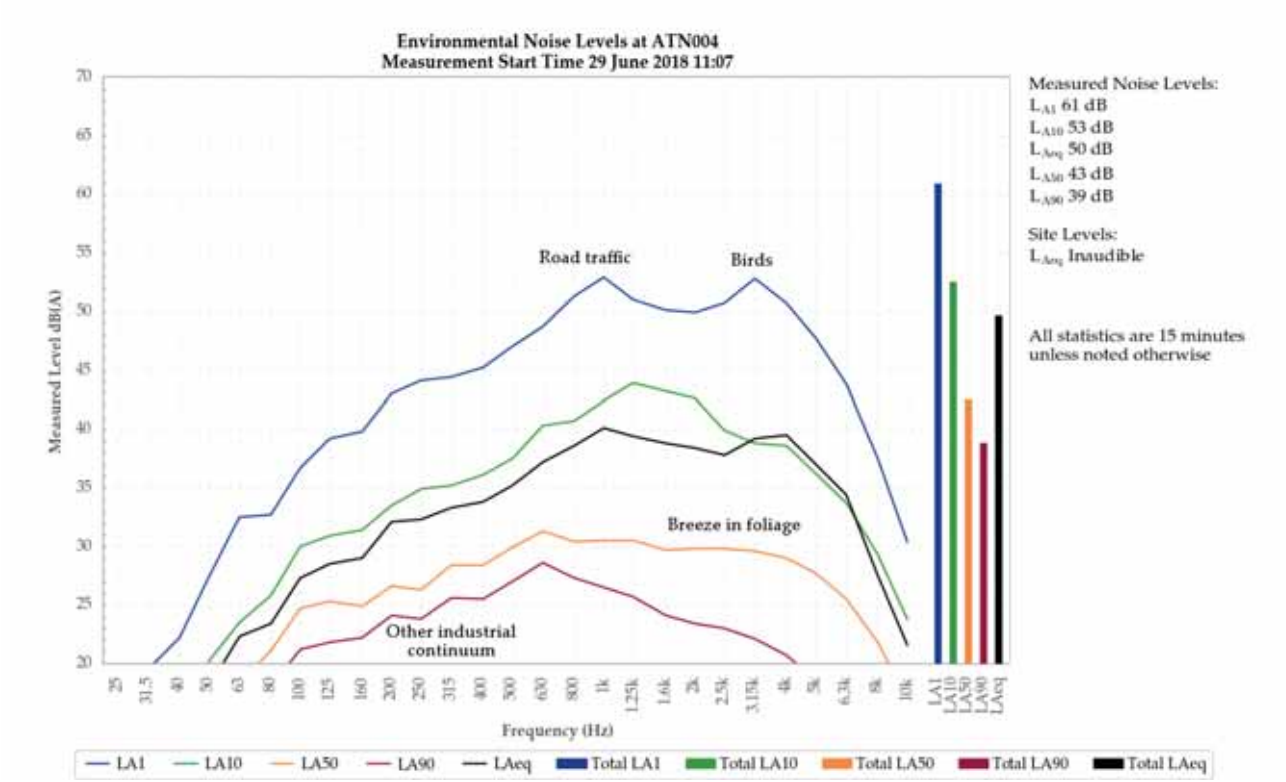



**Figure 6: Environmental Noise Levels, ATN004 – 20 Lloyd Avenue**

CVC was inaudible during the measurement.

Road traffic and birds generated the measured $L_{A1}$, $L_{A10}$ and $L_{Aeq}$. Other industrial continuum generated the measured $L_{A90}$ and contributed to the $L_{A50}$. Breeze in foliage contributed to the $L_{A50}$.

Dogs, construction work and residential noise was also noted.

### 5.1.5 ATN005, Day

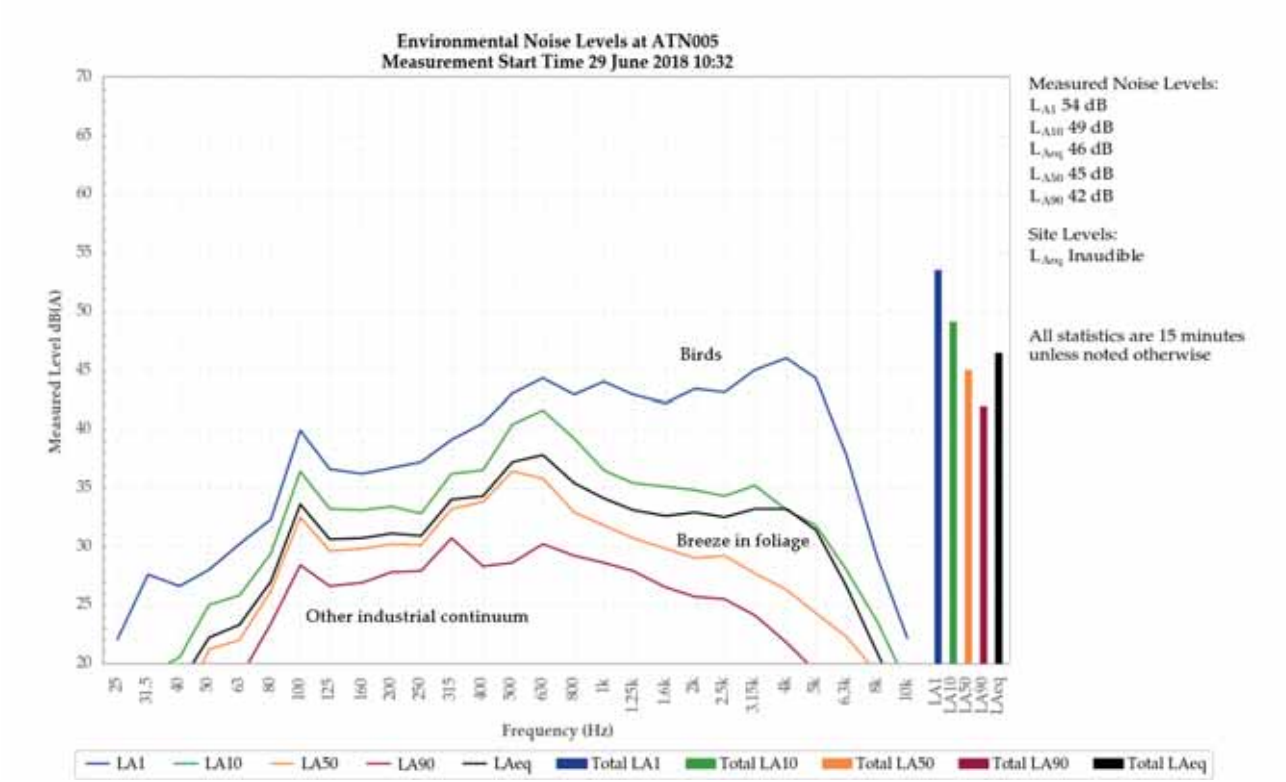



**Figure 7: Environmental Noise Levels, ATN005 – 74 Teralgin Drive**

CVC was inaudible during the measurement.

Other industrial continuum contributed to all measured levels. Birds were primarily responsible for the measured $L_{A1}$. Breeze in foliage contributed to the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$ and $L_{A90}$.

Voices, road traffic and another mining operation were also noted.

### 5.1.6 ATN006, Day

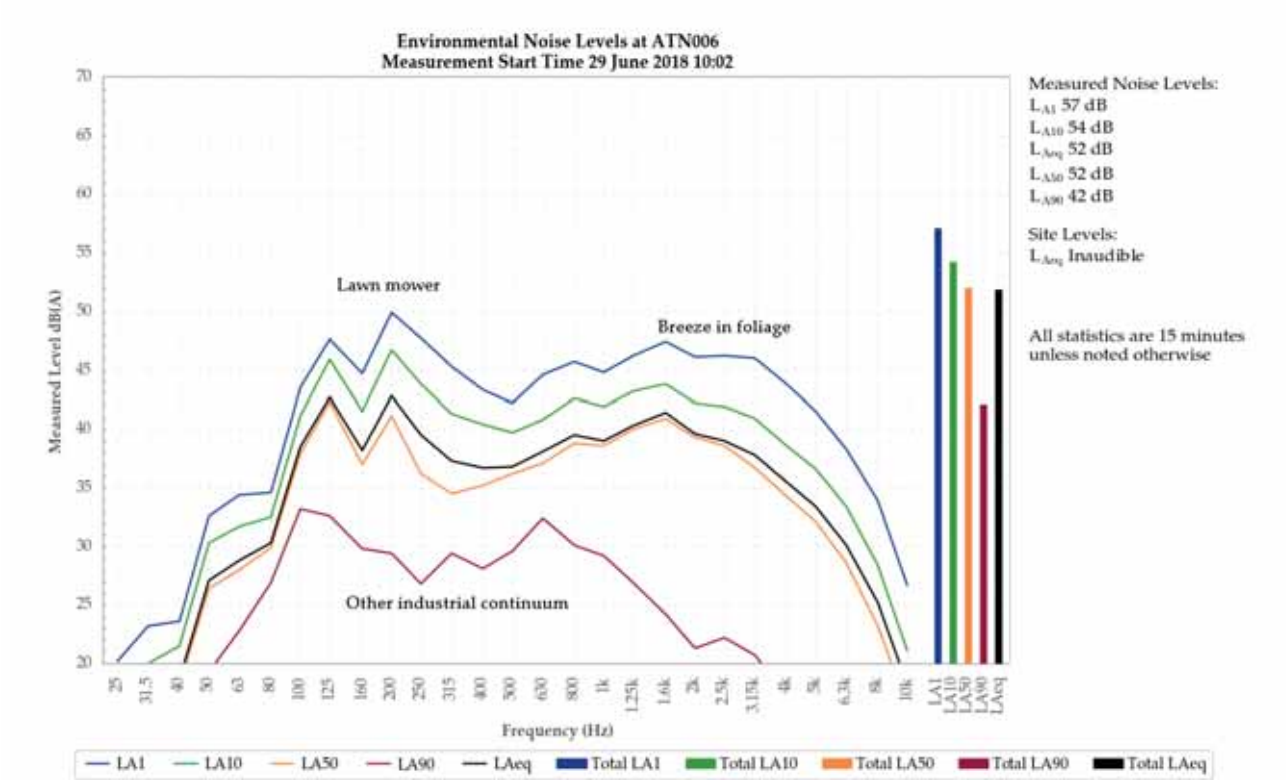



**Figure 8: Environmental Noise Levels, ATN006 – 2 Sunset Parade**

CVC was inaudible during the measurement.

Other industrial continuum generated the measured $L_{A90}$. A lawn mower and breeze in foliage were responsible for all other measured levels.

Birds and another mining operation were also noted.

### 5.1.7 ATN007, Day

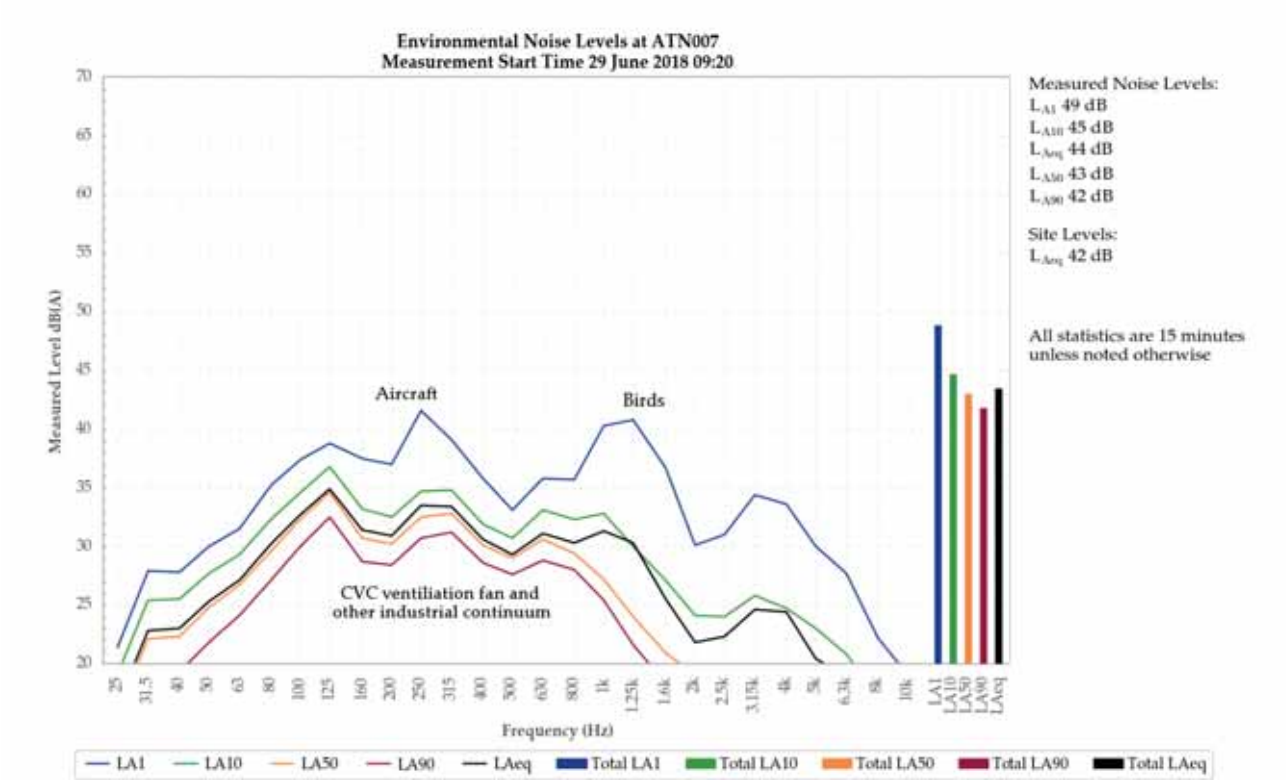



**Figure 9: Environmental Noise Levels, ATN007 – 275a Cams Boulevard**

A ventilation fan continuum from CVC was audible during the measurement generating a site only $L_{Aeq}$ of 42 dB.

Birds and aircraft noise were primarily responsible for the measured $L_{A1}$. A CVC ventilation fan continuum and other industrial noise primarily generated all other measured levels.

Breeze in foliage was also noted.

### 5.1.8 R13, Day

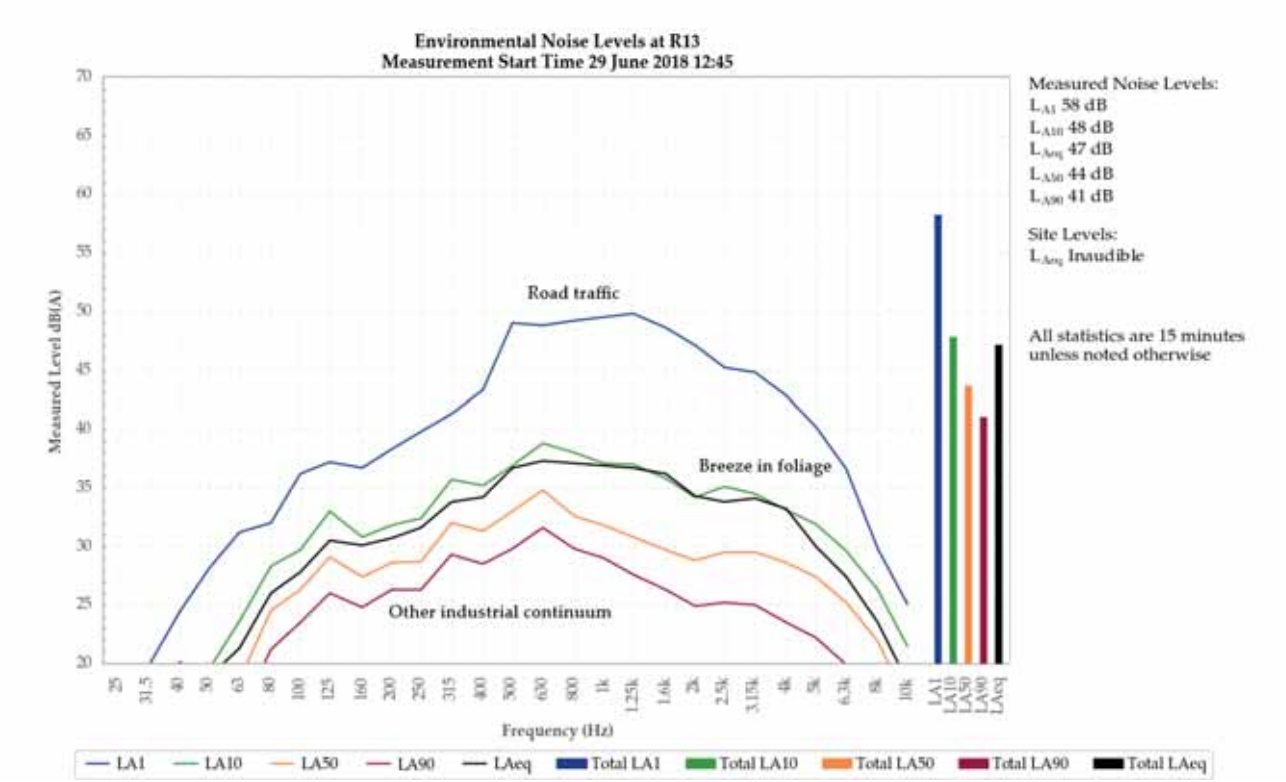



**Figure 10: Environmental Noise Levels, R13 – 33 Karoola Avenue**

CVC was inaudible during the measurement.

Breeze in foliage contributed to all measured levels. Road traffic generated the measured $L_{A1}$ and contributed to the measured $L_{A10}$ and $L_{Aeq}$. Other industrial continuum was primarily responsible for the measured $L_{A50}$ and $L_{A90}$.

Birds and aircraft noise were also noted.

### 5.1.9 ATN001, Evening

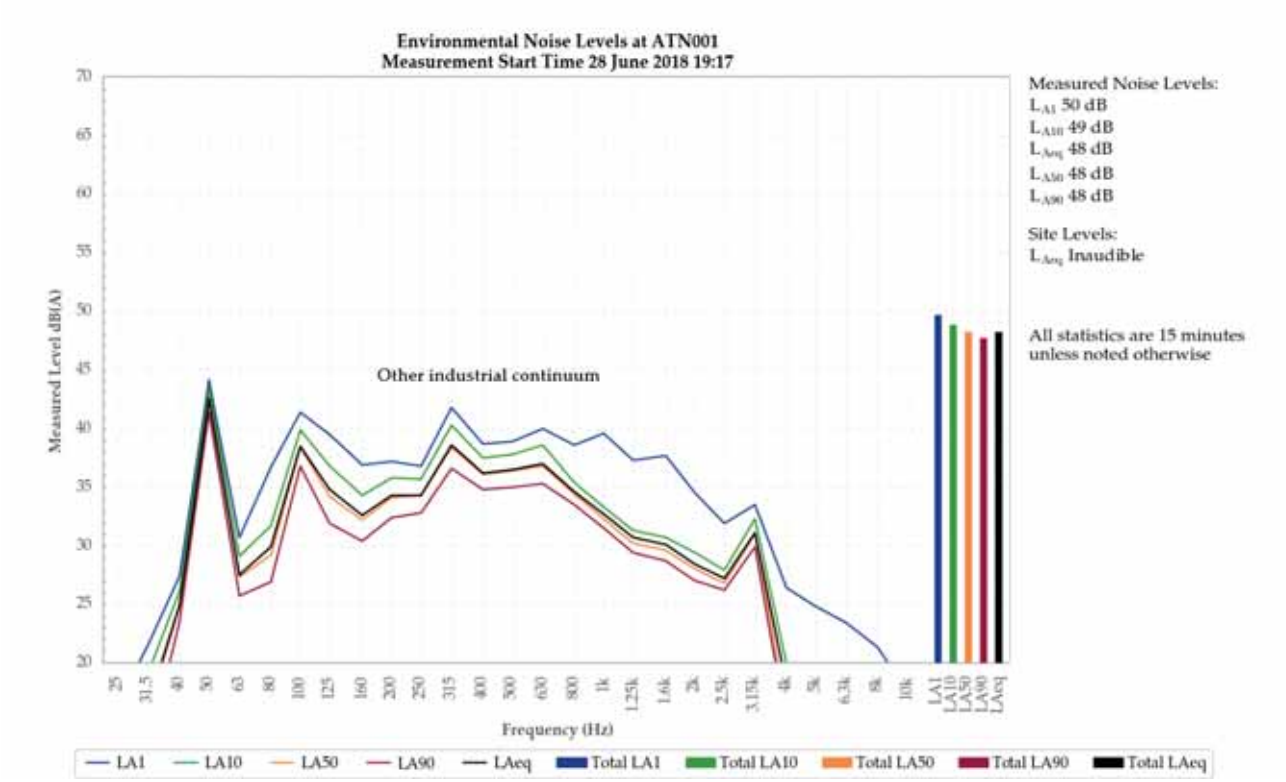



**Figure 11: Environmental Noise Levels, ATN001 - 109 Griffith Street**

CVC was inaudible during the measurement.

Other industrial continuum generated all levels

Road traffic, birds, residential noise and dogs were also noted.

### 5.1.10 ATN002, Evening

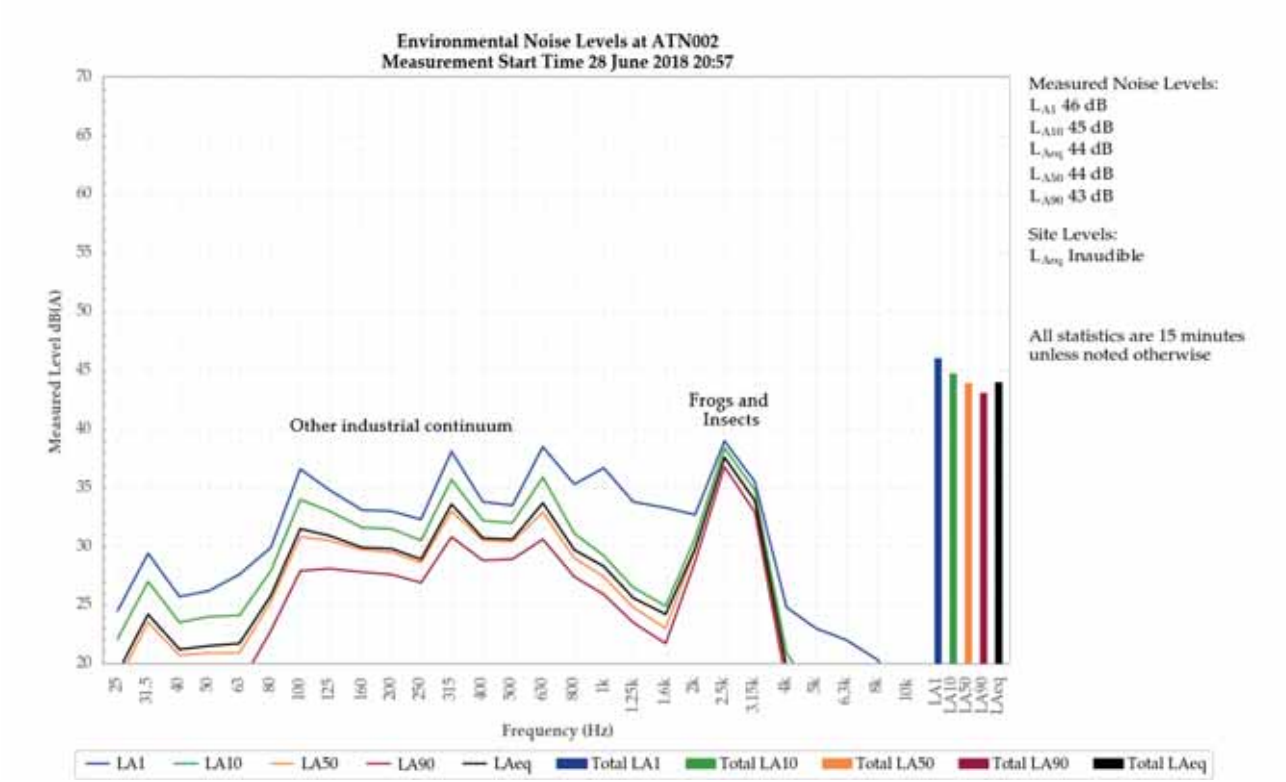



**Figure 12: Environmental Noise Levels, ATN002 – 35 Lakeshore Avenue**

CVC was inaudible during the measurement.

Other industrial continuum, frogs and insects generated all measured levels.

Road traffic was also noted.

### 5.1.11 ATN003, Evening

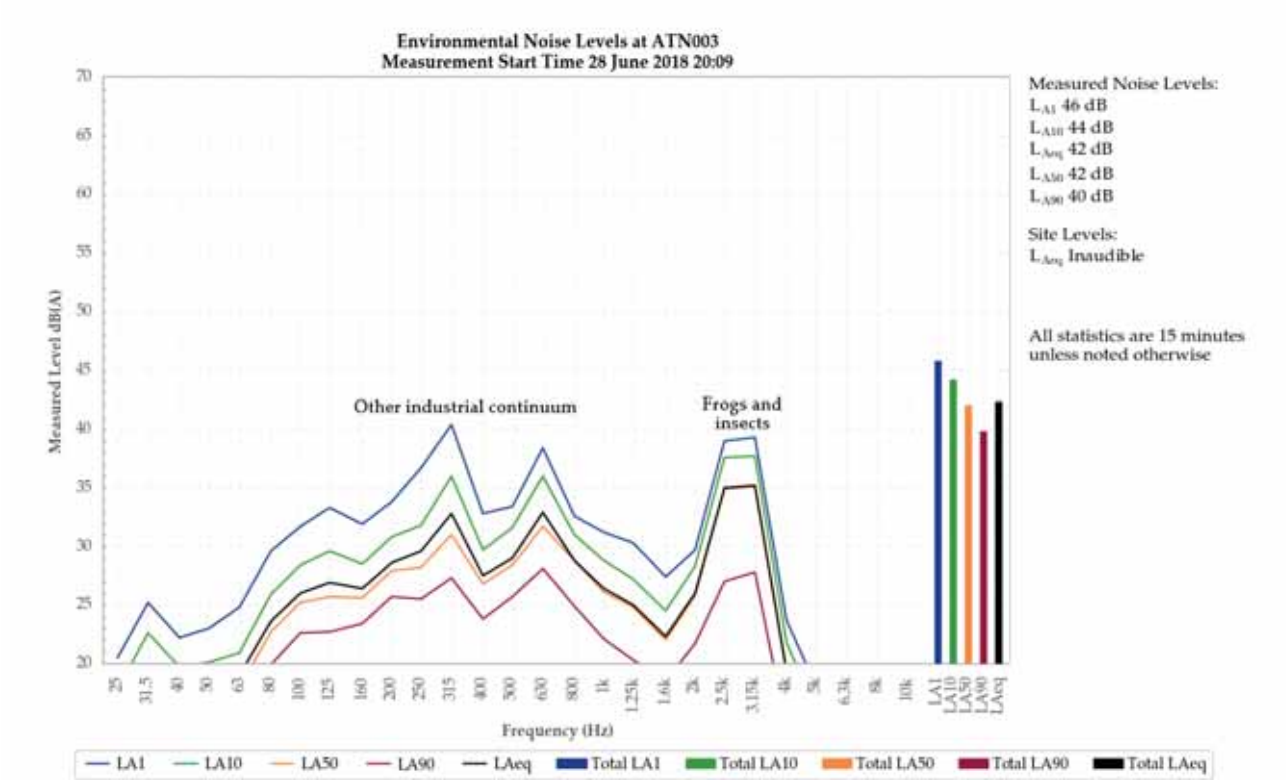



**Figure 13: Environmental Noise Levels, ATN003 – Short Street**

CVC was inaudible during the measurement.

Other industrial continuum primarily generated all measured levels. Frogs and insects contributed to all levels.

Aircraft noise and road traffic was also noted.

### 5.1.12 ATN004, Evening

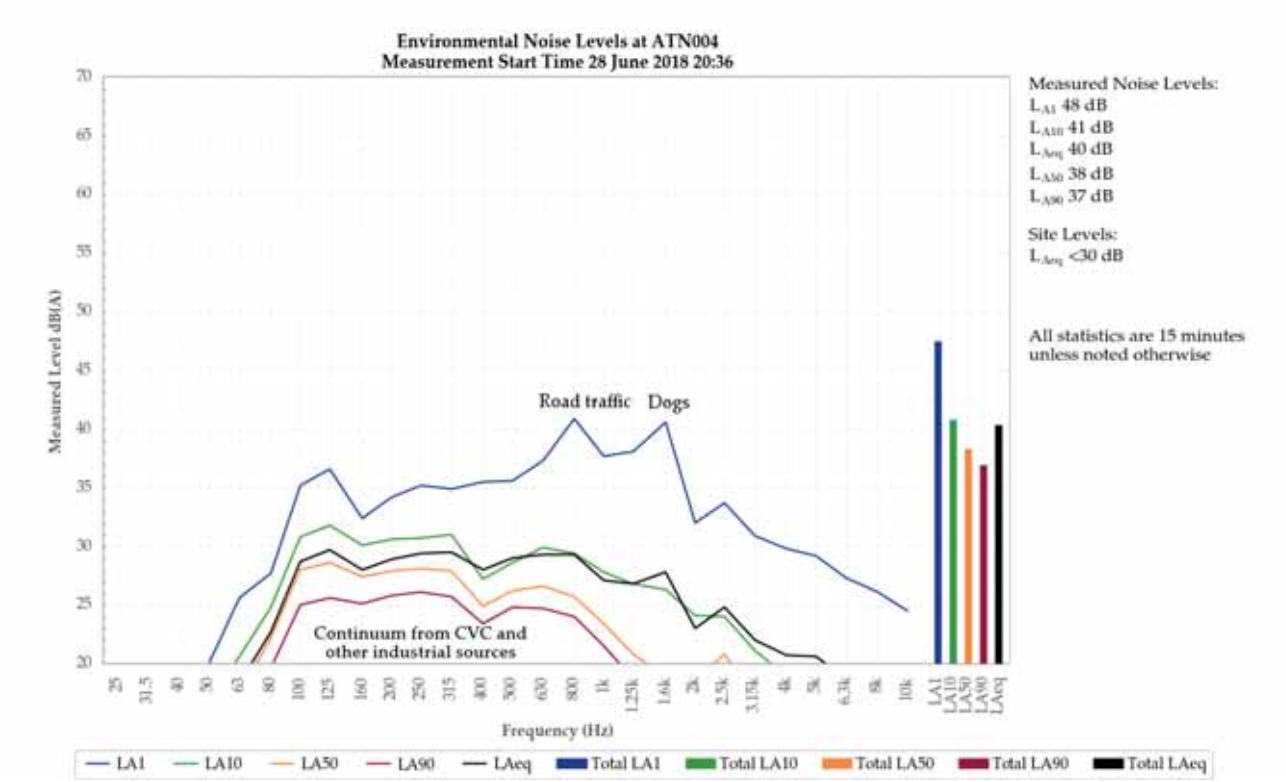



**Figure 14: Environmental Noise Levels, ATN004 – 20 Lloyd Avenue**

A continuum from CVC was audible throughout the measurement and generated the site only $L_{Aeq}$ of less than 30 dB.

Continuum from CVC and other industrial sources generated the measured $L_{A50}$ and $L_{A90}$, and was primarily responsible for the measured $L_{Aeq}$ and $L_{A10}$. Road traffic and dogs generated the measured $L_{A1}$ and contributed to the measured $L_{A10}$ and $L_{Aeq}$.

Aircraft noise, frogs, insects and residential noise were also noted.

### 5.1.13 ATN005, Evening

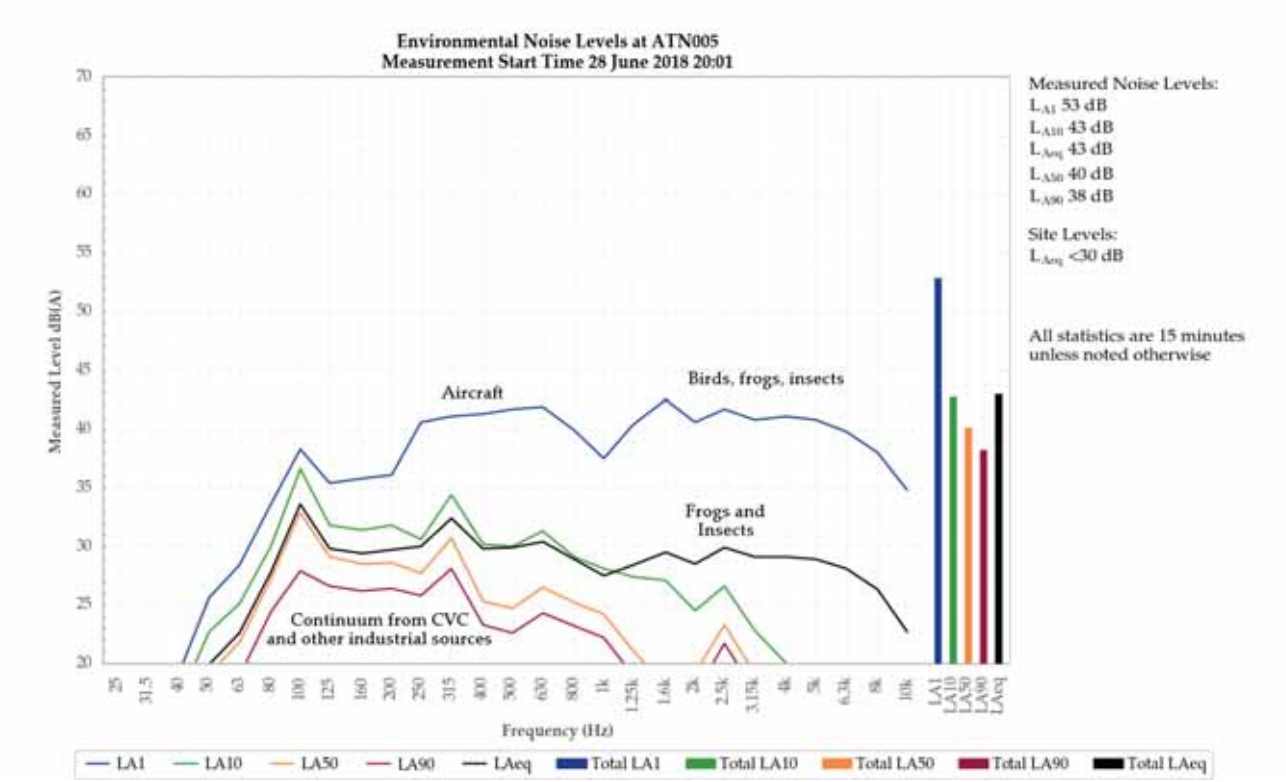



**Figure 15: Environmental Noise Levels, ATN005 – 74 Teralgin Drive**

A low-level continuum from CVC was audible during the measurement generating a site only $L_{Aeq}$ of less than 30 dB.

Wildlife noise and an aircraft generated the measured $L_{A1}$ and contributed to the measured $L_{Aeq}$. A continuum from other industry primarily generated the measured $L_{A10}$, $L_{A50}$ and L90 and contributed to the measured $L_{Aeq}$. A continuum from CVC contributed to the measured $L_{A90}$.

Dogs were also noted.

