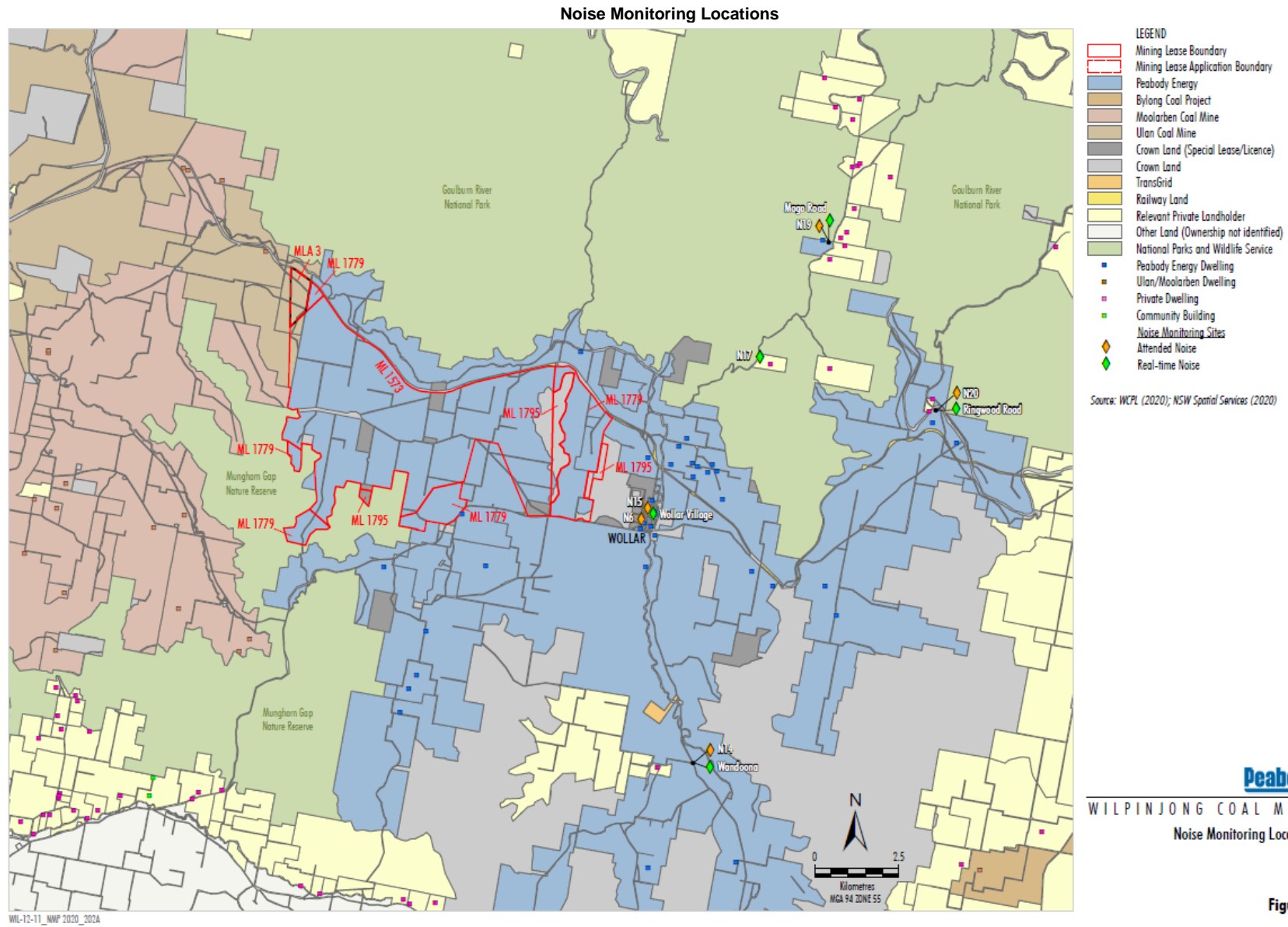


**APPENDIX 3F**  
**NOISE MONITORING DATA**





- LEGEND**
- Peabody Energy
  - Crown Land (Special Lease/Licence)
  - Crown Land
  - Railway Land
  - Relevant Private Landholder
  - 1 Landholder Reference Number
  - Peabody Energy Dwelling
  - Community Building
  - Private Dwelling
- # Special Lease/Licence Holder

- Noise Monitoring Sites**
- Attended Noise
  - Real-time Noise

Source: WCPL (2020); NSW Spatial Services (2020)

**Peabody**  
 WILPINJONG COAL MINE  
 Noise Monitoring Sites  
 - Wollar

Figure 4

## Noise Monitoring Reports

# *Wilpinjong Coal*

---

*Environmental Noise Monitoring  
January 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

---



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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring January 2021

Reference: 21012\_R01

Report date: 19 February 2021

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Jason Cameron  
Consultant

QA Review: Jesse Tribby  
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*

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## 1 INTRODUCTION

### 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 26/27 January 2021 at six locations.

### 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O’Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

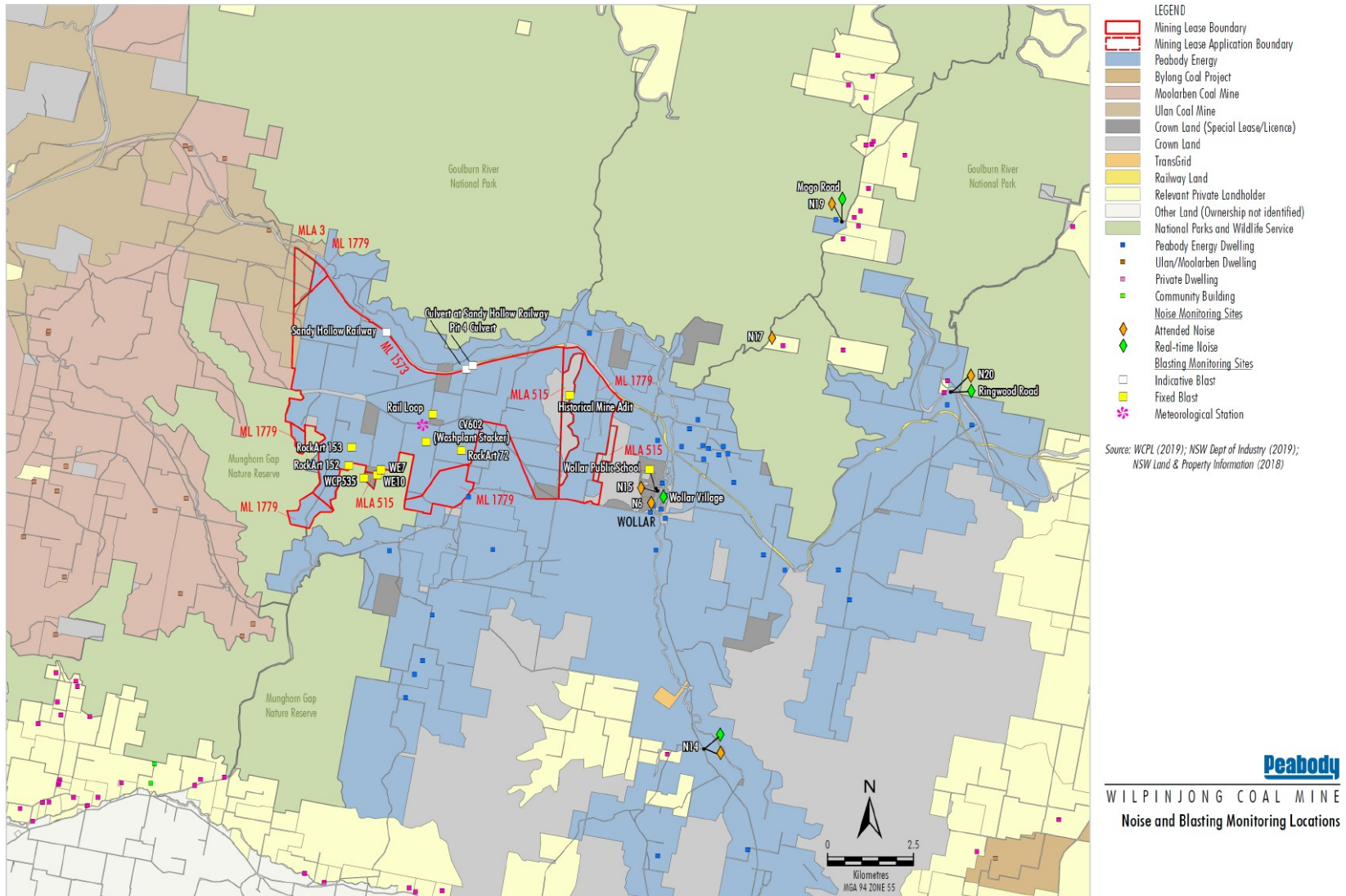


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2019)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The “C” weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in June 2020. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in September 2019. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

- N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
- N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Jason Cameron.

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

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

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

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

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

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

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

### 3.3 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	00701424	14/06/2021
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	79631	13/05/2022
Pulsar 105 acoustic calibrator	78226	08/02/2023

### 3.4 Modifying Factors

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

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

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

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	26/01/2021 23:10	51	49	48	47	47	46	44
N14	26/01/2021 22:45	48	44	39	36	33	29	25
N15	26/01/2021 23:30	49	47	46	46	46	45	42
N17	26/01/2021 22:26	56	56	55	55	55	54	53
N19	26/01/2021 22:00	55	54	54	52	52	50	44
N20	26/01/2021 22:00	41	38	37	35	35	32	29

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.4.

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



### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JANUARY 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	26/01/2021 23:10	1.7	E	37	Yes	IA	Nil
N14	26/01/2021 22:45	1.1	E	35	Yes	<25	Nil
N15	26/01/2021 23:30	2.3	E	37	Yes	IA	Nil
N17	26/01/2021 22:26	0.2	E	38	Yes	26	Nil
N19	26/01/2021 22:00	1.7	E	35	Yes	<20	Nil
N20	26/01/2021 22:00	1.7	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JANUARY 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	26/01/2021 23:10	1.7	E	45	Yes	IA	Nil
N14	26/01/2021 22:45	1.1	E	45	Yes	28	Nil
N15	26/01/2021 23:30	2.3	E	45	Yes	IA	Nil
N17	26/01/2021 22:26	0.2	E	45	Yes	35	Nil
N19	26/01/2021 22:00	1.7	E	45	Yes	<20	Nil
N20	26/01/2021 22:00	1.7	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – JANUARY 2021

Location	Start Date And Time	Temperature ° C	Wind Speed m/s	Wind Direction ° MN	Cloud Cover eighths
N6	26/01/2021 23:10	26	0.0	-	8
N14	26/01/2021 22:45	29	0.3	270	8
N15	26/01/2021 23:30	28	0.0	-	8
N17	26/01/2021 22:26	29	0.0	-	0
N19	26/01/2021 22:00	31	0.0	-	8
N20	26/01/2021 22:00	27	0.0	-	8

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

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

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

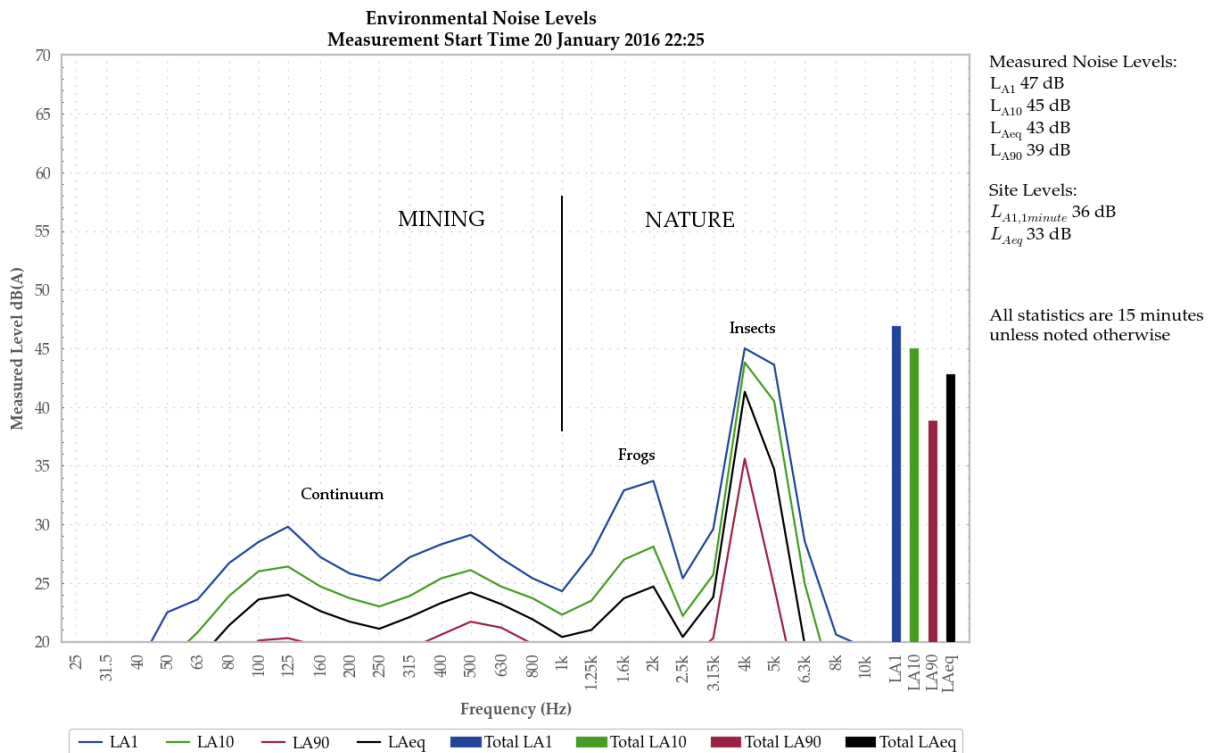
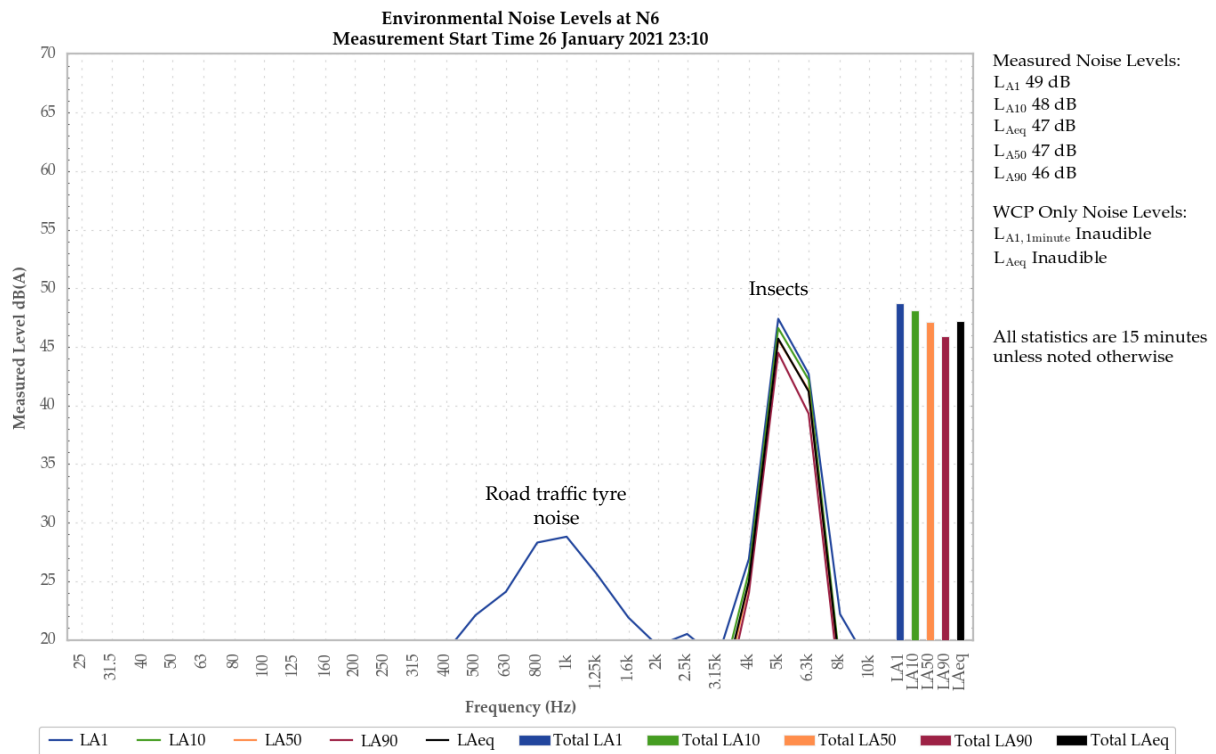


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6



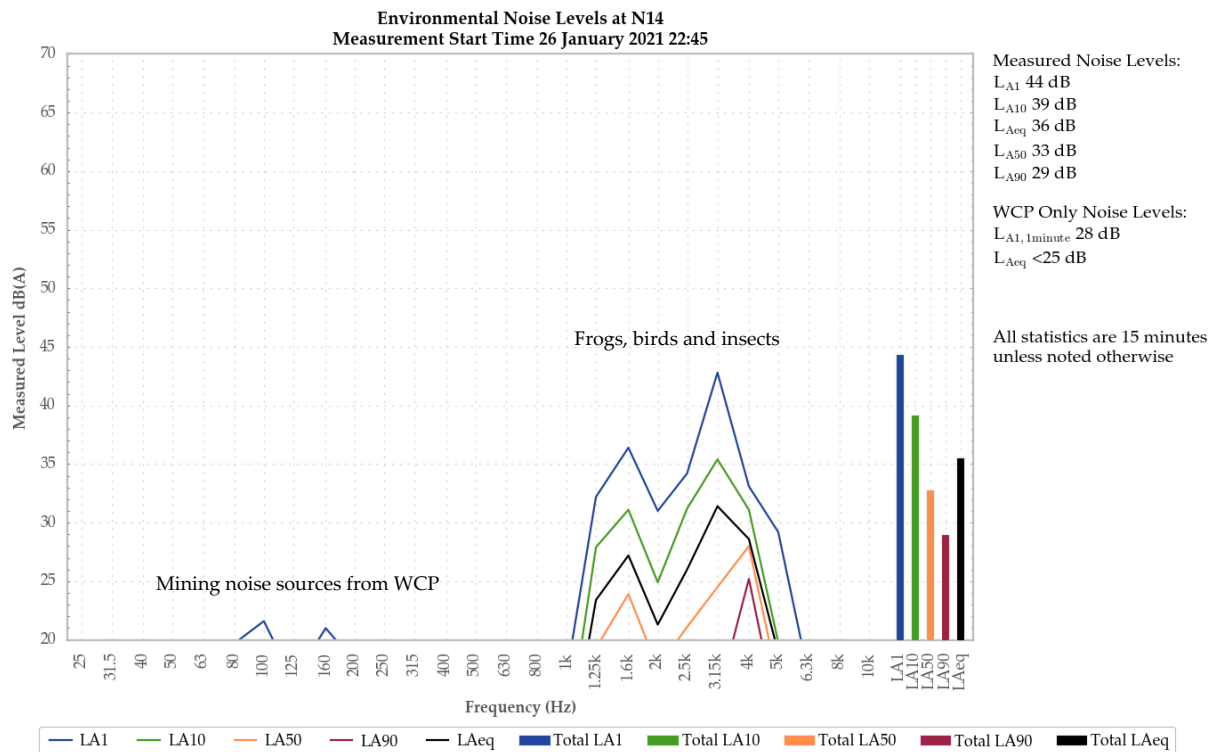
**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

WCP was inaudible.

Insects generated the measured levels.

Road traffic, bats, birds and local fan noise were also noted.

### 5.1.2 N14

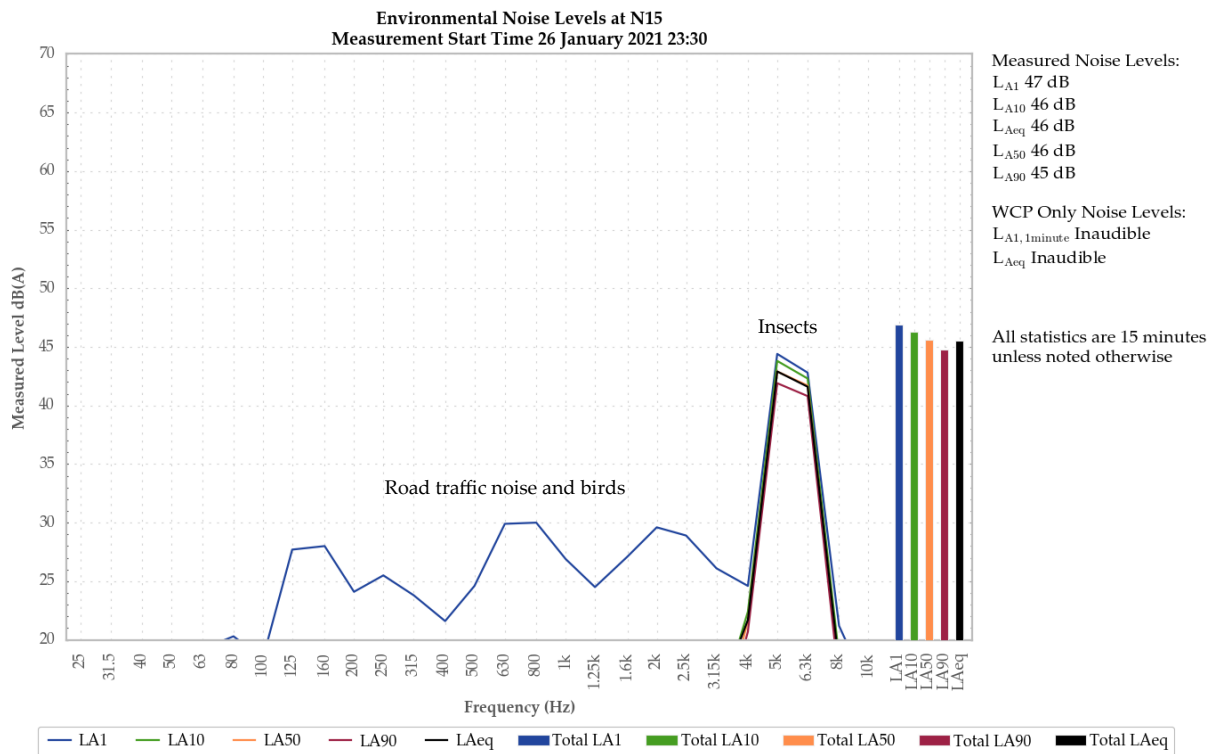


A mining continuum from WCP was audible at low levels throughout the measurement, generating the site-only LAeq of less than 25 dB. Engine surges generated the measured site-only LA1,1minute of 28 dB. Impacts were also noted..

Frogs, birds and insects were responsible for the measured noise levels.

An electrical substation was also noted.

### 5.1.3 N15



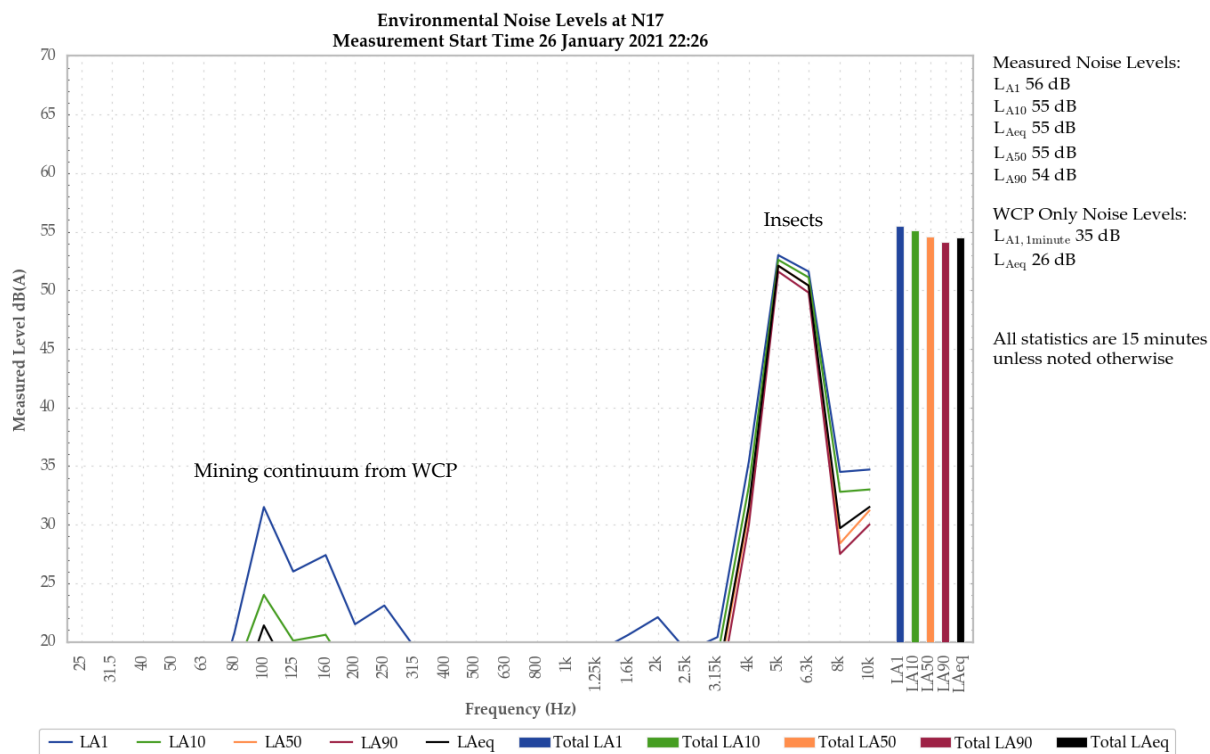
**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

WCP was inaudible.

Insects were responsible for the measured levels.

Road traffic, birds, frogs, dogs, an aircraft and an air conditioner were also noted.

### 5.1.4 N17

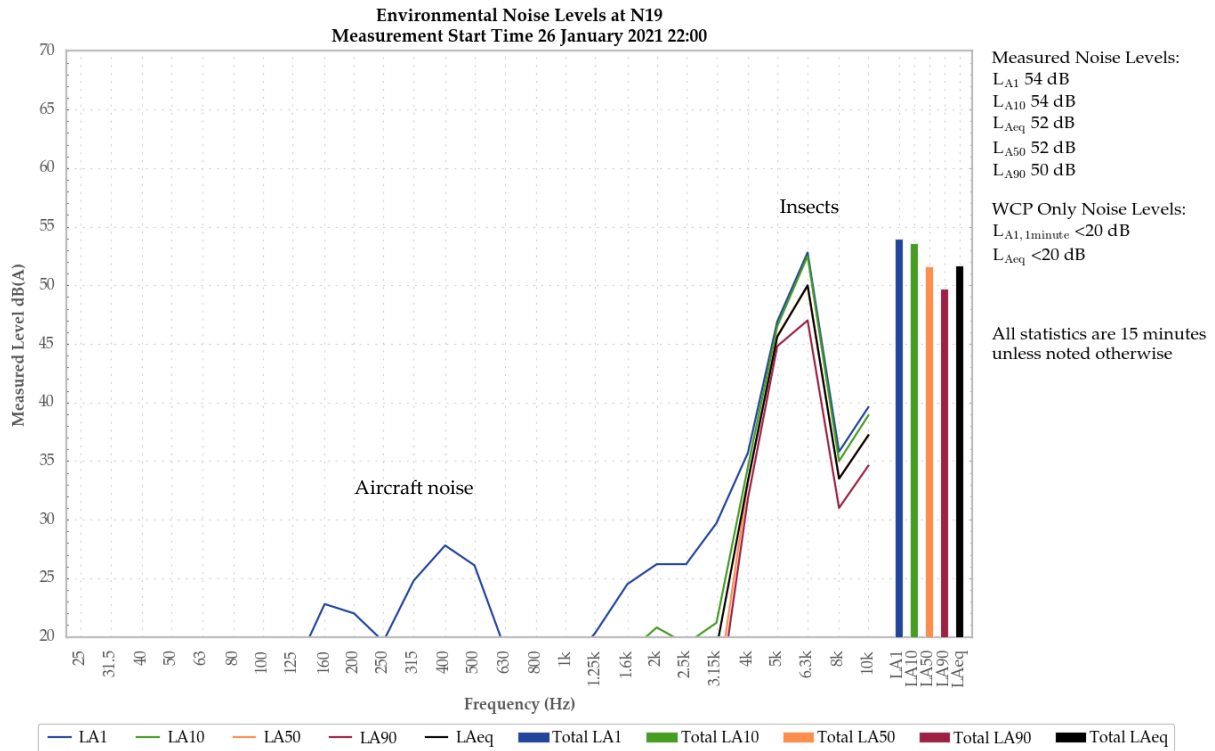


A mining continuum from WCP was audible throughout the measurement and generated the site-only LAeq of 26 dB. A surge in the continuum generated the measured site-only LA1,1minute of 35 dB.