### 5.1.14 ATN006, Evening

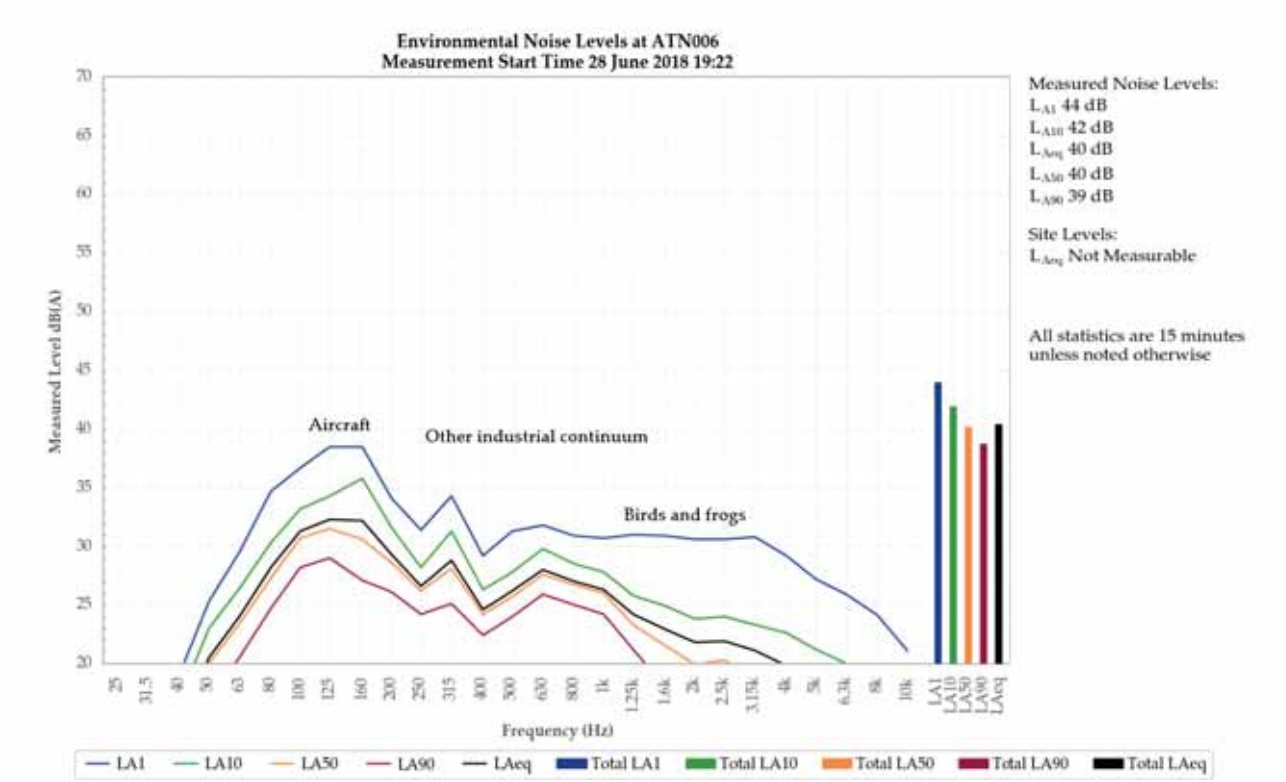



**Figure 16: Environmental Noise Levels, ATN006 – 2 Sunset Parade**

Some noise from CVC was audible during the measurement but was not measurable.

An aircraft, other industrial continuum, birds, and frogs generated the measured $L_{A1}$. Another industrial continuum generated the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$, and $L_{A90}$.

Residential noise and road traffic were also noted.

### 5.1.15 ATN007, Evening

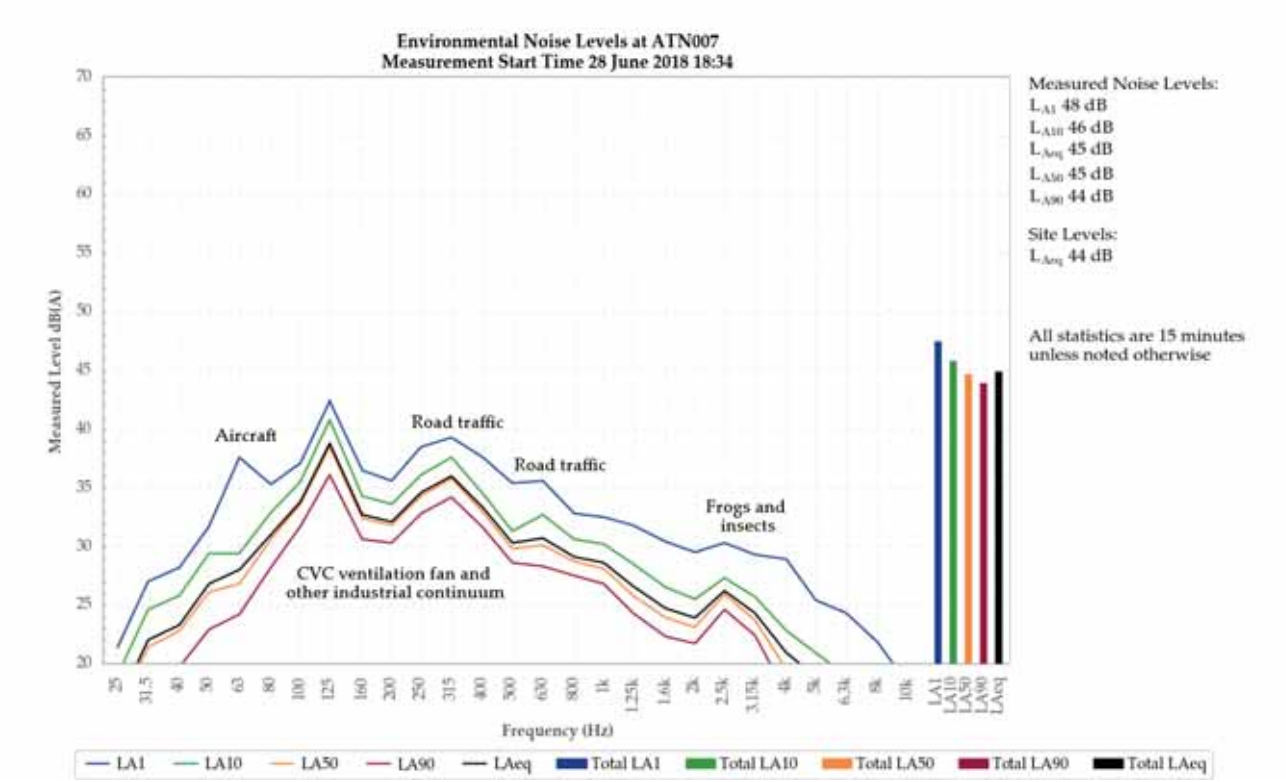



**Figure 17: Environmental Noise Levels, ATN007 – 275a Cams Boulevard**

A ventilation fan continuum from CVC was audible during the measurement generating the site only $L_{Aeq}$ of 44 dB.

A ventilation fan continuum from CVC primarily generated measured levels. An aircraft and road traffic contributed to the measured $L_{A1}$. A continuum from other industry contributed to the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$, and $L_{A90}$.

Frogs and insects, water dripping, and birds were also noted.

### 5.1.16 R13, Evening

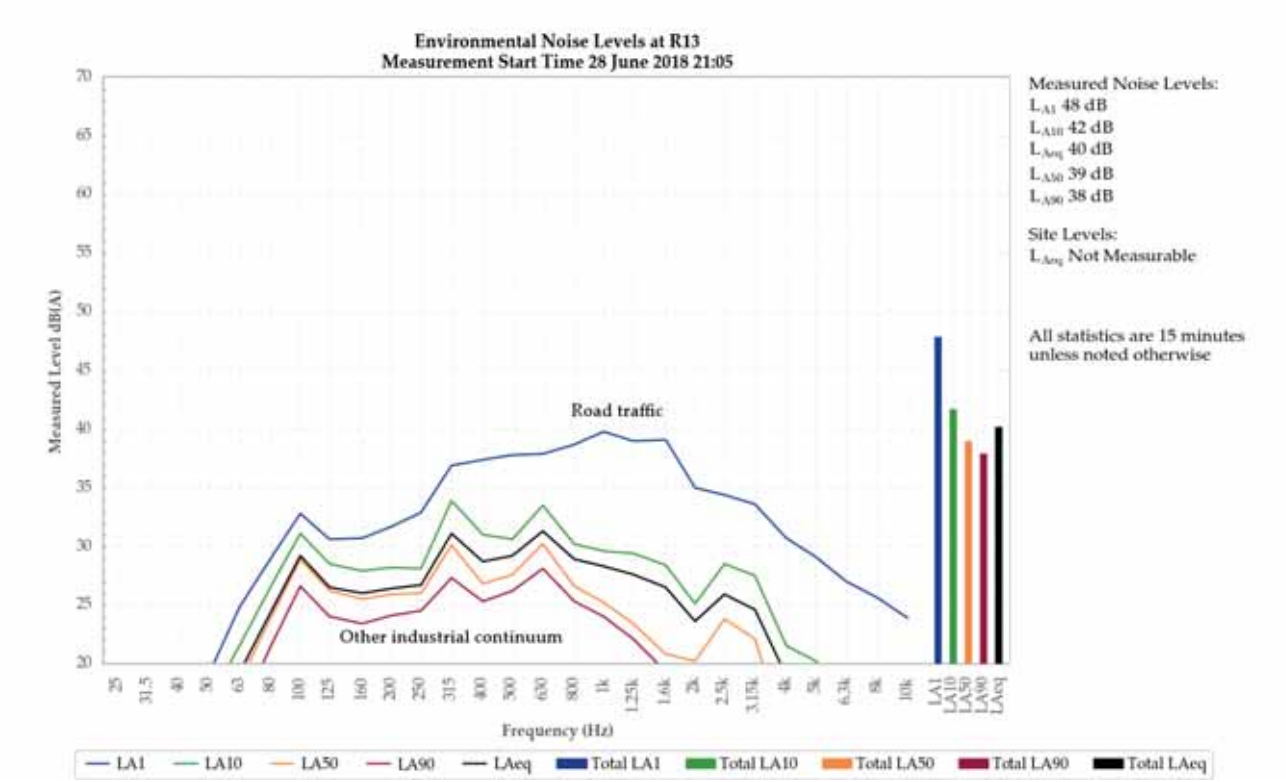



**Figure 18: Environmental Noise Levels, R13 – 33 Karoola Avenue**

Some noise from CVC was briefly audible during the measurement but was not measurable.

Road traffic generated the measured $L_{A1}$ and contributed to the measured $L_{Aeq}$. Another industrial continuum generated the measured $L_{A10}$, $L_{A50}$, primarily the $L_{Aeq}$, and generated the measured $L_{A90}$.

Dogs, frogs, and insects were also noted.

### 5.1.17 ATN001, Night

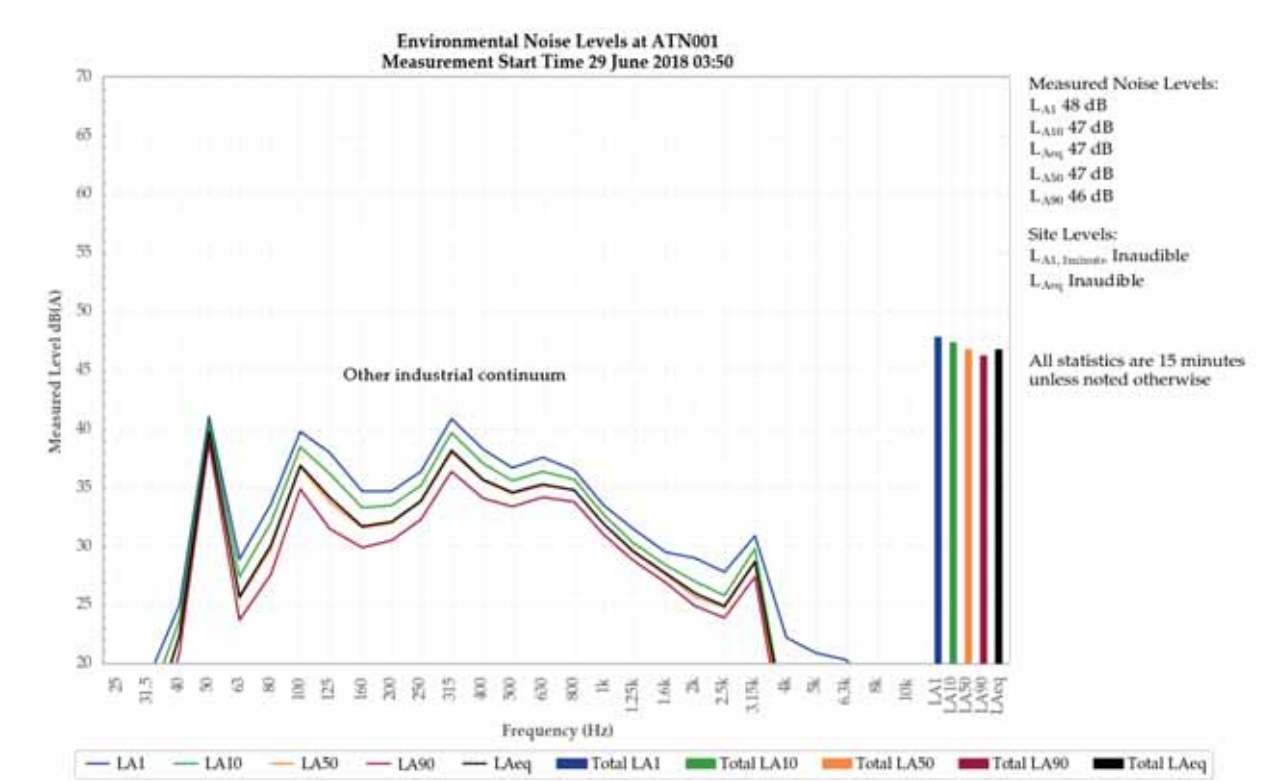



**Figure 19: Environmental Noise Levels, ATN001 - 109 Griffith Street**

CVC was inaudible during the measurement.

Another industrial continuum generated measured levels.

### 5.1.18 ATN002, Night

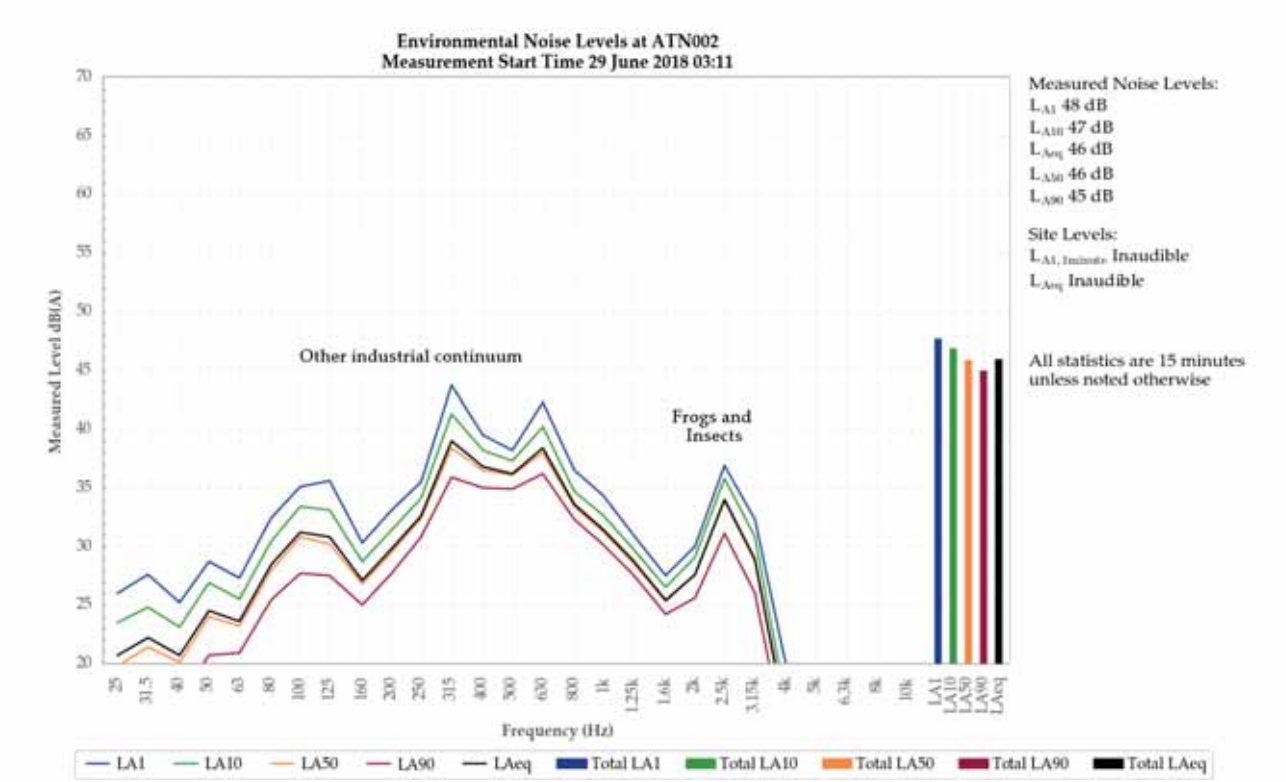



**Figure 20: Environmental Noise Levels, ATN002 – 35 Lakeshore Avenue**

CVC was inaudible during the measurement.

Another industrial continuum, frogs, and insects generated measured levels.

Road traffic noise was also noted.

### 5.1.19 ATN003, Night

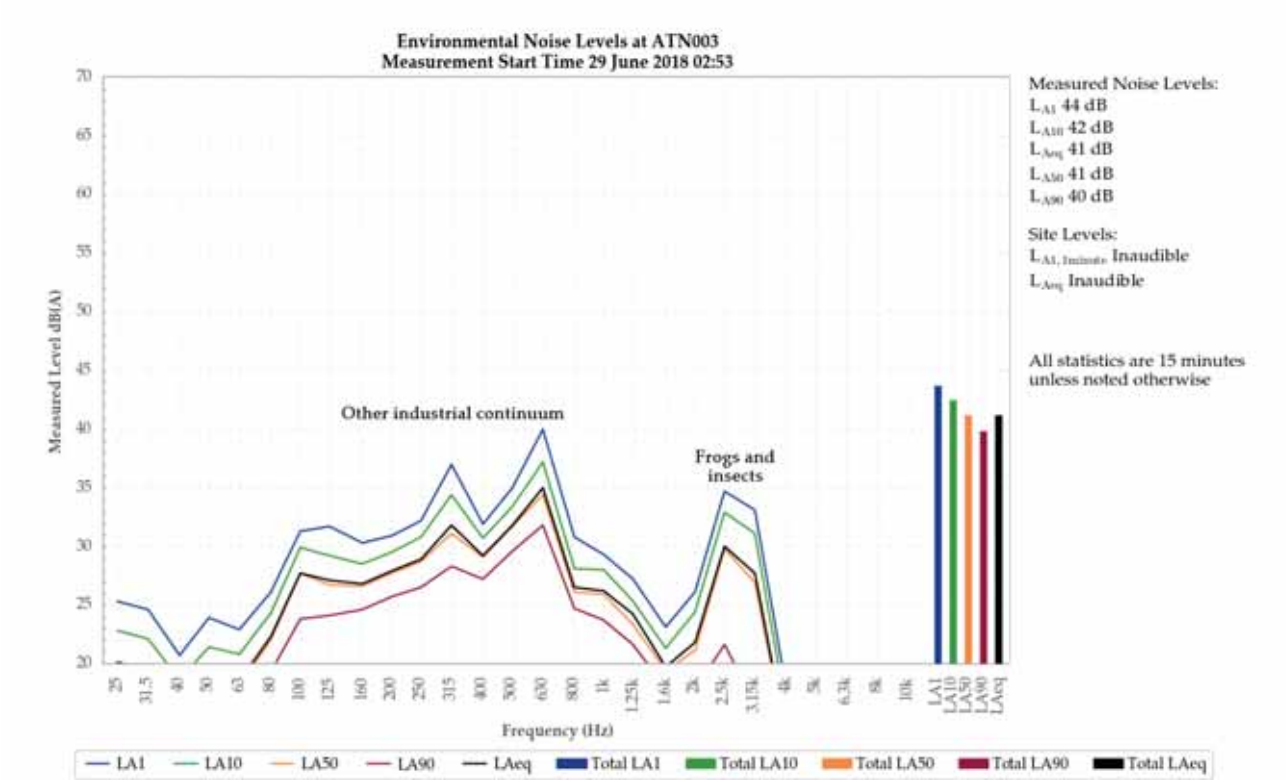



**Figure 21: Environmental Noise Levels, ATN003 – Short Street**

CVC was inaudible during the measurement.

Another industrial continuum, frogs, and insects generated measured levels.

Road traffic noise was also noted.

### 5.1.20 ATN004, Night

*Due to technical difficulties this graph is not available.*

CVC was inaudible during the measurement.

An aircraft generated the measured $L_{A1}$. Another industrial continuum generated the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$, and $L_{A90}$.

Dogs, road traffic, frogs, and insects were also noted.

### 5.1.21 ATN005, Night

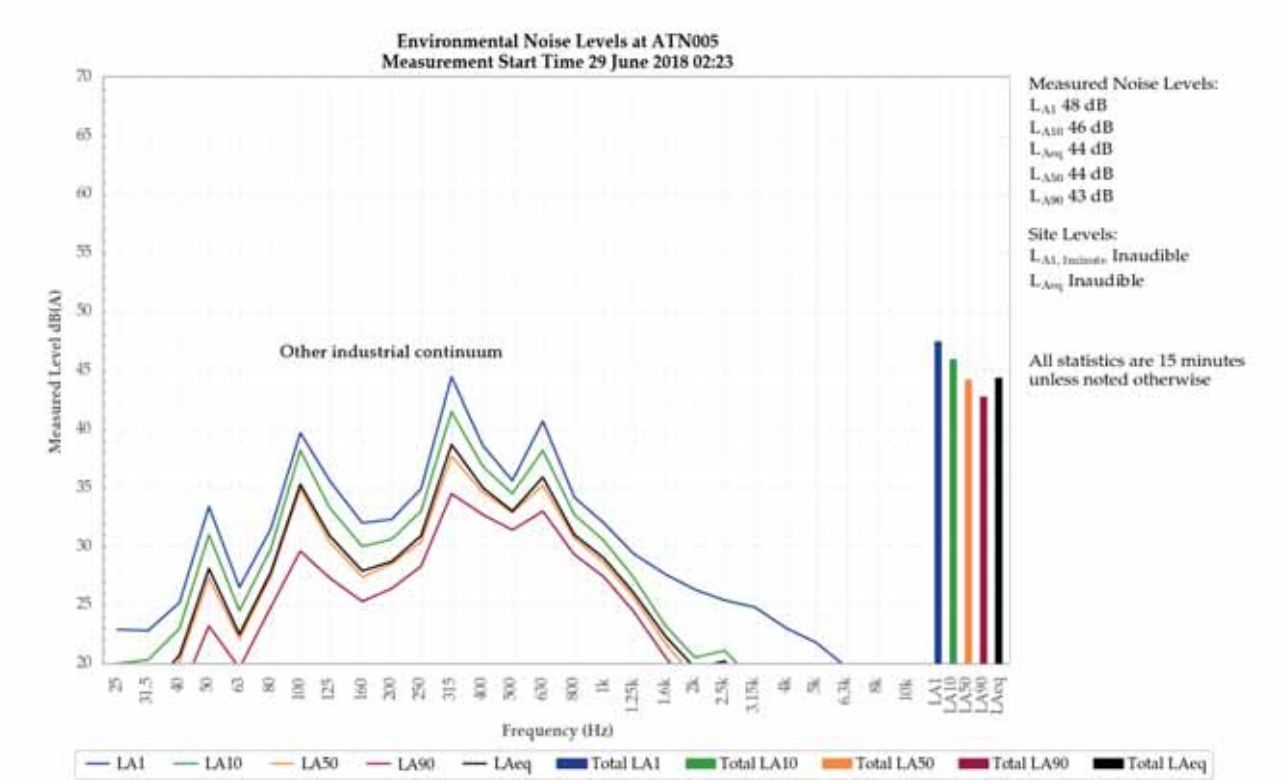



**Figure 22: Environmental Noise Levels, ATN005 – 74 Teralgin Drive**

CVC was inaudible during the measurement.

Another industrial continuum generated measured levels.

Birds, road traffic, dogs, frogs, and insects were also noted.

### 5.1.22 ATN006, Night

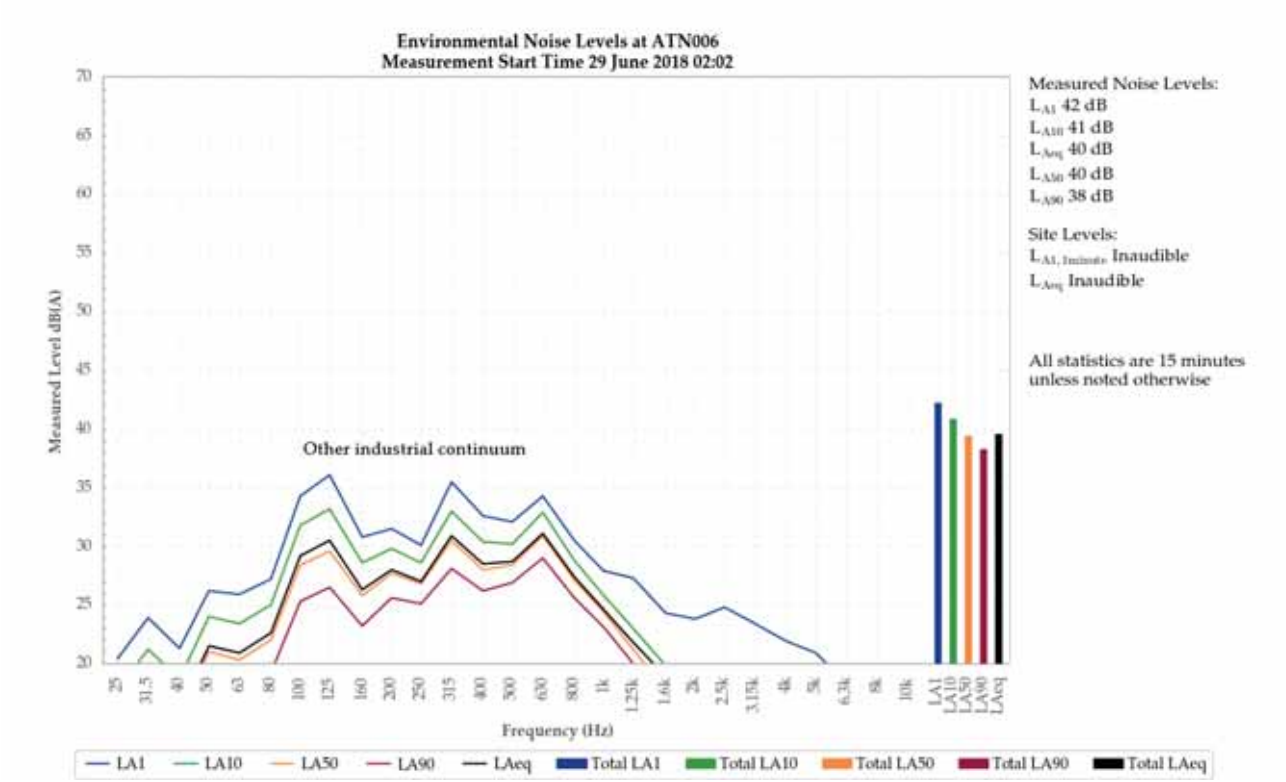



**Figure 23: Environmental Noise Levels, ATN006 – 2 Sunset Parade**

CVC was inaudible during the measurement.

Another industrial continuum generated measured levels.

Dogs and residential noise were also noted.

### 5.1.23 ATN007, Night

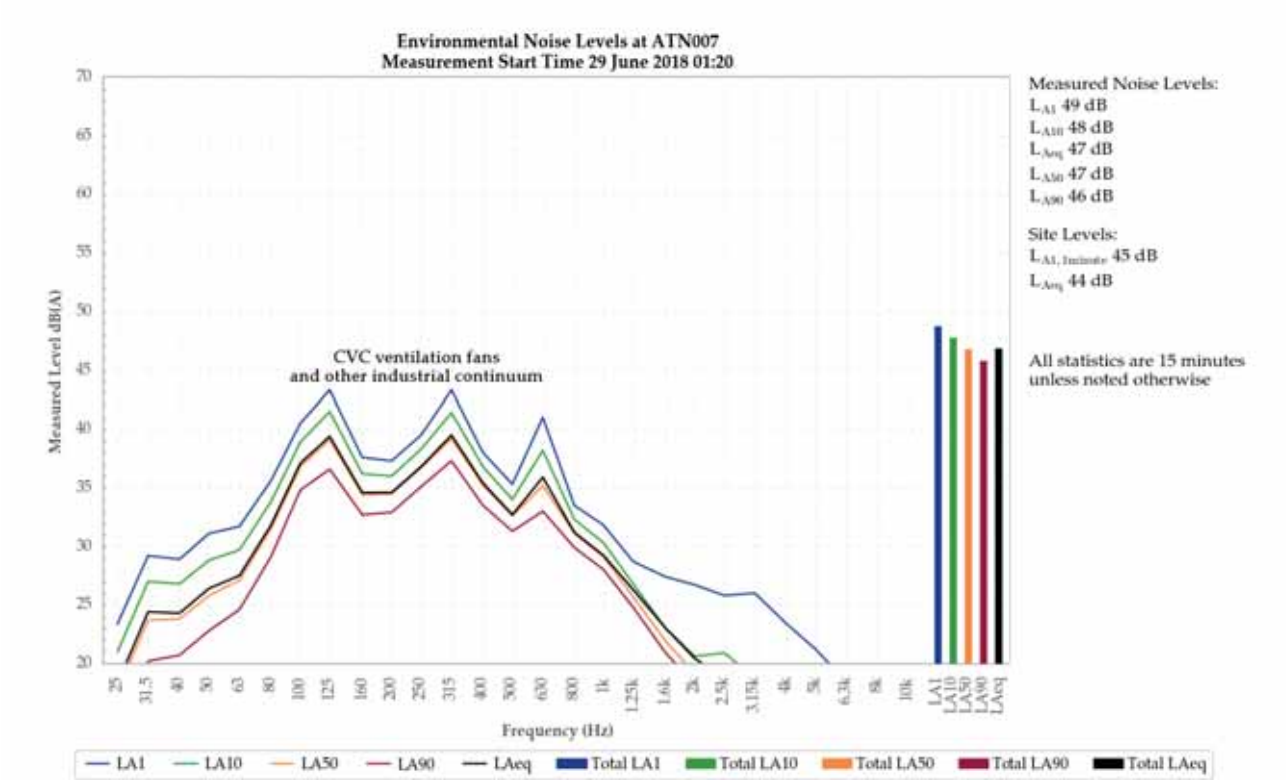



**Figure 24: Environmental Noise Levels, ATN007 – 275a Cams Boulevard**

A ventilation fan continuum from CVC was audible during the measurement generating the site only $L_{Aeq}$ of 44 dB and $L_{A1,1minute}$ of 45 dB.

CVC ventilation fan continuum and a power station continuum generated all measured levels.

Frogs and insects were also noted.

### 5.1.24 R13, Night

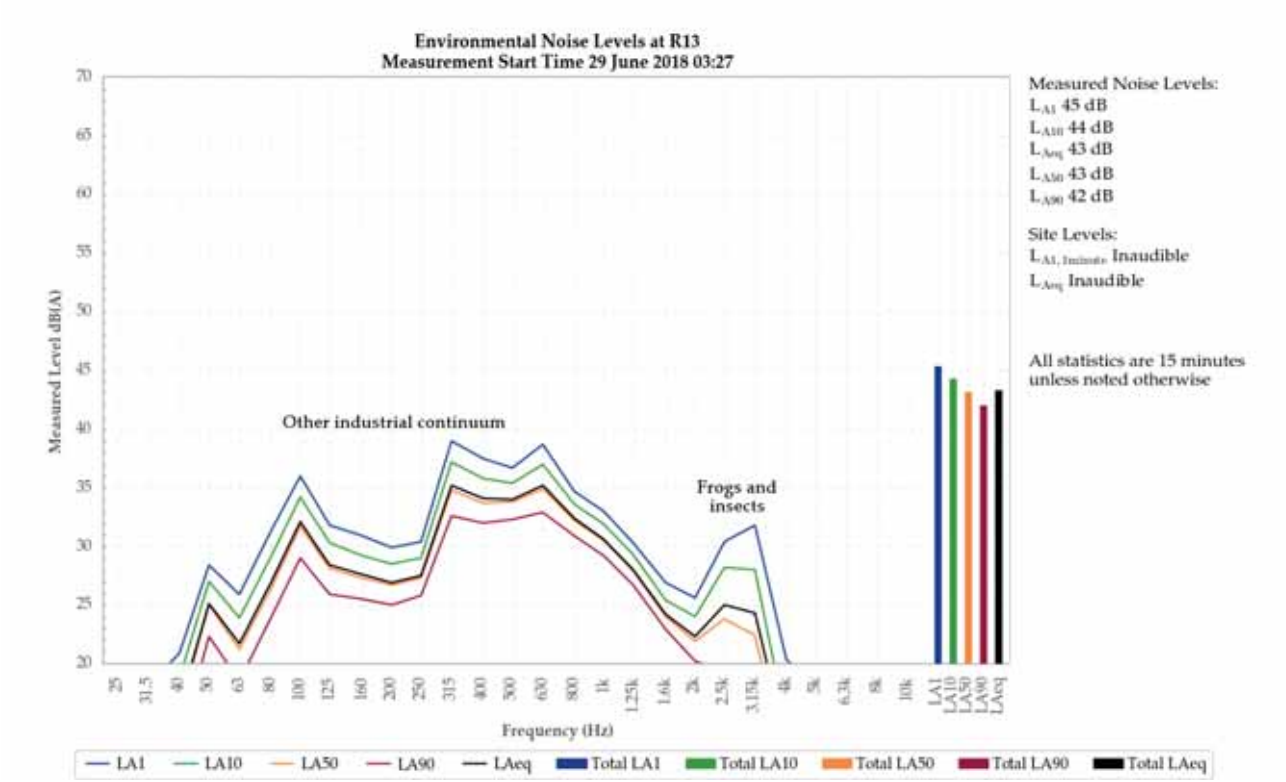



**Figure 25: Environmental Noise Levels, R13 – 33 Karoola Avenue**

CVC was inaudible during the measurement.

Another industrial continuum generated measured levels.

Frogs and insects were also noted.

# 6 SUMMARY OF COMPLIANCE

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery, an underground coal mine at Chain Valley Bay, NSW.

The purpose of this noise survey is to quantify and describe the acoustic environment around the site and compare results with limits specified in the Chain Valley Extension Project Development Consent (SSD-5465).

Environmental noise monitoring described in this report was undertaken during day, evening and night of 28/29 June 2018.

CVC complied with the relevant noise limits at all locations during Quarter 2 2018. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

# APPENDIX

## *A PROJECT CONSENT*

NSW Department of Planning Project Consent SSD- 5465 applies to the Chain Valley Colliery operation. The noise section is reproduced below:

**NOISE**

**Noise Impact Assessment Criteria**

7. The Applicant shall ensure that the noise generated by the development at any residence on privately-owned land does not exceed the criteria for the location in Table 1 nearest to that residence.

*Table 1: Noise Criteria dB(A)*

| Location | Day | Evening | Night | |
|---|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{A1(1\ min)}$ |
| R8 | 38 | 38 | 38 | 45 |
| R11 | 49 | 49 | 49 | 54 |
| R12 | 49 | 49 | 49 | 53 |
| R13 | 43 | 43 | 43 | 49 |
| R15 | 36 | 36 | 36 | 45 |
| R19 | 37 | 37 | 37 | 45 |
| R22 | 46 | 46 | 46 | 46 |
| all other privately-owned land | 35 | 35 | 35 | 45 |

*Notes:*

- *To interpret the locations referred to in Table 1, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

**Operating Conditions**

8. The Applicant shall:
   (a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and transport noise generated by the development;
   (b) regularly assess the noise monitoring and meteorological data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent;
   (c) minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 8);
   (d) use its best endeavours to achieve the long-term noise goals in Table 2, where reasonable and feasible, and report on progress towards achieving these goals in each Annual Review;

(e) carry out a comprehensive noise audit of the development in conjunction with each independent environmental audit; and
(f) prepare an action plan to implement any additional reasonable and feasible onsite noise mitigation measures identified by each audit;
to the satisfaction of the Director-General.

*Table 2: Long-term Noise Goals dB(A)*

| Location | Day | Evening | Night |
|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ |
| R11 – R13 | 41 | 41 | 41 |
| R22 | 40 | 40 | 40 |

*Notes:*
- *To interpret the locations referred to in Table 2, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

**Noise Management Plan**

9. The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Director-General. This plan must:
   (a) be prepared in consultation with the EPA and submitted to the Director-General for approval within 4 months of the date of this consent, unless otherwise agreed by the Director-General;
   (b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent;
   (c) describe the proposed noise management system in detail including the mitigation measures that would be implemented to minimise noise during construction and operations, including on and off site road noise generated by vehicles associated with the development; and
   (d) include a monitoring program that:
      - uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
      - evaluates and reports on:
         - the effectiveness of the on-site noise management system; and
         - compliance against the noise operating conditions; and
      - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

## APPENDIX 8
## NOISE COMPLIANCE ASSESSMENT

**Applicable Meteorological Conditions**

1. The noise criteria in Table 1 of the conditions are to apply under all meteorological conditions except the following:
   (a) during periods of rain or hail;
   (b) average wind speed at microphone height exceeds 5 m/s;
   (c) wind speeds greater than 3 m/s measured at 10 m above ground level; or
   (d) temperature inversion conditions greater than 3°C/100 m.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station described in condition 15 of schedule 3.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.

4. This monitoring must be carried out at least 4 times in each calendar year (ie at least once every 3 months), unless the Director-General directs otherwise.

5. Unless otherwise agreed with the Director-General, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
   (a) monitoring locations for the collection of representative noise data;
   (b) meteorological conditions during which collection of noise data is not appropriate;
   (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
   (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

# APPENDIX

## *B CALIBRATION CERTIFICATES*

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

# Octave Band Filter
## AS 4476:1997
# Calibration Certificate

**Calibration Number** C16643A

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

**Filter Model Number :** Rion NA-28
**Filter Serial Number :** N/A
**Instrument Serial Number :** 00370304
**Microphone Serial Number :** 10421
**Pre-amplifier Serial Number :** 60313

**Atmospheric Conditions**
**Ambient Temperature :** 22.3°C
**Relative Humidity :** 43%
**Barometric Pressure :** 99.96kPa

**Calibration Technician :** Vicky Jaiswal
**Calibration Date :** 17/11/2016
**Secondary Check:** Sandra Minto
**Report Issue Date :** 17/11/2016
**Approved Signatory :** Juan Aguero

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 4.4 & 5.3: 1/1 Octave relative attenuation | *Pass* | 4.6 & 5.5: Linear operating range | *Pass* |
| 4.4 & 5.3: 1/3 Octave relative attenuation | *Pass* | 4.8 & 5.7: Anti-alias filters | *Pass* |
| | | 4.10 & 5.9: Flat frequency response | *Pass* |

The fractional octave band meter under test has been shown to conform to the class 1 requirements for periodic testing as described in AS 4476:1997 for the tests stated above.

Least Uncertainties of Measurement -

| Electrical Tests | |
|---|---|
| *< 16Hz* | *±0.19dB* |
| *16Hz-100Hz* | *±0.11dB* |
| *100Hz-10000Hz* | *±0.09dB* |
| *10000Hz-10kHz* | *±0.09dB* |
| *>10kHz* | *±0.16dB* |

| Environmental Conditions | |
|---|---|
| *Temperature* | *±0.05°C* |
| *Relative Humidity* | *±0.46%* |
| *Barometric Pressure* | *±0.017kPa* |

*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.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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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# Octave Band Filter
## AS 4476:1997
# Calibration Certificate

**Calibration Number** C17126A

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

**Filter Model Number :** Rion NA-28
**Filter Serial Number :** N/A
**Instrument Serial Number :** 30131882
**Microphone Serial Number :** 04739
**Pre-amplifier Serial Number :** 11942

**Atmospheric Conditions**
**Ambient Temperature :** 22.3°C
**Relative Humidity :** 54.4%
**Barometric Pressure :** 99.83kPa

**Calibration Technician :** Vicky Jaiswal
**Calibration Date :** 15/03/2017
**Secondary Check:** Riley Cooper
**Report Issue Date :** 15/03/2017
**Approved Signatory :** Ken Williams

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 4.4 & 5.3: 1/1 Octave relative attenuation | *Pass* | 4.6 & 5.5: Linear operating range | *Pass* |
| 4.4 & 5.3: 1/3 Octave relative attenuation | *Pass* | 4.8 & 5.7: Anti-alias filters | *Pass* |
| | | 4.10 & 5.9: Flat frequency response | *Pass* |

The fractional octave band meter under test has been shown to conform to the class 1 requirements for periodic testing as described in AS 4476:1997 for the tests stated above.

Least Uncertainties of Measurement -

Electrical Tests

| | |
|---|---|
| *< 16Hz* | *±0.19dB* |
| *16Hz-100Hz* | *±0.11dB* |
| *100Hz-1000Hz* | *±0.09dB* |
| *1000Hz-10kHz* | *±0.09dB* |
| *>10kHz* | *±0.16dB* |

Environmental Conditions

| | |
|---|---|
| *Temperature* | *±0.05°C* |
| *Relative Humidity* | *±0.46%* |
| *Barometric Pressure* | *±0.017kPa* |

*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.

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## Sound Calibrator
**IEC 60942-2004**

# Calibration Certificate

**Calibration Number** C17682_Reissued

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

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

**Atmospheric Conditions**
**Ambient Temperature :** 23.5°C
**Relative Humidity :** 49.8%
**Barometric Pressure :** 98.79kPa

**Calibration Technician :** Vicky Jaiswal **Secondary Check:** Riley Cooper
**Calibration Date :** 18 Dec 2017 **Report Issue Date :** 27 Mar 2018

**Approved Signatory :** Ken Williams

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 5.2.2: Generated Sound Pressure Level | *Pass* | 5.3.2: Frequency Generated | *Pass* |
| 5.2.3: Short Term Fluctuation | *Pass* | 5.5: Total Distortion | *Pass* |

| | Nominal Level | Nominal Frequency | Measured Level | Measured Frequency |
|---|---|---|---|---|
| Measured Output | 94.0 | 1000.0 | 94.1 | 1000.36 |

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement -

| Specific Tests | | Environmental Conditions | |
|---|---|---|---|
| *Generated SPL* | *±0.1dB* | *Temperature* | *±°C* |
| *Short Term Fluct.* | *±0.02dB* | *Relative Humidity* | *±%* |
| *Frequency* | *±0.01%* | *Barometric Pressure* | *±kPa* |
| *Distortion* | *±0.5%* | | |

*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 Australian/national standards.

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 60942-2004**

# Calibration Certificate

**Calibration Number** C17127

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

**Equipment Tested/ Model Number :** Pulsar 105
**Instrument Serial Number :** 78226

**Atmospheric Conditions**
**Ambient Temperature :** 22.3°C
**Relative Humidity :** 55.6%
**Barometric Pressure :** 99.9kPa

**Calibration Technician :** Vicky Jaiswal
**Calibration Date :** 14/03/2017
**Secondary Check:** Riley Cooper
**Report Issue Date :** 15/03/2017

**Approved Signatory :** Ken Williams

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 5.2.2: Generated Sound Pressure Level | *Pass* | 5.3.2: Frequency Generated | *Pass* |
| 5.2.3: Short Term Fluctuation | *Pass* | 5.5: Total Distortion | *Pass* |

| | Nominal Level | Nominal Frequency | Measured Level | Measured Frequency |
|---|---|---|---|---|
| Measured Output | 94.0 | 1000.0 | 94.1 | 1000.32 |

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement -

| Specific Tests | | Environmental Conditions | |
|---|---|---|---|
| *Generated SPL* | *±0.11dB* | *Temperature* | *±0.05°C* |
| *Short Term Fluct.* | *±0.02dB* | *Relative Humidity* | *±0.46%* |
| *Frequency* | *±0.01%* | *Barometric Pressure* | *±0.017kPa* |
| *Distortion* | *±0.5%* | | |

*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.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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Appendix B

# Quarterly attended noise monitoring report – Quarter 3 2018

# *Chain Valley Colliery*

*Environmental Noise Monitoring*
*Quarter 3 2018*

*Prepared for*
*LDO Group*

Global Acoustics

Noise and Vibration Analysis and Solutions

Global Acoustics Pty Ltd
PO Box 3115 | Thornton NSW 2322
Telephone +61 2 4966 4333
Email global@globalacoustics.com.au
ABN 94 094 985 734

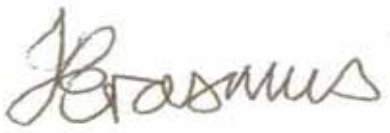
# Chain Valley Colliery

## Environmental Noise Monitoring
## Quarter 3 2018

Reference: 18294_R01
Report date: 27 September 2018

### Prepared for
LDO Group
PO Box 174
Rutherford NSW 2330

### Prepared by
Global Acoustics Pty Ltd
PO Box 3115
Thornton NSW 2322



| | | | |
|---|---|---|---|
| Prepared: | Jason Cameron<br>Consultant | QA Review: | Jonathan Erasmus<br>Consultant |

*Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire*

# EXECUTIVE SUMMARY

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery (CVC), an underground coal mine at Chain Valley Bay, NSW.

The purpose of this noise survey is to quantify and describe the acoustic environment around the site and compare results with limits specified in the Chain Valley Extension Project Development Consent (SSD-5465).

Environmental noise monitoring described in this report was undertaken during day, evening and night of 28/29 August 2018.

CVC complied with the relevant noise limits at all locations during Quarter 3 2018. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

# Table of Contents

## *Appendices*

# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery (CVC), an underground coal mine at Chain Valley Bay, NSW.

Environmental noise monitoring described in this report was undertaken during day, evening and night periods on 28/29 August 2018.

The purpose of the survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

## 1.2 Monitoring Locations

There were nine attended monitoring locations during this survey as detailed in Table 1.1 and shown on Figure 1.

*Table 1.1: ATTENDED NOISE MONITORING LOCATIONS*

| Report Descriptor | Monitoring Location |
|---|---|
| ATN001 | 109 Griffith Street, Mannering Park |
| ATN002 | 35 Lakeshore Avenue, Kingfisher Shores, Chain Valley Bay |
| R12[1] | 20 Lakeshore Avenue, Kingfisher Shores, Chain Valley Bay |
| R13 | 33 Karoola Avenue, Kingfisher Shores, Chain Valley Bay |
| ATN003 | Short Street, Macquarie Shores, Chain Valley Bay |
| ATN004 | 20 Lloyd Avenue, Chain Valley Bay |
| ATN005 | 74 Teragalin Drive, Chain Valley Bay |
| ATN006 | 2 Sunset Parade, Chain Valley Bay |
| ATN007 | 275a Cams Boulevard, Chain Valley Bay |

*Notes:*

1. *Monitoring conducted in conjunction with ATN002 as monitoring location is representative of both ATN002 (R11) and R12.*

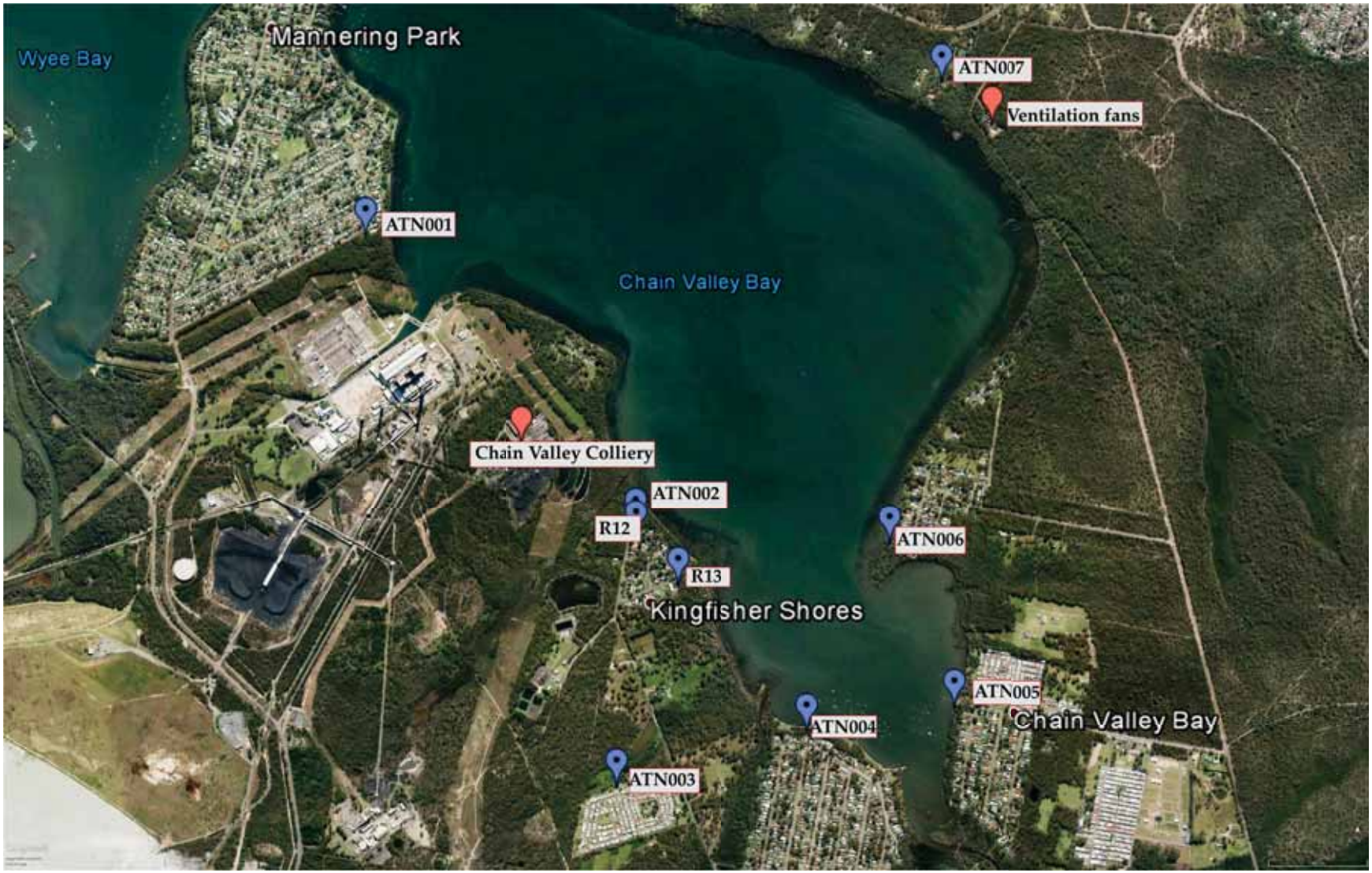



**Figure 1: CVC attended noise monitoring locations**

## 1.3 Terminology & Abbreviations

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

*Table 1.2: TERMINOLOGY & ABBREVIATIONS*

| Descriptor | Definition |
|---|---|
| $L_A$ | The A-weighted root mean squared (RMS) noise level at any instant |
| $L_{A1,1minute}$ | The noise level which is exceeded for 1 per cent of the specified time period of 1 minute |
| $L_{A10}$ | The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels |
| $L_{A90}$ | The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The $L_{A90}$ level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes. |
| $L_{Aeq}$ | The average noise energy during a measurement period |
| 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. |
| SEL | Sound exposure level (SEL), the A-weighted noise energy during a measurement period normalised to one second |
| 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. |
| SC | Stability Class. Estimated from wind speed and sigma theta data. |
| 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 |

## 1.4 Log of Operations

The client has advised that CVC was operating normally during Quarter 3 2018 monitoring.

# 2 PROJECT APPROVAL & CRITERIA

## 2.1 Project Approval & Consent

Lake Coal Pty Ltd obtained a project approval on the 23rd January 2012 (MP10_0161) for CVC, with no prior project approval, and therefore noise limits, existing before that date. A further application was approved on 23 December 2013 for the Chain Valley Extension Project SSD-5465 (the Consent). Schedule 3, Conditions 7 to 9 of the Consent detail the conditions pertaining to noise. The noise sections of the Consent are reproduced in Appendix A.

## 2.2 Noise Management Plan

A Noise Management Plan (NMP) for CVC as required under Schedule 3, Condition 9 of the consent was approved by the Department of Planning and Infrastructure on 12 March 2014 and details the monitoring requirements associated with the then approved operational phase of the mine as well as any construction activities. The monitoring locations outlined in the NMP are listed in Table 2.1.

## 2.3 Project Specific Criteria

Activities have been assessed against criteria from Table 1 of the Consent, as set out in Table 2.1.

*Table 2.1: CVC IMPACT ASSESSMENT CRITERIA, dB*

| Location | Reference ID | Day $L_{Aeq,15min}$ | Evening $L_{Aeq,15min}$ | Night $L_{Aeq,15min}$ | Night $L_{A1,1min}$ |
|---|---|---|---|---|---|
| ATN001 | R9 | 35 | 35 | 35 | 45 |
| ATN002 | R11 | 49 | 49 | 49 | 54 |
| R12 | R12 | 49 | 49 | 49 | 53 |
| R13 | R13 | 43 | 43 | 43 | 49 |
| ATN003 | R15 | 36 | 36 | 36 | 45 |
| ATN004 | R14 | 35 | 35 | 35 | 45 |
| ATN005 | R17 | 35 | 35 | 35 | 45 |
| ATN006 | R19 | 37 | 37 | 37 | 45 |
| ATN007 | R22 | 46 | 46 | 46 | 46 |

*Notes:*

1. *Day: 7:00am to 6:00pm ~ Evening: 6:00pm to 10:00pm ~Night: 10:00pm to 7:00am.*

CVC long term noise goal criteria are set out in Table 2.2.

*Table 2.2: CVC LONG TERM NOISE GOALS, dB*

| Location | Reference ID | Day $L_{Aeq,15min}$ | Evening $L_{Aeq,15min}$ | Night $L_{Aeq,15min}$ |
|---|---|---|---|---|
| ATN002 | R11 | 41 | 41 | 41 |
| ATN007 | R22 | 40 | 40 | 40 |

*Notes:*

1. *Day: 7:00am to 6:00pm ~ Evening: 6:00pm to 10:00pm ~Night: 10:00pm to 7:00am.*

## 2.4 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017, and supersedes the EPA's Industrial Noise Policy (INP, 2000). Assessment and reporting of modifying factors is to be carried out in accordance with Fact Sheet C of the NPfI.

NPfI modifying factors, as they are applicable to mining noise, are described in more detail below.

### 2.4.1 Tonality and Intermittent Noise

As defined in the NPfI:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.*

### 2.4.2 Low Frequency Noise

As defined in the NPfI:

> *Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.*

The NPfI contains the current method of assessing low frequency noise, which is a 2 step process as detailed below:

> *Measure/assess source contribution C-weighted and A-weighted $L_{eq}$,T levels over the same time period. The low frequency noise modifying factor correction is to be applied where the C-A level is 15 dB or more and:*
>
> • *where any of the 1/3 octave noise levels in Table C2 are exceeded by **up to and including** 5 dB and cannot be mitigated, a 2 dBA positive adjustment to measured A weighted levels applies for the evening/night period; and*
>
> • *where any of the 1/3 octave noise levels in Table C2 are exceeded by **more than** 5 dB and cannot be mitigated, a 5 dBA positive adjustment to measured A weighted levels applies for the evening/night period and a 2 dBA positive adjustment applies for the daytime period.*

Table C2 and associated notes from the NPfI is reproduced below:

**Table C2: One-third octave low-frequency noise thresholds.**

| Hz/dB(Z) | One-third octave $L_{Zeq,15min}$ threshold level | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency (Hz) | 10 | 12.5 | 16 | 20 | 25 | 31.5 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| dB(Z) | 92 | 89 | 86 | 77 | 69 | 61 | 54 | 50 | 50 | 48 | 48 | 46 | 44 |

**Notes:**

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for

wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.

- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

# 3 METHODOLOGY

## 3.1 Overview

All noise monitoring was conducted at locations representative of the nearest residences in accordance with Australian Standard AS1055 ' Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements.

Meteorological data was obtained from the Mannering Colliery meteorological station, which is adjacent to CVC. This allowed correlation of atmospheric parameters and measured noise levels. Sigma theta is used to calculate vertical temperature gradient (VTG) in accordance with procedures detailed in the NPfI.

## 3.2 Attended Noise Monitoring

During this survey, attended monitoring was undertaken during the day, evening and night periods. A single measurement was taken at each location with the duration of each measurement being 15 minutes.

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest, in this case CVC.

If the exact contribution of the source of interest 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 levels, for example, $L_{A10}$, $L_{A50}$ or $L_{A90}$. 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 as per the NPfI (e.g. measure closer and back calculate) to determine a value for reporting.

Therefore, 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 or reasonable to employ NPfI 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 $L_{A1,1minute}$ corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this was quantified by measuring or estimating the highest noise level emitted from a site noise source during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

## 3.3 Modifying Factors

Years of monitoring have indicated that noise levels from mining operations, particularly those measured at significant distances from the source are relatively continuous and broad spectrum. Given this, noise levels from CVC at the monitoring locations are unlikely to be intermittent or tonal.

Assessment of low-frequency modifying factors is necessary when application of the maximum correction could potentially result in an exceedance of the relevant site-only $L_{Aeq}$ criterion. Low-frequency analysis is therefore undertaken for measurements in this report where:

- meteorological conditions resulted in criteria being applicable;
- contributions from CVC were audible and directly measurable, such that the site-only $L_{Aeq}$ was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB");
- contributions from CVC were within 5 dB of the relevant $L_{Aeq}$ criterion, as 5 dB is the maximum penalty that can be applied by low-frequency modifying factors; and
- CVC was the dominant low-frequency noise source.

All measurements meeting these conditions were evaluated for possible low frequency penalty applicability in accordance with the NPfI.

## 3.4 Monitoring Equipment

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

*Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT*

| Model | Serial Number | Calibration Due Date |
|---|---|---|
| Rion NA-28 sound level analyser | 00370304 | 16/11/2018 |
| Pulsar 106 acoustic calibrator | 81334 | 18/12/2019 |
| Rion NA-28 sound level analyser | 01070590 | 25/06/2020 |
| Pulsar 106 acoustic calibrator | 79631 | 30/03/2019 |

# 4 RESULTS

## 4.1 Modifying Factors

Measured CVC only levels were assessed for the applicability of modifying factors in accordance with the EPA's NPfI.

There were no intermittent or tonal noise sources, as defined in the NPfI, audible from site during the survey. None of the measurements satisfied the conditions outlined in Section 3.3 when assessing low frequency noise.

Therefore no further assessment of modifying factors was undertaken.

## 4.2 Attended Noise Monitoring

Overall noise levels measured at each location during attended measurements are provided in Table 4.1.

*Table 4.1: MEASURED NOISE LEVELS – QUARTER 3 2018[1,2]*

| Location | Start Date and Time | $L_{A1}$ (dB) | $L_{A10}$ (dB) | $L_{Aeq}$ (dB) | $L_{A90}$ (dB) |
|---|---|---|---|---|---|
| | | Day | | | |
| ATN001 | 29/08/2018 14:00 | 54 | 52 | 50 | 48 |
| ATN002 | 29/08/2018 13:09 | 52 | 45 | 43 | 37 |
| ATN003 | 29/08/2018 12:23 | 55 | 48 | 44 | 37 |
| ATN004 | 29/08/2018 11:58 | 55 | 46 | 44 | 37 |
| ATN005 | 29/08/2018 11:24 | 53 | 49 | 46 | 40 |
| ATN006 | 29/08/2018 10:59 | 53 | 43 | 46 | 35 |
| ATN007 | 29/08/2018 10:31 | 72 | 54 | 57 | 40 |
| R13 | 29/08/2018 13:29 | 61 | 48 | 48 | 36 |
| | | Evening | | | |
| ATN001 | 28/08/2018 18:17 | 55 | 49 | 48 | 46 |
| ATN002 | 28/08/2018 19:46 | 42 | 41 | 40 | 39 |
| ATN003 | 28/08/2018 19:04 | 46 | 43 | 41 | 39 |
| ATN004 | 28/08/2018 19:59 | 44 | 38 | 38 | 36 |
| ATN005 | 28/08/2018 19:30 | 46 | 42 | 40 | 36 |
| ATN006 | 28/08/2018 19:04 | 45 | 39 | 37 | 33 |
| ATN007 | 28/08/2018 18:31 | 45 | 44 | 43 | 41 |
| R13 | 28/08/2018 20:25 | 46 | 43 | 42 | 40 |
| | | Night | | | |
| ATN001 | 29/08/2018 01:00 | 47 | 46 | 45 | 44 |
| ATN002 | 29/08/2018 01:52 | 48 | 47 | 45 | 44 |
| ATN003 | 29/08/2018 01:29 | 42 | 41 | 40 | 39 |
| ATN004 | 29/08/2018 00:22 | 40 | 38 | 37 | 36 |
| ATN005 | 28/08/2018 23:54 | 46 | 44 | 42 | 41 |
| ATN006 | 29/08/2018 02:41 | 45 | 44 | 43 | 41 |
| ATN007 | 29/08/2018 03:10 | 51 | 45 | 44 | 41 |
| R13 | 29/08/2018 02:12 | 50 | 48 | 46 | 45 |

*Notes:*

1. *Noise levels in this table are not necessarily the result of activities at CVC; and*
2. *All measurements are 15 minutes duration.*

Table 4.2 compares measured levels with $L_{Aeq,15minute}$ impact assessment criteria detailed in the Consent.

*Table 4.2: $L_{Aeq,15minute}$ GENERATED BY CVC AGAINST IMPACT ASSESSMENT CRITERIA – QUARTER 3 2018*

| Location | Start Date and Time | Wind Speed (m/s) | VTG (°C per 100m)[1] | $L_{Aeq}$ Criterion (dB) | Criterion Applies?[2] | CVC $L_{Aeq}$ (dB)[3,4] | Exceedance (dB)[4,5] |
|---|---|---|---|---|---|---|---|
| | | | Day | | | | |
| ATN001 | 29/08/2018 14:00 | 2.6 | -2.0 | 35 | Yes | IA | Nil |
| ATN002 | 29/08/2018 13:09 | 2.4 | -2.0 | 49 | Yes | IA | Nil |
| ATN003 | 29/08/2018 12:23 | 3.5 | -2.0 | 36 | No | IA | NA |
| ATN004 | 29/08/2018 11:58 | 2.3 | -2.0 | 35 | Yes | IA | Nil |
| ATN005 | 29/08/2018 11:24 | 3.0 | -2.0 | 35 | Yes | IA | Nil |
| ATN006 | 29/08/2018 10:59 | 2.4 | -2.0 | 37 | Yes | IA | Nil |
| ATN007 | 29/08/2018 10:31 | 2.8 | -2.0 | 46 | Yes | 36 | Nil |
| R13 | 29/08/2018 13:29 | 2.8 | -2.0 | 43 | Yes | IA | Nil |
| | | | Evening | | | | |
| ATN001 | 28/08/2018 18:17 | 1.1 | 3.0 | 35 | Yes | IA | Nil |
| ATN002 | 28/08/2018 19:46 | 0.6 | 0.5 | 49 | Yes | IA | Nil |
| ATN003 | 28/08/2018 19:04 | 0.8 | 3.0 | 36 | Yes | IA | Nil |
| ATN004 | 28/08/2018 19:59 | 0.7 | 3.0 | 35 | Yes | IA | Nil |
| ATN005 | 28/08/2018 19:30 | 0.8 | 0.5 | 35 | Yes | IA | Nil |
| ATN006 | 28/08/2018 19:04 | 0.8 | 3.0 | 37 | Yes | IA | Nil |
| ATN007 | 28/08/2018 18:31 | 0.7 | 3.0 | 46 | Yes | 42 | Nil |
| R13 | 28/08/2018 20:25 | 0.9 | 3.0 | 43 | Yes | IA | Nil |
| | | | Night | | | | |
| ATN001 | 29/08/2018 01:00 | 1.2 | -1.0 | 35 | Yes | IA | Nil |
| ATN002 | 29/08/2018 01:52 | 1.2 | 0.5 | 49 | Yes | <30 | Nil |
| ATN003 | 29/08/2018 01:29 | 1.0 | 0.5 | 36 | Yes | IA | Nil |
| ATN004 | 29/08/2018 00:22 | 1.2 | -1.0 | 35 | Yes | NM | Nil |
| ATN005 | 28/08/2018 23:54 | 1.1 | -1.0 | 35 | Yes | 32 | Nil |
| ATN006 | 29/08/2018 02:41 | 0.6 | 0.5 | 37 | Yes | IA | Nil |
| ATN007 | 29/08/2018 03:10 | 0.5 | 0.5 | 46 | Yes | 38 | Nil |
| R13 | 29/08/2018 02:12 | 1.1 | -1.0 | 43 | Yes | IA | Nil |

*Notes:*

1. *Sigma theta data used to calculate Vertical Temperature Gradient (VTG) in accordance with procedures detailed in the NPfI;*
2. *Noise emission limits do not apply for winds greater than 3 metres per second (at a height of 10 metres); or temperature inversion conditions greater than 3°C/100m;*
3. *These are results for CVC in the absence of all other noise sources;*
4. *Bold results in red are those greater than the relevant criterion (if applicable); and*
5. *NA in exceedance column means atmospheric conditions outside conditions specified in the Consent and so criterion is not applicable.*

Table 4.3 compares measured levels with $L_{A1,1minute}$ impact assessment criteria detailed in the Consent.

*Table 4.3: $L_{A1,1minute}$ GENERATED BY CVC AGAINST IMPACT ASSESSMENT CRITERIA – QUARTER 3 2018*

| Location | Start Date and Time | Wind Speed (m/s) | VTG (°C / 100m)[1] | $L_{Aeq}$ Criterion (dB) | Criterion Applies?[2] | CVC $L_{A1,1minute}$ (dB) [3,4] | Exceedance (dB)[4,5] |
|---|---|---|---|---|---|---|---|
| ATN001 | 29/08/2018 01:00 | 1.2 | -1.0 | 45 | Yes | IA | Nil |
| ATN002 | 29/08/2018 01:52 | 1.2 | 0.5 | 53 | Yes | 30 | Nil |
| ATN003 | 29/08/2018 01:29 | 1.0 | 0.5 | 45 | Yes | IA | Nil |
| ATN004 | 29/08/2018 00:22 | 1.2 | -1.0 | 45 | Yes | NM | Nil |
| ATN005 | 28/08/2018 23:54 | 1.1 | -1.0 | 45 | Yes | 37 | Nil |
| ATN006 | 29/08/2018 02:41 | 0.6 | 0.5 | 45 | Yes | IA | Nil |
| ATN007 | 29/08/2018 03:10 | 0.5 | 0.5 | 46 | Yes | 39 | Nil |
| R13 | 29/08/2018 02:12 | 1.1 | -1.0 | 49 | Yes | IA | Nil |

*Notes:*

1. *Sigma theta data used to calculate VTG in accordance with procedures detailed in the NPfI;*
2. *Noise emission limits do not apply for winds greater than 3 metres per second (at a height of 10 metres); or temperature inversion conditions greater than 3°C/100m;*
3. *These are results for CVC in the absence of all other noise sources;*
4. *Bold results in red are those greater than the relevant criterion (if applicable); and*
5. *NA in exceedance column means atmospheric conditions outside conditions specified in the Consent and so criterion is 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 or hail.

*Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – QUARTER 3 2018[1,2]*

| Location | Start Date and Time | Temperature (°C) | Wind Speed (m/s) | Wind Direction (°MN) | Cloud Cover (1/8s) |
|---|---|---|---|---|---|
| | | Day | | | |
| ATN001 | 29/08/2018 14:00 | 15 | 1.2 | 120 | 0 |
| ATN002 | 29/08/2018 13:09 | 16 | 0.8 | 70 | 1 |
| ATN003 | 29/08/2018 12:23 | 18 | 1.4 | 135 | 0 |
| ATN004 | 29/08/2018 11:58 | 20 | 0.4 | 220 | 0 |
| ATN005 | 29/08/2018 11:24 | 14 | 1.8 | 220 | 1 |
| ATN006 | 29/08/2018 10:59 | 16 | 0.3 | 135 | 0 |
| ATN007 | 29/08/2018 10:31 | 17 | 0.6 | 135 | 1 |
| R13 | 29/08/2018 13:29 | 17 | 0.5 | 60 | 0 |
| | | Evening | | | |
| ATN001 | 28/08/2018 18:17 | 15 | 0.0 | - | 1 |
| ATN002 | 28/08/2018 19:46 | 10 | 0.0 | - | 5 |
| ATN003 | 28/08/2018 19:04 | 10 | 0.0 | - | 3 |
| ATN004 | 28/08/2018 19:59 | 11 | 0.0 | - | 5 |
| ATN005 | 28/08/2018 19:30 | 12 | 0.0 | - | 6 |
| ATN006 | 28/08/2018 19:04 | 12 | 0.0 | - | 6 |
| ATN007 | 28/08/2018 18:31 | 12 | 0.0 | - | 2 |
| R13 | 28/08/2018 20:25 | 10 | 0.0 | - | 4 |
| | | Night | | | |
| ATN001 | 29/08/2018 01:00 | 8 | 0.0 | - | 0 |
| ATN002 | 29/08/2018 01:52 | 7 | 0.0 | - | 0 |
| ATN003 | 29/08/2018 01:29 | 7 | 0.0 | - | 0 |
| ATN004 | 29/08/2018 00:22 | 8 | 0.0 | - | 0 |
| ATN005 | 28/08/2018 23:54 | 7 | 0.7 | 75 | 1 |
| ATN006 | 29/08/2018 02:41 | 6 | 0.0 | - | 0 |
| ATN007 | 29/08/2018 03:10 | 7 | 0.0 | - | 0 |
| R13 | 29/08/2018 02:12 | 7 | 0.0 | - | 0 |

*Notes:*

1. *"-" indicates calm conditions during monitoring.*

# 5 DISCUSSION

## 5.1 Noted Noise Sources

Table 4.2 and Table 4.3 present data gathered during attended monitoring. These noise levels are the result of multiple 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 CVC's contribution, if any, to measured levels. At each monitoring location, CVC's $L_{Aeq,15minute}$ and $L_{A1,1minute}$ (in the absence of any other noise) was, where possible, measured directly or determined by frequency analysis. Time variations of noise sources in each measurement and their temporal characteristics, have been taken into account via statistical descriptors.

From these observations summaries have been derived for each location. This discussion provides these summaries. Statistical 1/3 octave band analysis of environmental noise was undertaken, and the figures following this section display the frequency ranges for various noise sources at each location for $L_{A1}$, $L_{A10}$, $L_{A90}$ and $L_{Aeq}$. 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; mining noise is at frequencies less than 1000 Hz (this 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; this can be dogs, cows, or, most commonly, road traffic. The local power station directly adjacent to CVC's pit top facilities was identified as a source of low frequency noise.

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 considered accurate for $L_{Aeq}$.