Insects were responsible for the measured levels.

Birds were also noted.

5.1.5 N19



**Figure 7: Environmental Noise Levels – N19, Upper Mogo Road**

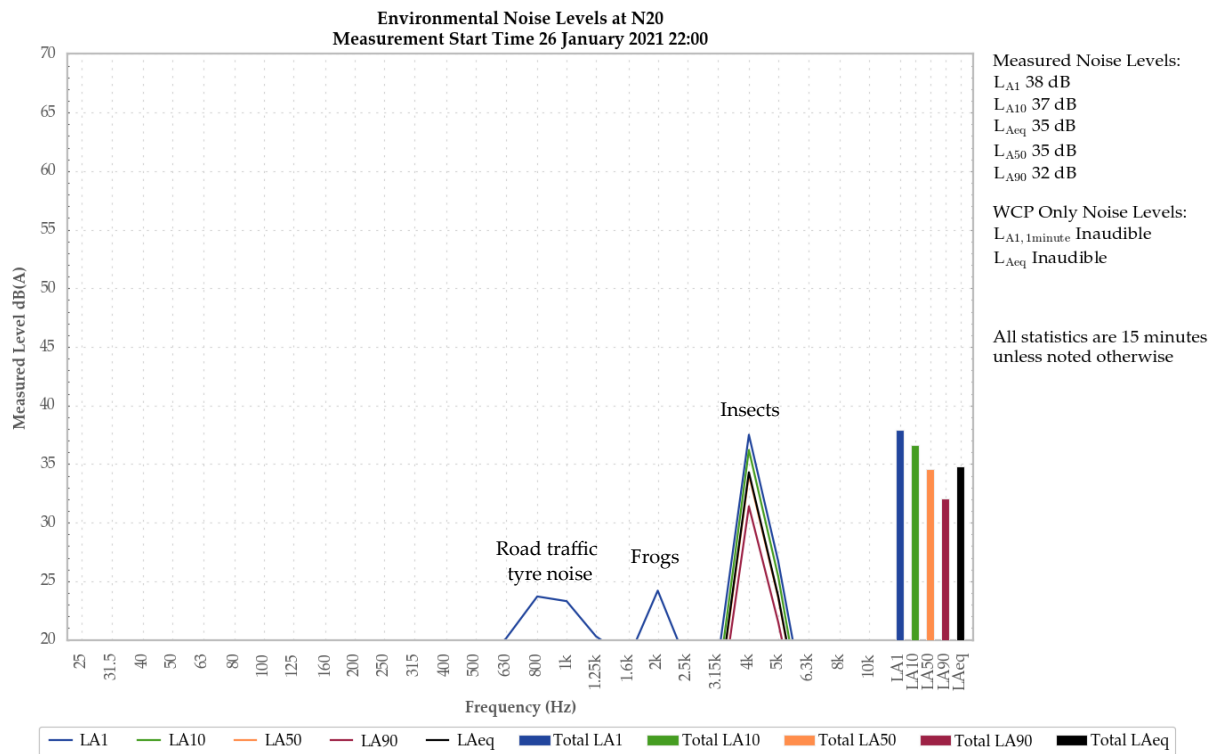
A mining continuum from WCP was audible at very low levels throughout the measurement, generating the site-only LAeq and LA1,1minute of less than 20 dB..

Insects were responsible for the measured noise levels.

An aircraft was also noted.



### 5.1.6 N20



**Figure 8: Environmental Noise Levels, N20 – Ringwood Road**

WCP was inaudible during the measurement.

Insects were responsible for the measured noise levels.

Road traffic tyre noise, frogs, and birds were also noted.

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 26/27 January 2021 at six monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the January 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development

Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

- L5.4 For the purpose of condition L5.3:
- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
  - b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.
- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.



## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
<b>St Laurence O'Toole Church</b>	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
<b>Tichular</b>	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
<b>Wollar Village</b>	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
<b>Mogo Rd</b>	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
<b>Mogo Rd</b>	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
<b>Ringwood Road</b>	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
<b>WCPL Rail Loop</b>	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions
<b>Wollar Village<sup>4</sup></b>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
<b>Mogo Rd<sup>4</sup></b>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
<b>Ringwood Road</b>	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with <b>DPIE</b> and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
<b>Tichular<sup>3</sup></b>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify **DPIE** and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandoona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to **Section 6.5**.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with **DPIE** and the EPA.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface

winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

### 6.3.7 Response to Non-Compliance or Exceedance

Where any non-compliance of the Noise Criteria (**Table 6**) has occurred, WCPL will, at the earliest opportunity:

- Take all feasible and reasonable and steps to ensure that the non-compliance ceases and does not recur;
- Consider all feasible and reasonable and options for remediation (where relevant) and submit a report to the **DPIE** describing those options and any preferred remediation measures or other course of action (**Section 9.1**);
- Implement remediation measures as directed by the Secretary; and
- Review and, if necessary, revise this NMP (**Section 10**), to the satisfaction of the Secretary.

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## APPENDIX

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



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C21058

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
-----------------------	--

<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	30131882
<b>Microphone Serial Number :</b>	04739
<b>Pre-amplifier Serial Number :</b>	11942

<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
<b>Ambient Temperature :</b> 23.5°C	<b>Ambient Temperature :</b> 23.3°C
<b>Relative Humidity :</b> 46.7%	<b>Relative Humidity :</b> 47.7%
<b>Barometric Pressure :</b> 100.28kPa	<b>Barometric Pressure :</b> 100.25kPa

<b>Calibration Technician :</b> Jeff Yu	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 8 Feb 2021	<b>Report Issue Date :</b> 9 Feb 2021

**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	
125Hz	±0.12dB	Temperature	±0.2°C
1kHz	±0.11dB	Relative Humidity	±2.4%
8kHz	±0.13dB	Barometric Pressure	±0.015kPa
Electrical Tests	±0.10dB		

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



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

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

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

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



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C19342

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

**Equipment Tested/ Model Number :** Rion NA-28  
**Instrument Serial Number :** 00701424  
**Microphone Serial Number :** 01916  
**Pre-amplifier Serial Number :** 01463

**Pre-Test Atmospheric Conditions**  
**Ambient Temperature :** 26°C  
**Relative Humidity :** 40.2%  
**Barometric Pressure :** 100.96kPa

**Post-Test Atmospheric Conditions**  
**Ambient Temperature :** 26°C  
**Relative Humidity :** 40.7%  
**Barometric Pressure :** 100.32kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 14 Jun 2019

**Secondary Check:** Eloise Burrows  
**Report Issue Date :** 18 Jun 2019

**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	±0.15dB	Temperature	±0.2°C
12.5kHz	±0.2dB	Relative Humidity	±2.4%
16kHz	±0.29dB	Barometric Pressure	±0.015kPa
Electrical Tests			
51.5 Hz to 20 kHz	±0.11dB		

*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.  
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Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C21059

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

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

**Atmospheric Conditions**

**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.27kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 08 Feb 2021  
**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 2021

**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
94	1000	94.02	1000.40

The sound calibrator has been shown to conform to the class 1 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.

Specific Tests	Least Uncertainties of Measurement - Environmental Conditions	
Generated SPL	±0.14dB	Temperature ±0.2°C
Frequency	±0.09%	Relative Humidity ±2.4%
Distortion	±0.09%	Barometric Pressure ±0.015kPa

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

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



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

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

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

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**Acoustic  
Research  
Labs Pty Ltd**

Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

**Sound Calibrator**  
IEC 60942-2017

**Calibration Certificate**

Calibration Number C20270

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

**Equipment Tested/ Model Number :** Pulsar Model 105  
**Instrument Serial Number :** 79631

**Atmospheric Conditions**

**Ambient Temperature :** 21.9°C  
**Relative Humidity :** 43.9%  
**Barometric Pressure :** 101.2kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 13 May 2020  
**Secondary Check:** Max Moore  
**Report Issue Date :** 19 May 2020

**Approved Signatory :**

Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.07	1000.40

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.

Specific Tests	Least Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.14dB	Temperature ±0.2°C
Frequency	±0.099%	Relative Humidity ±2.4%
Distortion	±0.099%	Barometric Pressure ±0.015kPa

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

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



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

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

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# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
February 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring February 2021

Reference: 21031\_R01

Report date: 25 February 2021

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Ryan Bruniges  
Consultant

QA Review: Jesse Tribby  
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*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 11/12 February 2021 at six locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O’Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

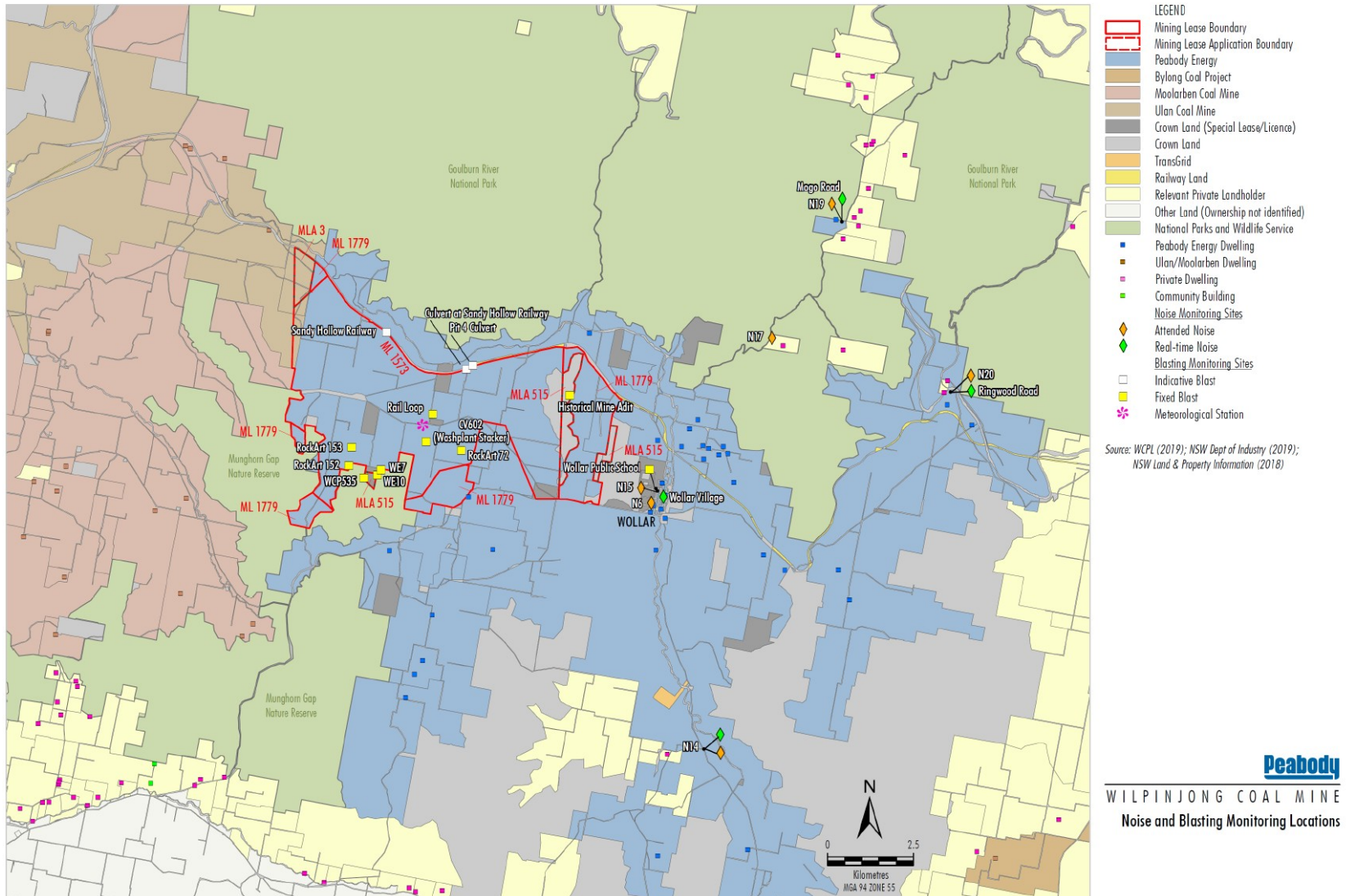


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2019)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The “C” weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in June 2020. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in September 2019. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.



## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Ryan Bruniges.

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

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

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

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

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

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

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

### 3.3 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	00701424	14/06/2021
Pulsar 105 acoustic calibrator	79631	13/05/2022

### 3.4 Modifying Factors

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

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

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

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	12/02/2021 01:04	48	45	28	31	26	24	23
N14	11/02/2021 23:45	45	34	31	28	26	24	21
N15	11/02/2021 23:00	45	39	33	30	27	25	22
N17	11/02/2021 22:30	52	46	46	45	45	44	43
N19	11/02/2021 22:01	55	54	54	48	44	39	36
N20	12/02/2021 00:30	44	38	34	31	29	26	23

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.4.

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – FEBRUARY 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	12/02/2021 01:04	0.0	G	37	No	<20	NA
N14	11/02/2021 23:45	0.0	G	35	No	<25	NA
N15	11/02/2021 23:00	0.0	G	37	No	IA	NA
N17	11/02/2021 22:30	0.0	F	38	Yes	IA	Nil
N19	11/02/2021 22:01	1.5	E	35	Yes	IA	Nil
N20	12/02/2021 00:30	0.0	G	35	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – FEBRUARY 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	12/02/2021 01:04	0.0	G	45	No	<20	NA
N14	11/02/2021 23:45	0.0	G	45	No	<25	NA
N15	11/02/2021 23:00	0.0	G	45	No	IA	NA
N17	11/02/2021 22:30	0.0	F	45	Yes	IA	Nil
N19	11/02/2021 22:01	1.5	E	45	Yes	IA	Nil
N20	12/02/2021 00:30	0.0	G	45	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – FEBRUARY 2021

Location	Start Date And Time	Temperature ° C	Wind Speed m/s	Wind Direction ° MN	Cloud Cover eighths
N6	12/02/2021 01:04	15	0.0	-	0
N14	11/02/2021 23:45	19	0.0	-	0
N15	11/02/2021 23:00	18	0.5	170	0
N17	11/02/2021 22:30	22	0.0	-	0
N19	11/02/2021 22:01	25	0.0	-	0
N20	12/02/2021 00:30	15	0.0	-	0

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

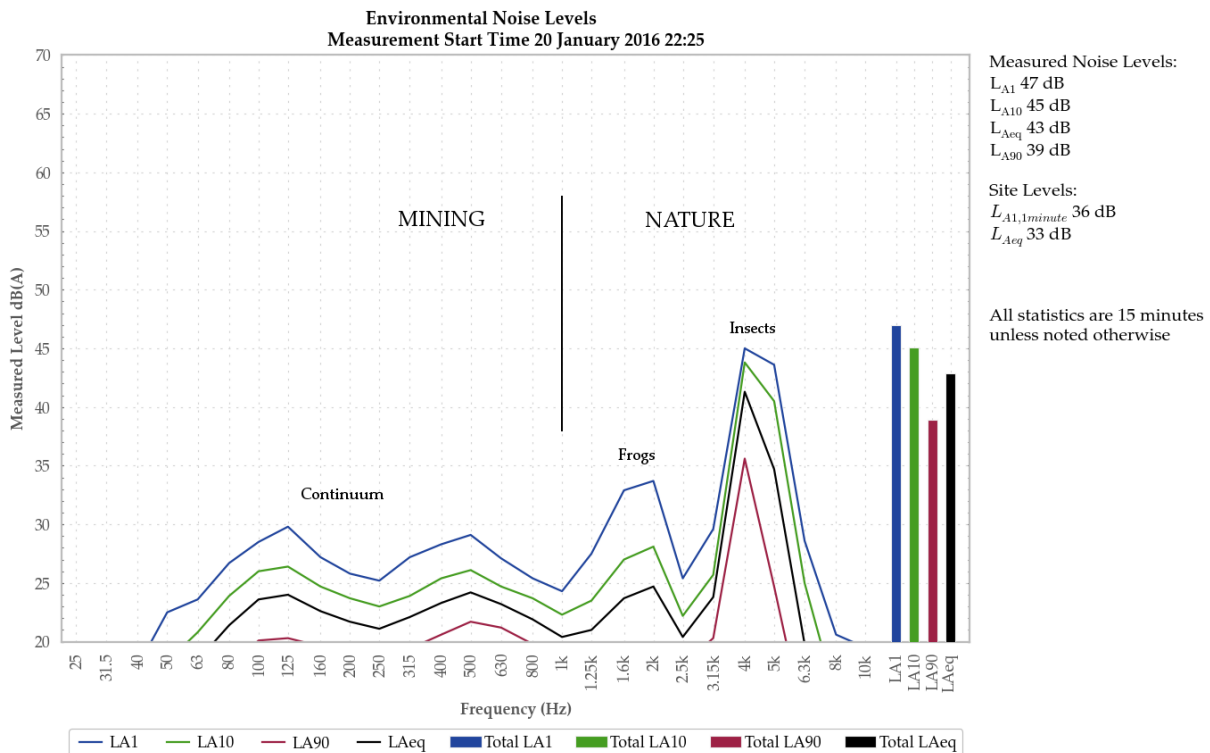
## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

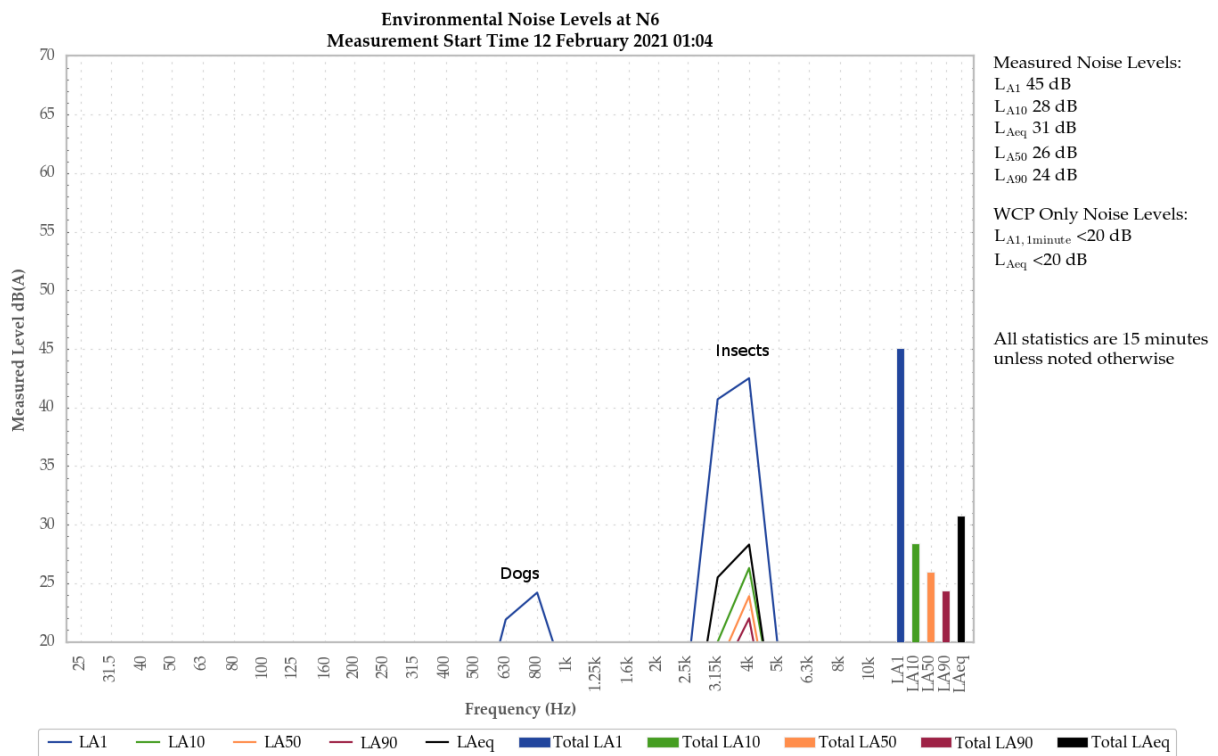
An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be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

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.



**Figure 2: Example graph (refer to Section 5.1 for explanatory note)**

5.1.1 N6



**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

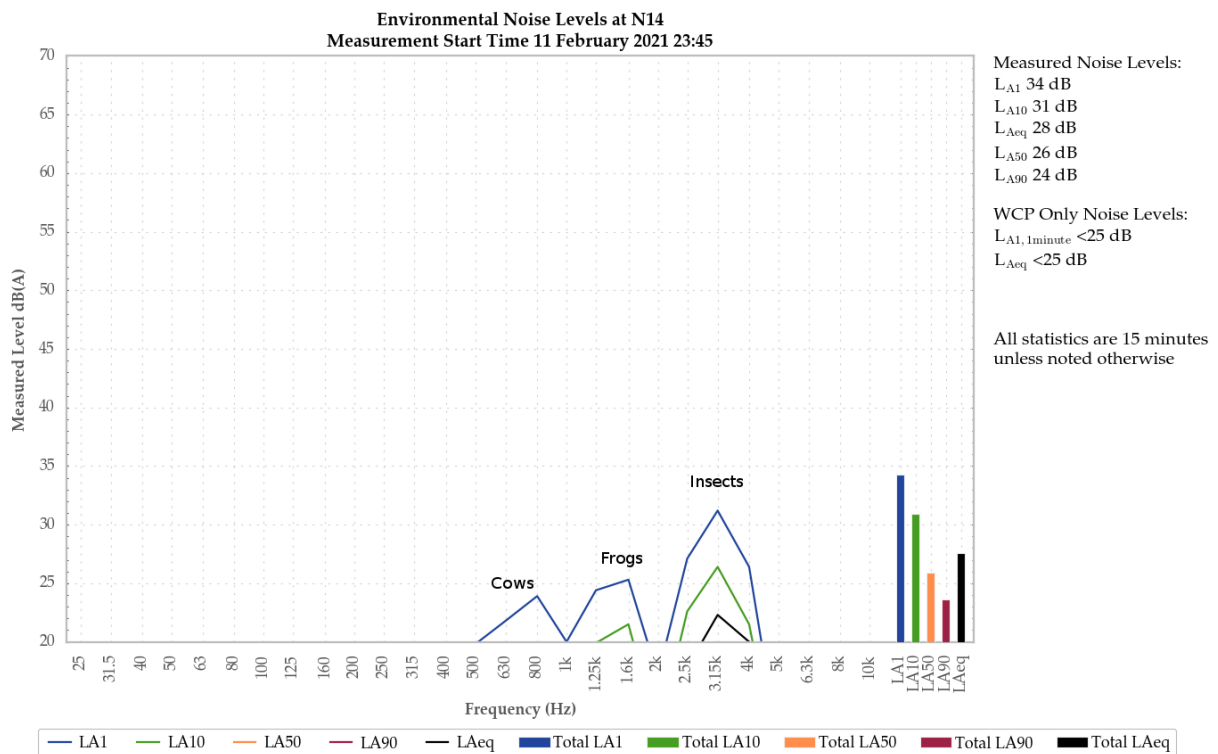
A mining continuum from WCP was audible at low very low levels during the measurement and generated the measured site-only LAeq,15minute and LA1,1minute of less than 20 dB.

Insects were responsible for the measured noise levels.

A local continuum and dogs were also noted.



5.1.2 N14



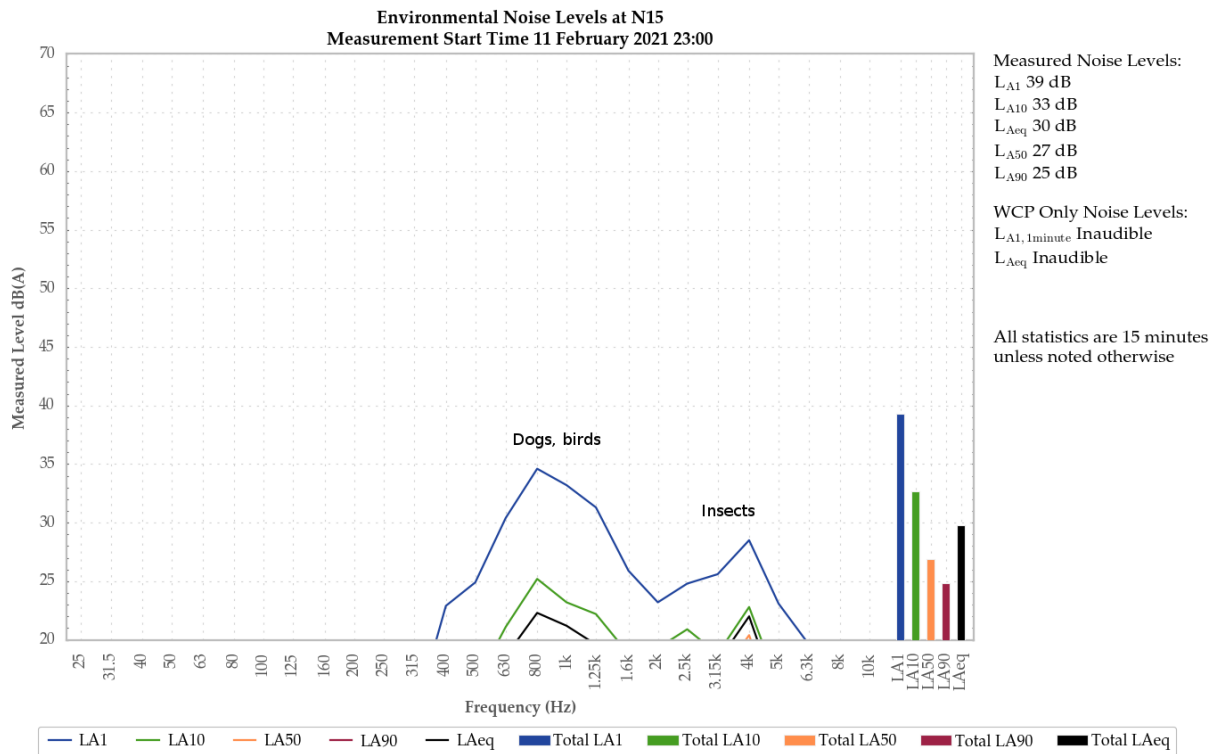
**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

A mining continuum from WCP was audible at low levels throughout the measurement and generated the measured site-only LAeq,15minute and LA1,1minute of less than 25 dB.

Frogs and insects were responsible for the measured noise levels.

Cows were also noted.