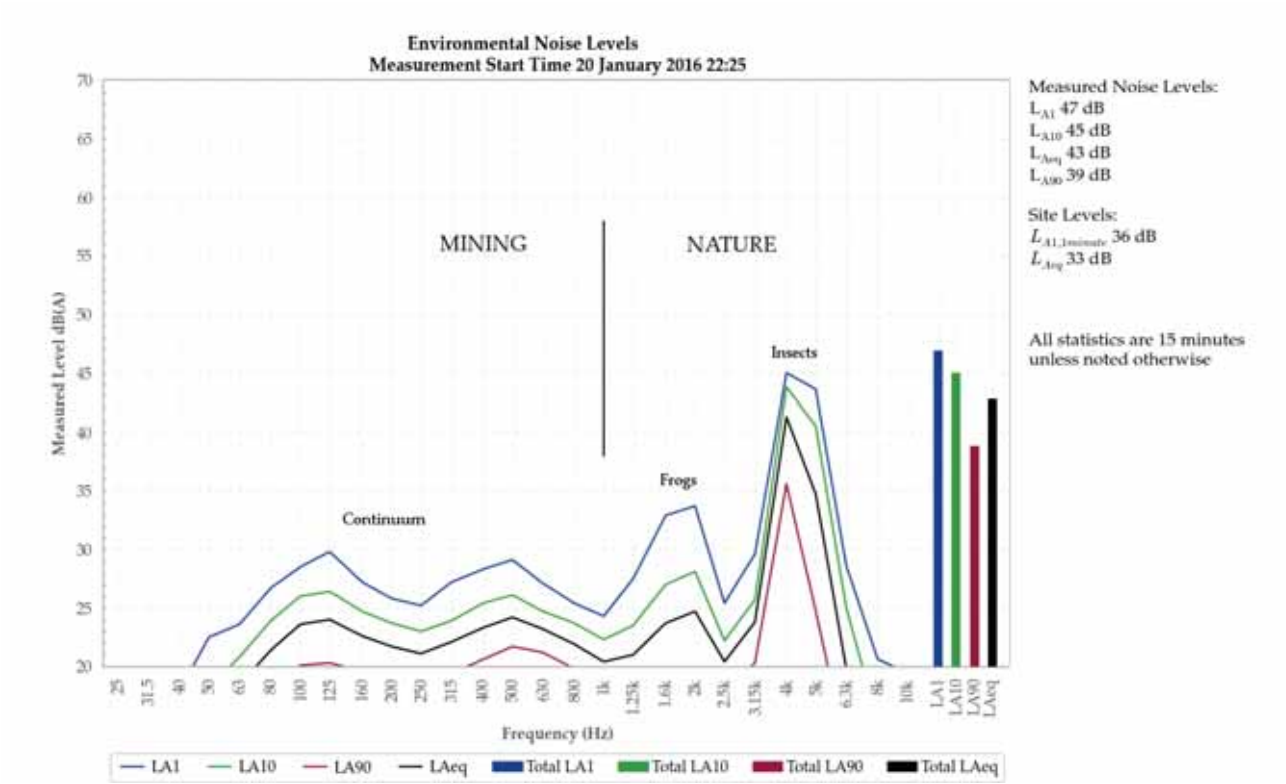



**Figure 2: Sample Graph (see Section 5.1 for explanatory note)**

### 5.1.1 ATN001, Day

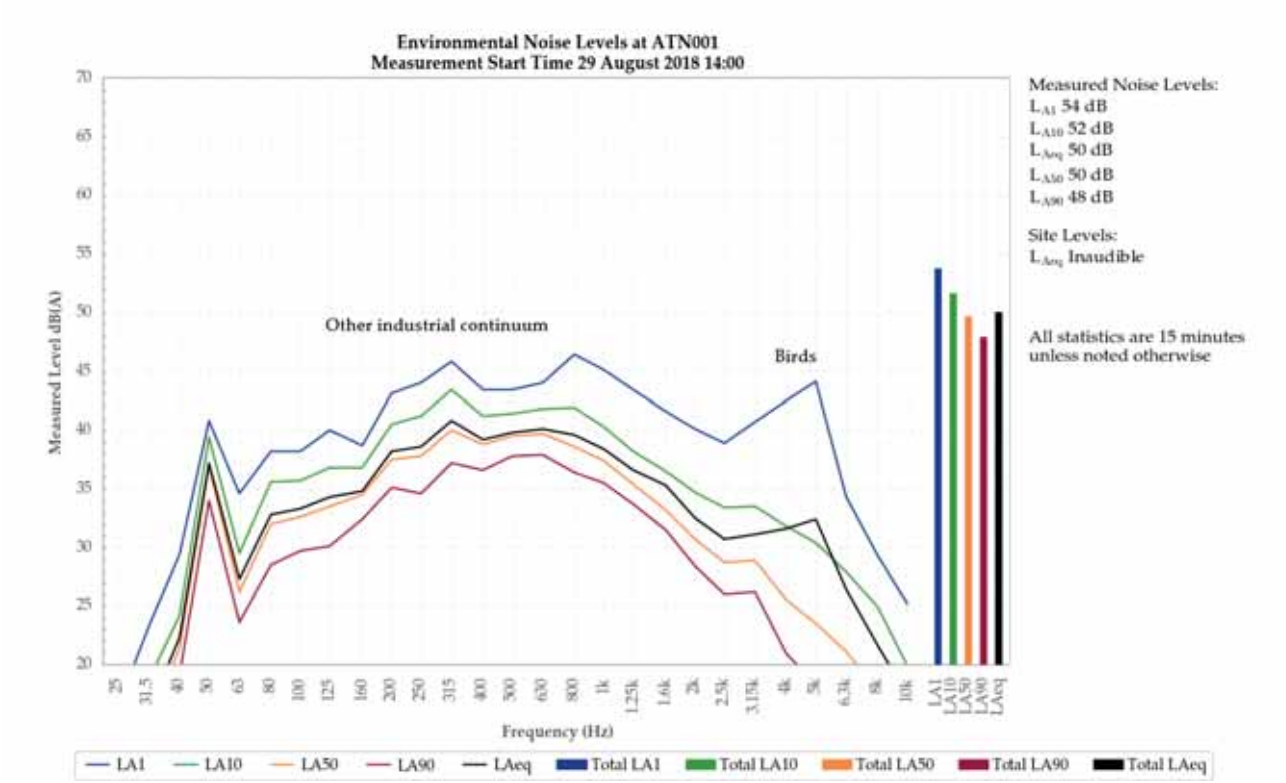



**Figure 3: Environmental Noise Levels, ATN001 - 109 Griffith Street**

CVC was inaudible during the measurement.

A power station continuum generated all measured levels. Birds contributed to the measured $L_{A1}$.

Dogs, aircraft power tools and breeze in foliage were also noted.

### 5.1.2 ATN002, Day

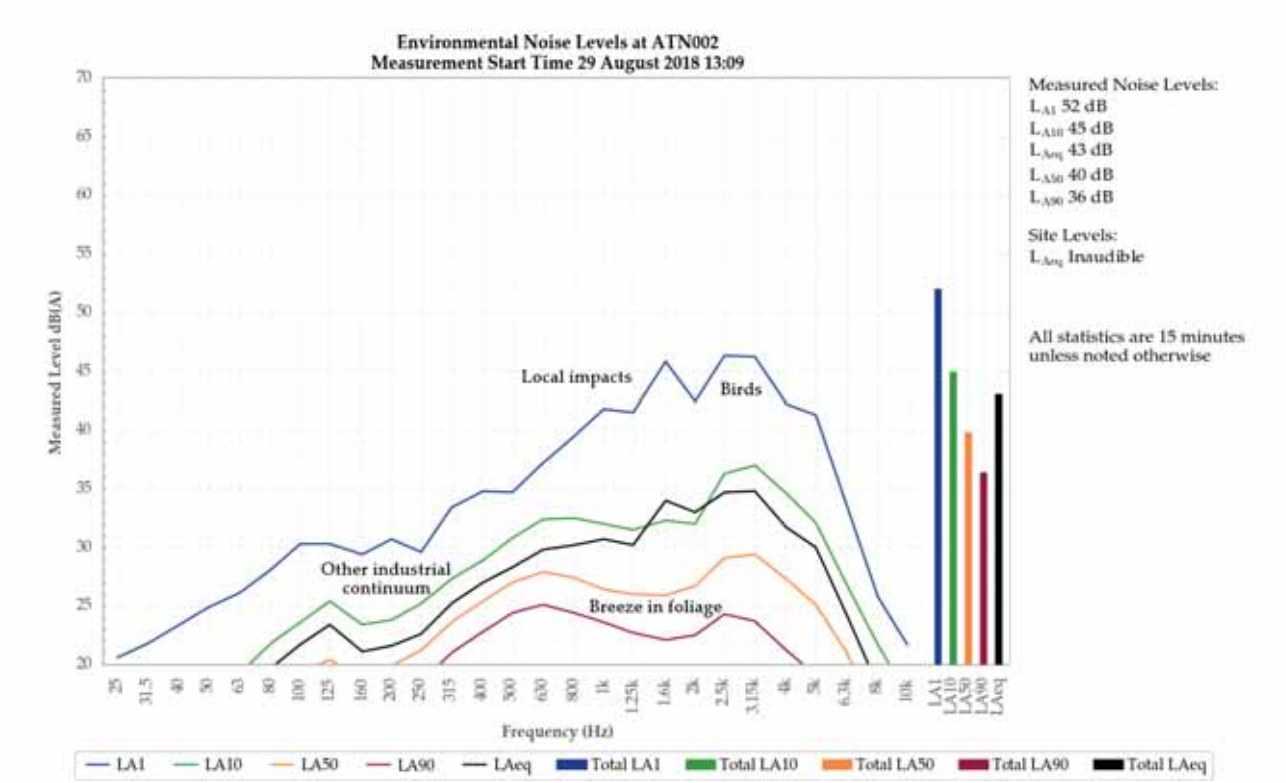



**Figure 4: Environmental Noise Levels, ATN002 – 35 Lakeshore Avenue**

CVC was inaudible during the measurement.

Birds and local impacts generated the measured $L_{A1}$, $L_{A10}$ and $L_{Aeq}$. A power station continuum contributed to the measured $L_{A10}$, $L_{Aeq}$ and $L_{A50}$. Breeze in foliage contributed to the measured $L_{A50}$ and generated the measured $L_{A90}$.

Road traffic and dogs were also noted.

### 5.1.3 ATN003, Day

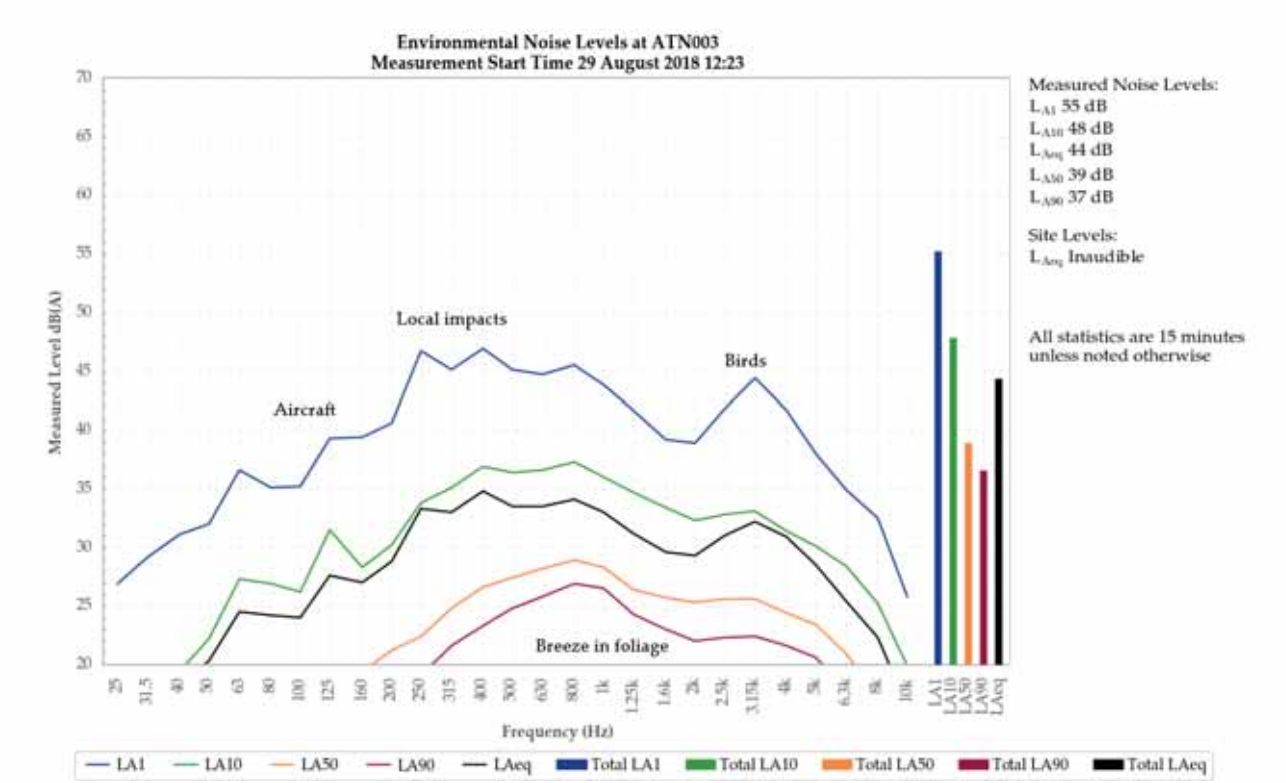



**Figure 5: Environmental Noise Levels, ATN003 – Short St**

CVC was inaudible during the measurement.

Local impacts and birds generated the measured $L_{A1}$, $L_{A10}$ and $L_{Aeq}$. Aircraft noise was a minor contributor to the measured $L_{A1}$, $L_{A10}$ and $L_{Aeq}$. Breeze in foliage generated the measured $L_{A50}$ and $L_{A90}$.

Road traffic was also noted.

### 5.1.4 ATN004, Day

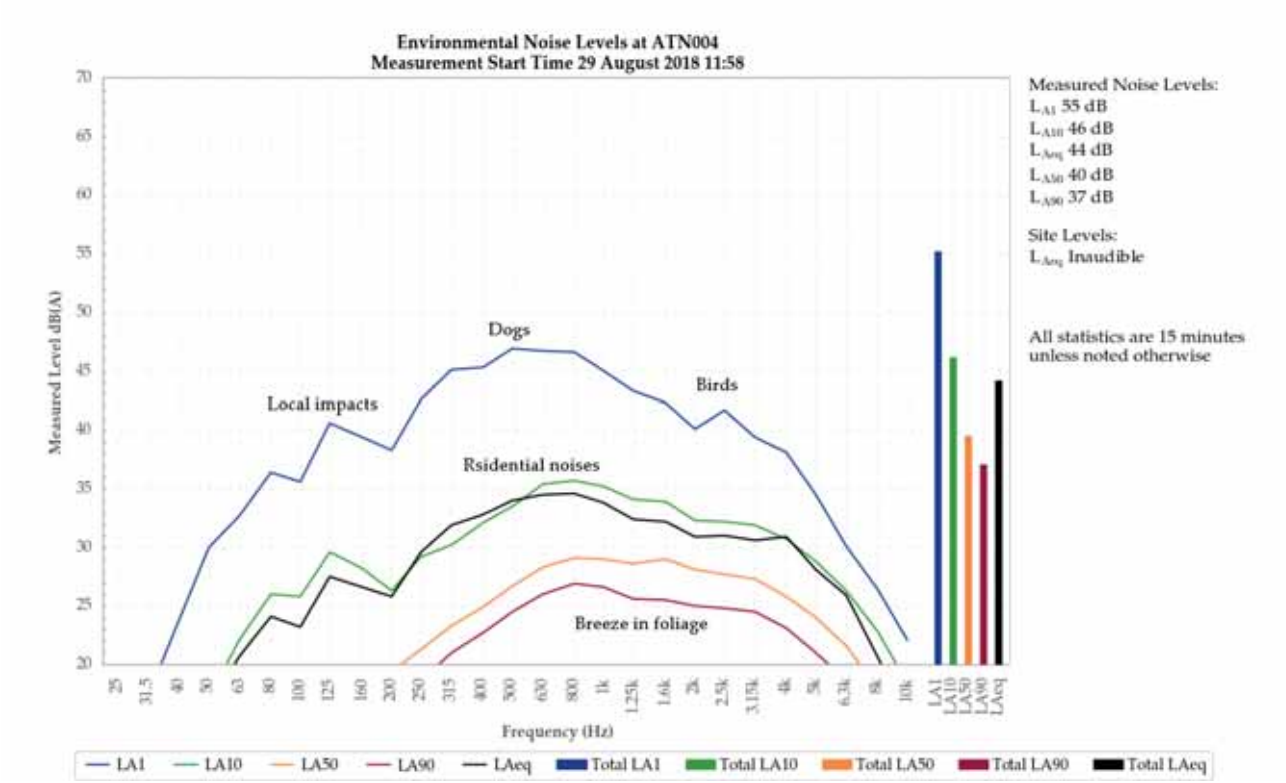



**Figure 6: Environmental Noise Levels, ATN004 – 20 Lloyd Avenue**

CVC was inaudible during the measurement.

Local impacts, dogs and birds generated the measured $L_{A1}$ and contributed to the measured $L_{A10}$ and $L_{Aeq}$. Residential noises primarily generated the measured $L_{A10}$ and $L_{Aeq}$. Breeze in foliage generated the measured $L_{A50}$ and $L_{A90}$.

### 5.1.5 ATN005, Day

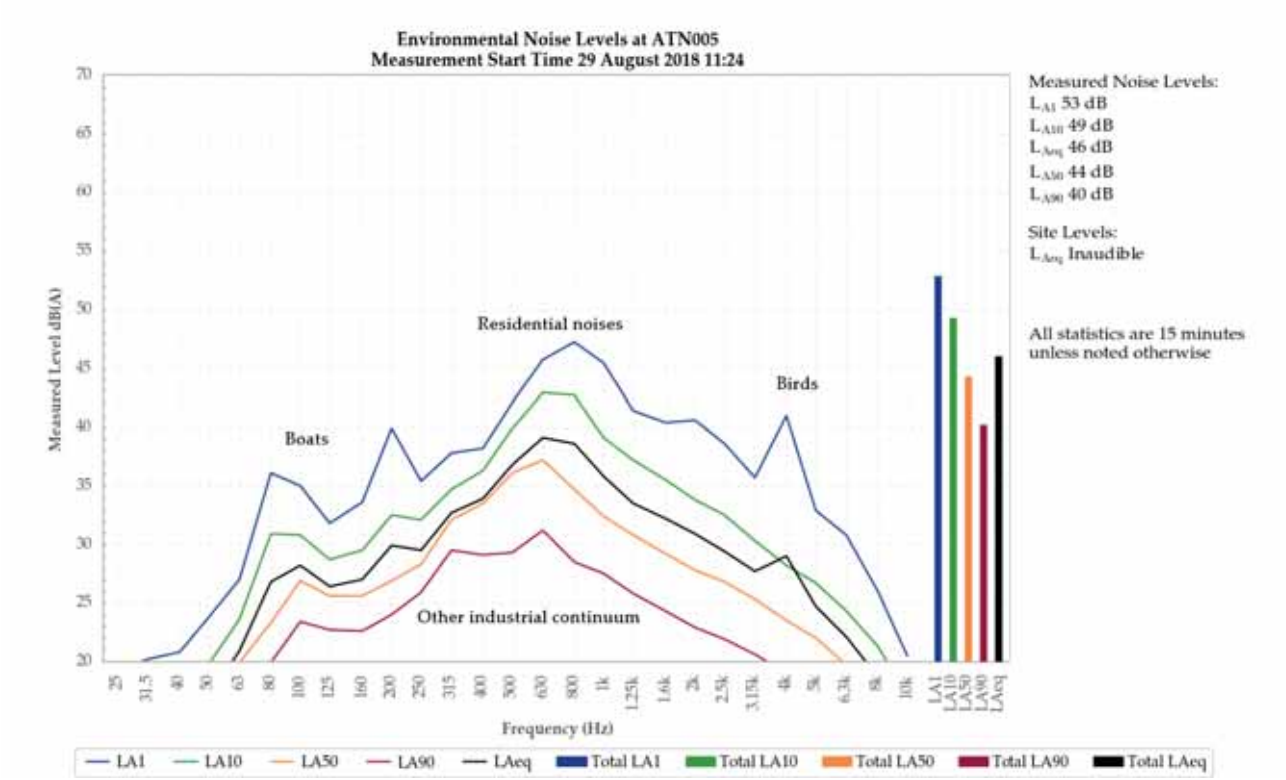



**Figure 7: Environmental Noise Levels, ATN005 – 74 Teralgin Drive**

CVC was inaudible during the measurement.

Residential noise primarily generated the measured $L_{A1}$, $L_{A10}$, $L_{Aeq}$ and $L_{A50}$, and contributed to the measured $L_{A90}$. Birds contributed to the measured $L_{A1}$ and $L_{Aeq}$. Boats contributed to all measured levels. A power station continuum was primarily responsible for the measured $L_{A90}$.

Road traffic was also noted.

### 5.1.6 ATN006, Day

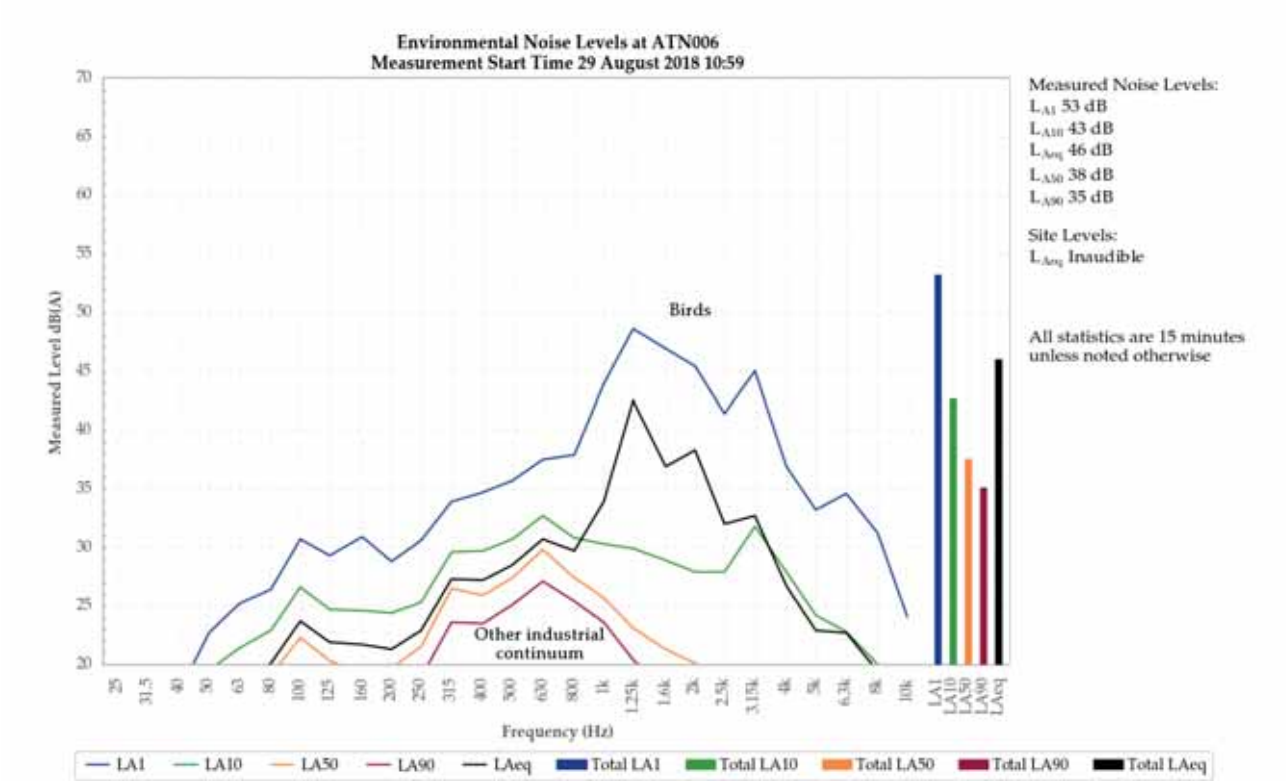



**Figure 8: Environmental Noise Levels, ATN006 – 2 Sunset Parade**

CVC was inaudible during the measurement.

Birds generated the measured $L_{A1}$ and $L_{Aeq}$, and contributed to the measured $L_{A10}$. A power station continuum generated the measured $L_{A50}$ and $L_{A90}$ and contributed to the measured $L_{A10}$.

Road traffic, dogs, aircraft and breeze in foliage were also noted.

### 5.1.7 ATN007, Day

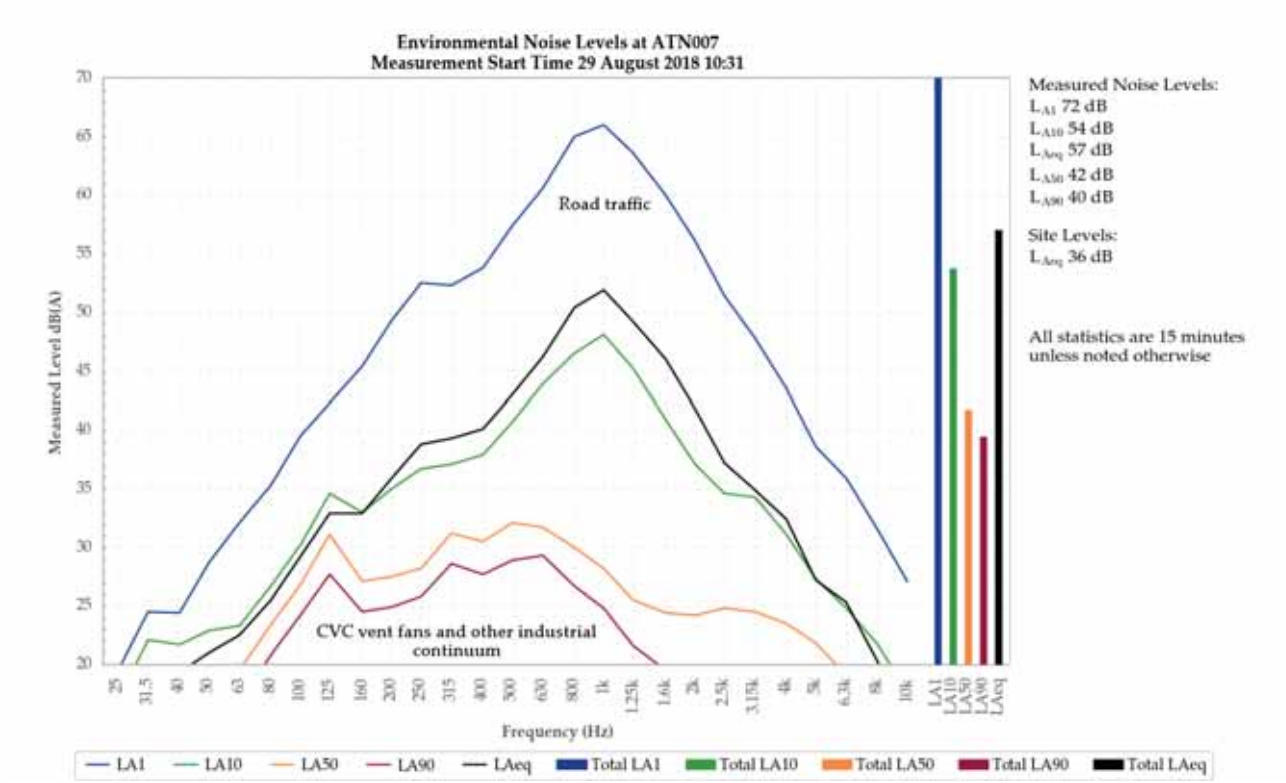



**Figure 9: Environmental Noise Levels, ATN007 – 275a Cams Boulevard**

A ventilation fan continuum from CVC was audible during the measurement generating a site only $L_{Aeq}$ of 36 dB.

Road traffic primarily generated the measured $L_{A1}$, $L_{A10}$ and $L_{Aeq}$. The CVC vent fan continuum and a power station continuum generated the measured $L_{A50}$ and $L_{A90}$.

Birds, insects and breeze in foliage were also noted.

### 5.1.8 R13, Day

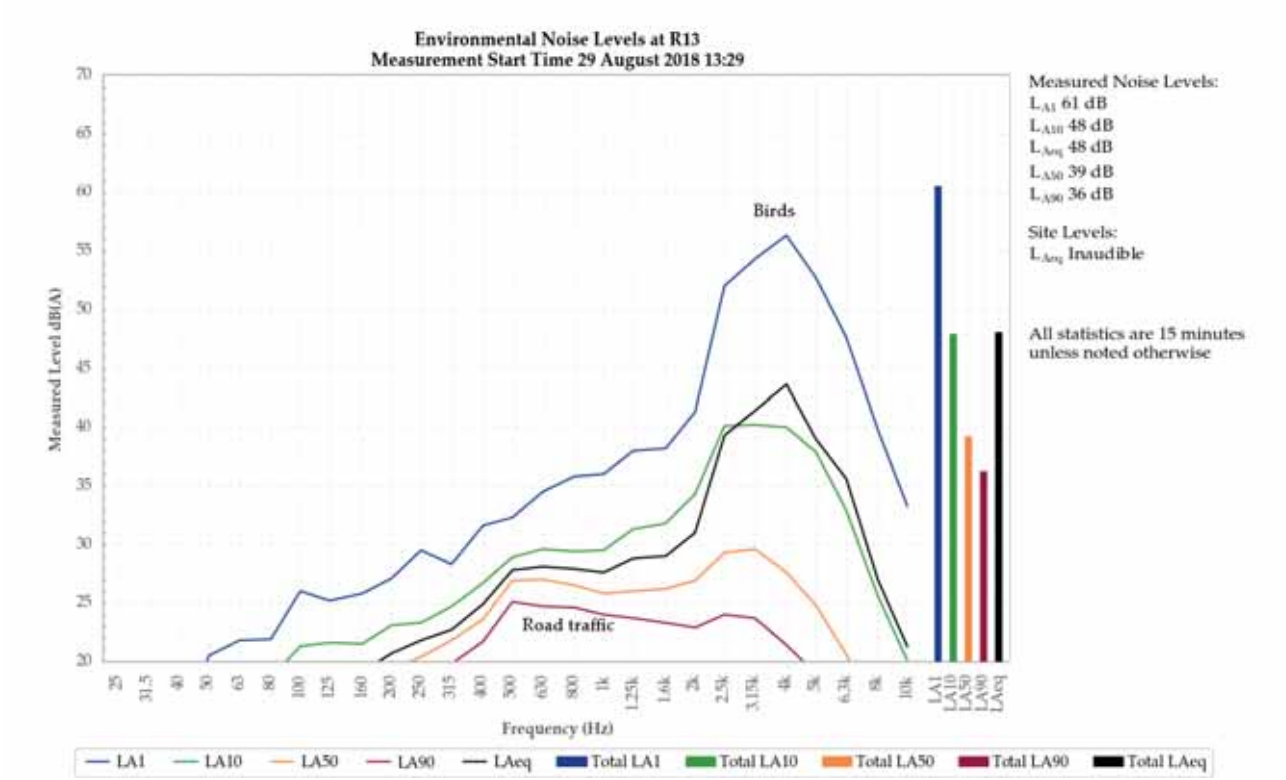



**Figure 10: Environmental Noise Levels, R13 – 33 Karoola Avenue**

CVC was inaudible during the measurement.

Birds generated the measured $L_{A1}$, $L_{A10}$ and $L_{Aeq}$, and contributed to the measured $L_{A50}$ and $L_{A90}$. Road traffic contributed to the measured $L_{A50}$ and $L_{A90}$.

Local impacts and breeze in foliage were also noted.

### 5.1.9 ATN001, Evening

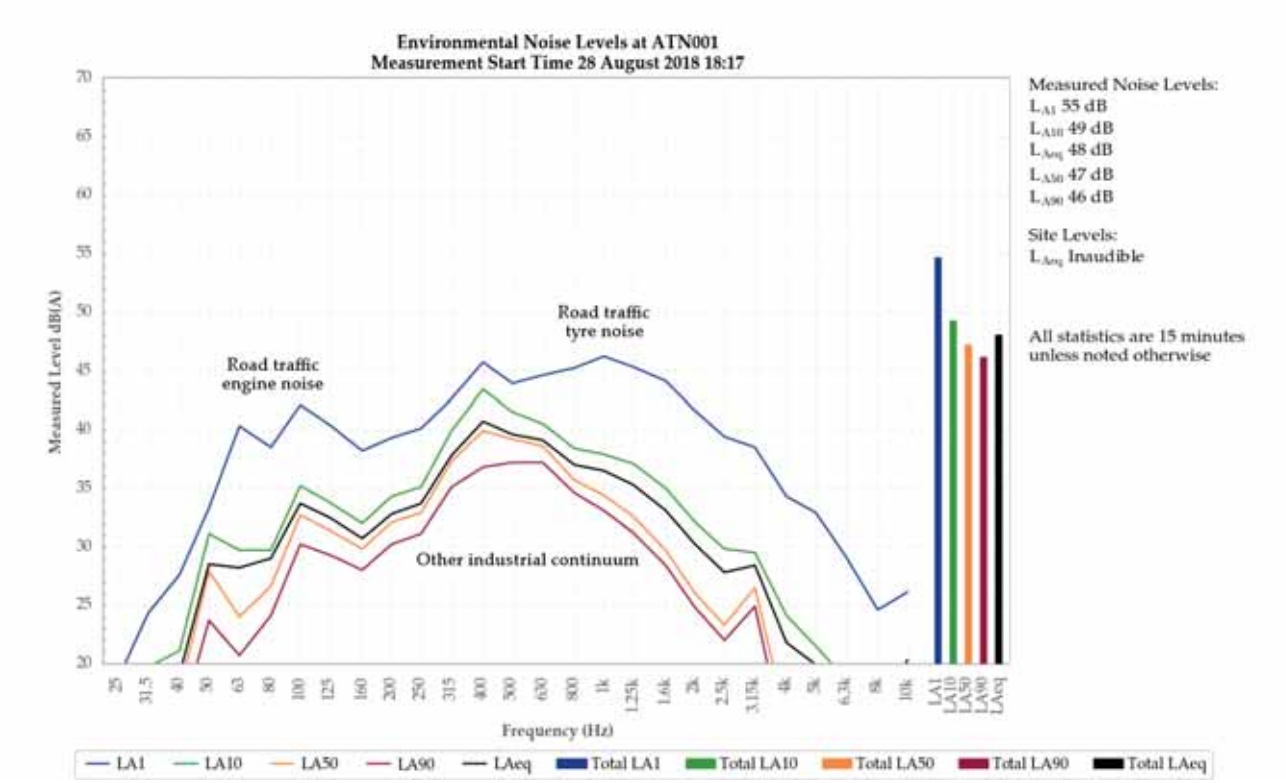



**Figure 11: Environmental Noise Levels, ATN001 - 109 Griffith Street**

CVC was inaudible during the measurement.

A power station continuum, road traffic tyre noise and road traffic engine noise generated the measured $L_{A1}$. A power station continuum generated all other measured levels.

### 5.1.10 ATN002, Evening

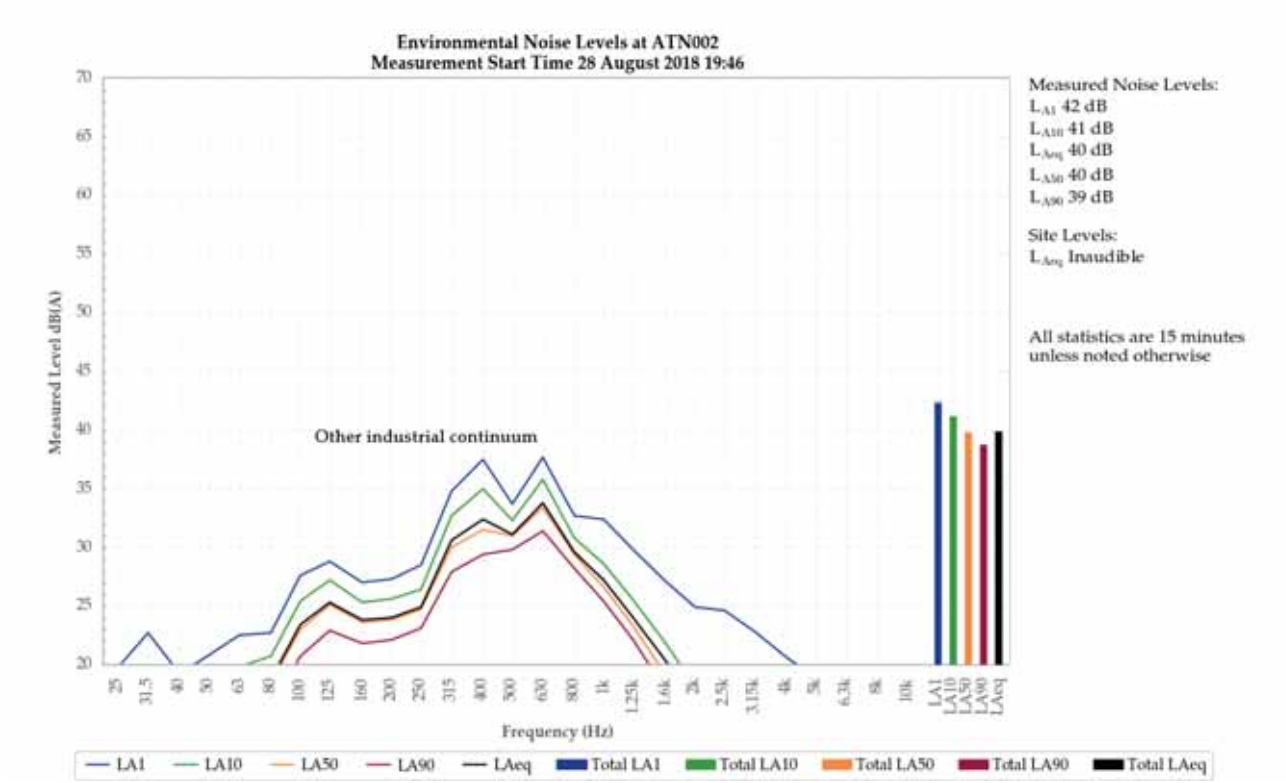



**Figure 12: Environmental Noise Levels, ATN002 – 35 Lakeshore Avenue**

CVC was inaudible during the measurement.