### 5.1.3 N15



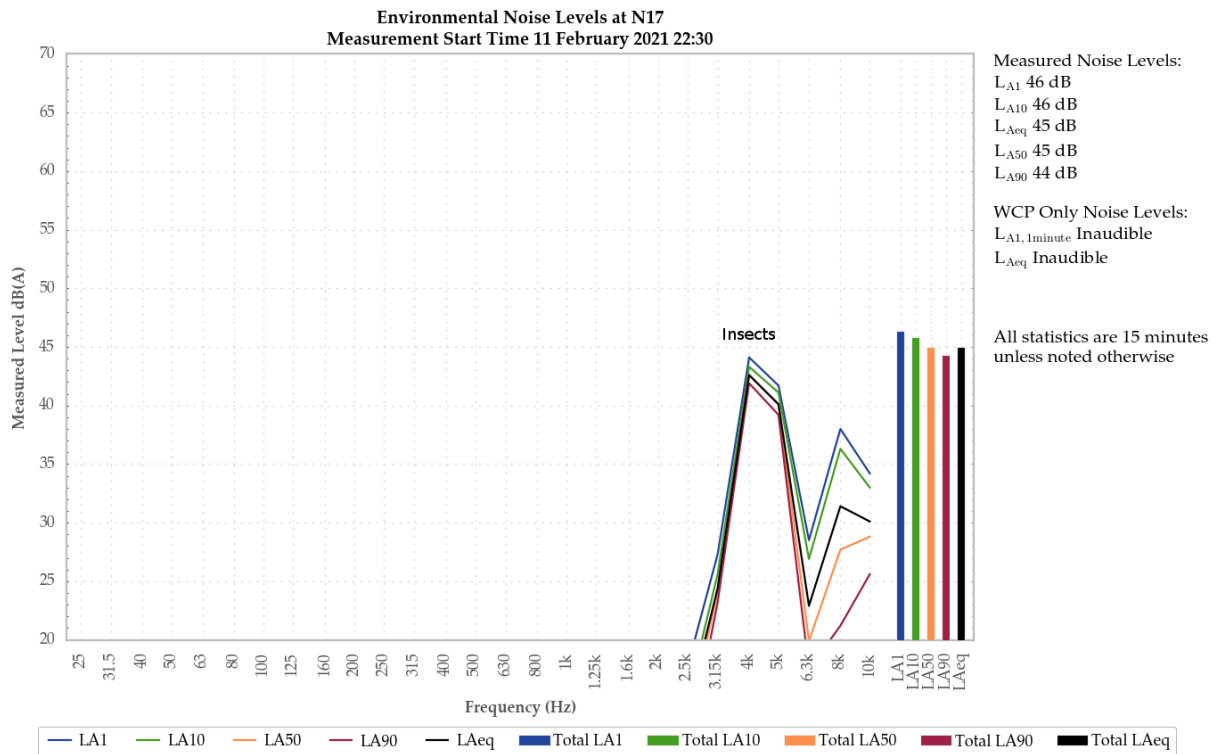
**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

WCP was inaudible during the measurement.

Dogs and birds generated the measured LA1 and contributed to the measured LA10 and LAeq. Insects also contributed to the measured LA10 and LAeq, and generated the measured LA50 and LA90.

Road traffic tyre noise, breeze in the foliage and an aircraft were also noted.

5.1.4 N17



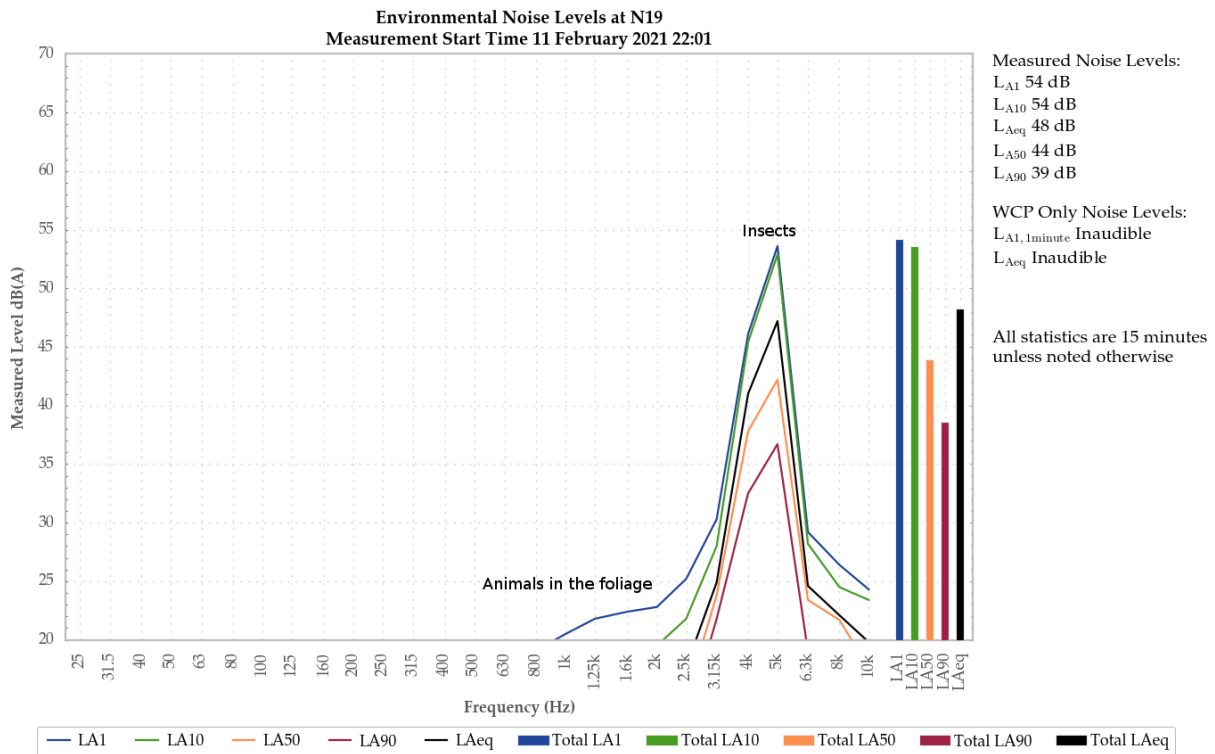
**Figure 6: Environmental Noise Levels – N17 Mogo Road, off Araluen Road**

WCP was inaudible during the measurement.

Insects were responsible for the measured noise levels.

An aircraft was also noted.

5.1.5 N19



**Figure 7: Environmental Noise Levels – N19, Upper Mogo Road**

WCP was inaudible during the measurement.

Insects were responsible for the measured noise levels.

Animals in the foliage were also noted.

5.1.6 N20

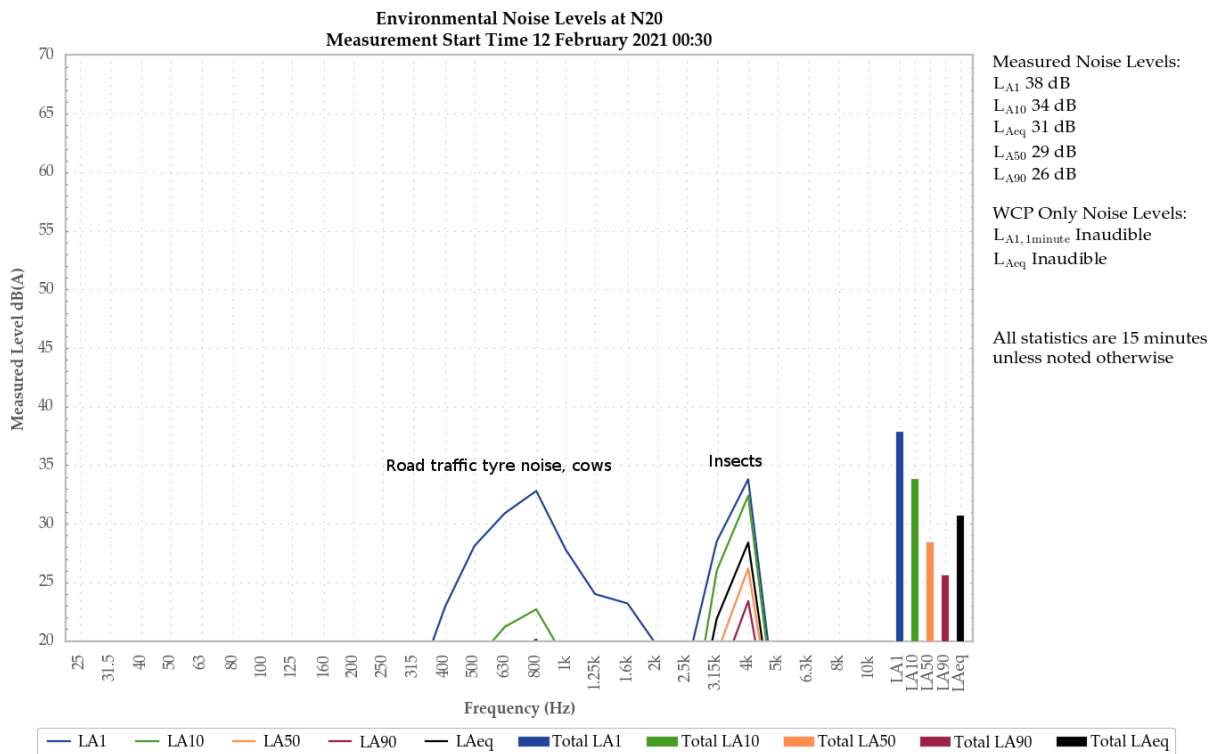


Figure 8: Environmental Noise Levels, N20 – Ringwood Road

WCP was inaudible during the measurement.

Insects were primarily responsible for the measured noise levels. Road traffic tyre noise and cows contributed to the measured LA1.

Breeze in the foliage was also noted.

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 11/12 February 2021 at six monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the February 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

### **Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.



### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development

Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

- L5.4 For the purpose of condition L5.3:
- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
  - b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.
- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
<b>St Laurence O'Toole Church</b>	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
<b>Tichular</b>	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
<b>Wollar Village</b>	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
<b>Mogo Rd</b>	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
<b>Mogo Rd</b>	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
<b>Ringwood Road</b>	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
<b>WCPL Rail Loop</b>	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions
<b>Wollar Village<sup>4</sup></b>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
<b>Mogo Rd<sup>4</sup></b>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
<b>Ringwood Road</b>	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with <b>DPIE</b> and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
<b>Tichular<sup>3</sup></b>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify **DPIE** and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandoona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to **Section 6.5**.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with **DPIE** and the EPA.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface

winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

### 6.3.7 Response to Non-Compliance or Exceedance

Where any non-compliance of the Noise Criteria (**Table 6**) has occurred, WCPL will, at the earliest opportunity:

- Take all feasible and reasonable and steps to ensure that the non-compliance ceases and does not recur;
- Consider all feasible and reasonable and options for remediation (where relevant) and submit a report to the **DPIE** describing those options and any preferred remediation measures or other course of action (**Section 9.1**);
- Implement remediation measures as directed by the Secretary; and
- Review and, if necessary, revise this NMP (**Section 10**), to the satisfaction of the Secretary.

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## APPENDIX

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





**Sound Level Meter**  
IEC 61672-3:2013  
**Calibration Certificate**  
Calibration Number C19342

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

**Equipment Tested/ Model Number :** Rion NA-28  
**Instrument Serial Number :** 00701424  
**Microphone Serial Number :** 01916  
**Pre-amplifier Serial Number :** 01463

<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
Ambient Temperature : 26°C	Ambient Temperature : 26°C
Relative Humidity : 40.2%	Relative Humidity : 40.7%
Barometric Pressure : 100.96kPa	Barometric Pressure : 100.32kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 14 Jun 2019  
**Secondary Check:** Eloise Burrows  
**Report Issue Date :** 18 Jun 2019

**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 -			
<b>Acoustic Tests</b>		<b>Environmental Conditions</b>	
31.5 Hz to 8kHz	±0.15dB	Temperature	±0.2°C
12.5kHz	±0.2dB	Relative Humidity	±2.4%
16kHz	±0.29dB	Barometric Pressure	±0.015kPa
<b>Electrical Tests</b>			
51.5 Hz to 20 kHz	±0.11dB		

*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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Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C20270

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

**Equipment Tested/ Model Number :** Pulsar Model 105  
**Instrument Serial Number :** 79631

**Atmospheric Conditions**

**Ambient Temperature :** 21.9°C  
**Relative Humidity :** 43.9%  
**Barometric Pressure :** 101.2kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 13 May 2020  
**Secondary Check:** Max Moore  
**Report Issue Date :** 19 May 2020

**Approved Signatory :**

Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.07	1000.40

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.

Specific Tests	Least Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.14dB	Temperature ±0.2°C
Frequency	±0.099%	Relative Humidity ±2.4%
Distortion	±0.099%	Barometric Pressure ±0.015kPa

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

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



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

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

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

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

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# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
March 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring March 2021

Reference: 21062\_R01

Report date: 20 April 2021

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Jesse Tribby  
Consultant



QA Review: Robert Kirwan  
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*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 30/31 March 2021 at six locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar





### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

- N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
- N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Ryan Bruniges.

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

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

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

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

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

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

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

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

### 3.3 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	78226	08/02/2023

### 3.4 Modifying Factors

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

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

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

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	31/03/2021 00:41	37	33	30	27	25	23	22
N14	31/03/2021 00:15	40	33	31	29	29	27	24
N15	30/03/2021 23:00	63	52	46	42	30	25	23
N17	30/03/2021 22:28	43	41	38	35	34	32	31
N19	30/03/2021 22:00	49	44	38	36	34	32	30
N20	30/03/2021 23:30	38	34	31	28	28	25	22

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.4.

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MARCH 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	31/03/2021 00:41	2.0	D	37	Yes	IA	Nil
N14	31/03/2021 00:15	1.6	D	35	Yes	IA	Nil
N15	30/03/2021 23:00	1.8	E	37	Yes	IA	Nil
N17	30/03/2021 22:28	1.4	E	38	Yes	IA	Nil
N19	30/03/2021 22:00	2.9	D	35	Yes	IA	Nil
N20	30/03/2021 23:30	2.3	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MARCH 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	31/03/2021 00:41	2.0	D	45	Yes	IA	Nil
N14	31/03/2021 00:15	1.6	D	45	Yes	IA	Nil
N15	30/03/2021 23:00	1.8	E	45	Yes	IA	Nil
N17	30/03/2021 22:28	1.4	E	45	Yes	IA	Nil
N19	30/03/2021 22:00	2.9	D	45	Yes	IA	Nil
N20	30/03/2021 23:30	2.3	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – MARCH 2021

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	31/03/2021 00:41	16	0.0	-	4
N14	31/03/2021 00:15	17	0.0	-	7
N15	30/03/2021 23:00	19	0.0	-	1
N17	30/03/2021 22:28	19	0.0	-	1
N19	30/03/2021 22:00	17	1.0	80	2
N20	30/03/2021 23:30	18	0.0	-	6

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.



## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

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

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

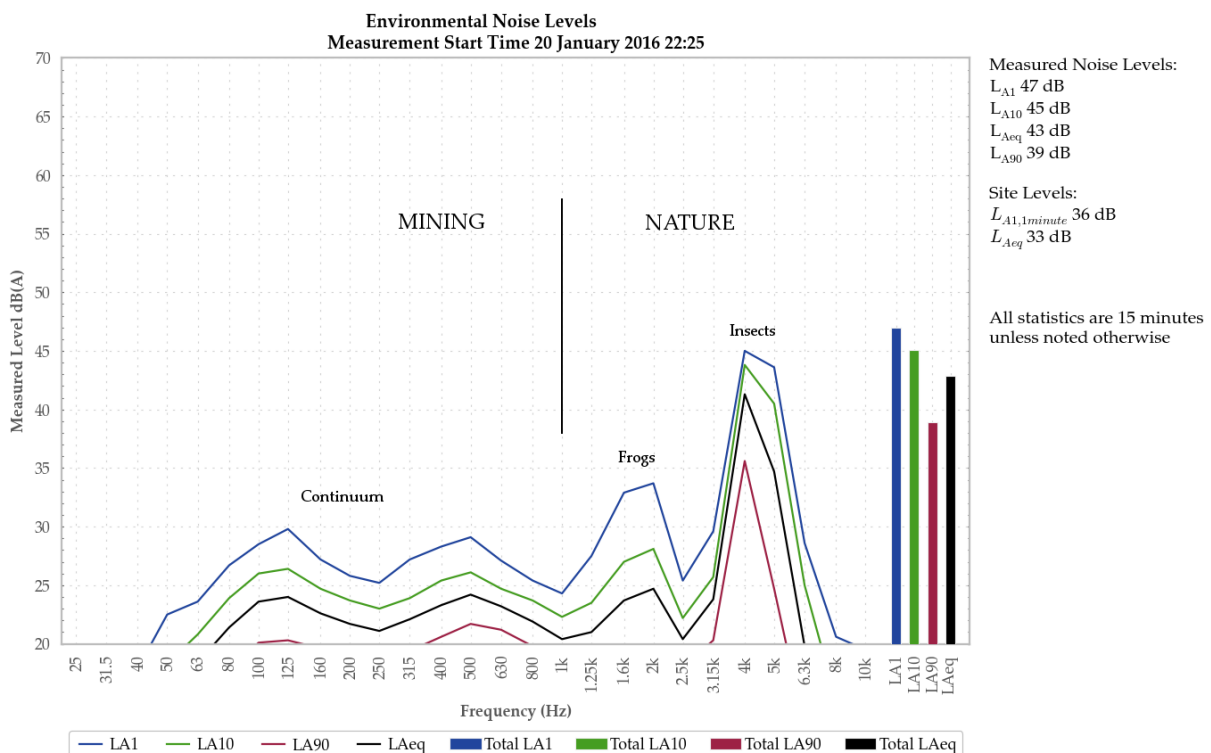
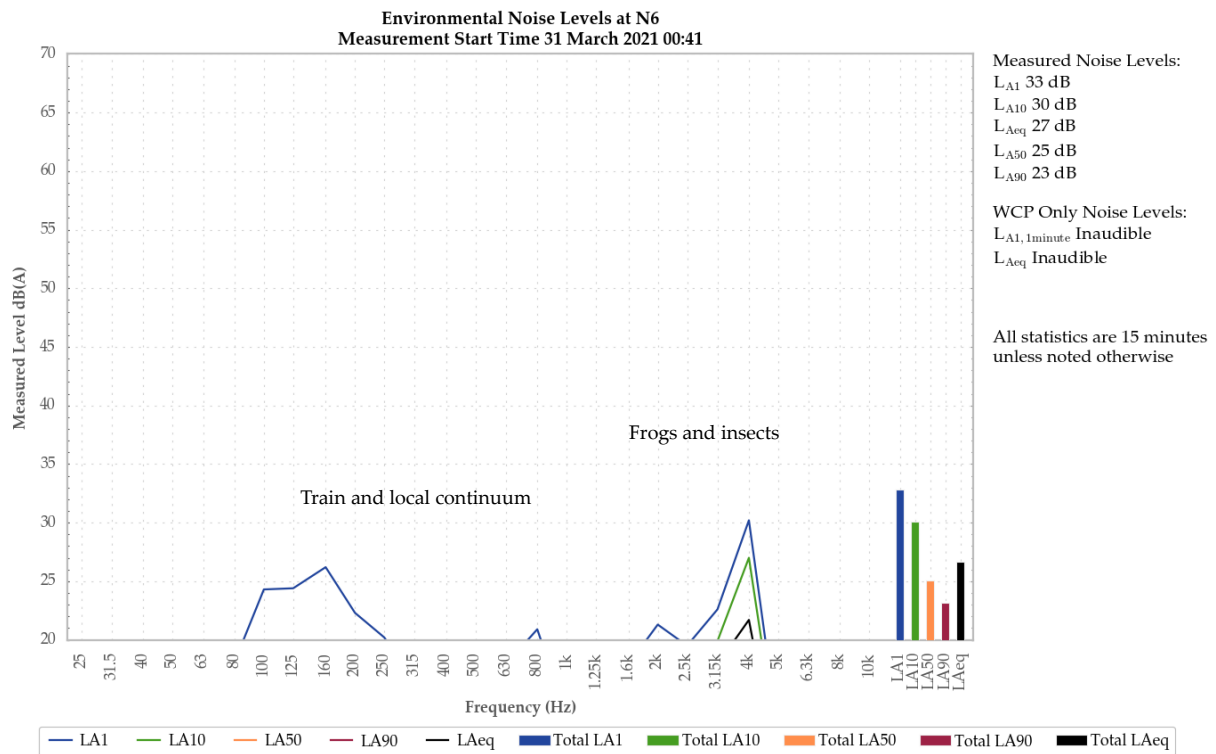


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

### 5.1.1 N6



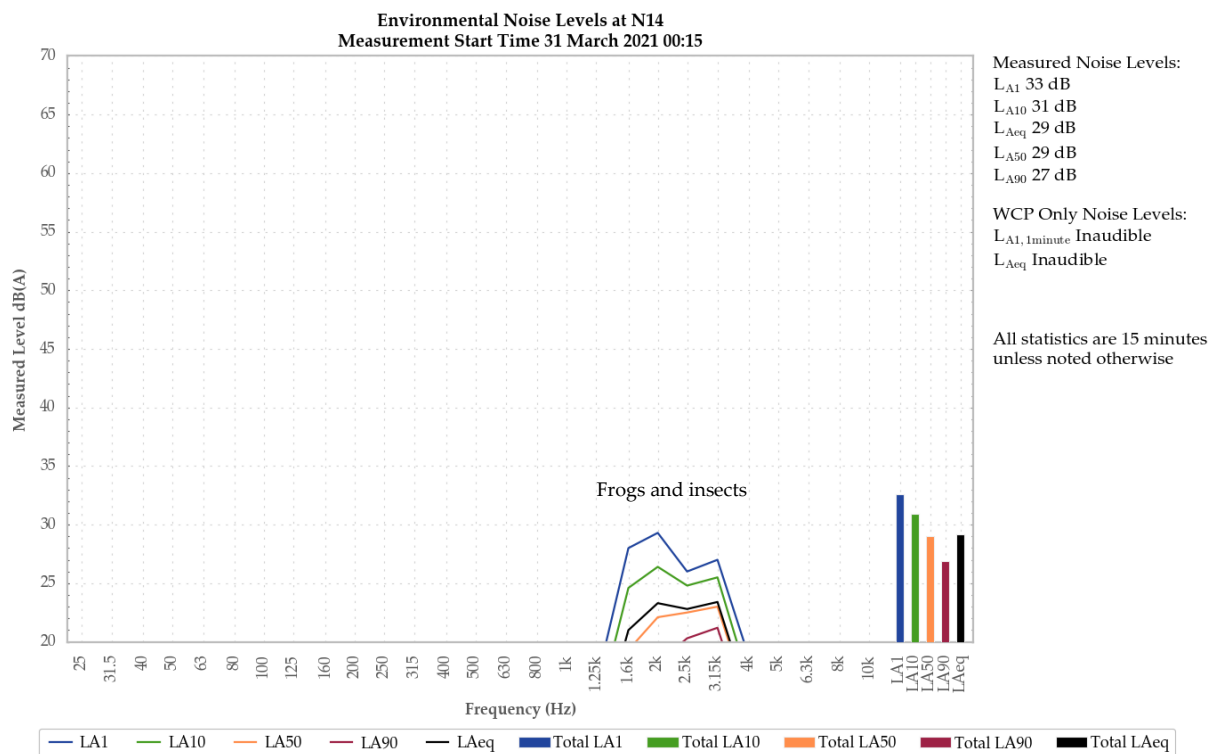
**Figure 3: Environmental Noise Levels - N6, St Laurence O'Toole Catholic Church, Wollar Village**

WCP was inaudible during the measurement.

Frogs and insects were primarily responsible for the measured noise levels. Train noise contributed to the measured LA1, LA10, and LAeq.

Local residential continuum was also noted.

### 5.1.2 N14

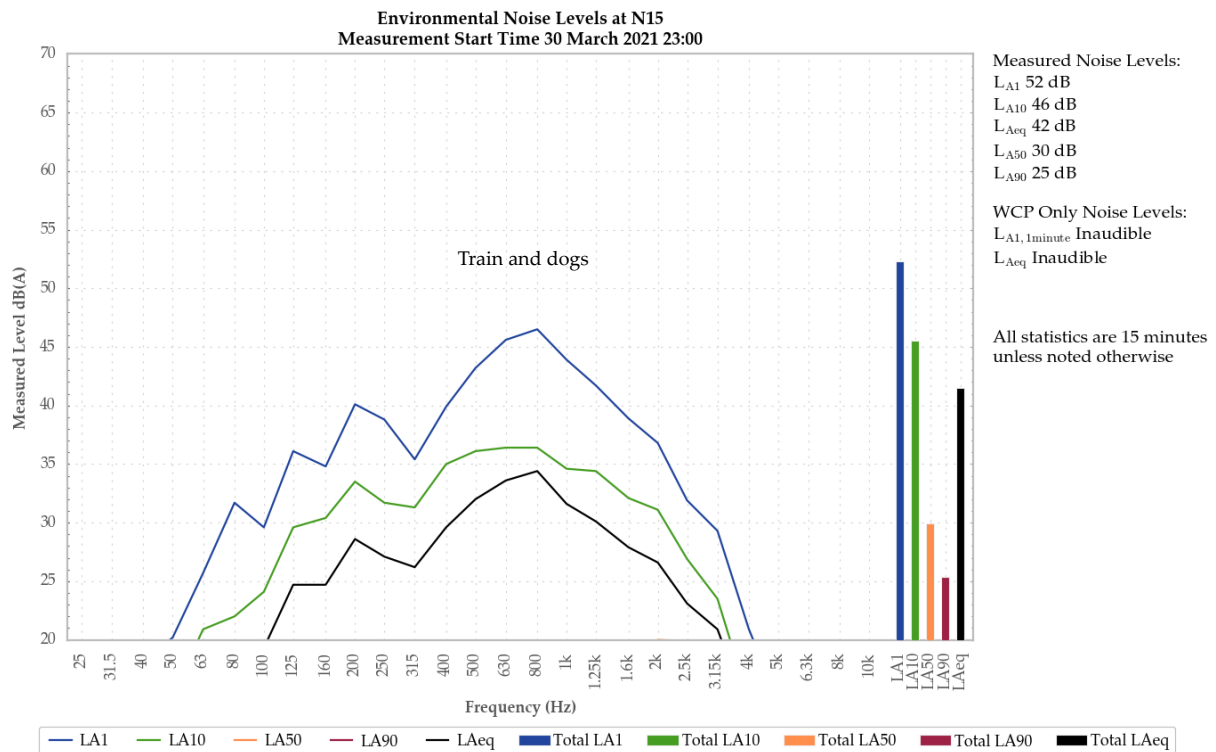


**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

WCP was inaudible during the measurement.

Frogs and insects were responsible for the measured noise levels.

### 5.1.3 N15



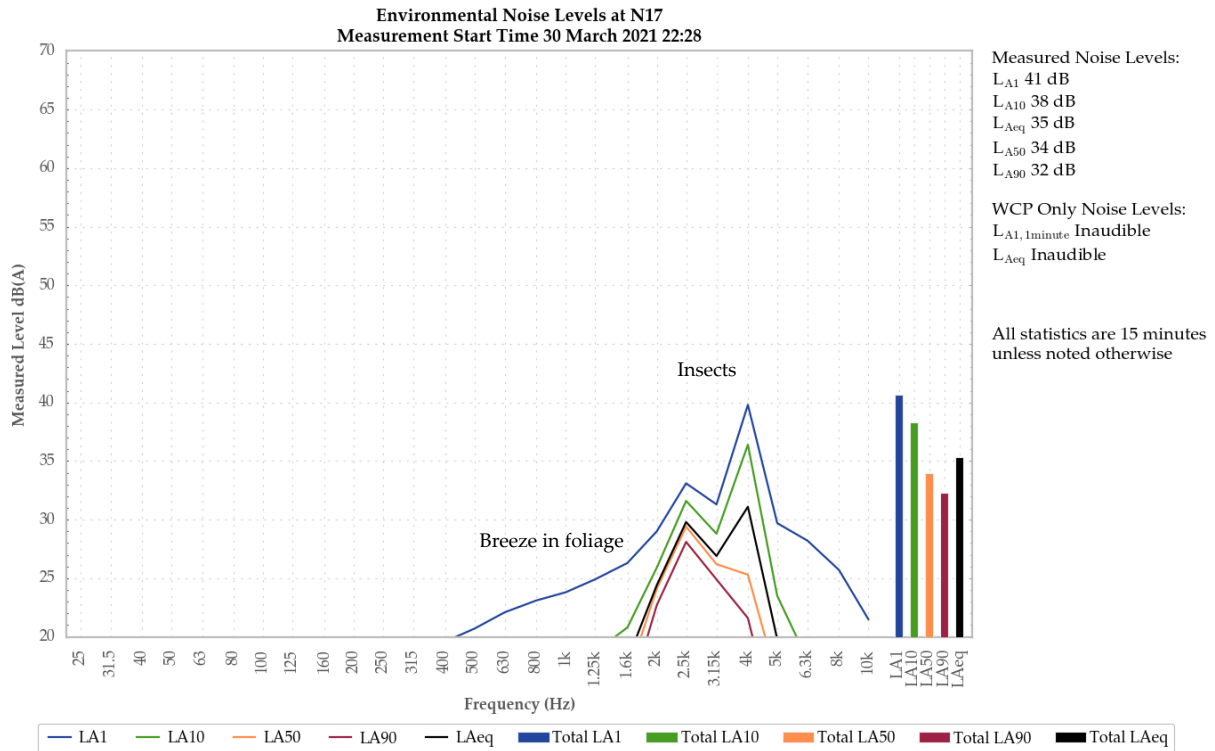
**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

WCP was inaudible during the measurement.