A power station continuum generated all measured levels.

Road traffic, dogs and aircraft were also noted.

### 5.1.11 ATN003, Evening

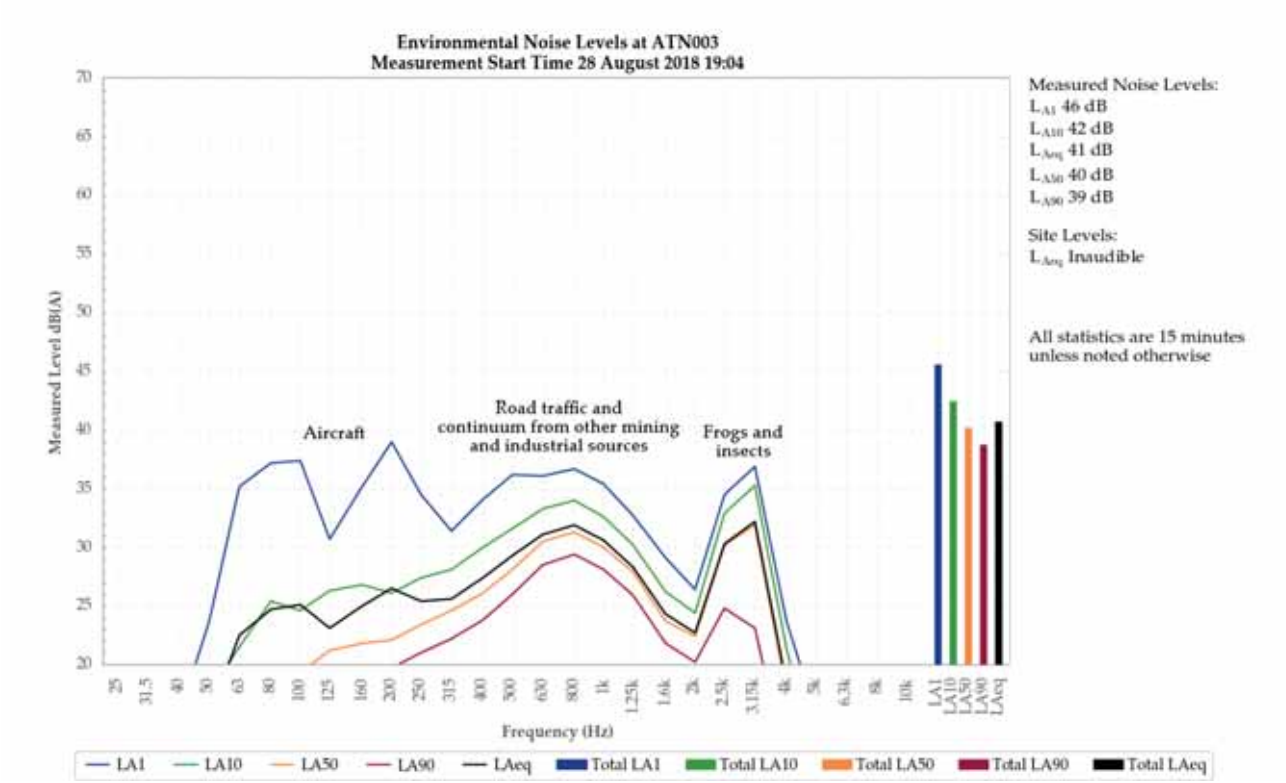



**Figure 13: Environmental Noise Levels, ATN003 – Short Street**

CVC was inaudible during the measurement.

An aircraft was primarily responsible for the measured $L_{A1}$. Road traffic, a power station continuum and a mining continuum from another mine, and frogs and insects contributed to the measured $L_{A1}$ and primarily generated the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$, and $L_{A90}$.

Dogs were also noted.

### 5.1.12 ATN004, Evening

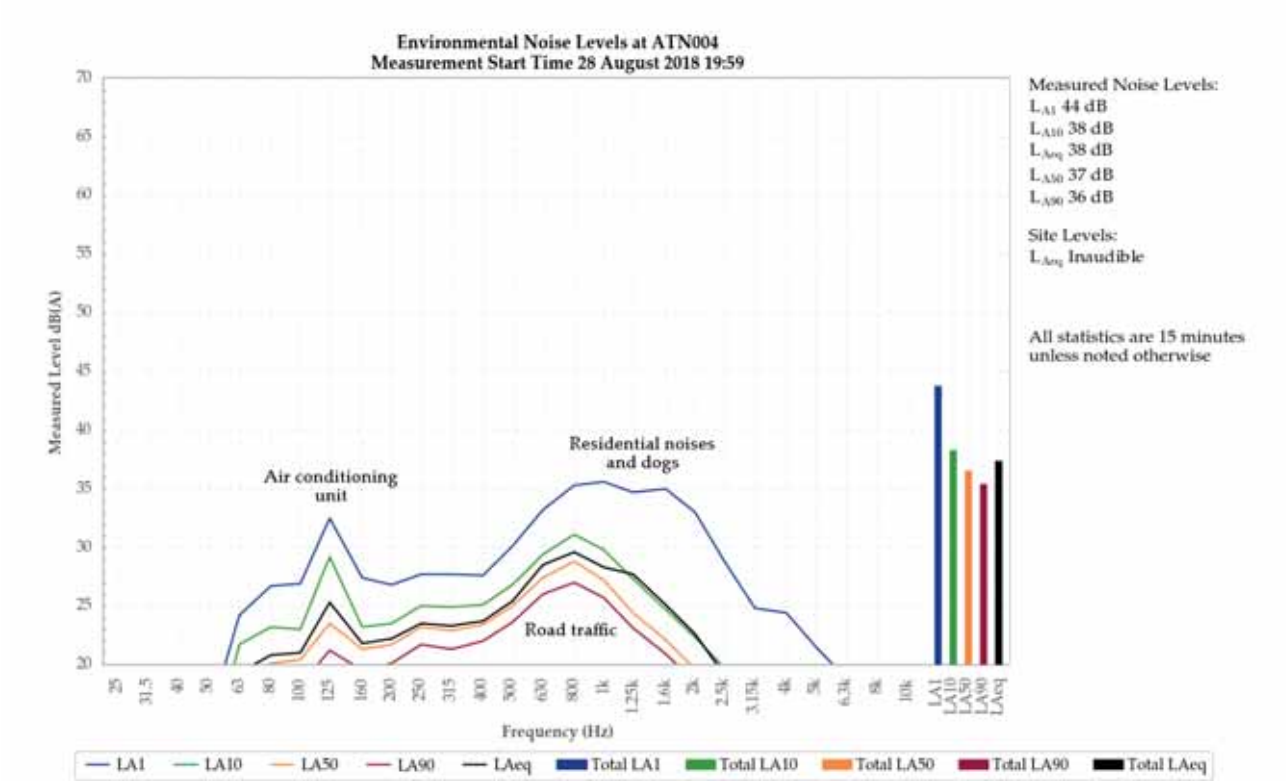



**Figure 14: Environmental Noise Levels, ATN004 – 20 Lloyd Avenue**

CVC was inaudible during the measurement.

Residential noises and dogs primarily generated the measured $L_{A1}$. Road traffic noise contributed to the measured $L_{A1}$ and $L_{A10}$, and primarily generated the measured $L_{Aeq}$, $L_{A50}$ and $L_{A90}$. A residential air conditioning unit contributed to all measured levels.

### 5.1.13 ATN005, Evening

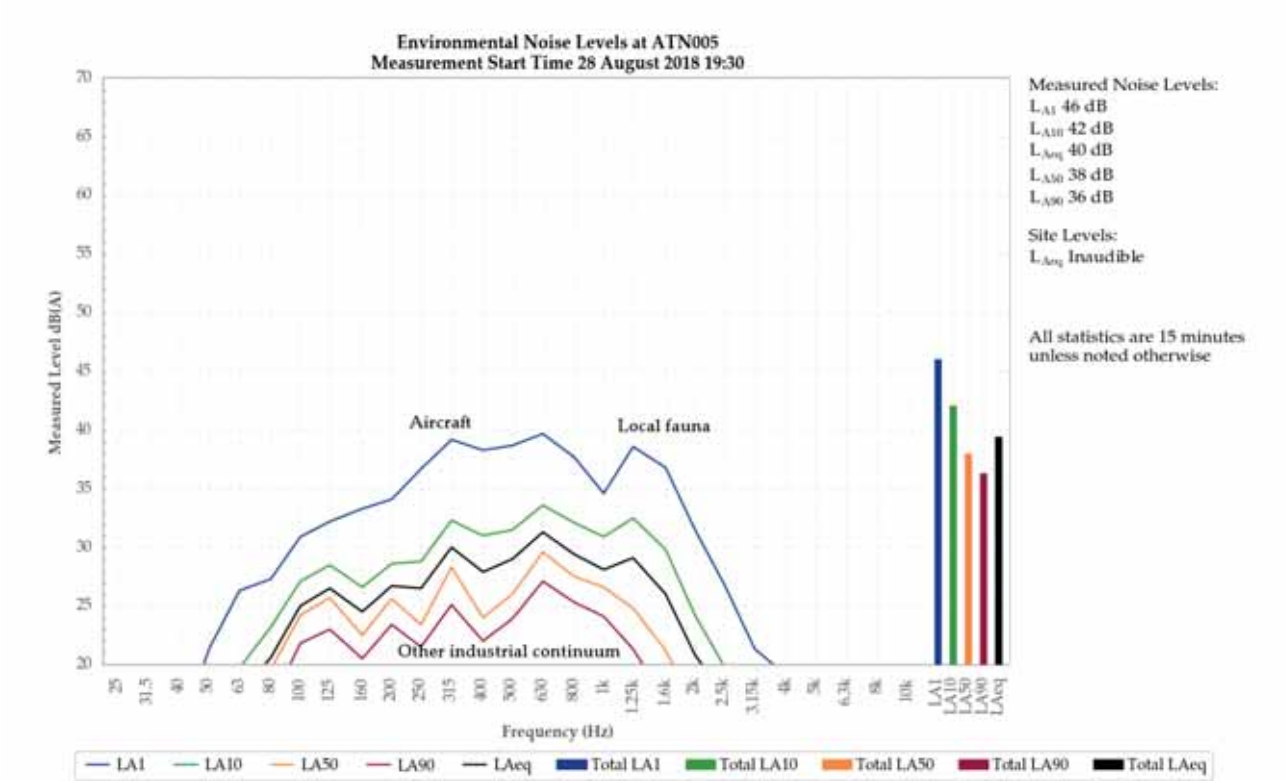



**Figure 15: Environmental Noise Levels, ATN005 – 74 Teralgin Drive**

CVC was inaudible during the measurement.

Aircraft and local fauna generated the measured $L_{A1}$ and contributed to the measured $L_{A10}$ and $L_{Aeq}$. A power station continuum generated the measured $L_{A50}$ and $L_{A90}$, and contributed to the measured $L_{A10}$ and $L_{Aeq}$.

Road traffic, birds, dogs and fish were also noted.

### 5.1.14 ATN006, Evening

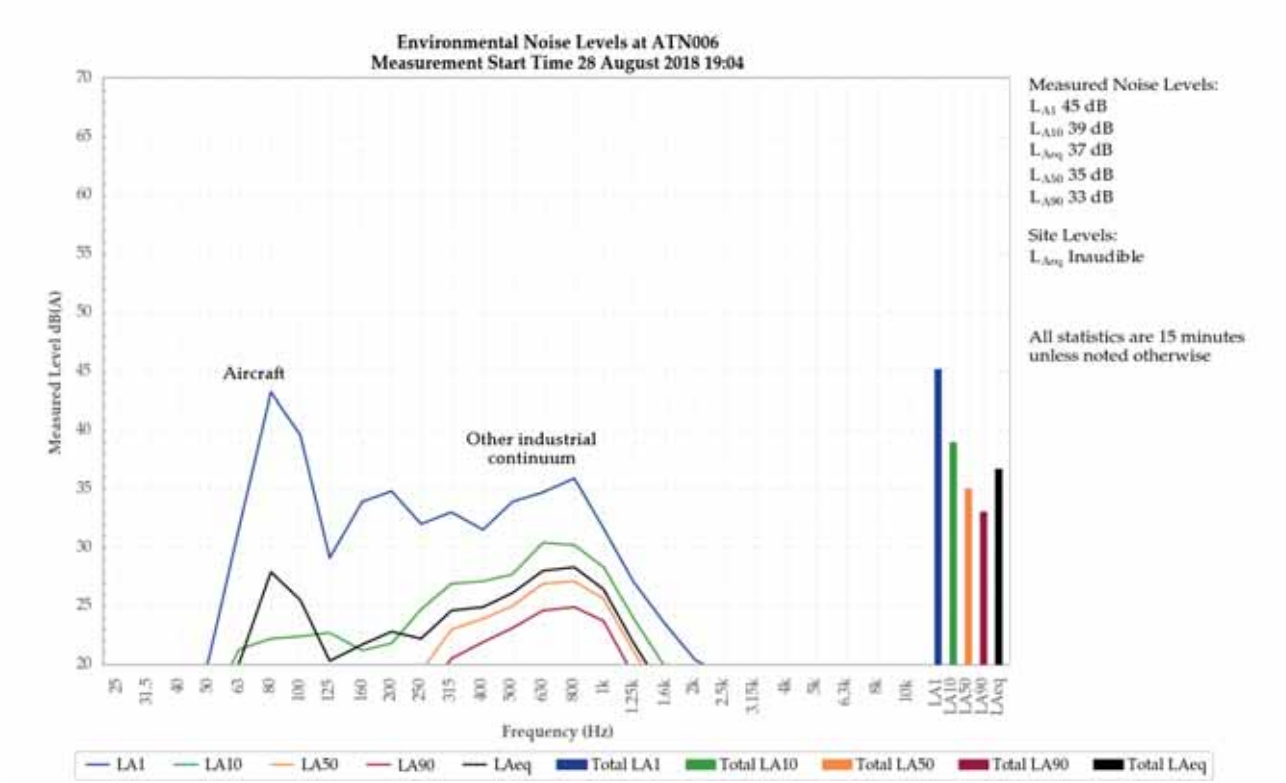



**Figure 16: Environmental Noise Levels, ATN006 – 2 Sunset Parade**

CVC was inaudible during the measurement.

Aircraft primarily generated the measured $L_{A1}$ and contributed to the measured $L_{Aeq}$. A power station continuum contributed to the measured $L_{A1}$ and $L_{Aeq}$ and primarily generated the measured $L_{A10}$, $L_{A50}$ and $L_{A90}$.

Dogs and road traffic were also noted.

### 5.1.15 ATN007, Evening

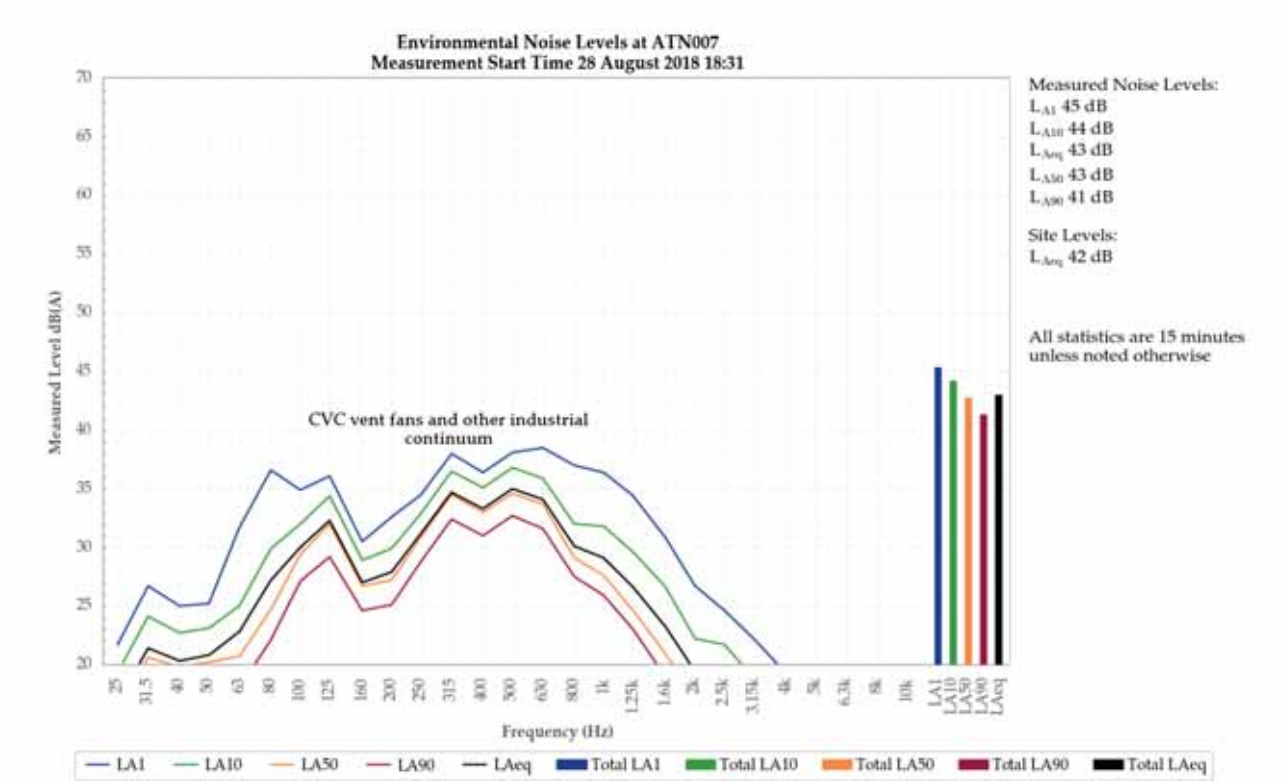



**Figure 17: Environmental Noise Levels, ATN007 – 275a Cams Boulevard**

A ventilation fan continuum from CVC was audible during the measurement generating the site only $L_{Aeq}$ of 42 dB.

CVC ventilation fan continuum and a power station continuum generated all measured levels.

Road traffic and frogs were also noted.

### 5.1.16 R13, Evening

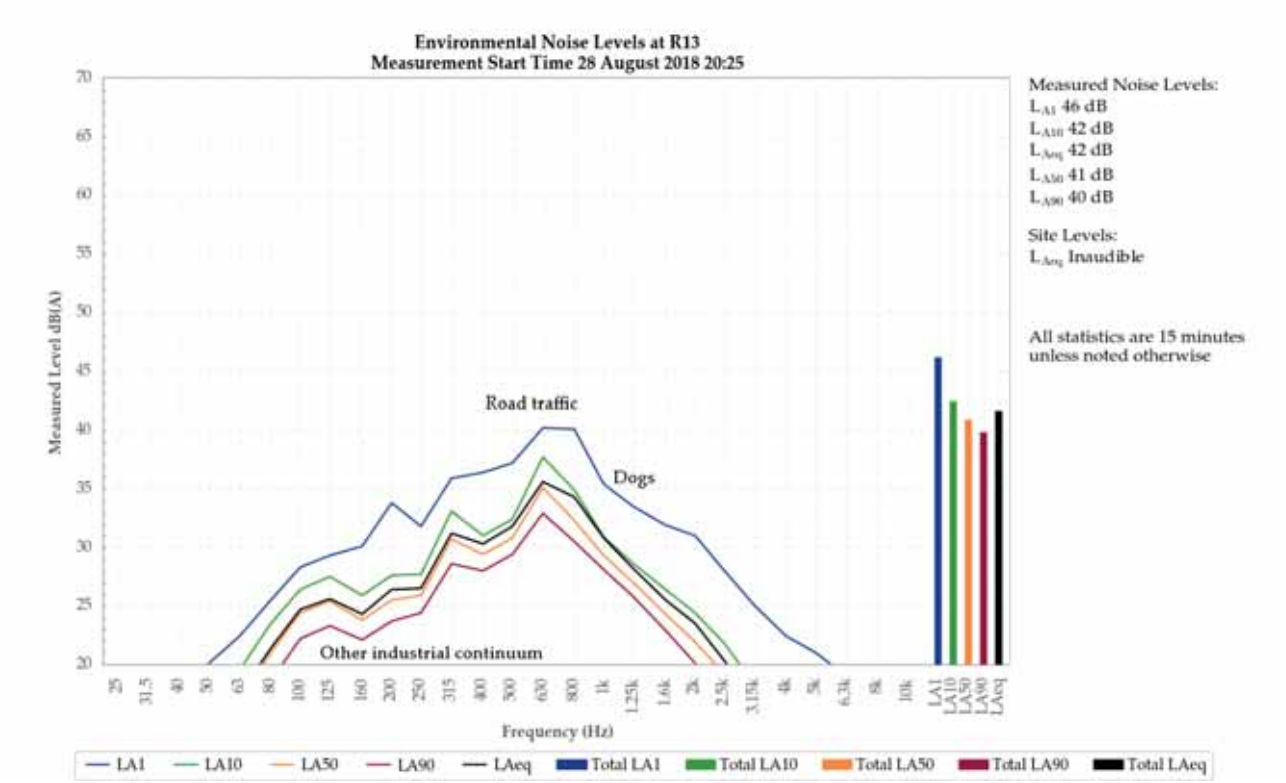



**Figure 18: Environmental Noise Levels, R13 – 33 Karoola Avenue**

CVC was inaudible during the measurement.

Road traffic tyre noise and dogs primarily generated the measured $L_{A1}$. Road traffic contributed to the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$ and $L_{A90}$. A power station continuum was primarily responsible for the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$ and $L_{A90}$ and contributed to the measured $L_{A1}$.

An air conditioning unit and birds were also noted.

### 5.1.17 ATN001, Night

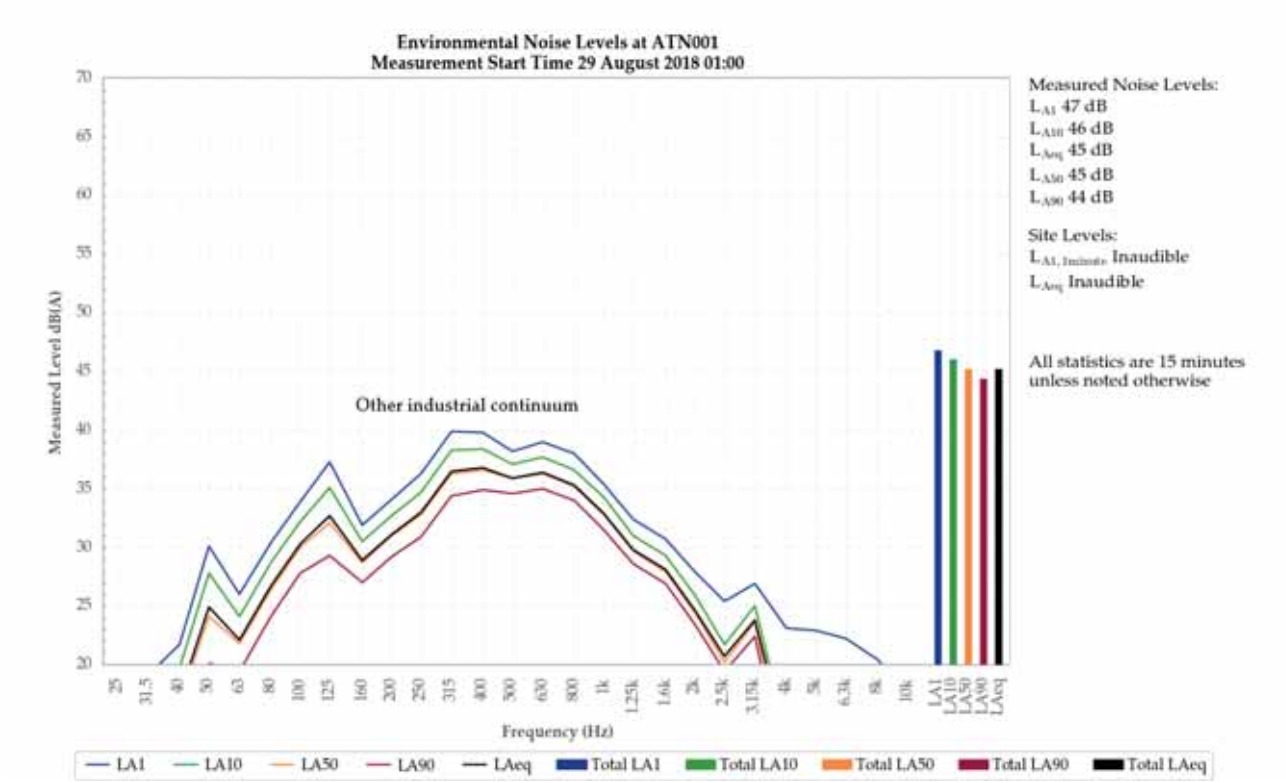



**Figure 19: Environmental Noise Levels, ATN001 - 109 Griffith Street**

CVC was inaudible during the measurement.

A power station continuum generated all measured levels.

### 5.1.18 ATN002, Night

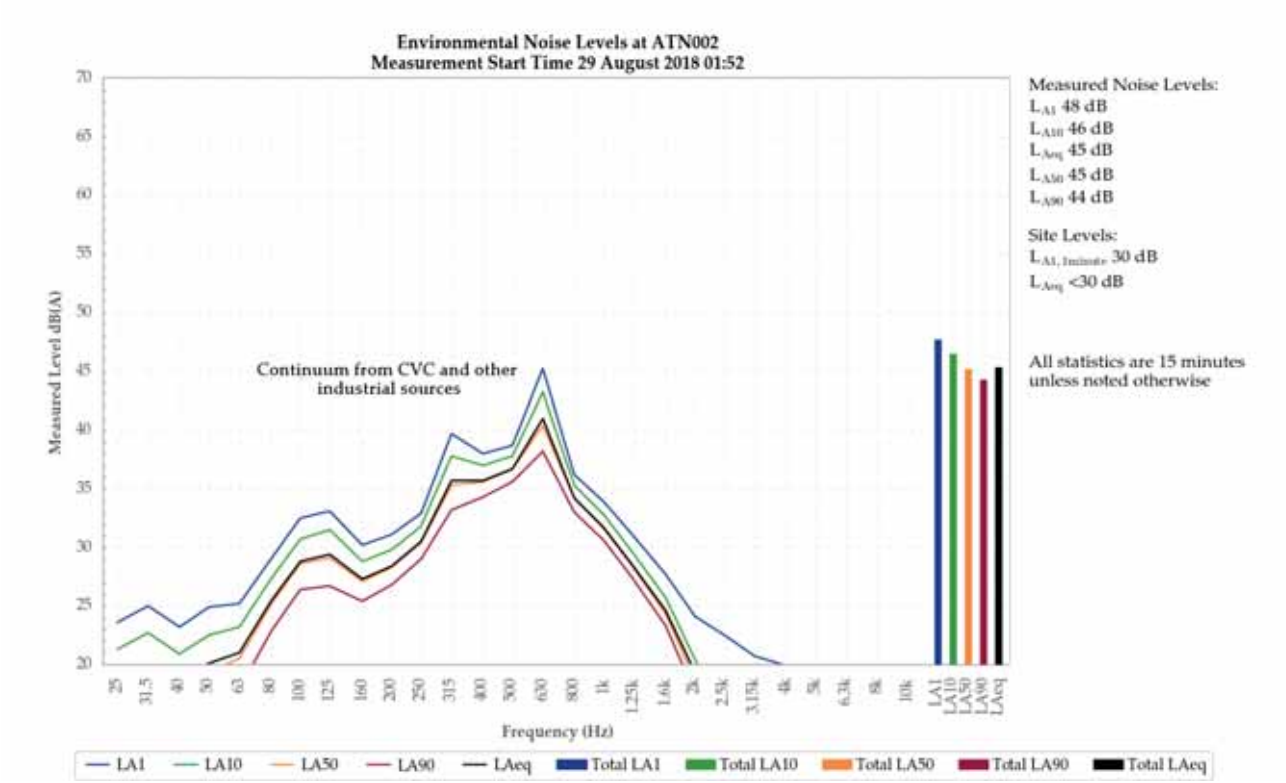



**Figure 20: Environmental Noise Levels, ATN002 – 35 Lakeshore Avenue**

A continuum from CVC was audible throughout the measurement and generated the site only $L_{Aeq}$ and $L_{A1,1minute}$ of less than 30 dB.

The CVC continuum and a power station continuum generated all measured levels.

### 5.1.19 ATN003, Night

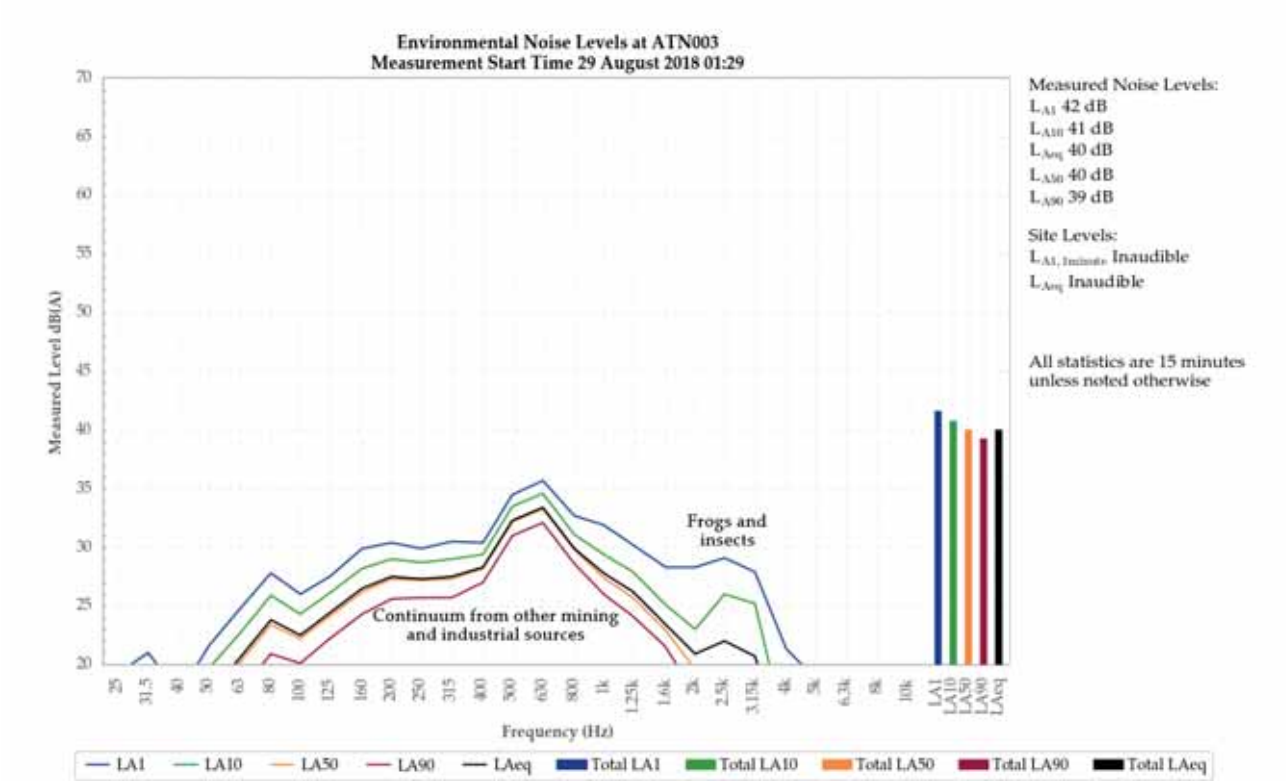



**Figure 21: Environmental Noise Levels, ATN003 – Short Street**

CVC was inaudible during the measurement.

A power station continuum and a mining continuum from another mine generated all measured levels. Frogs and insects were a minor contributor to the measured $L_{A1}$ and $L_{A10}$.

Road traffic was also noted.

### 5.1.20 ATN004, Night

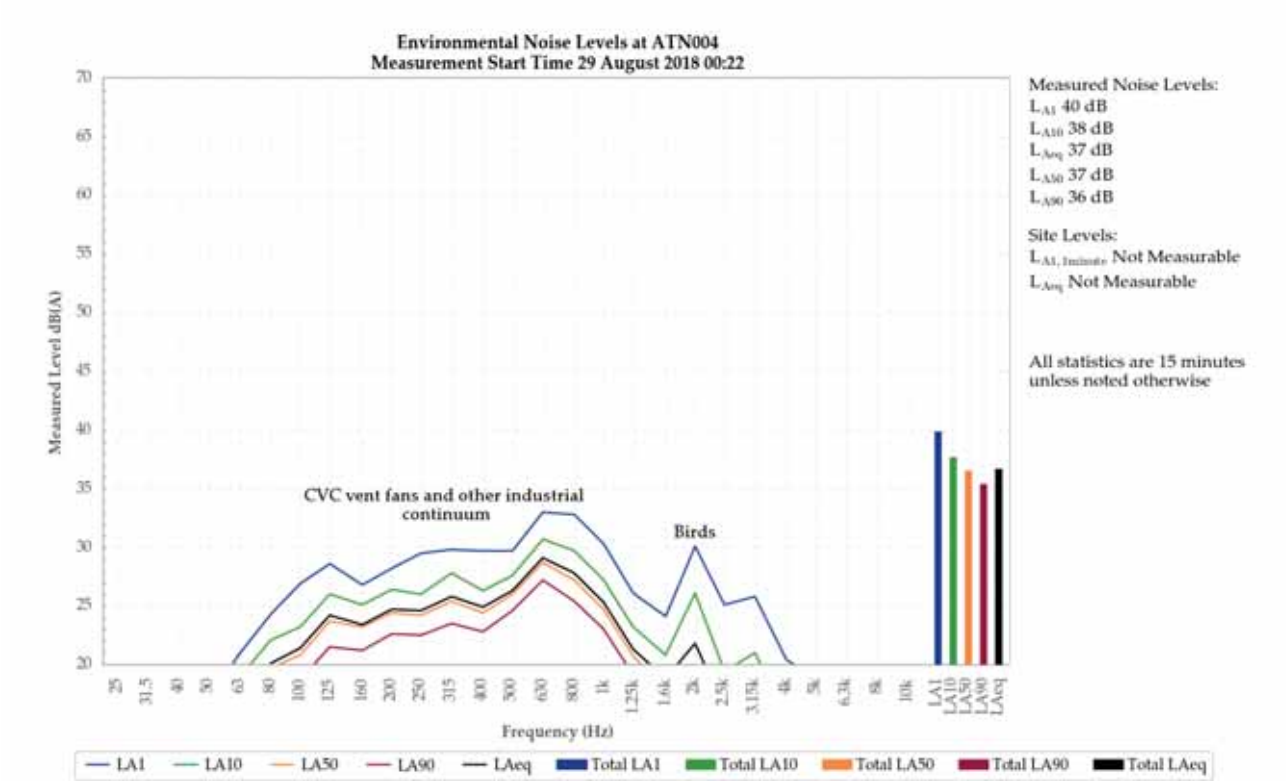



**Figure 22: Environmental Noise Levels, ATN004 – 20 Lloyd Avenue**

A faint CVC ventilation fan continuum was audible throughout the measurement, but was not measurable.

A power station continuum primarily generated all measured levels. The CVC ventilation fan continuum contributed to all measured levels. Birds contributed to the measured $L_{A1}$ and $L_{A1}$

Road traffic and aircraft were also noted.

### 5.1.21 ATN005, Night

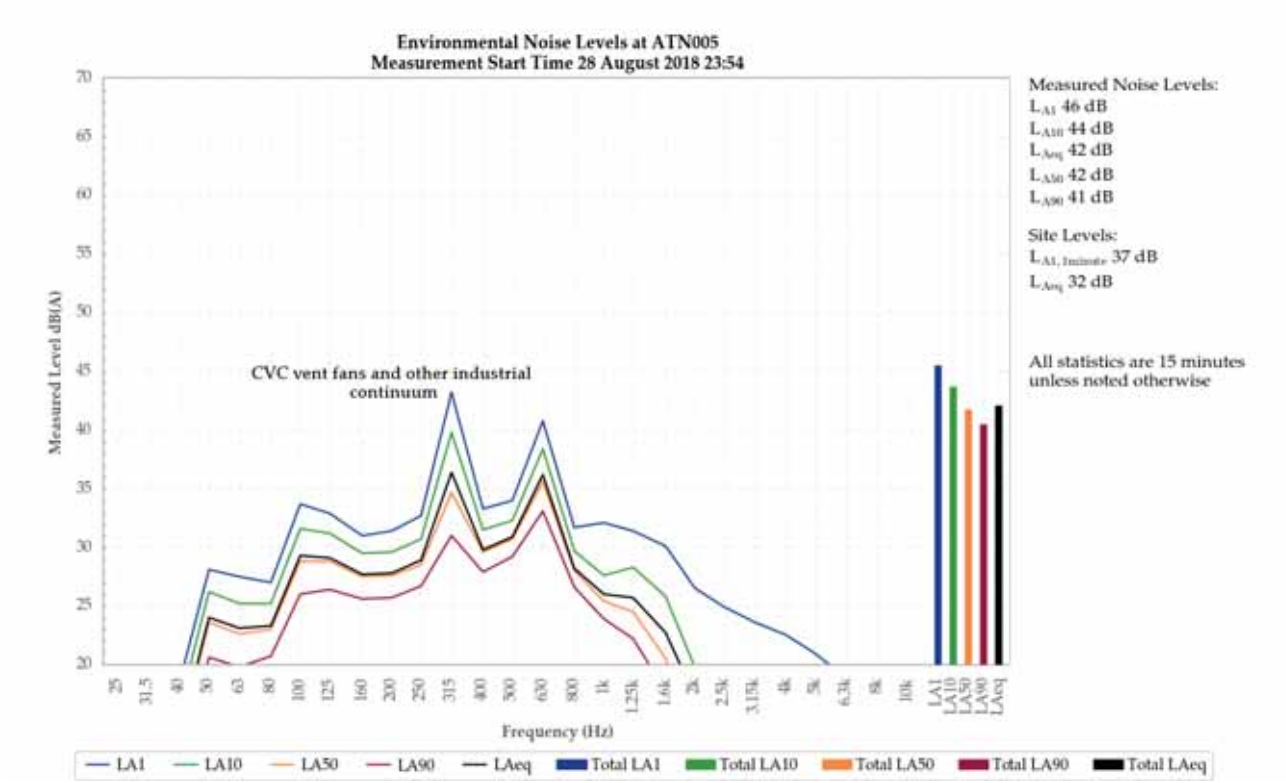



**Figure 23: Environmental Noise Levels, ATN005 – 74 Teralgin Drive**

A CVC ventilation fan continuum was audible throughout the measurement and generated the site only $L_{Aeq}$ of 32 dB. Surges in the continuum generated the site only $L_{A1,1minute}$ of 37 dB.

The CVC ventilation fan continuum and a power station continuum generated all measured levels.

Birds, frogs and road traffic were also noted.

### 5.1.22 ATN006, Night

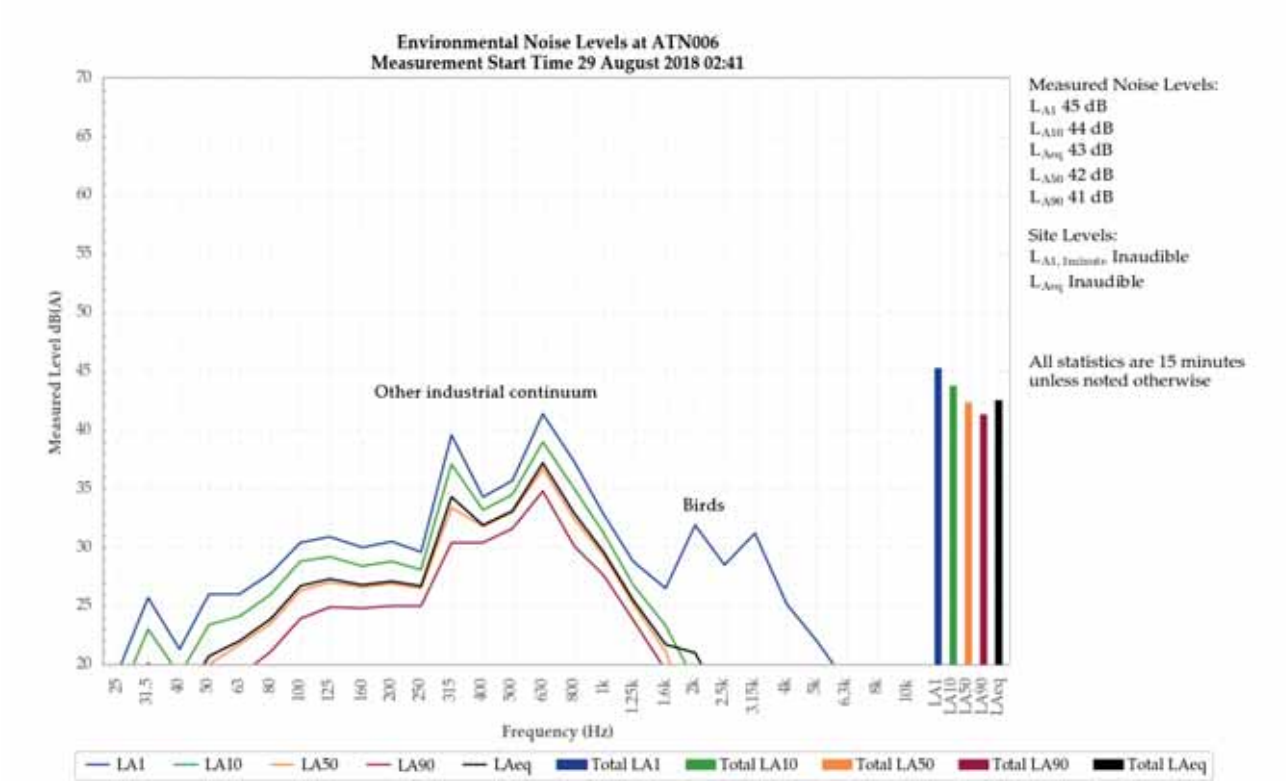



**Figure 24: Environmental Noise Levels, ATN006 – 2 Sunset Parade**

CVC was inaudible during the measurement.

A power station continuum generated measured levels. Birds were a minor contributor to the measured $L_{A1}$.

### 5.1.23 ATN007, Night

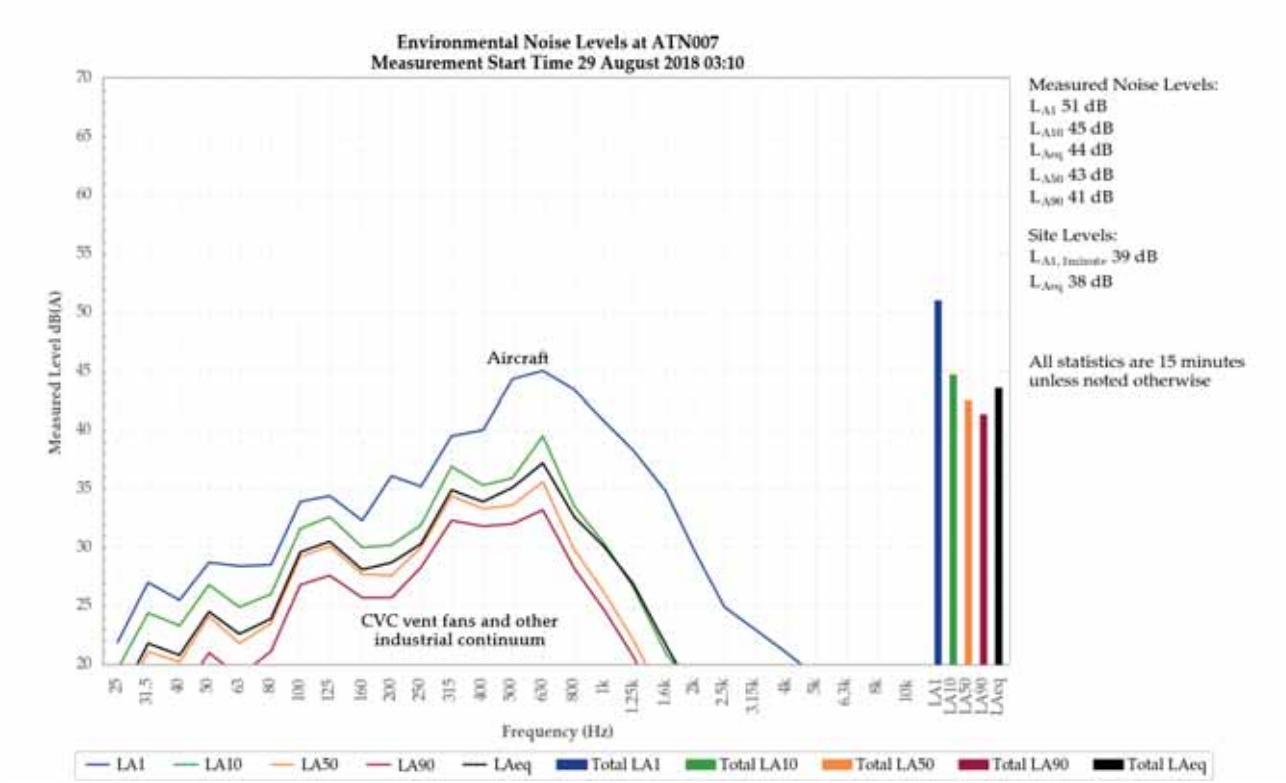



**Figure 25: Environmental Noise Levels, ATN007 – 275a Cams Boulevard**

A ventilation fan continuum from CVC was audible during the measurement generating the site only $L_{Aeq}$ of 38 dB and $L_{A1,1minute}$ of 39 dB.

CVC ventilation fan continuum and a power station continuum generated the measured $L_{A10}$, $L_{Aeq}$, $L_{A50}$ and $L_{A90}$, and contributed to the measured $L_{A1}$. Aircraft primarily generated the measured $L_{A1}$.

Dogs and road traffic were also noted.

### 5.1.24 R13, Night

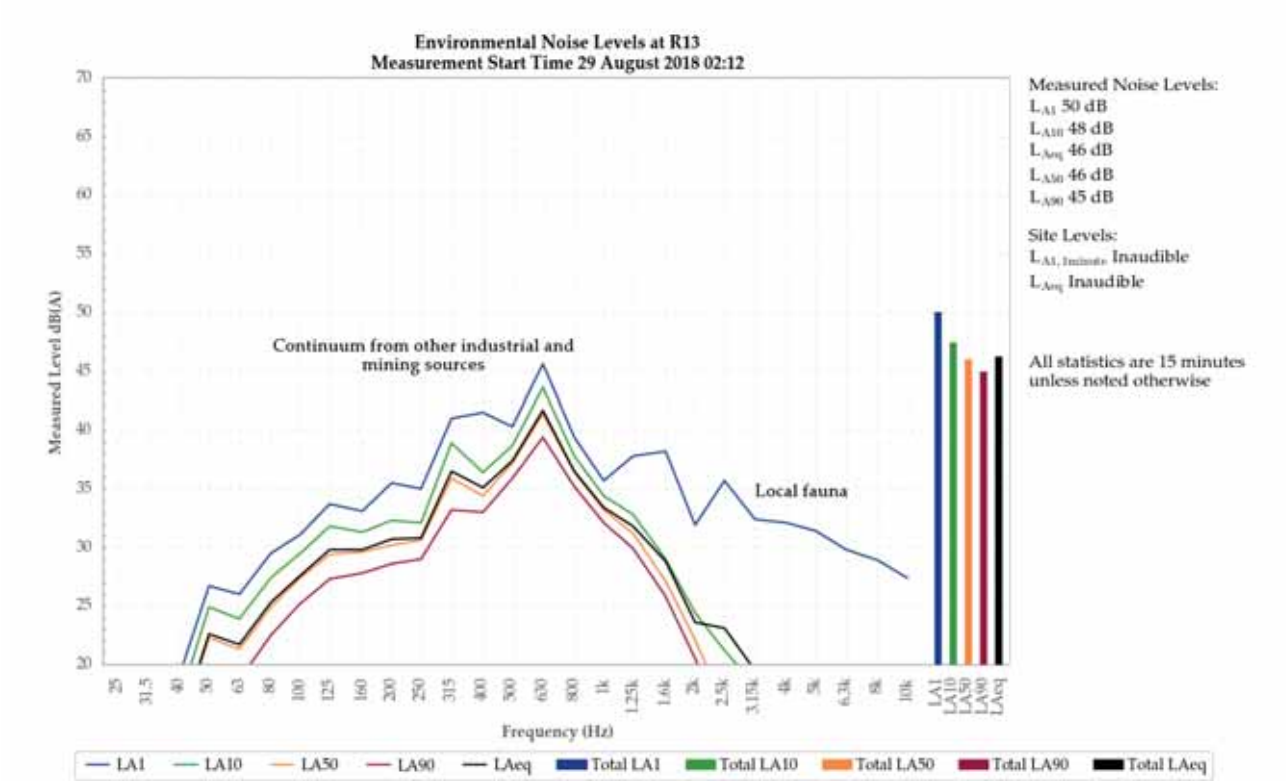



**Figure 26: Environmental Noise Levels, R13 – 33 Karoola Avenue**

CVC was inaudible during the measurement.

A power station continuum and a mining continuum from another mine generated all measured levels. Local fauna contributed to the measured $L_{A1}$.

# 6 SUMMARY OF COMPLIANCE

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery, an underground coal mine at Chain Valley Bay, NSW.

The purpose of this noise survey is to quantify and describe the acoustic environment around the site and compare results with limits specified in the Chain Valley Extension Project Development Consent (SSD-5465).

Environmental noise monitoring described in this report was undertaken during day, evening and night of 28/29 August 2018.

CVC complied with the relevant noise limits at all locations during Quarter 3 2018. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

# APPENDIX

## A PROJECT CONSENT

NSW Department of Planning Project Consent SSD- 5465 applies to the Chain Valley Colliery operation. The noise section is reproduced below:

**NOISE**

**Noise Impact Assessment Criteria**

7. The Applicant shall ensure that the noise generated by the development at any residence on privately-owned land does not exceed the criteria for the location in Table 1 nearest to that residence.

*Table 1: Noise Criteria dB(A)*

| Location | Day | Evening | Night | |
|---|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{A1(1\ min)}$ |
| R8 | 38 | 38 | 38 | 45 |
| R11 | 49 | 49 | 49 | 54 |
| R12 | 49 | 49 | 49 | 53 |
| R13 | 43 | 43 | 43 | 49 |
| R15 | 36 | 36 | 36 | 45 |
| R19 | 37 | 37 | 37 | 45 |
| R22 | 46 | 46 | 46 | 46 |
| all other privately-owned land | 35 | 35 | 35 | 45 |

*Notes:*

- *To interpret the locations referred to in Table 1, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

**Operating Conditions**

8. The Applicant shall:
   (a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and transport noise generated by the development;
   (b) regularly assess the noise monitoring and meteorological data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent;
   (c) minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 8);
   (d) use its best endeavours to achieve the long-term noise goals in Table 2, where reasonable and feasible, and report on progress towards achieving these goals in each Annual Review;

(e) carry out a comprehensive noise audit of the development in conjunction with each independent environmental audit; and
(f) prepare an action plan to implement any additional reasonable and feasible onsite noise mitigation measures identified by each audit;
to the satisfaction of the Director-General.

*Table 2: Long-term Noise Goals dB(A)*

| Location | Day | Evening | Night |
|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ |
| R11 – R13 | 41 | 41 | 41 |
| R22 | 40 | 40 | 40 |

*Notes:*
- *To interpret the locations referred to in Table 2, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

**Noise Management Plan**

9. The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Director-General. This plan must:
(a) be prepared in consultation with the EPA and submitted to the Director-General for approval within 4 months of the date of this consent, unless otherwise agreed by the Director-General;
(b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent;
(c) describe the proposed noise management system in detail including the mitigation measures that would be implemented to minimise noise during construction and operations, including on and off site road noise generated by vehicles associated with the development; and
(d) include a monitoring program that:
- uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
- evaluates and reports on:
  - the effectiveness of the on-site noise management system; and
  - compliance against the noise operating conditions; and
- defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

## APPENDIX 8
## NOISE COMPLIANCE ASSESSMENT

**Applicable Meteorological Conditions**

1. The noise criteria in Table 1 of the conditions are to apply under all meteorological conditions except the following:
   (a) during periods of rain or hail;
   (b) average wind speed at microphone height exceeds 5 m/s;
   (c) wind speeds greater than 3 m/s measured at 10 m above ground level; or
   (d) temperature inversion conditions greater than 3°C/100 m.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station described in condition 15 of schedule 3.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.

4. This monitoring must be carried out at least 4 times in each calendar year (ie at least once every 3 months), unless the Director-General directs otherwise.

5. Unless otherwise agreed with the Director-General, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
   (a) monitoring locations for the collection of representative noise data;
   (b) meteorological conditions during which collection of noise data is not appropriate;
   (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
   (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

# APPENDIX

## B CALIBRATION CERTIFICATES

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

## Sound Level Meter
IEC 61672-3.2006

# Calibration Certificate

**Calibration Number** C16643

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

**Equipment Tested/ Model Number :** Rion NA-28
**Instrument Serial Number :** 00370304
**Microphone Serial Number :** 10421
**Pre-amplifier Serial Number :** 60313

| Pre-Test Atmospheric Conditions | | Post-Test Atmospheric Conditions | |
|---|---|---|---|
| **Ambient Temperature :** | 22.2°C | **Ambient Temperature :** | 22.4°C |
| **Relative Humidity :** | 46.6% | **Relative Humidity :** | 44.5% |
| **Barometric Pressure :** | 99.95kPa | **Barometric Pressure :** | 99.95kPa |

**Calibration Technician :** Vicky Jaiswal
**Calibration Date :** 16/11/2016
**Secondary Check:** Sandra Minto
**Report Issue Date :** 17/11/2016

**Approved Signatory :** Juan Aguero

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 10: Self-generated noise | *Pass* | 14: Level linearity on the reference level range | *Pass* |
| 11: Acoustical tests of a frequency weighting | *Pass* | 15: Level linearity incl. the level range control | *Pass* |
| 12: Electrical tests of frequency weightings | *Pass* | 16: Toneburst response | *Pass* |
| 13: Frequency and time weightings at 1 kHz | *Pass* | 17: Peak C sound level | *Pass* |
| | | 18: Overload Indication | *Pass* |

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, 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 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Least Uncertainties of Measurement -

| Acoustic Tests | | Environmental Conditions | |
|---|---|---|---|
| *31.5 Hz to 8kHz* | *±0.12dB* | *Temperature* | *±0.05°C* |
| *12.5kHz* | *±0.18dB* | *Relative Humidity* | *±0.46%* |
| *16kHz* | *±0.31dB* | *Barometric Pressure* | *±0.017kPa* |
| Electrical Tests | | | |
| *31.5 Hz to 20 kHz* | *±0.12dB* | | |

*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.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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 Level Meter
IEC 61672-3.2013
# Calibration Certificate
**Calibration Number** C18363

| | |
|---|---|
| **Client Details** | Global Acoustics Pty Ltd<br>12/16 Huntingdale Drive<br>Thornton NSW 2322 |
| **Equipment Tested/ Model Number :** | Rion NA-28 |
| **Instrument Serial Number :** | 01070590 |
| **Microphone Serial Number :** | 08184 |
| **Pre-amplifier Serial Number :** | 52329 |

| Pre-Test Atmospheric Conditions | | Post-Test Atmospheric Conditions | |
|---|---|---|---|
| **Ambient Temperature :** | 21.3°C | **Ambient Temperature :** | 22.7°C |
| **Relative Humidity :** | 41.7% | **Relative Humidity :** | 39.2% |
| **Barometric Pressure :** | 100.95kPa | **Barometric Pressure :** | 100.89kPa |

**Calibration Technician :** Lucky Jaiswal **Secondary Check:** Lewis Boorman
**Calibration Date :** 25 Jun 2018 **Report Issue Date :** 25 Jun 2018

**Approved Signatory :** Juan Aguero

| 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 | |
|---|---|---|---|
| *31.5 Hz to 8kHz* | *±0.12dB* | *Temperature* | *±0.05°C* |
| *12.5kHz* | *±0.18dB* | *Relative Humidity* | *±0.46%* |
| *16kHz* | *±0.31dB* | *Barometric Pressure* | *±0.017kPa* |
| Electrical Tests | | | |
| *31.5 Hz to 20 kHz* | *±0.12dB* | | |

*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 Australian/national standards.

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# Sound Calibrator
## IEC 60942-2004
# Calibration Certificate

**Calibration Number** C17682_Reissued

**Client Details** Global Acoustics Pty Ltd
C/o Coal & Allied Pty Ltd
Thornton NSW 2322

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

**Atmospheric Conditions**
**Ambient Temperature :** 23.5°C
**Relative Humidity :** 49.8%
**Barometric Pressure :** 98.79kPa

**Calibration Technician :** Vicky Jaiswal
**Calibration Date :** 18 Dec 2017
**Secondary Check:** Riley Cooper
**Report Issue Date :** 28 Jun 2018
**Approved Signatory :** Ken Williams

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 5.2.2: Generated Sound Pressure Level | *Pass* | 5.3.2: Frequency Generated | *Pass* |
| 5.2.3: Short Term Fluctuation | *Pass* | 5.5: Total Distortion | *Pass* |

| | Nominal Level | Nominal Frequency | Measured Level | Measured Frequency |
|---|---|---|---|---|
| Measured Output | 94.0 | 1000.0 | 94.1 | 1000.36 |

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed..

Least Uncertainties of Measurement -

| Specific Tests | | Environmental Conditions | |
|---|---|---|---|
| *Generated SPL* | *±0.11dB* | *Temperature* | *±0.3°C* |
| *Short Term Fluct.* | *±0.06dB* | *Relative Humidity* | *±2.5%* |
| *Frequency* | *±0.01%* | *Barometric Pressure* | *±0.017kPa* |
| *Distortion* | *±0.5%* | | |

*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 Australian/national standards.

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## Sound Calibrator
IEC 60942-2004

# Calibration Certificate

**Calibration Number** C17149

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

**Equipment Tested/ Model Number :** Pulsar 106
**Instrument Serial Number :** 79631

**Atmospheric Conditions**
**Ambient Temperature :** 21.9°C
**Relative Humidity :** 54.6%
**Barometric Pressure :** 98.84kPa

**Calibration Technician :** Vicky Jaiswal
**Calibration Date :** 30/03/2017
**Secondary Check:** Riley Cooper
**Report Issue Date :** 31/03/2017
**Approved Signatory :** Juan Aguero

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 5.2.2: Generated Sound Pressure Level | *Pass* | 5.3.2: Frequency Generated | *Pass* |
| 5.2.3: Short Term Fluctuation | *Pass* | 5.5: Total Distortion | *Pass* |

| | Nominal Level | Nominal Frequency | Measured Level | Measured Frequency |
|---|---|---|---|---|
| Measured Output | 94.0 | 1000.0 | 94.1 | 1000.38 |

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942 2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement -

| Specific Tests | | Environmental Conditions | |
|---|---|---|---|
| *Generated SPL* | *±0.11dB* | *Temperature* | *±0.05°C* |
| *Short Term Fluct.* | *±0.02dB* | *Relative Humidity* | *±0.46%* |
| *Frequency* | *±0.01%* | *Barometric Pressure* | *±0.017kPa* |
| *Distortion* | *±0.5%* | | |

*All uncertainties are directed 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.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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Appendix C

# Quarterly attended noise monitoring report – Quarter 4 2018

# *Chain Valley Colliery*

*Environmental Noise Monitoring*

*Quarter 4 2018*

*Prepared for*

*LDO Group*

Global Acoustics

Noise and Vibration Analysis and Solutions

Global Acoustics Pty Ltd
PO Box 3115 | Thornton NSW 2322
Telephone +61 2 4966 4333
Email global@globalacoustics.com.au
ABN 94 094 985 734

# *Chain Valley Colliery*

## *Environmental Noise Monitoring*
## *Quarter 4 2018*

Reference: 18429_R01
Report date: 29 January 2019

### *Prepared for*

LDO Group
PO Box 174
Rutherford NSW 2330

### *Prepared by*

Global Acoustics Pty Ltd
PO Box 3115
Thornton NSW 2322

| | | | |
|---|---|---|---|
| Prepared: | Jason Cameron<br>Consultant | QA Review: | Robert Kirwan<br>Consultant |

*Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire*

# *EXECUTIVE SUMMARY*

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery (CVC), an underground coal mine at Chain Valley Bay, NSW.

The purpose of this noise survey is to quantify and describe the acoustic environment around the site and compare results with limits specified in the Chain Valley Extension Project Development Consent (SSD-5465).

Environmental noise monitoring described in this report was undertaken during day, evening and night of 19/20 December 2018.

CVC complied with the relevant noise limits at all locations during Quarter 4 2018. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

# Table of Contents



# Appendices

# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery (CVC), an underground coal mine at Chain Valley Bay, NSW.

Environmental noise monitoring described in this report was undertaken during day, evening and night periods on 19/20 December 2018.

The purpose of the survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

## 1.2 Monitoring Locations

There were nine attended monitoring locations during this survey as detailed in Table 1.1 and shown on Figure 1.

*Table 1.1: ATTENDED NOISE MONITORING LOCATIONS*

| Report Descriptor | Monitoring Location |
|---|---|
| ATN001 | 109 Griffith Street, Mannering Park |
| ATN002 | 35 Lakeshore Avenue, Kingfisher Shores, Chain Valley Bay |
| R12[1] | 20 Lakeshore Avenue, Kingfisher Shores, Chain Valley Bay |
| R13 | 33 Karoola Avenue, Kingfisher Shores, Chain Valley Bay |
| ATN003 | Short Street, Macquarie Shores, Chain Valley Bay |
| ATN004 | 20 Lloyd Avenue, Chain Valley Bay |
| ATN005 | 74 Teragalin Drive, Chain Valley Bay |
| ATN006 | 2 Sunset Parade, Chain Valley Bay |
| ATN007 | 275a Cams Boulevard, Chain Valley Bay |

*Notes:*

1. *Monitoring conducted in conjunction with ATN002 as monitoring location is representative of both ATN002 (R11) and R12.*

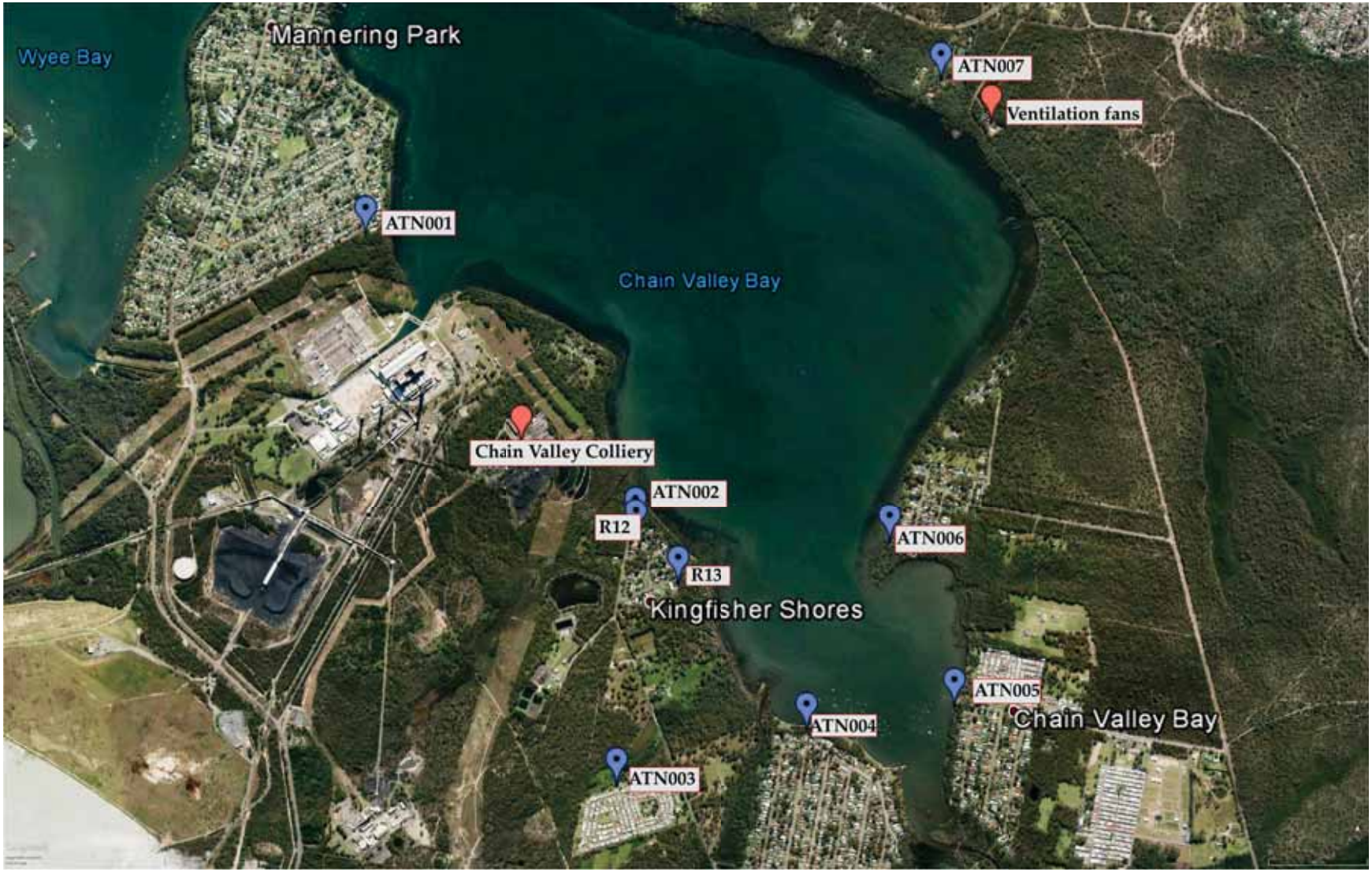


**Figure 1: CVC attended noise monitoring locations**

## 1.3 Terminology & Abbreviations

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

*Table 1.2: TERMINOLOGY & ABBREVIATIONS*

| Descriptor | Definition |
|---|---|
| $L_A$ | The A-weighted root mean squared (RMS) noise level at any instant |
| $L_{A1,1minute}$ | The noise level which is exceeded for 1 per cent of the specified time period of 1 minute |
| $L_{A10}$ | The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels |
| $L_{A90}$ | The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The $L_{A90}$ level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes. |
| $L_{Aeq}$ | The average noise energy during a measurement period |
| 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. |
| SEL | Sound exposure level (SEL), the A-weighted noise energy during a measurement period normalised to one second |
| 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. |
| SC | Stability Class. Estimated from wind speed and sigma theta data. |
| 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 |

## 1.4

# 2 PROJECT APPROVAL & CRITERIA

## 2.1 Project Approval & Consent

Lake Coal Pty Ltd obtained a project approval on the 23rd January 2012 (MP10_0161) for CVC, with no prior project approval, and therefore noise limits, existing before that date. A further application was approved on 23 December 2013 for the Chain Valley Extension Project SSD-5465 (the Consent). Schedule 3, Conditions 7 to 9 of the Consent detail the conditions pertaining to noise. The noise sections of the Consent are reproduced in Appendix A.

## 2.2 Noise Management Plan

A Noise Management Plan (NMP) for CVC as required under Schedule 3, Condition 9 of the consent was approved by the Department of Planning and Infrastructure on 12 March 2014 and details the monitoring requirements associated with the then approved operational phase of the mine as well as any construction activities. The monitoring locations outlined in the NMP are listed in Table 2.1.

## 2.3 Project Specific Criteria

Activities have been assessed against criteria from Table 1 of the Consent, as set out in Table 2.1.

*Table 2.1: CVC IMPACT ASSESSMENT CRITERIA, dB*

| Location | Reference ID | Day $L_{Aeq,15min}$ | Evening $L_{Aeq,15min}$ | Night $L_{Aeq,15min}$ | Night $L_{A1,1min}$ |
|---|---|---|---|---|---|
| ATN001 | R9 | 35 | 35 | 35 | 45 |
| ATN002 | R11 | 49 | 49 | 49 | 54 |
| R12 | R12 | 49 | 49 | 49 | 53 |
| R13 | R13 | 43 | 43 | 43 | 49 |
| ATN003 | R15 | 36 | 36 | 36 | 45 |
| ATN004 | R14 | 35 | 35 | 35 | 45 |
| ATN005 | R17 | 35 | 35 | 35 | 45 |
| ATN006 | R19 | 37 | 37 | 37 | 45 |
| ATN007 | R22 | 46 | 46 | 46 | 46 |

*Notes:*

1. *Day: 7:00am to 6:00pm ~ Evening: 6:00pm to 10:00pm ~Night: 10:00pm to 7:00am.*

CVC long term noise goal criteria are set out in Table 2.2.

*Table 2.2: CVC LONG TERM NOISE GOALS, dB*

| Location | Reference ID | Day $L_{Aeq,15min}$ | Evening $L_{Aeq,15min}$ | Night $L_{Aeq,15min}$ |
|---|---|---|---|---|
| ATN002 | R11 | 41 | 41 | 41 |
| ATN007 | R22 | 40 | 40 | 40 |

*Notes:*

1. *Day: 7:00am to 6:00pm ~ Evening: 6:00pm to 10:00pm ~Night: 10:00pm to 7:00am.*

## 2.4 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017, and supersedes the EPA's Industrial Noise Policy (INP, 2000). Assessment and reporting of modifying factors is to be carried out in accordance with Fact Sheet C of the NPfI.

NPfI modifying factors, as they are applicable to mining noise, are described in more detail below.

### 2.4.1 Tonality and Intermittent Noise

As defined in the NPfI:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.*

### 2.4.2 Low-Frequency Noise

As defined in the NPfI:

> *Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.*

The NPfI contains the current method of assessing low-frequency noise, which is a 2 step process as detailed below:

> *Measure/assess source contribution C-weighted and A-weighted $L_{eq,}$T levels over the same time period. The low frequency noise modifying factor correction is to be applied where the C-A level is 15 dB or more and:*
>
> • *where any of the 1/3 octave noise levels in Table C2 are exceeded by **up to and including** 5 dB and cannot be mitigated, a 2 dBA positive adjustment to measured A weighted levels applies for the evening/night period; and*

> • *where any of the 1/3 octave noise levels in Table C2 are exceeded by* ***more than*** *5 dB and cannot be mitigated, a 5 dBA positive adjustment to measured A weighted levels applies for the evening/night period and a 2 dBA positive adjustment applies for the daytime period.*

Table C2 and associated notes from the NPfI is reproduced below:

**Table C2: One-third octave low-frequency noise thresholds.**

| Hz/dB(Z) | One-third octave $L_{Zeq,15min}$ threshold level | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency (Hz) | 10 | 12.5 | 16 | 20 | 25 | 31.5 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| dB(Z) | 92 | 89 | 86 | 77 | 69 | 61 | 54 | 50 | 50 | 48 | 48 | 46 | 44 |

**Notes:**

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.
- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

# 3 METHODOLOGY

## 3.1 Overview

All noise monitoring was conducted at locations representative of the nearest residences in accordance with Australian Standard AS1055 ' Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements.