Train noise and dogs generated the measured LA1, LA10, and LAeq, and contributed to the measured LA50. Insects contributed to the measured LA50 and were responsible for the measured LA90.

Road traffic tyre noise was also noted.

5.14 N17



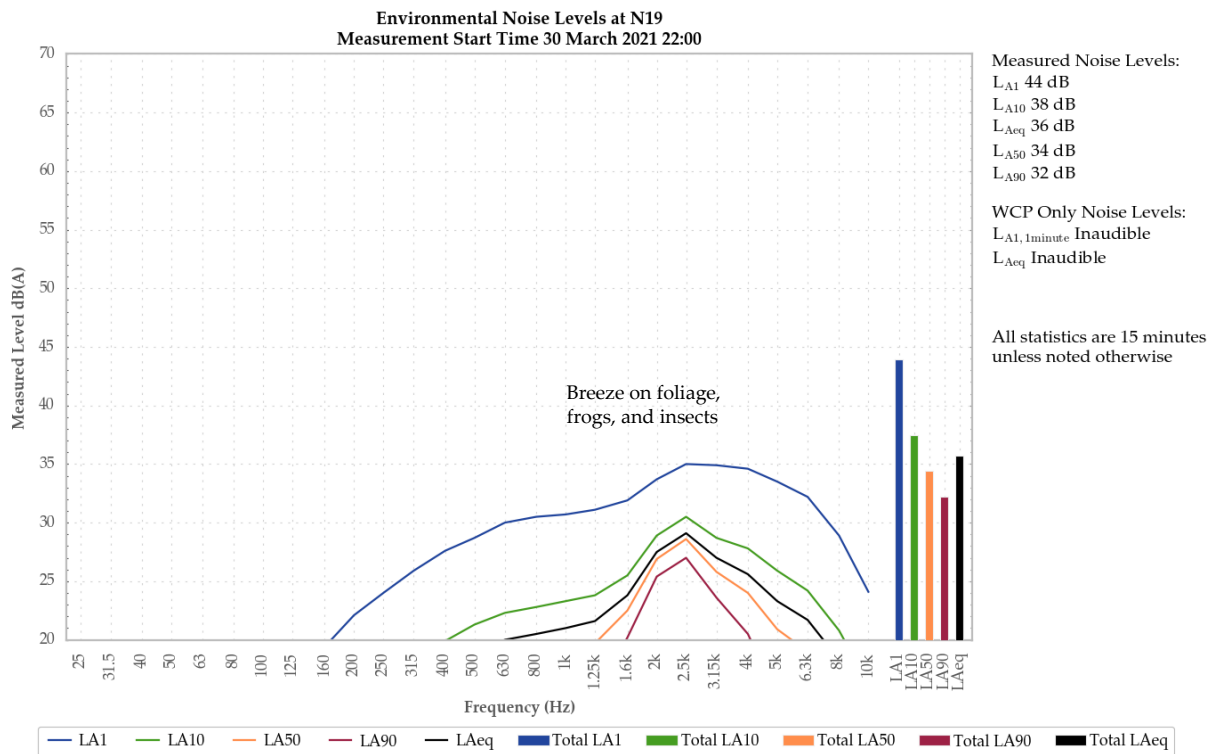
**Figure 6: Environmental Noise Levels - N17 Mogo Road, off Araluen Road**

WCP was inaudible during the measurement.

Insects generated the measured noise levels.

Breeze in foliage and nearby animals were also noted.

### 5.1.5 N19



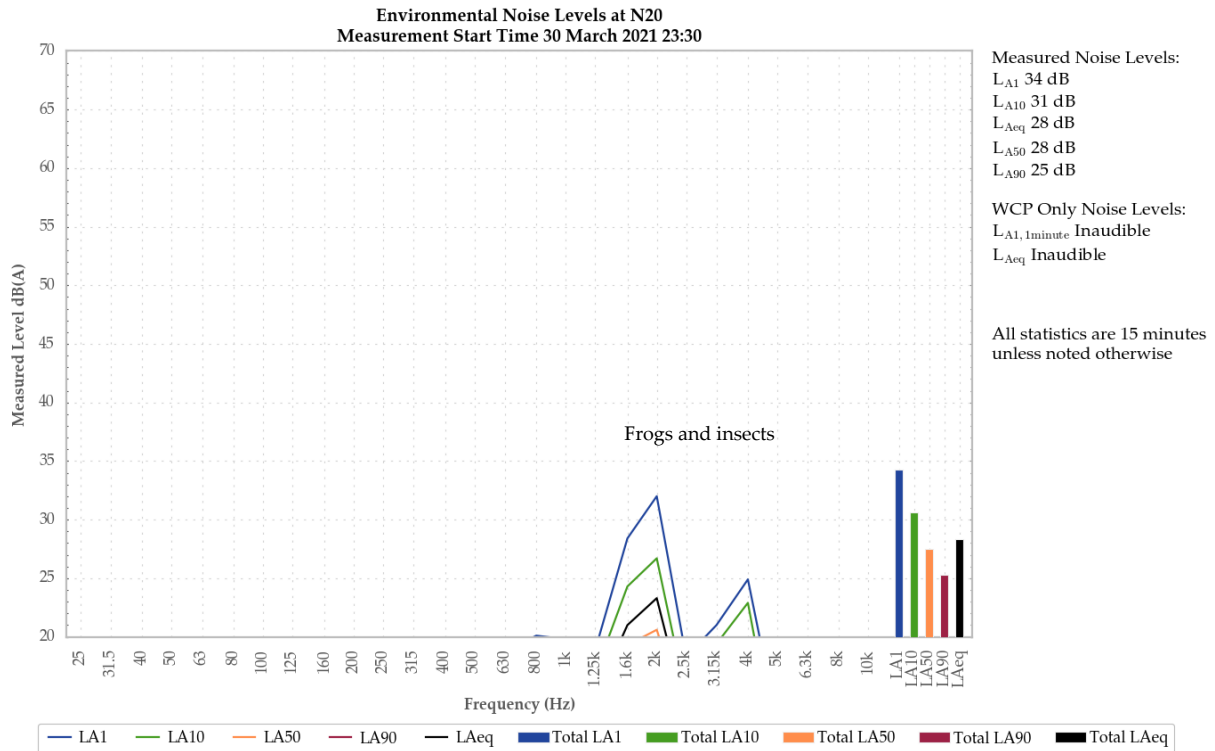
**Figure 7: Environmental Noise Levels - N19, Upper Mogo Road**

WCP was inaudible during the measurement.

Breeze on the microphone and in foliage generated the measured LA1 and contributed to the measured LA10 and LAeq. Frogs and insects were primarily responsible for the measured LA10 and LAeq, and generated the measured LA50 and LA90.

Bats and a distant aircraft were also noted.

5.1.6 N20



**Figure 8: Environmental Noise Levels, N20 - Ringwood Road**

WCP was inaudible during the measurement.

Frogs and insects generated the measured noise levels.

A distant train and train horn were also noted.

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 30/31 March 2021 at six monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the March 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**



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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquill stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.



### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per Table 7,</li> <li>Figure 3 and Figure 4</li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C21058

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
-----------------------	--

<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	30131882
<b>Microphone Serial Number :</b>	04739
<b>Pre-amplifier Serial Number :</b>	11942

<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
<b>Ambient Temperature :</b> 23.5°C	<b>Ambient Temperature :</b> 23.3°C
<b>Relative Humidity :</b> 46.7%	<b>Relative Humidity :</b> 47.7%
<b>Barometric Pressure :</b> 100.28kPa	<b>Barometric Pressure :</b> 100.25kPa

<b>Calibration Technician :</b> Jeff Yu	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 8 Feb 2021	<b>Report Issue Date :</b> 9 Feb 2021

**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	
125Hz	±0.12dB	Temperature	±0.2°C
1kHz	±0.11dB	Relative Humidity	±2.4%
8kHz	±0.13dB	Barometric Pressure	±0.015kPa
Electrical Tests	±0.10dB		

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



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

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

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

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



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C21059

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

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

**Atmospheric Conditions**

**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.27kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 08 Feb 2021  
**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 2021

**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
94	1000	94.02	1000.40

The sound calibrator has been shown to conform to the class 1 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.

Specific Tests	Least Uncertainties of Measurement - Environmental Conditions	
Generated SPL	±0.14dB	Temperature ±0.2°C
Frequency	±0.09%	Relative Humidity ±2.4%
Distortion	±0.09%	Barometric Pressure ±0.015kPa

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

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



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

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

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

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

PAGE 1 OF 1

# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
April 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring April 2021

Reference: 21100\_R01  
Report date: 13 May 2021

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Tambalyn Durney  
Consultant



QA Review: Robert Kirwan  
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*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 20/21 April 2021 at six locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar



### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

*Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB*

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Tambalyn Durney.

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

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

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

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

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

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

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

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

### 3.3 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	78226	08/02/2023

### 3.4 Modifying Factors

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

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

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



## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	20/04/2021 23:52	47	39	35	33	32	29	26
N14	21/04/2021 00:30	53	35	35	27	25	23	21
N15	20/04/2021 23:31	46	44	37	34	30	27	25
N17	20/04/2021 22:29	49	38	35	34	33	31	28
N19	20/04/2021 22:01	48	41	35	31	26	23	20
N20	21/04/2021 01:17	54	40	32	29	25	23	21

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.4.

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – APRIL 2021**

Location	Start Date and Time	Wind Speed $m/s^1$	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	20/04/2021 23:52	0.0	G	37	No	30	NA
N14	21/04/2021 00:30	0.7	G	35	No	<25	NA
N15	20/04/2021 23:31	1.5	G	37	No	34	NA
N17	20/04/2021 22:29	0.9	G	38	No	33	NA
N19	20/04/2021 22:01	0.7	G	35	No	<25	NA
N20	21/04/2021 01:17	0.9	G	35	No	<25	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – APRIL 2021**

Location	Start Date and Time	Wind Speed $m/s^1$	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	20/04/2021 23:52	0.0	G	45	No	31	NA
N14	21/04/2021 00:30	0.7	G	45	No	27	NA
N15	20/04/2021 23:31	1.5	G	45	No	44	NA
N17	20/04/2021 22:29	0.9	G	45	No	42	NA
N19	20/04/2021 22:01	0.7	G	45	No	<30	NA
N20	21/04/2021 01:17	0.9	G	45	No	31	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – APRIL 2021

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	20/04/2021 23:52	9	0.0	-	0
N14	21/04/2021 00:30	6	0.0	-	0
N15	20/04/2021 23:31	7	0.0	-	0
N17	20/04/2021 22:29	9	0.0	-	0
N19	20/04/2021 22:01	12	0.7	265	0
N20	21/04/2021 01:17	7	0.0	-	0

Notes:

1. “-” indicates calm conditions at monitoring location.