Meteorological data was obtained from the Mannering Colliery meteorological station, which is adjacent to CVC. This allowed correlation of atmospheric parameters and measured noise levels. Sigma theta is used to calculate vertical temperature gradient (VTG) in accordance with procedures detailed in the NPfI.

## 3.2 Attended Noise Monitoring

During this survey, attended monitoring was undertaken during the day, evening and night periods. A single measurement was taken at each location with the duration of each measurement being 15 minutes.

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest, in this case CVC.

If the exact contribution of the source of interest 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 levels, for example, $L_{A10}$, $L_{A50}$ or $L_{A90}$. 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 as per the NPfI (e.g. measure closer and back calculate) to determine a value for reporting.

Therefore, 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 or reasonable to employ NPfI 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 $L_{A1,1minute}$ corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this was quantified by measuring or estimating the highest noise level emitted from a site noise source during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

## 3.3 Modifying Factors

Years of monitoring have indicated that noise levels from mining operations, particularly those measured at significant distances from the source are relatively continuous and broad spectrum. Given this, noise levels from CVC at the monitoring locations are unlikely to be intermittent or tonal.

Assessment of low-frequency modifying factors is necessary when application of the maximum correction could potentially result in an exceedance of the relevant site-only $L_{Aeq}$ criterion. Low-frequency analysis is therefore undertaken for measurements in this report where:

- meteorological conditions resulted in criteria being applicable;
- contributions from CVC were audible and directly measurable, such that the site-only $L_{Aeq}$ was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB");
- contributions from CVC were within 5 dB of the relevant $L_{Aeq}$ criterion, as 5 dB is the maximum penalty that can be applied by low-frequency modifying factors; and
- CVC was the only low-frequency noise source.

All measurements meeting these conditions were evaluated for possible low-frequency penalty applicability in accordance with the NPfI.

## 3.4 Monitoring Equipment

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

*Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT*

| Model | Serial Number | Calibration Due Date |
|---|---|---|
| Rion NA-28 sound level analyser | 00370304 | 29/11/2020 |
| Rion NA-28 sound level analyser | 01070590 | 25/06/2020 |
| Pulsar 106 acoustic calibrator | 81334 | 22/11/2020 |
| Pulsar 106 acoustic calibrator | 79631 | 30/03/2019 |

# 4 RESULTS

## 4.1 Attended Noise Monitoring

Overall noise levels measured at each location during attended measurements are provided in Table 4.1.

*Table 4.1: MEASURED NOISE LEVELS – QUARTER 4 2018[1,2]*

| Location | Start Date and Time | $L_{A1}$ (dB) | $L_{A10}$ (dB) | $L_{Aeq}$ (dB) | $L_{A90}$ (dB) |
|---|---|---|---|---|---|
| | | Day | | | |
| ATN001 | 19/12/2018 17:40 | 71 | 70 | 66 | 67 |
| ATN002 | 19/12/2018 16:50 | 63 | 55 | 49 | 53 |
| ATN003 | 19/12/2018 16:07 | 58 | 57 | 54 | 55 |
| ATN004 | 19/12/2018 15:45 | 67 | 54 | 45 | 53 |
| ATN005 | 19/12/2018 15:16 | 61 | 60 | 52 | 54 |
| ATN006 | 19/12/2018 14:53 | 62 | 59 | 52 | 55 |
| ATN007 | 19/12/2018 14:25 | 66 | 61 | 48 | 56 |
| R13 | 19/12/2018 17:10 | 61 | 51 | 48 | 50 |
| | | Evening | | | |
| ATN001 | 19/12/2018 18:00 | 60 | 55 | 51 | 53 |
| ATN002 | 19/12/2018 21:58 | 48 | 46 | 44 | 44 |
| ATN003 | 19/12/2018 18:46 | 56 | 54 | 47 | 50 |
| ATN004 | 19/12/2018 19:28 | 67 | 53 | 44 | 54 |
| ATN005 | 19/12/2018 19:00 | 59 | 53 | 45 | 49 |
| ATN006 | 19/12/2018 18:34 | 50 | 47 | 39 | 43 |
| ATN007 | 19/12/2018 1800 | 52 | 49 | 47 | 44 |
| R13 | 19/12/2018 19:25 | 66 | 64 | 60 | 61 |
| | | Night | | | |
| ATN001 | 20/12/2018 01:01 | 50 | 49 | 48 | 48 |
| ATN002 | 20/12/2018 01:28 | 41 | 39 | 38 | 38 |
| ATN003 | 20/12/2018 02:08 | 46 | 45 | 43 | 43 |
| ATN004 | 19/12/2018 23:04 | 59 | 59 | 58 | 58 |
| ATN005 | 19/12/2018 23:31 | 50 | 46 | 43 | 44 |
| ATN006 | 20/12/2018 02:43 | 65 | 41 | 38 | 49 |
| ATN007 | 20/12/2018 03:11 | 53 | 53 | 51 | 51 |
| R13 | 20/12/2018 01:46 | 47 | 46 | 45 | 45 |

*Notes:*

1. *Noise levels in this table are not necessarily the result of activities at CVC; and*
2. *All measurements are 15 minutes duration.*

## 4.2 Modifying Factors

Measured CVC only levels were assessed for the applicability of modifying factors in accordance with the EPA's NPfI.

There were no intermittent or tonal noise sources, as defined in the NPfI, audible from site during the survey. None of the measurements satisfied the conditions outlined in Section 3.3 when assessing low-frequency noise.

Therefore no further assessment of modifying factors was undertaken.

## 4.3 Attended Noise Monitoring Results

Table 4.2 compares measured levels with $L_{Aeq,15minute}$ impact assessment criteria detailed in the Consent.

*Table 4.2: $L_{Aeq,15minute}$ GENERATED BY CVC AGAINST IMPACT ASSESSMENT CRITERIA – QUARTER 4 2018*

| Location | Start Date and Time | Wind Speed (m/s) | VTG (°C per 100m)[1] | $L_{Aeq}$ Criterion (dB) | Criterion Applies?[2] | CVC $L_{Aeq}$ (dB)[3,4] | Exceedance (dB)[4,5] |
|---|---|---|---|---|---|---|---|
| | | | Day | | | | |
| ATN001 | 19/12/2018 17:40 | 1.1 | -2.0 | 35 | Yes | IA | Nil |
| ATN002 | 19/12/2018 16:50 | 2.2 | -2.0 | 49 | Yes | IA | Nil |
| ATN003 | 19/12/2018 16:07 | 1.0 | -2.0 | 36 | Yes | IA | Nil |
| ATN004 | 19/12/2018 15:45 | 2.0 | -2.0 | 35 | Yes | IA | Nil |
| ATN005 | 19/12/2018 15:16 | 1.9 | -1.6 | 35 | Yes | IA | Nil |
| ATN006 | 19/12/2018 14:53 | 2.4 | -1.8 | 37 | Yes | IA | Nil |
| ATN007 | 19/12/2018 14:25 | 0.6 | -2.0 | 46 | Yes | 41 | Nil |
| R13 | 19/12/2018 17:10 | 1.1 | -2.0 | 43 | Yes | IA | Nil |
| | | | Evening | | | | |
| ATN001 | 19/12/2018 18:00 | 1.9 | -2.0 | 35 | Yes | IA | Nil |
| ATN002 | 19/12/2018 21:58 | 3.2 | -1.0 | 49 | Yes | IA | Nil |
| ATN003 | 19/12/2018 18:46 | 1.4 | -2.0 | 36 | Yes | IA | Nil |
| ATN004 | 19/12/2018 19:28 | 0.9 | 3.0 | 35 | Yes | IA | Nil |
| ATN005 | 19/12/2018 19:00 | 1.3 | 3.0 | 35 | Yes | IA | Nil |
| ATN006 | 19/12/2018 18:34 | 1.4 | -2.0 | 37 | Yes | IA | Nil |
| ATN007 | 19/12/2018 1800 | 1.8 | -2.0 | 46 | Yes | 45 | Nil |
| R13 | 19/12/2018 19:25 | 1.0 | 3.0 | 43 | Yes | IA | Nil |
| | | | Night | | | | |
| ATN001 | 20/12/2018 01:01 | 1.7 | 3.0 | 35 | Yes | IA | Nil |
| ATN002 | 20/12/2018 01:28 | 0.5 | 3.0 | 49 | Yes | IA | Nil |
| ATN003 | 20/12/2018 02:08 | 0.6 | 3.0 | 36 | Yes | IA | Nil |

| Location | Start Date and Time | Wind Speed (m/s) | VTG (°C per 100m)[1] | $L_{Aeq}$ Criterion (dB) | Criterion Applies?[2] | CVC $L_{Aeq}$ (dB)[3,4] | Exceedance (dB)[4,5] |
|---|---|---|---|---|---|---|---|
| ATN004 | 19/12/2018 23:04 | 2.7 | 0.5 | 35 | Yes | IA | Nil |
| ATN005 | 19/12/2018 23:31 | 1.0 | 3.0 | 35 | Yes | IA | Nil |
| ATN006 | 20/12/2018 02:43 | 0.8 | 3.0 | 37 | Yes | IA | Nil |
| ATN007 | 20/12/2018 03:11 | 0.8 | 3.0 | 46 | Yes | 43 | Nil |
| R13 | 20/12/2018 01:46 | 1.0 | 3.0 | 43 | Yes | IA | Nil |

*Notes:*

1. *Sigma theta data used to calculate Vertical Temperature Gradient (VTG) in accordance with procedures detailed in the NPfI;*
2. *Noise emission limits do not apply for winds greater than 3 metres per second (at a height of 10 metres); or temperature inversion conditions greater than 3°C/100m;*
3. *These are results for CVC in the absence of all other noise sources;*
4. *Bold results in red are those greater than the relevant criterion (if applicable); and*
5. *NA in exceedance column means atmospheric conditions outside conditions specified in the Consent and so criterion is not applicable.*

Table 4.3 compares measured levels with $L_{A1,1minute}$ impact assessment criteria detailed in the Consent.

*Table 4.3: $L_{A1,1minute}$ GENERATED BY CVC AGAINST IMPACT ASSESSMENT CRITERIA – QUARTER 4 2018*

| Location | Start Date and Time | Wind Speed (m/s) | VTG (°C / 100m)[1] | $L_{A1,1minute}$ Criterion (dB) | Criterion Applies?[2] | CVC $L_{A1,1minute}$ (dB)[3,4] | Exceedance (dB)[4,5] |
|---|---|---|---|---|---|---|---|
| ATN001 | 20/12/2018 01:01 | 1.7 | 3.0 | 45 | Yes | IA | Nil |
| ATN002 | 20/12/2018 01:28 | 0.5 | 3.0 | 53 | Yes | IA | Nil |
| ATN003 | 20/12/2018 02:08 | 0.6 | 3.0 | 45 | Yes | IA | Nil |
| ATN004 | 19/12/2018 23:04 | 2.7 | 0.5 | 45 | Yes | IA | Nil |
| ATN005 | 19/12/2018 23:31 | 1.0 | 3.0 | 45 | Yes | IA | Nil |
| ATN006 | 20/12/2018 02:43 | 0.8 | 3.0 | 45 | Yes | IA | Nil |
| ATN007 | 20/12/2018 03:11 | 0.8 | 3.0 | 46 | Yes | 46 | Nil |
| R13 | 20/12/2018 01:46 | 1.0 | 3.0 | 49 | Yes | IA | Nil |

*Notes:*

1. *Sigma theta data used to calculate VTG in accordance with procedures detailed in the NPfI;*
2. *Noise emission limits do not apply for winds greater than 3 metres per second (at a height of 10 metres); or temperature inversion conditions greater than 3°C/100m;*
3. *These are results for CVC in the absence of all other noise sources;*
4. *Bold results in red are those greater than the relevant criterion (if applicable); and*
5. *NA in exceedance column means atmospheric conditions outside conditions specified in the Consent and so criterion is not applicable.*

## 4.4 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 or hail.

*Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – QUARTER 4 2018[1,2]*

| Location | Start Date and Time | Temperature (°C) | Wind Speed (m/s) | Wind Direction (°MN) | Cloud Cover (1/8s) |
|---|---|---|---|---|---|
| | | Day | | | |
| ATN001 | 19/12/2018 17:40 | 25 | 0.0 | - | 8 |
| ATN002 | 19/12/2018 16:50 | 25 | 0.0 | - | 8 |
| ATN003 | 19/12/2018 16:07 | 26 | 0.9 | 110 | 8 |
| ATN004 | 19/12/2018 15:45 | 28 | 0.7 | 190 | 7 |
| ATN005 | 19/12/2018 15:16 | 29 | 0.7 | 200 | 7 |
| ATN006 | 19/12/2018 14:53 | 24 | 0.6 | 180 | 8 |
| ATN007 | 19/12/2018 14:25 | 25 | 0.0 | - | 8 |
| R13 | 19/12/2018 17:10 | 25 | 0.0 | - | 7 |
| | | Evening | | | |
| ATN001 | 19/12/2018 18:00 | 25 | 0.0 | - | 8 |
| ATN002 | 19/12/2018 21:58 | 24 | 0.9 | 0 | 8 |
| ATN003 | 19/12/2018 18:46 | 26 | 0.0 | - | 8 |
| ATN004 | 19/12/2018 19:28 | 26 | 0.0 | - | 8 |
| ATN005 | 19/12/2018 19:00 | 26 | 0.0 | - | 8 |
| ATN006 | 19/12/2018 18:34 | 26 | 0.0 | - | 8 |
| ATN007 | 19/12/2018 1800 | 26 | 0.0 | - | 8 |
| R13 | 19/12/2018 19:25 | 26 | 0.0 | - | 8 |
| | | Night | | | |
| ATN001 | 20/12/2018 01:01 | 20 | 0.0 | - | 4 |
| ATN002 | 20/12/2018 01:28 | 22 | 0.0 | - | 0 |
| ATN003 | 20/12/2018 02:08 | 22 | 0.0 | - | 8 |
| ATN004 | 19/12/2018 23:04 | 24 | 0.8 | 300 | 7 |
| ATN005 | 19/12/2018 23:31 | 24 | 1.1 | 320 | 7 |
| ATN006 | 20/12/2018 02:43 | 23 | 0.0 | - | 8 |
| ATN007 | 20/12/2018 03:11 | 23 | 0.0 | - | 4 |
| R13 | 20/12/2018 01:46 | 23 | 0.0 | - | 7 |

*Notes:*

1. *"-" indicates calm conditions during monitoring.*

# 5 SUMMARY OF COMPLIANCE

Global Acoustics was engaged by Lake Coal Pty Ltd to conduct an attended noise survey around Chain Valley Colliery, an underground coal mine at Chain Valley Bay, NSW.

The purpose of this noise survey is to quantify and describe the acoustic environment around the site and compare results with limits specified in the Chain Valley Extension Project Development Consent (SSD-5465).

Environmental noise monitoring described in this report was undertaken during day, evening and night of 19/20 December 2018.

CVC complied with the relevant noise limits at all locations during Quarter 4 2018. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

# APPENDIX

## *A PROJECT CONSENT*

NSW Department of Planning Project Consent SSD- 5465 applies to the Chain Valley Colliery operation. The noise section is reproduced below:

**NOISE**

**Noise Impact Assessment Criteria**

7. The Applicant shall ensure that the noise generated by the development at any residence on privately-owned land does not exceed the criteria for the location in Table 1 nearest to that residence.

*Table 1: Noise Criteria dB(A)*

| Location | Day | Evening | Night | |
|---|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{A1(1\ min)}$ |
| R8 | 38 | 38 | 38 | 45 |
| R11 | 49 | 49 | 49 | 54 |
| R12 | 49 | 49 | 49 | 53 |
| R13 | 43 | 43 | 43 | 49 |
| R15 | 36 | 36 | 36 | 45 |
| R19 | 37 | 37 | 37 | 45 |
| R22 | 46 | 46 | 46 | 46 |
| all other privately-owned land | 35 | 35 | 35 | 45 |

*Notes:*

- *To interpret the locations referred to in Table 1, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

**Operating Conditions**

8. The Applicant shall:
   (a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and transport noise generated by the development;
   (b) regularly assess the noise monitoring and meteorological data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent;
   (c) minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 8);
   (d) use its best endeavours to achieve the long-term noise goals in Table 2, where reasonable and feasible, and report on progress towards achieving these goals in each Annual Review;

(e) carry out a comprehensive noise audit of the development in conjunction with each independent environmental audit; and
(f) prepare an action plan to implement any additional reasonable and feasible onsite noise mitigation measures identified by each audit;
to the satisfaction of the Director-General.

*Table 2: Long-term Noise Goals dB(A)*

| Location | Day | Evening | Night |
|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ |
| R11 – R13 | 41 | 41 | 41 |
| R22 | 40 | 40 | 40 |

*Notes:*
- *To interpret the locations referred to in Table 2, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

**Noise Management Plan**

9. The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Director-General. This plan must:
(a) be prepared in consultation with the EPA and submitted to the Director-General for approval within 4 months of the date of this consent, unless otherwise agreed by the Director-General;
(b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent;
(c) describe the proposed noise management system in detail including the mitigation measures that would be implemented to minimise noise during construction and operations, including on and off site road noise generated by vehicles associated with the development; and
(d) include a monitoring program that:
- uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
- evaluates and reports on:
  - the effectiveness of the on-site noise management system; and
  - compliance against the noise operating conditions; and
- defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

## APPENDIX 8
## NOISE COMPLIANCE ASSESSMENT

**Applicable Meteorological Conditions**

1. The noise criteria in Table 1 of the conditions are to apply under all meteorological conditions except the following:
   (a) during periods of rain or hail;
   (b) average wind speed at microphone height exceeds 5 m/s;
   (c) wind speeds greater than 3 m/s measured at 10 m above ground level; or
   (d) temperature inversion conditions greater than 3°C/100 m.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station described in condition 15 of schedule 3.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.

4. This monitoring must be carried out at least 4 times in each calendar year (ie at least once every 3 months), unless the Director-General directs otherwise.

5. Unless otherwise agreed with the Director-General, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
   (a) monitoring locations for the collection of representative noise data;
   (b) meteorological conditions during which collection of noise data is not appropriate;
   (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
   (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

# APPENDIX

## *B CALIBRATION CERTIFICATES*

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
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** C18618

| | |
|---|---|
| **Client Details** | Global Acoustics Pty Ltd<br>12/16 Huntingdale Drive<br>Thornton NSW 2322 |
| **Equipment Tested/ Model Number :** | Rion NA-28 |
| **Instrument Serial Number :** | 00370304 |
| **Microphone Serial Number :** | 10421 |
| **Pre-amplifier Serial Number :** | 60313 |

| **Pre-Test Atmospheric Conditions** | | **Post-Test Atmospheric Conditions** | |
|---|---|---|---|
| **Ambient Temperature :** | 23.6°C | **Ambient Temperature :** | 22.4°C |
| **Relative Humidity :** | 42.6% | **Relative Humidity :** | 42.4% |
| **Barometric Pressure :** | 98.42kPa | **Barometric Pressure :** | 98.45kPa |

**Calibration Technician :** Lucky Jaiswal **Secondary Check:** Lewis Boorman
**Calibration Date :** 26 Nov 2018 **Report Issue Date :** 29 Nov 2018

**Approved Signatory :** 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 | |
|---|---|---|---|
| *31.5 Hz to 8kHz* | *±0.12dB* | *Temperature* | *±0.05°C* |
| *12.5kHz* | *±0.18dB* | *Relative Humidity* | *±0.46%* |
| *16kHz* | *±0.31dB* | *Barometric Pressure* | *±0.017kPa* |
| Electrical Tests | | | |
| *31.5 Hz to 20 kHz* | *±0.12dB* | | |

*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 Australian/national standards.

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 Level Meter
IEC 61672-3.2013
# Calibration Certificate

**Calibration Number** C18363

| | |
|---|---|
| **Client Details** | Global Acoustics Pty Ltd<br>12/16 Huntingdale Drive<br>Thornton NSW 2322 |
| **Equipment Tested/ Model Number :** | Rion NA-28 |
| **Instrument Serial Number :** | 01070590 |
| **Microphone Serial Number :** | 08184 |
| **Pre-amplifier Serial Number :** | 52329 |

| Pre-Test Atmospheric Conditions | | Post-Test Atmospheric Conditions | |
|---|---|---|---|
| **Ambient Temperature :** | 21.3°C | **Ambient Temperature :** | 22.7°C |
| **Relative Humidity :** | 41.7% | **Relative Humidity :** | 39.2% |
| **Barometric Pressure :** | 100.95kPa | **Barometric Pressure :** | 100.89kPa |

**Calibration Technician :** Lucky Jaiswal
**Calibration Date :** 25 Jun 2018
**Secondary Check:** Lewis Boorman
**Report Issue Date :** 25 Jun 2018
**Approved Signatory :** Juan Aguero

| 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 | |
|---|---|---|---|
| *31.5 Hz to 8kHz* | *±0.12dB* | *Temperature* | *±0.05°C* |
| *12.5kHz* | *±0.18dB* | *Relative Humidity* | *±0.46%* |
| *16kHz* | *±0.31dB* | *Barometric Pressure* | *±0.017kPa* |
| Electrical Tests | | | |
| *31.5 Hz to 20 kHz* | *±0.12dB* | | |

*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.

Accredited for compliance with ISO/IEC 17025 - calibration.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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## Sound Calibrator
IEC 60942-2017

# Calibration Certificate

**Calibration Number** C18619

| | |
|---|---|
| **Client Details** | Global Acoustics Pty Ltd<br>12/16 Huntingdale Drive<br>Thornton NSW 2322 |
| **Equipment Tested/ Model Number :** | Pulsar Model 106 |
| **Instrument Serial Number :** | 81334 |

**Atmospheric Conditions**

| | |
|---|---|
| **Ambient Temperature :** | 24.2°C |
| **Relative Humidity :** | 42.9% |
| **Barometric Pressure :** | 97.69kPa |

| | | | |
|---|---|---|---|
| **Calibration Technician :** | Lucky Jaiswal | **Secondary Check:** | Lewis Boorman |
| **Calibration Date :** | 22 Nov 2018 | **Report Issue Date :** | 29 Nov 2018 |

**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 | 94.2 | 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 -

| Specific Tests | | Environmental Conditions | |
|---|---|---|---|
| *Generated SPL* | *±0.11dB* | *Temperature* | *±0.2°C* |
| *Frequency* | *±0.01%* | *Relative Humidity* | *±2.4%* |
| *Distortion* | *±0.48%* | *Barometric Pressure* | *±0.015kPa* |

*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.

NATA
WORLD RECOGNISED ACCREDITATION

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 Australian/national standards.

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## Sound Calibrator
**IEC 60942-2004**

# Calibration Certificate

**Calibration Number** C17149

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

**Equipment Tested/ Model Number :** Pulsar 106
**Instrument Serial Number :** 79631

**Atmospheric Conditions**
**Ambient Temperature :** 21.9°C
**Relative Humidity :** 54.6%
**Barometric Pressure :** 98.84kPa

**Calibration Technician :** Vicky Jaiswal
**Secondary Check:** Riley Cooper
**Calibration Date :** 30/03/2017
**Report Issue Date :** 31/03/2017

**Approved Signatory :** Juan Aguero

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 5.2.2: Generated Sound Pressure Level | *Pass* | 5.3.2: Frequency Generated | *Pass* |
| 5.2.3: Short Term Fluctuation | *Pass* | 5.5: Total Distortion | *Pass* |

| | Nominal Level | Nominal Frequency | Measured Level | Measured Frequency |
|---|---|---|---|---|
| Measured Output | 94.0 | 1000.0 | 94.1 | 1000.38 |

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement -

| Specific Tests | | Environmental Conditions | |
|---|---|---|---|
| *Generated SPL* | *±0.11dB* | *Temperature* | *±0.05°C* |
| *Short Term Fluct.* | *±0.02dB* | *Relative Humidity* | *±0.46%* |
| *Frequency* | *±0.01%* | *Barometric Pressure* | *±0.017kPa* |
| *Distortion* | *±0.5%* | | |

*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

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards

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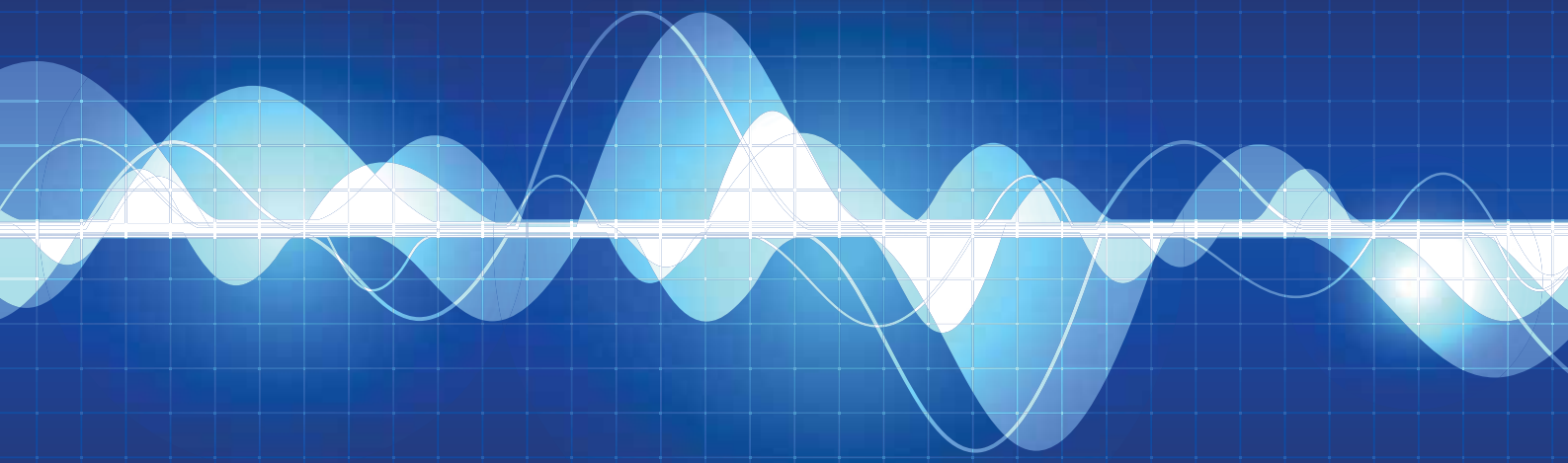
Appendix D

# Quarterly attended noise monitoring report – Quarter 1 2019

# Chain Valley Colliery

## Quarterly attended noise monitoring
## Quarter 1 - 2019

**Prepared for Great Southern Energy Pty Ltd (trading as DeltaCoal)**
**April 2019**



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F 07 3839 1866

## ADELAIDE
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Adelaide SA 5000
T 08 8232 2253

## PERTH
PO Box 8155
Fremantle WA 6160

## CANBERRA
PO Box 9148
Deakin ACT 2600

**www.emmconsulting.com.au**

# Chain Valley Colliery

Quarterly attended noise monitoring - Quarter 1 2019

Prepared for Great Southern Energy Pty Ltd (trading as DeltaCoal)
April 2019



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# Chain Valley Colliery

## Quarterly attended noise monitoring - Quarter 1 2019

**Report Number**

H180389 RP2

**Client**

Great Southern Energy Pty Ltd (trading as DeltaCoal)

**Date**

18 April 2019

**Version**

v1-0 Draft

**Prepared by**

**Lucas Adamson**
Acoustic Consultant
18 April 2019

**Approved by**

**Najah Ishac**
Director
18 April 2019

# Table of Contents



## Appendices



## Tables



## Figures

# 1 Introduction

EMM Consulting Pty Limited (EMM) was engaged to undertake operator attended noise surveys on behalf of DeltaCoal Pty Limited (DeltaCoal).

The purpose of the monitoring was to address requirements of the Chain Valley Colliery Noise Management Plan (NMP), prepared to satisfy the requirements of the Development Consent SSD-5465 (DC) and Environment Protection License (EPL) 1770.

The approved Chain Valley Colliery Noise Management Plan (NMP) requires monitoring to occur on a quarterly basis. This report presents the results and findings of attended noise monitoring conducted during the first quarter of 2019, on 26 March 2019.

The following material was referenced as part of this assessment:

- Department of Planning and Environment (DPE), Development Consent SSD-5465, as modified on 16 December 2015 (current as of 26 March 2019);
- Environment Protection Authority (EPA), Environment Protection License (EPL) 1770, as varied on 8 June 2016 (current as of 26 March 2019);
- Chain Valley Colliery Noise Management Plan, approved by DPE on 12 March 2014;
- NSW EPA, Industrial Noise Policy (INP), 2000;
- NSW EPA, Industrial Noise Policy Application notes, 2017; and
- NSW EPA, Noise Policy for Industry (NPfI), 2017.

# 2 Noise limits

## 2.1 Operational and sleep disturbance noise limits

Chain Valley Colliery noise limits are provided in Table 1, Condition 7 of Schedule 3 of the DC and L5.1 of the EPL. Extracts of the relevant sections of the DC and EPL pertaining to noise are provided in Appendix A and B, respectively. The approved NMP adopts seven attended noise monitoring locations that are representative of residences outlined in the DC. One additional location, assessment location R13, has also been included. The noise monitoring locations and relevant criteria are summarised in Table 3.1.

**Table 2.1 Noise impact assessment criteria**

| Monitoring location (refer Fig 3.1) | Assessment location | Day $L_{Aeq,15\ minute}$, dB | Evening $L_{Aeq,15\ minute}$, dB | Night $L_{Aeq,15\ minute}$, dB | Night $L_{A1,1\ minute}$, dB |
|---|---|---|---|---|---|
| ATN001 | R9 | 35 | 35 | 35 | 45 |
| ATN002 | R11 | 49 | 49 | 49 | 54 |
| R12 | R12 | 49 | 49 | 49 | 53 |
| R13 | R13 | 43 | 43 | 43 | 49 |
| ATN003 | R15 | 36 | 36 | 36 | 45 |
| ATN004 | R14 | 35 | 35 | 35 | 45 |
| ATN005 | R17 | 35 | 35 | 35 | 45 |
| ATN006 | R19 | 37 | 37 | 37 | 45 |
| ATN007 | R22 | 46 | 46 | 46 | 46 |

The DC specifies the following meteorological conditions under which noise limits do not apply:

- wind speeds greater than 3 m/s at 10 metres above ground level; or
- stability category F or G temperature inversion conditions.

The EPL specifies the following meteorological conditions under which noise limits do not apply:

- wind speeds greater than 3 m/s at 10 metres above ground level;
- stability category F temperature inversion and with wind speeds greater than 2 m/s at 10 metres above ground level; or
- stability category G temperature inversion conditions.

If noise limits are satisfied adopting the EPL weather exclusion rules, then the DC limits will also be met. For this assessment, the recorded $L_{Amax}$ has been used as a conservative estimate of the $L_{A1,1\ minute}$. The INP application notes state that the EPA accepts sleep disturbance analysis based on either the $L_{A1,1\ minute}$ or $L_{Amax}$ metrics (EPA 2013), with $L_{Amax}$ resulting in a more conservative assessment.

The DC and EPL state that modification factor corrections in the application notes to the INP (2017) shall be applied to the measured mine noise levels where applicable. The application notes to the INP state that Fact Sheet C of the NPfI (EPA 2017) now applies regarding the application of modifying factors.

## 2.2 Low frequency noise criteria

Appendix 8 Condition 5 of the DC and L5.9 of the EPL states that noise generated by Chain Valley Colliery is to be measured in accordance with the relevant requirements of the INP. The INP application notes state that Section 4 of the INP has been withdrawn and the modifying factor adjustments outlined in Fact Sheet C of the NPfI are to be used when assessing the characteristics of a noise source.

Fact sheet C of the NPfI (EPA 2017) provides guidelines for applying modifying factor corrections to account for low frequency noise emissions. The NPfI specifies that a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels identifies the potential for an unbalanced spectrum and potential increased annoyance.

Where a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels is identified, the one-third octave noise levels recorded should be compared to the values in Table C2 of the NPfI (EPA 2017), which has been reproduced in Table 2.2 below.

**Table 2.2 One-third octave low-frequency noise thresholds**

| | One-third octave $L_{Zeq,15\ minute}$ threshold level | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency (Hz)** | **10** | **12.5** | **16** | **20** | **25** | **31.5** | **40** | **50** | **63** | **80** | **100** | **125** | **160** |
| dB (Z) | 92 | 89 | 86 | 77 | 69 | 61 | 54 | 50 | 50 | 48 | 48 | 46 | 44 |

The following modifying factor correction is to be applied where the site 'C-weighted' and site 'A-weighted' noise emission level is 15 dB or more and:

- where any of the one-third octave noise levels in Table 3.2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period; or
- where any of the one-third octave noise levels in Table 3.2 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period.

Hence, where possible throughout each survey the operator has estimated the difference between site 'C-weighted' and site 'A-weighted' noise emission levels by matching audible sounds with the response of the analyser ($L_{Ceq}$-$L_{Aeq}$). Where this was deemed to be 15 dB or greater, the measured one-third octave frequencies have been compared to the values in Table 2.2 to identify the relevant modifying factor correction (if applicable). This method has been applied to this assessment as presented in Section 5.

It is of note that the NPfI (EPA 2017) states that low-frequency noise corrections only apply under the standard or noise-enhancing (i.e. applicable) meteorological conditions.

# 3 Assessment methodology

## 3.1 Attended noise monitoring

To quantify noise emissions from Chain Valley Colliery, 15-minute attended noise monitoring surveys were completed at representative locations, in accordance with the approved NMP.

Noise monitoring locations required as per the NMP, as well as one additional location, and their coordinates are listed in Table 3.1 and are shown in Figure 3.1.

**Table 3.1 Attended noise monitoring locations**

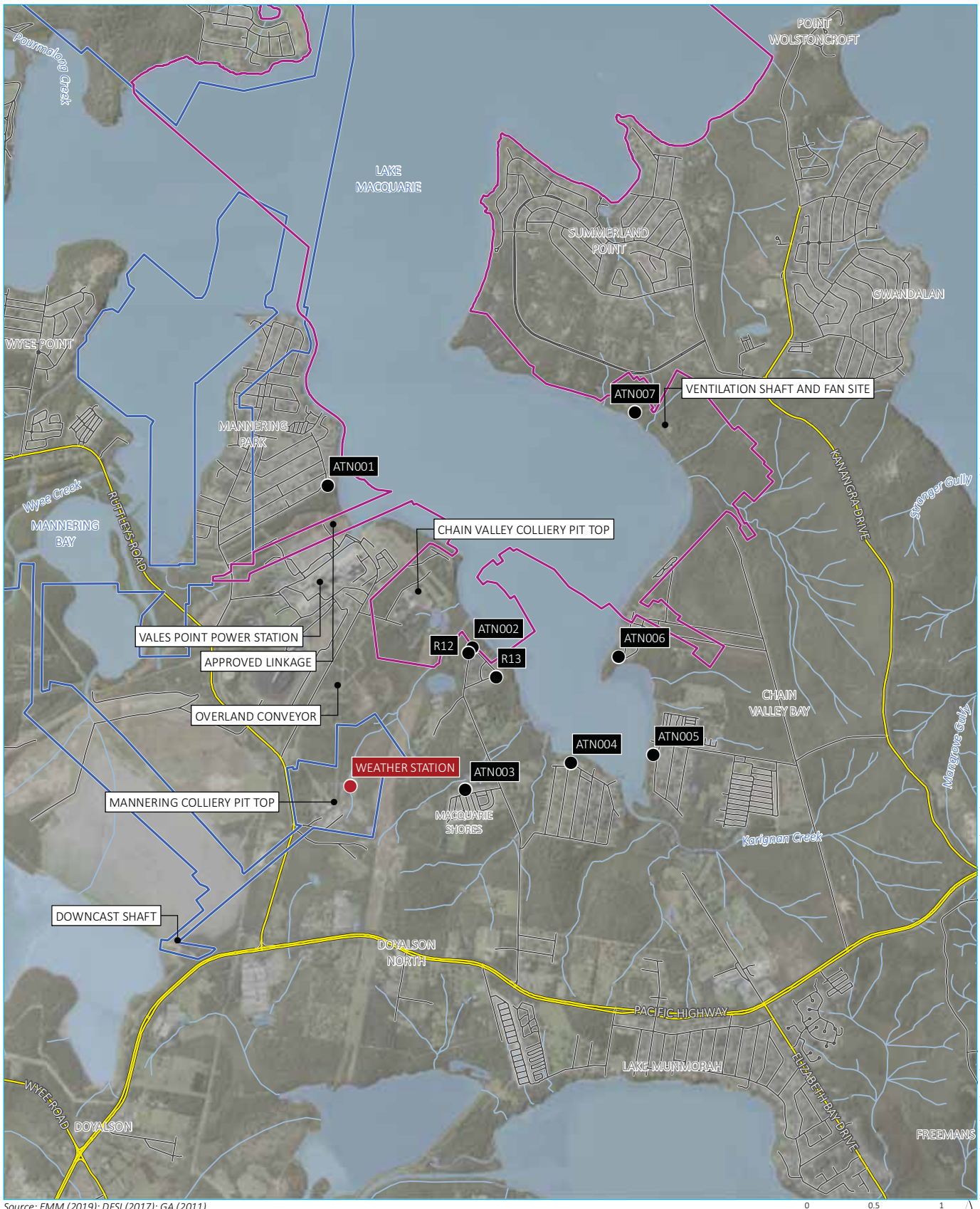
| Monitoring location | Description | MGA56 | |
|---|---|---|---|
| | | Easting | Northing |
| ATN001 | Griffith Street, Mannering Park | 364140 | 6330594 |
| ATN002 | Lakeshore Avenue, Kingfisher Shores | 365218 | 6329388 |
| ATN003 | Short Street, Macquarie Shores | 365165 | 6328323 |
| ATN004 | Lloyd Avenue, Chain Valley Bay | 365949 | 6328530 |
| ATN005 | Teragalin Drive, Chain Valley Bay | 366560 | 6328590 |
| ATN006 | Sunset Parade, Chain Valley Bay | 366305 | 6329321 |
| ATN007[1] | Cams Boulevard, Chain Valley Bay | 366425 | 6331135 |
| R12[2] | Lakeshore Avenue, Kingfisher Shores | 365185 | 6329352 |
| R13 | Karoola Avenue, Kingfisher Shores | 365391 | 6329169 |

Notes: 1. Due to access issues, noise monitoring for ATN007 was conducted at an intermediate location with site contributions calculated back to ATN007.
2. Noise monitoring at R12 is conducted in conjunction with ATN002, as monitoring location is representative of both ATN002 and R12.

## 3.2 Instrumentation

Brüel & Kjær 2250 Type 1 and Svantek 979 Type 1 sound analysers (s/n 2759405 and 21095, respectively) were used to conduct 15-minute attended measurements and record 1/3 octave frequency and statistical noise indices. The sound analysers were calibrated before and on completion of the survey using a Brüel & Kjær Type 4230 calibrator (s/n 1276091). The instrumentation's calibration certificates are provided in Appendix C.

Where possible throughout each survey, the operator has quantified the contribution of each significant noise source. This was done by matching audible sounds with the response of the analyser (where applicable) and/or via post-analysis of data (e.g. low pass filtering).




Source: EMM (2019); DFSI (2017); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm\Jobs\2018\H180389 - LakeCoal CVC and MC noise monitoring\8 GIS\02_Maps\N001_AssessmentLocationsChainValley_20190401_01.mxd 3/04/2019

KEY

- Chain Valley Colliery development consent boundary
- Mannering Colliery project approval boundary
- Noise monitoring location
- Weather station
- Main road
- Local road
- Watercourse/drainage line
- Waterbody

Site boundary and noise monitoring locations

Chain Valley Colliery noise monitoring
Figure 3.1

EMM creating opportunities

## 3.3 Determination of stability category

As required by the DC, EPL and NMP, this assessment determined the stability categories throughout the attended monitoring period using the sigma-theta (ST) method as per Appendix E of the INP (EPA 2000). The ST data was obtained from Chain Valley Colliery meteorological station located to the north of the site.

Table E1 of the INP (EPA 2000) is reproduced in Table 4.2 and presents the stability categories and associated ranges in temperature lapse rates.

**Table 3.2 Stability categories and temperature lapse rates**

| Stability category | Temperature lapse rate (ΔT) (°C/100 m) |
|---|---|
| A | $\Delta T < -1.9$ |
| B | $-1.9 \leq \Delta T < -1.7$ |
| C | $-1.7 \leq \Delta T < -1.5$ |
| D | $-1.5 \leq \Delta T < -0.5$ |
| E | $-0.5 \leq \Delta T < 1.5$ |
| F | $1.5 \leq \Delta T < 4.0$ |
| G | $\Delta T \geq 4.0$ |

Source: INP (EPA 2000).

# 4 Review of data and discussion

## 4.1 Summary

Results of attended noise measurements are summarised in Table 4.1. Chain Valley Colliery contribution and total mine noise were determined for each survey using in-field observations and post-analysis of data as required (e.g. removing higher frequencies that are not mine related i.e. above 630 Hz). Attended monitoring was completed on 26 March 2019.

The meteorological data for the monitoring period was sourced from Mannering Colliery's weather station to determine applicability of criteria in accordance with the DC and EPL. In accordance with the DC, noise limits were not applicable during 13 of the 24 measurements due the presence of wind speeds greater than 3 m/s or an F atmospheric stability category. In accordance with the EPL, noise limits were not applicable during 11 of the 24 measurements due the presence of wind speeds greater than 3 m/s or an F atmospheric stability category in combination with wind speeds greater than 2 m/s.

Low frequency noise was conservatively assessed by comparison of the total measured one-third octave $L_{Aeq}$ noise levels to the NPfI one-third octave low-frequency noise thresholds. Measured noise levels exceed the relevant LFN thresholds during the three measurements at ATN007. Therefore, in accordance with the NPfI, a 2 dB positive adjustment was found to be relevant and was applied to estimated site noise levels for these measurements.

Monitoring identified that site noise was inaudible during 21 of the 24 measurements. Typically, when a particular source is not audible above local ambient noise levels, the likely contribution of that source is generally at least 10 dB below the measured background ($L_{A90}$) level. Therefore, site $L_{Aeq}$ noise contributions were below the relevant limits at these locations.

At the one location where site noise was audible (i.e. vent fan emissions at ATN007), Chain Valley Colliery noise contributions were below (i.e. complied with) the noise limits, where applicable.

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q1 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| ATN1 | 26/3 | 15:35 (Day) | 44 | 46 | 53 | 50 | 67 | 74 | 70 | Nil | IA | N/A | 35 | N/A | 2.4 m/s @ 169 B class stability Y/Y | Nil/Nil | **Site noise inaudible.** Vales Point Power Station (VPPS) noise and bird noise consistent. Wind in trees, resident noise, car passbys and distant traffic occasional. |
| ATN1 | 26/3 | 18:32 (Eve.) | 46 | 48 | 52 | 52 | 59 | 78 | 70 | Nil | IA | N/A | 35 | N/A | 3.8 m/s @ 165 B class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** VPPS noise consistent. Bird noise frequent. Wind in trees, resident noise, car passbys and distant traffic occasional. |
| ATN1 | 26/3 | 23:14 (Night) | 45 | 47 | 49 | 50 | 53 | 59 | 67 | Nil | IA | IA | 35 | 35 | 2.1 m/s @ 148 F class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** VPPS noise and insects consistent. Wind in trees, local traffic and dogs barking occasional. |
| ATN2 | 26/3 | 16:06 (Day) | 35 | 38 | 43 | 45 | 51 | 60 | 58 | Nil | IA | N/A | 49 | N/A | 2.0 m/s @ 158 A class stability Y/Y | Nil/Nil | **Site noise inaudible.** Bird noise consistent. Wind in trees and VPPS noise frequent. Resident noise, local traffic and boat noise occasional. |
| ATN2 | 26/3 | 19:15 (Eve.) | 35 | 38 | 44 | 44 | 55 | 67 | 58 | Nil | IA | N/A | 49 | N/A | 2.1 m/s @ 165 A class stability Y/Y | Nil/Nil | **Site noise inaudible.** Insects and VPPS noise consistent. Distant and local traffic frequent. Wind in trees and distant dogs barking occasional. |
| ATN2 | 26/3 | 23:39 (Night) | 31 | 33 | 36 | 38 | 40 | 51 | 57 | Nil | IA | IA | 49 | 54 | 0.9 m/s @ 155 F class stability N/Y | 'N/A' / Nil | **Site noise inaudible.** Insects, bird noise and VPPS noise consistent. Wind in trees frequent. Distant traffic occasional. |
| ATN3 | 26/3 | 15:45 (Day) | 36 | 38 | 44 | 45 | 55 | 63 | 60 | Nil | IA | N/A | 36 | N/A | 3.6 m/s @ 161 B class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** Insects and bird noise consistent. Wind in trees, distant traffic and resident noise frequent. Aircraft noise and dogs barking occasional. |

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q1 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| ATN3 | 26/3 | 18:53 (Eve.) | 35 | 37 | 40 | 42 | 45 | 62 | 58 | Nil | IA | N/A | 36 | N/A | 2.2 m/s @ 152 B class stability Y/Y | Nil / Nil | **Site noise inaudible.** Insects and bird noise consistent. Wind in trees, resident noise, distant and local traffic frequent. Aircraft noise occasional. |
| ATN3 | 26/3 | 23:18 (Night) | 34 | 37 | 39 | 41 | 42 | 49 | 50 | Nil | IA | IA | 36 | 45 | 2.1 m/s @ 161 F class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** Insects, bird noise and idling noise from NE (unrelated to CVC) consistent. Distant traffic frequent. |
| ATN4 | 26/3 | 16:20 (Day) | 36 | 40 | 53 | 53 | 64 | 74 | 67 | Nil | IA | N/A | 35 | N/A | 2.5 m/s @ 125 A class stability Y/Y | Nil / Nil | **Site noise inaudible.** Insects consistent. Bird noise frequent. Car passbys, wind in trees, distant traffic, distant dogs barking, resident noise and nearby sign occasional. |
| ATN4 | 26/3 | 18:01 (Eve.) | 40 | 43 | 53 | 56 | 63 | 77 | 57 | Nil | IA | N/A | 35 | N/A | 2.3 m/s @ 177 B class stability Y/Y | Nil / Nil | **Site noise inaudible.** Insects consistent. Bird noise frequent. Car passbys, wind in trees, distant traffic, distant dogs barking, resident noise and nearby sign occasional. |
| ATN4 | 26/3 | 22:47 (Night) | 36 | 38 | 41 | 43 | 49 | 57 | 46 | Nil | IA | IA | 35 | 45 | 2.4 m/s @ 171 F class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** Insects consistent. Resident noise, distant dogs barking, wind in trees and distant traffic occasional. |
| ATN5 | 26/3 | 16:46 (Day) | 34 | 36 | 44 | 43 | 54 | 69 | 59 | Nil | IA | N/A | 35 | N/A | 1.9 m/s @ 143 A class stability Y/Y | Nil / Nil | **Site noise inaudible.** Insects and nearby music consistent. Bird noise frequent. Distant traffic, VPPS noise, distant dogs barking and nearby dogs occasional. |
| ATN5 | 26/3 | 19:19 (Eve.) | 35 | 37 | 42 | 43 | 52 | 56 | 55 | Nil | IA | N/A | 35 | N/A | 3.1 m/s @ 159 B class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** Insects consistent. Bird noise, distant traffic, distant dogs barking, wind in trees, aircraft noise and resident noise occasional. |

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q1 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| ATN5 | 26/3 | 22:22 (Night) | 30 | 32 | 37 | 39 | 44 | 51 | 54 | Nil | IA | IA | 35 | 45 | 2.7 m/s @ 156 F class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** Insects consistent. VPPS noise, distant traffic, wind in trees, distant dogs barking and nearby car occasional. |
| ATN6 | 26/3 | 17:10 (Day) | 36 | 38 | 49 | 49 | 61 | 72 | 58 | Nil | IA | N/A | 37 | N/A | 2.0 m/s @ 143 A class stability Y/Y | Nil / Nil | **Site noise inaudible.** Lapping water consistent. Bird noise frequent. Distant traffic, VPPS noise, wind in trees and resident noise occasional. |
| ATN6 | 26/3 | 19:41 (Eve.) | 35 | 38 | 42 | 45 | 48 | 63 | 54 | Nil | IA | N/A | 37 | N/A | 3.3 m/s @ 144 B class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** Insects and VPPS noise consistent. Wind in trees frequent. Resident noise, bird noise, distant traffic, dogs barking and boat noise occasional. |
| ATN6 | 26/3 | 22:01 (Night) | 33 | 36 | 41 | 44 | 48 | 57 | 50 | Nil | IA | IA | 37 | 45 | 2.1 m/s @ 163 F class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** Insects and wind in trees consistent. VPPS noise and bat noise occasional. |
| ATN7[6] | 26/3 | 17:39 (Day) | 52 | 53 | 54 | 54 | 58 | 62 | 73 | 2 dB | 43 (41+2) | N/A | 46 | N/A | 3.5 m/s @ 167 B class stability N/N | 'N/A' / 'N/A' | **CVC vent fan noise consistent and dominant.** Bird noise frequent. Wind in trees and aircraft noise occasional. |
| ATN7[6] | 26/3 | 18:05 (Eve.) | 51 | 53 | 53 | 54 | 55 | 60 | 73 | 2 dB | 43 (41+2) | N/A | 46 | N/A | 2.3 m/s @ 177 B class stability Y/Y | Nil / Nil | **CVC vent fan noise consistent and dominant.** Bird noise consistent. Wind in trees occasional. |
| ATN7[6] | 26/3 | 22:02 (Night) | 53 | 54 | 55 | 55 | 56 | 57 | 74 | 2 dB | 44 (42+2) | 43 | 46 | 46 | 2.1 m/s @ 163 F class stability N/N | 'N/A' / 'N/A' | **CVC vent fan noise consistent and dominant.** Insects and bird noise consistent. Distant traffic occasional. |
| R13 | 26/3 | 16:28 (Day) | 33 | 36 | 56 | 56 | 69 | 76 | 69 | Nil | IA | N/A | 43 | N/A | 1.6 m/s @ 140 A class stability Y/Y | Nil / Nil | **Site noise inaudible.** Bird noise consistent. VPPS noise and local traffic frequent. Wind in trees and dogs barking occasional. |

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q1 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| R13 | 26/3 | 19:33 (Eve.) | 33 | 36 | 46 | 46 | 58 | 71 | 53 | Nil | IA | N/A | 43 | N/A | 1.9 m/s @ 150 B class stability Y/Y | Nil / Nil | **Site noise inaudible.** Insects consistent. VPPS noise, distant and local traffic frequent. Resident noise and dogs barking occasional. |
| R13 | 26/3 | 23:58 (Night) | 28 | 32 | 41 | 45 | 47 | 66 | 49 | Nil | IA | IA | 43 | 49 | 1.3 m/s @ 160 F class stability N/Y | 'N/A' / Nil | **Site noise inaudible.** Insects and VPPS noise consistent. Bird noise, and wind in trees occasional. |

Notes:
1. Modifying factor correction for low frequency noise in accordance with fact sheet C of the NPfI (refer Section 2.2).
2. For assessment purposes the $L_{Amax}$ and the $L_{A1,1\ minute}$ are interchangeable.
3. Meteorological data were taken as an average over 15 minutes from Chain Valley Colliery weather station (Refer to Section 5.1).
4. IA = inaudible.
5. N/A = not applicable.
6. Due to access issues, noise monitoring for ATN007 was conducted at an intermediate location with site contributions calculated back to ATN007

# 5 Conclusion

EMM has completed a review of mine noise from Chain Valley Colliery within the surrounding community based on attended measurements conducted on 26 March 2019.

The applicability of noise limits was assessed with reference to Mannering Colliery's meteorological station located to the south of the site. In accordance with the DC, noise limits were not applicable during 13 of the 24 measurements due the presence of wind speeds greater than 3 m/s or an F atmospheric stability category. In accordance with the EPL, noise limits were not applicable during 11 of the 24 measurements due the presence of wind speeds greater than 3 m/s or an F atmospheric stability category in combination with wind speeds greater than 2 m/s.

The assessment of noise contributions from site included consideration of modifying factors for noise characteristics where relevant and in accordance with the INP.

Chain Valley Colliery noise contributions were below (satisfied) the noise limits, where applicable, at all monitoring locations for this round of noise monitoring.

# References

Chain Valley Colliery Noise Management Plan, 2014.

NSW Department of Planning and Environment, Development Consent SSD5465, 2015.

NSW Environment Protection Authority, Environment Protection License 1770.

NSW Environment Protection Authority, Industrial Noise Policy, 2000.

NSW Environment Protection Authority, Industrial Noise Policy Application notes, 2017.

NSW Environment Protection Authority, Noise Policy for Industry, 2017.

Appendix A

# Glossary of acoustic terms

Several technical terms are discussed in this report. These are explained in Table A.1**Error! Reference source not found.**.

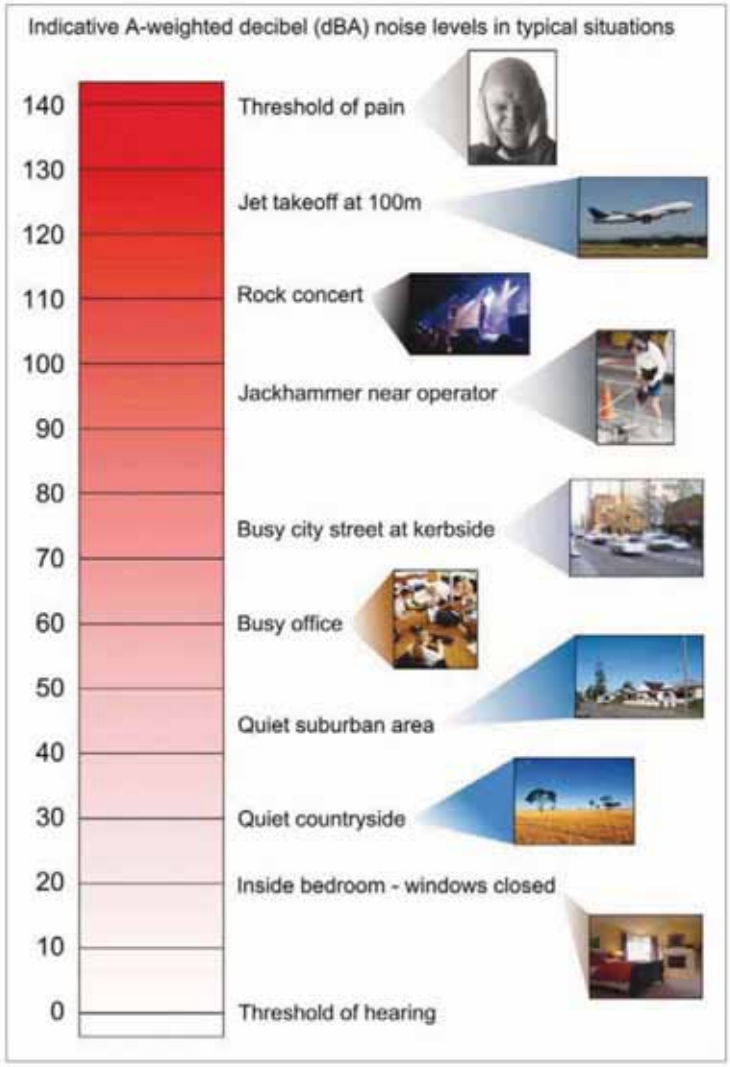
## Table A.1 Glossary of acoustic terms

| Term | Description |
|---|---|
| dB | Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear. |
| $L_{A1}$ | The 'A-weighted' noise level which is exceeded 1% of the time. |
| $L_{A1,1\ minute}$ | The 'A-weighted' noise level exceeded for 1% of the specified time period of 1 minute. |
| $L_{A10}$ | The 'A-weighted' noise level which is exceeded 10% of the time. It is approximately equivalent to the average of maximum noise level. |
| $L_{A90}$ | Commonly referred to as the background noise level. The 'A-weighted' noise level exceeded 90% of the time. |
| $L_{Aeq}$ | The energy average noise from a source. This is the equivalent continuous 'A-weighted' sound pressure level over a given period. The $L_{Aeq,15\ minute}$ descriptor refers to an $L_{Aeq}$ noise level measured over a 15-minute period. |
| $L_{Amin}$ | The minimum 'A-weighted' noise level received during a measuring interval. |
| $L_{Amax}$ | The maximum root mean squared 'A-weighted' sound pressure level (or maximum noise level) received during a measuring interval. |
| $L_{Ceq}$ | The equivalent continuous 'C-weighted' sound pressure level over a given period. The $L_{Ceq,15\ minute}$ descriptor refers to an $L_{Ceq}$ noise level measured over a 15 minute period. C-weighting can be used to measure low frequency noise. |
| Day period | Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm. |
| Evening period | Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm. |
| Night period | Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am. |
| Temperature inversion | A meteorological condition where the atmospheric temperature increases with altitude. |

It is useful to have an appreciation of decibels (dB), the unit of noise measurement. Table A.2**Error! Reference source not found.** gives an indication as to what an average person perceives about changes in noise levels. Examples of common noise levels are provided in Figure A.1.

## Table A.2 Perceived change in noise

| Change in sound pressure level (dB) | Perceived change in noise in surrounding environment |
|---|---|
| up to 2 | not perceptible |
| 3 | just perceptible |
| 5 | noticeable difference |
| 10 | twice (or half) as loud |
| 15 | large change |
| 20 | four times (or quarter) as loud |




Source: *Road Noise Policy (Department of Environment, Climate Change and Water 2011)*

## Figure A.1 Common noise levels

Appendix B

# Project approval extract

4. Prior to 31 March 2014, and every 12 months thereafter, unless the Secretary directs otherwise, the Applicant shall commission a suitably qualified person, whose appointment has been approved by the Secretary, to conduct an Independent Traffic Audit of the development. This audit must:
   (a) be undertaken without prior notice to the Applicant, and in consultation with RMS, NCC, WSC and the CCC;
   (b) assess the impact of the development on the performance and safety of the road network, including a review of:
      - haulage records;
      - accident records on the haulage route, infringements relating to the code of conduct and any incidents involving haulage vehicles;
      - community complaints register; and
   (c) assess the effectiveness of the Road Transport Protocol; and, if necessary, recommend measures to reduce or mitigate any adverse (or potentially adverse) impacts.

5. Within 1 month of receiving the audit report, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the report to the Secretary, with a detailed response to any of the recommendations contained in the audit report, including a timetable for the implementation of any measures proposed to address the recommendations in the audit report.

   A summary of the audit report must be included in the Annual Review.

**Alternative Coal Transport Options**

6. Prior to 31 December 2014, and every three years thereafter, the Applicant shall prepare and submit to the Secretary for approval, a study of the reasonable and feasible options to reduce or eliminate the use of public roads to transport coal from the development. The assessment must include:
   (a) an analysis of the capital, construction and operating costs of the alternative transport options; and
   (b) quantified social and environmental impacts associated with road and rail transport.

**NOISE**

**Noise Impact Assessment Criteria**

7. The Applicant shall ensure that the noise generated by the development at any residence on privately-owned land does not exceed the criteria for the location in Table 1 nearest to that residence.

*Table 1: Noise Criteria dB(A)*

| Location | Day | Evening | Night | |
|---|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{A1(1\ min)}$ |
| R8 | 38 | 38 | 38 | 45 |
| R11 | 49 | 49 | 49 | 54 |
| R12 | 49 | 49 | 49 | 53 |
| R13 | 43 | 43 | 43 | 49 |
| R15 | 36 | 36 | 36 | 45 |
| R19 | 37 | 37 | 37 | 45 |
| R22 | 46 | 46 | 46 | 46 |
| all other privately-owned land | 35 | 35 | 35 | 45 |

*Notes:*
- *To interpret the locations referred to in Table 1, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

**Operating Conditions**

8. The Applicant shall:
   (a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and transport noise generated by the development;

(b) regularly assess the noise monitoring and meteorological data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent;
(c) minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 8);
(d) use its best endeavours to achieve the long-term noise goals in Table 2, where reasonable and feasible, and report on progress towards achieving these goals in each Annual Review;
(e) carry out a comprehensive noise audit of the development in conjunction with each independent environmental audit; and
(f) prepare an action plan to implement any additional reasonable and feasible onsite noise mitigation measures identified by each audit;

to the satisfaction of the Secretary.

*Table 2: Long-term Noise Goals dB(A)*

| Location | Day | Evening | Night |
|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ |
| R11 – R13 | 41 | 41 | 41 |
| R22 | 40 | 40 | 40 |

*Notes:*

- *To interpret the locations referred to in Table 2, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

**Noise Management Plan**

9. The Applicant shall prepare a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:
(a) be prepared in consultation with the EPA and submitted to the Secretary for approval within 4 months of the date of this consent, unless otherwise agreed by the Secretary;
(b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent;
(c) describe the proposed noise management system in detail including the mitigation measures that would be implemented to minimise noise during construction and operations, including on and off site road noise generated by vehicles associated with the development; and
(d) include a monitoring program that:
- uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
- evaluates and reports on:
  - the effectiveness of the on-site noise management system; and
  - compliance against the noise operating conditions; and
- defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

The Applicant shall implement the approved management plan as approved from time to time by the Secretary.

**AIR QUALITY**

**Odour**

10. The Applicant shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.

**Air Quality Criteria**

11. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedance of the criteria listed in Tables 3, 4 and 5 at any residence on privately-owned land.

*Table 3: Long-term criteria for particulate matter*

| Pollutant | Averaging period | [d] Criterion |
|---|---|---|
| Total suspended particulate (TSP) matter | Annual | [a] 90 µg/m$^3$ |
| Particulate matter < 10 µm ($PM_{10}$) | Annual | [a] 30 µg/m$^3$ |

## APPENDIX 8
## NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 1 of the conditions are to apply under all meteorological conditions except the following:
   (a) during periods of rain or hail;
   (b) average wind speed at microphone height exceeds 5 m/s;
   (c) wind speeds greater than 3 m/s measured at 10 m above ground level; or
   (d) temperature inversion conditions greater than 3°C/100 m.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station described in condition 15 of schedule 3.

### Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.

4. This monitoring must be carried out at least 4 times in each calendar year (ie at least once every 3 months), unless the Secretary directs otherwise.

5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
   (a) monitoring locations for the collection of representative noise data;
   (b) meteorological conditions during which collection of noise data is not appropriate;
   (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
   (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

Appendix C

# EPL extract

## L4 Waste

L4.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled “Waste” and meeting the definition, if any, in the column titled “Description” in the table below.
Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled “Activity” in the table below.
Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled “Other Limits” in the table below.
This condition does not limit any other conditions in this licence.

| Code | Waste | Description | Activity | Other Limits |
|---|---|---|---|---|
| NA | Waste | Any other waste received on the premises for storage, treatment, processing, sorting or disposal and which receipt is not a scheduled activity under Schedule 1 of the POEO Act, as in force from time to time. | - | |
| NA | General or Specific exempted waste | Waste that meets all the conditions of a resource exemption under Clause 92 of the Protection of the Environment Operations (Waste) Regulation 2014. | As specified in each particular resource recovery exemption | NA |

## L5 Noise limits

L5.1 Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.

**POINT 12**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 49 |
| Evening | Evening-LAeq (15 minute) | - | 49 |
| Night | Night-LAeq (15 minute) | - | 49 |
| Night | Night-LA1 (1 minute) | - | 54 |

**POINT 13**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 49 |
| Evening | Evening-LAeq (15 minute) | - | 49 |
| Night | Night-LAeq (15 minute) | - | 49 |
| Night | Night-LA1 (1 minute) | - | 53 |

**POINT 14**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 43 |
| Evening | Evening-LAeq (15 minute) | - | 43 |
| Night | Night-LAeq (15 minute) | - | 43 |
| Night | Night-LA1 (1 minute) | - | 49 |

**POINT 16**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 36 |
| Evening | Evening-LAeq (15 minute) | - | 36 |
| Night | Night-LAeq (15 minute) | - | 36 |
| Night | Night-LA1 (1 minute) | - | 45 |

**POINT 20**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 37 |
| Evening | Evening-LAeq (15 minute) | - | 37 |
| Night | Night-LAeq (15 minute) | - | 37 |
| Night | Night-LA1 (1 minute) | - | 45 |

# Environment Protection Licence



**POINT 23**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 46 |
| Evening | Evening-LAeq (15 minute) | - | 46 |
| Night | Night-LAeq (15 minute) | - | 36 |
| Night | Night-LA1 (1 minute) | - | 45 |

**POINT 9**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 38 |
| Evening | Evening-LAeq (15 minute) | - | 38 |
| Night | Night-LAeq (15 minute) | - | 38 |
| Night | Night-LA1 (1 minute) | - | 45 |

L5.2 The licensee must ensure that noise generated on the premises does not exceed:

a) 35 LAeq(15min) during the day, evening or night at any privately owned land nearest to the residence apart from those receivers identified in Condition 5.1; and
b) 45 LA1(1min) during the night at any privately owned land nearest to the residence apart from those receivers identified in Condition 5.1.

Note: The licensee may provide to the EPA written evidence of any agreement with a landholder which is subject to the above noise limits. The written evidence may be submitted with a licence variation to remove the landholder from the above tables.

L5.3 For the purpose of condition L5.1 and condition L5.2:
(a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and public holidays;
(b) Evening is defined as the period 6pm to 10pm, and
(c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

L5.4 The noise limits set out in condition L5.1 and condition L5.2 apply under all meterorological conditions except for any one of 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.

L5.5 For the purpose of condition L5.4:
(a) the meteorological data to be used for determining meteorological conditions is the data recorded at the meteorological station identified in this licence as EPA Identification Point 26.
(b) Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the *NSW industrial Noise Policy* (EPA 2000)

Note: The weather station must be designed, commissioned and operated in a manner to obtain the necessary parameters required under the above condition.

L5.6 For the purpose of determining the noise generated at the premises the licensee must use a Class 1 or Class 2 noise monitoring device as defined by AS IEC61672.1 and AS IEC61672.2-2004, or other noise monitoring equipment accepted by the EPA in writing.

L5.7 To determine compliance:

1. With the $L_{Aeq(15\ min)}$ noise limits in condition L5.1 and condition L5.2, the licensee must locate noise monitoring equipment;

(a) within 30 metres of a dwelling facade (but not closer than 3 metres) where any dwelling on the property is situated more then 30 metres from the property boundary that is closest to the premises;

(b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises, or, where applicable,

(c) within approximately 50 metres if the boundary of a national park or nature reserve.

2. With the LA1(1 minute) noise limits in condition L5.1 and L5.2, the noise monitoring equipment must be located within 1 metre of a dwelling facade.

3. With the noise limits in condition L5.1 and condition L5.2, the noise monitoring equipment must be located;

(a) at the most affected point at a location where there is no dwelling at the location, or

(b) at the most affected point within an area at a location prescribed by conditions L5.7 1(a) or L5.7 1(b).

L5.8 A non-compliance of condition L5.1 or condition L5.2 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 conditions L5.7 1(a) and L5.7 1(b), and /or
b) at a point other than the most affected point at a location.

L5.9 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.

# 4 Operating Conditions

Appendix D

# Calibration certificates

# CERTIFICATE OF CALIBRATION

**CERTIFICATE NO.: SLM 22926 & FILT 4696**

| | | | |
|---|---|---|---|
| **Equipment Description:** | Sound & Vibration Analyzer | | |
| **Manufacturer:** | Svantek | | |
| **Model No:** | Svan-979 | **Serial No:** | 21095 |
| **Microphone Type:** | 40AE | **Serial No:** | 120711 |
| **Preamplifier Type:** | SV17 | **Serial No:** | 25110 |
| **Filter Type:** | 1/3 Octave | **Serial No:** | 21095 |
| **Comments:** | All tests passed for class 1.<br>(See over for details) | | |
| **Owner:** | EMGA Mitchell Mclennan<br>Ground Floor, Suite 01, 20 Chandos St<br>St Leonards NSW 2065 | | |
| **Ambient Pressure:** | 999 hPa ±1.5 hPa | | |
| **Temperature:** | 23 °C ±2° C | **Relative Humidity:** | 35% ±5% |
| **Date of Calibration:** | 14/06/2018 | **Issue Date:** | 15/06/2018 |
| **Acu-Vib Test Procedure:** | AVP10 (SLM) & AVP06 (Filters) | | |

**CHECKED BY:** ..... **AUTHORISED SIGNATURE:** .....
Jack Rielt

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab. No. 9262
Acoustic and Vibration Measurements


ACU-VIB ELECTRONICS
HEAD OFFICE
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02)96808233
Mobile: 0413 809806
web site: www.acu-vib.com.au

# CERTIFICATE OF CALIBRATION

**CERTIFICATE NO:** 24152

**EQUIPMENT TESTED:** Sound Level Calibrator

**Manufacturer:** B & K
**Type No:** 4230 **Serial No:** 1276091
**Owner:** EMM Consulting
Level 1, 146 Hunter Street
Newcastle, NSW 2300

**Tests Performed:** Measured output pressure level was found to be:

| Parameter | Pre-Adj | Adj Y/N | Output: (db re 20 µPa) | Frequency: (Hz) | THD&N (%) |
|---|---|---|---|---|---|
| **Level 1:** | NA | N | 93.81 | 989.84 | 1.58 |
| **Level 2:** | NA | N | NA | NA | NA |
| **Uncertainty:** | | | ±0.11 dB | ±0.05% | ±0.20 % |
| Uncertainty (at 95% c.l.) k=2 | | | | | |

**CONDITION OF TEST:**
**Ambient Pressure:** 1004 hPa ±1.5 hPa **Relative Humidity:** 47% ±5%
**Temperature:** 20 °C ±2° C
**Date of Calibration:** 14/02/2019 **Issue Date:** 15/02/2019
**Acu-Vib Test Procedure:** AVP02 (Calibrators)
**Test Method: AS IEC 60942 - 2017**
**CHECKED BY:** ..... **AUTHORISED SIGNATURE:** .....
Jack Kidt

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.
The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab. 9262
Acoustic and Vibration Measurements

ACU-VIB
ELECTRONICS
HEAD OFFICE
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
Tel: (02) 96808133 Fax: (02)96808233
Mobile: 0413 809806
Web site: www.acu-vib.com.au

# CERTIFICATE OF CALIBRATION

**CERTIFICATE NO.:** **SLM 22129 & FILT 4384**

| | | | |
|---|---|---|---|
| **Equipment Description:** | Sound Level Meter | | |
| **Manufacturer:** | B & K | | |
| **Model No:** | 2250 | **Serial No:** | 2759405 |
| **Microphone Type:** | 4189 | **Serial No:** | 2888134 |
| **Filter Type:** | 1/3 Octave | **Serial No:** | 2759405 |
| **Comments:** | All tests passed for class 1.<br>(See over for details) | | |
| **Owner:** | EMGA Mitchell Mclennan<br>Ground Floor, Suite 01, 20 Chandos St<br>St Leonards NSW 2065 | | |
| **Ambient Pressure:** | 1008 hPa ±1.5 hPa | | |
| **Temperature:** | 25 °C ±2° C | **Relative Humidity:** | 48% ±5% |
| **Date of Calibration:** | 07/02/2018 | **Issue Date:** | 09/02/2018 |

**Acu-Vib Test Procedure:** AVP10 (SLM) & AVP06 (Filters)

**CHECKED BY:** .....  **AUTHORISED SIGNATURE:** .....

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