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

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

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

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

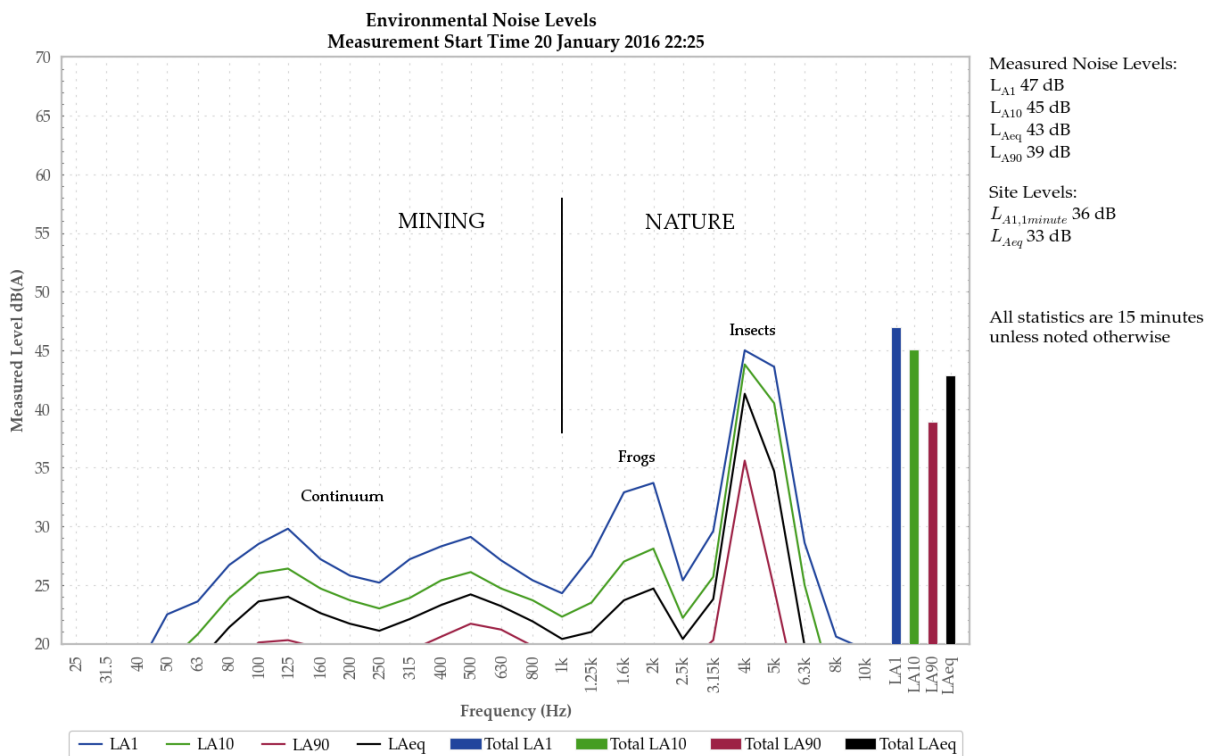
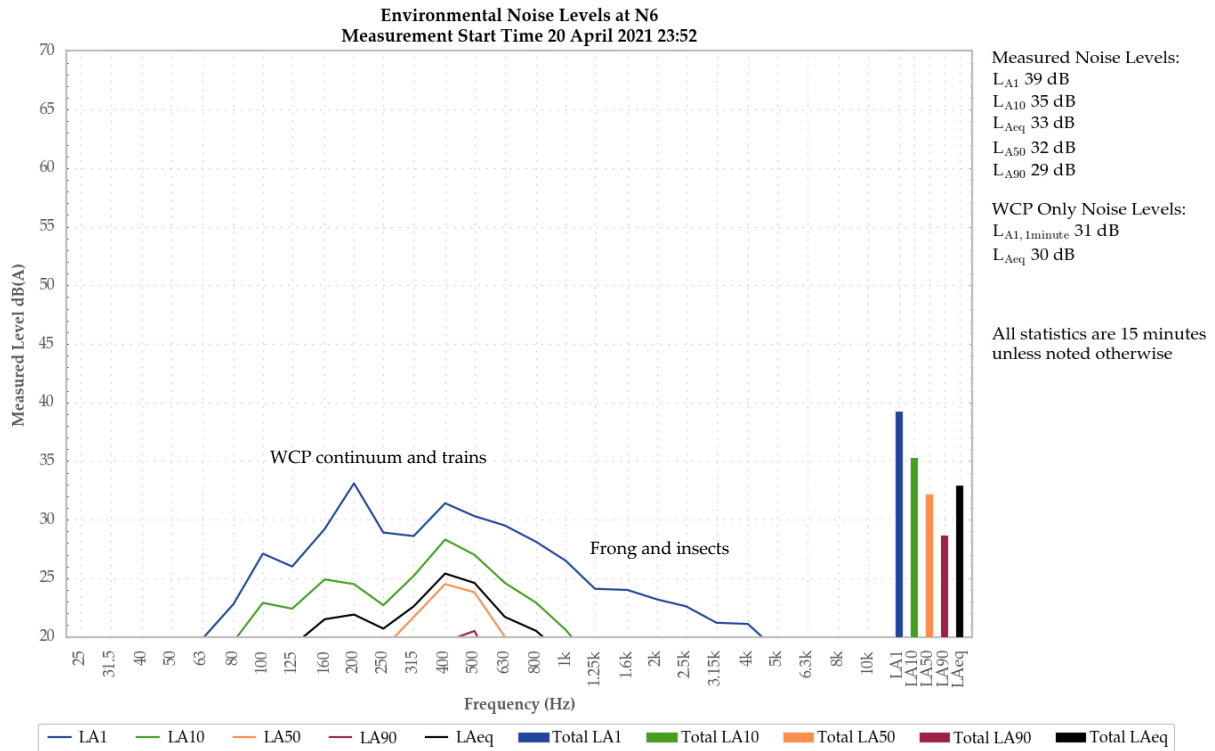


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6



**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

A mining continuum from WCP was audible throughout the measurement and generated the measured site-only LAeq of 30 dB and LA1,1minute of 31 dB.

Continuum and mining noise sources from WCP primarily generated the measured noise levels. Trains, frogs and insects contributed to the measured LA1, LA10 and LAeq.

Farm animals were also noted.

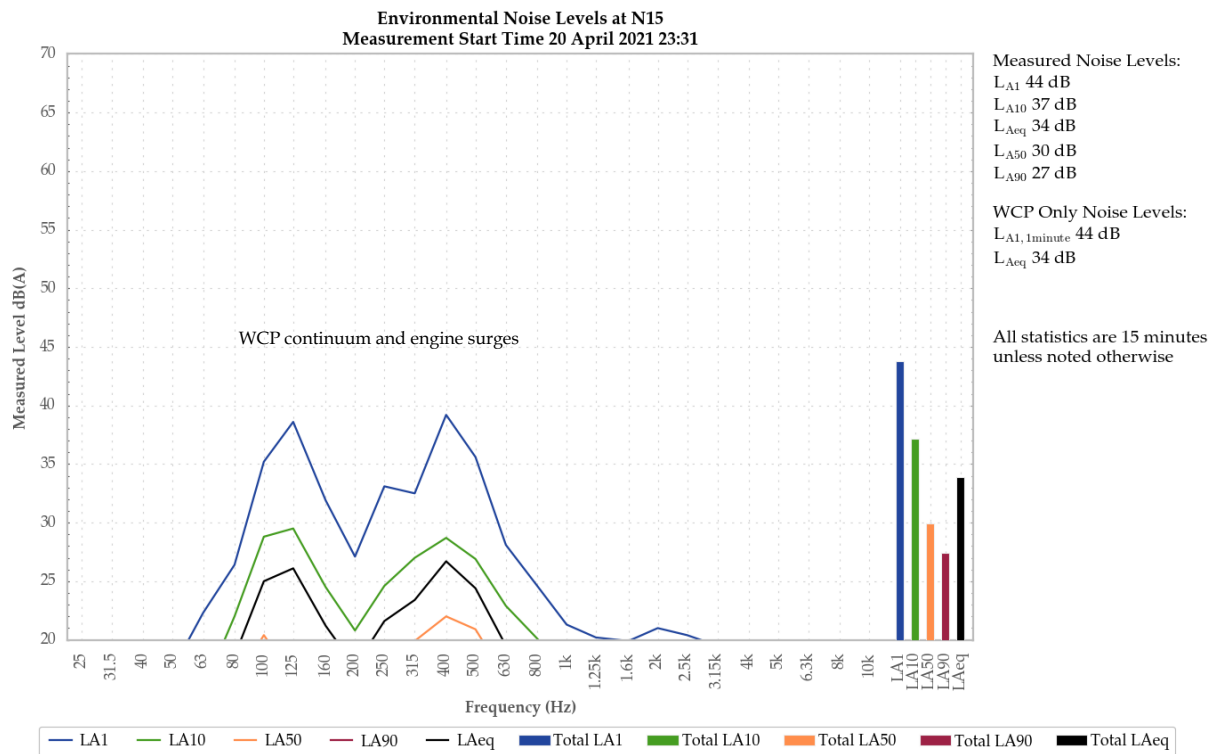
## 5.1.2 N14

*Figure not available due to storage error in the measurement instrument.*

A mining continuum from WCP was audible at low levels throughout the measurement and generated a site-only  $L_{Aeq}$  of less than 25 dB and  $L_{A1,1minute}$  of 27 dB.

Continuum and mining noise sources from WCP combined with frogs and insects to generate the measured noise levels.

### 5.1.3 N15



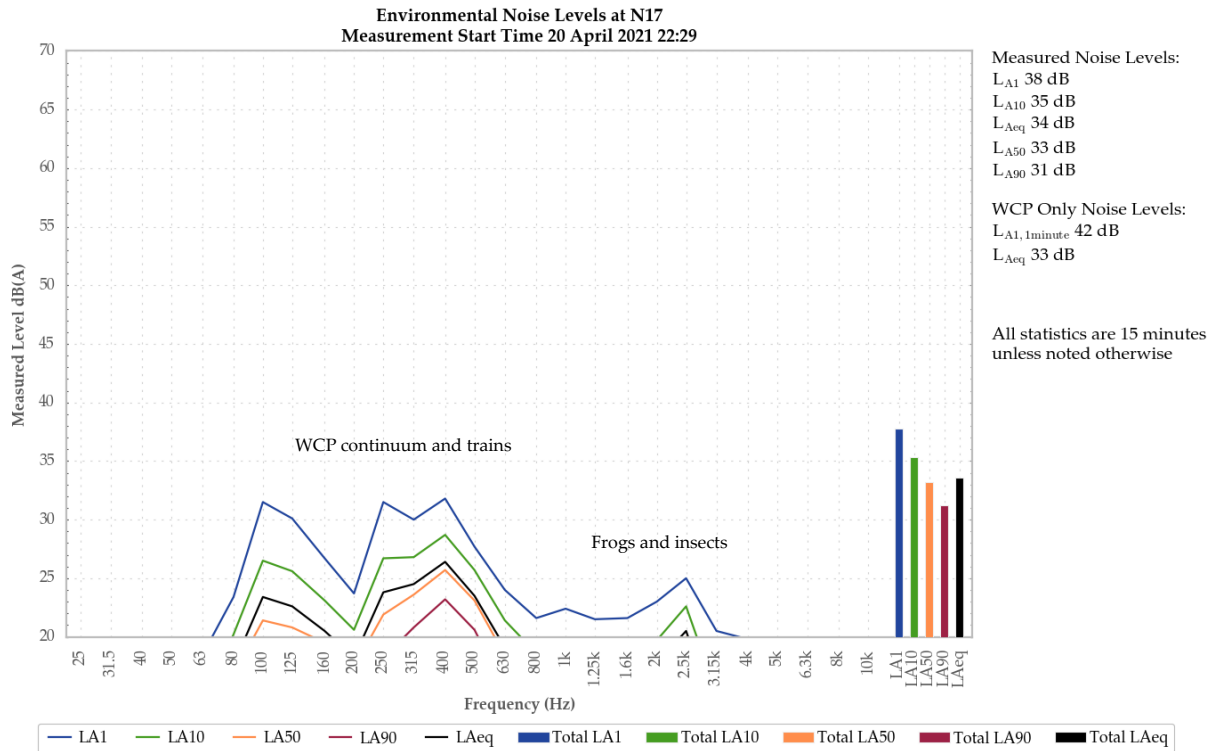
**Figure 4: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum and engine surges from WCP were audible throughout the measurement and generated the site-only of LAeq of 34 dB and an LA1,1minute of 44 dB.

Continuum and mining noise sources from WCP generated the measured noise levels.

Frogs, insects and bats were also noted.

5.14 N17



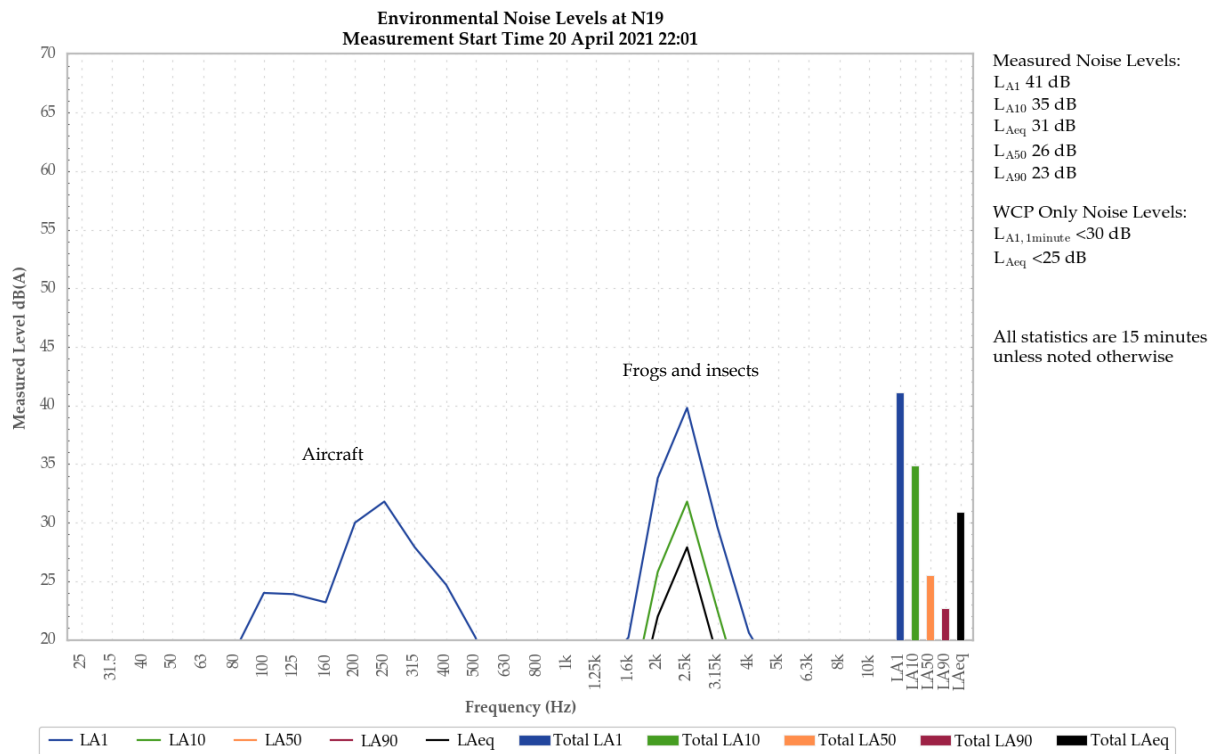
**Figure 5: Environmental Noise Levels - N17 Mogo Road, off Araluen Road**

A mining continuum from WCP was audible throughout the measurement and generated a site-only of LAeq of 33 dB and LA1,1minute of 42 dB.

Continuum and mining noise sources from WCP primarily generated the measured noise levels. Trains were a minor contributor to the measured LA1 and LA10. Frogs and insects were a minor contributor to the measured LA1, LA10 and LAeq.



### 5.1.5 N19

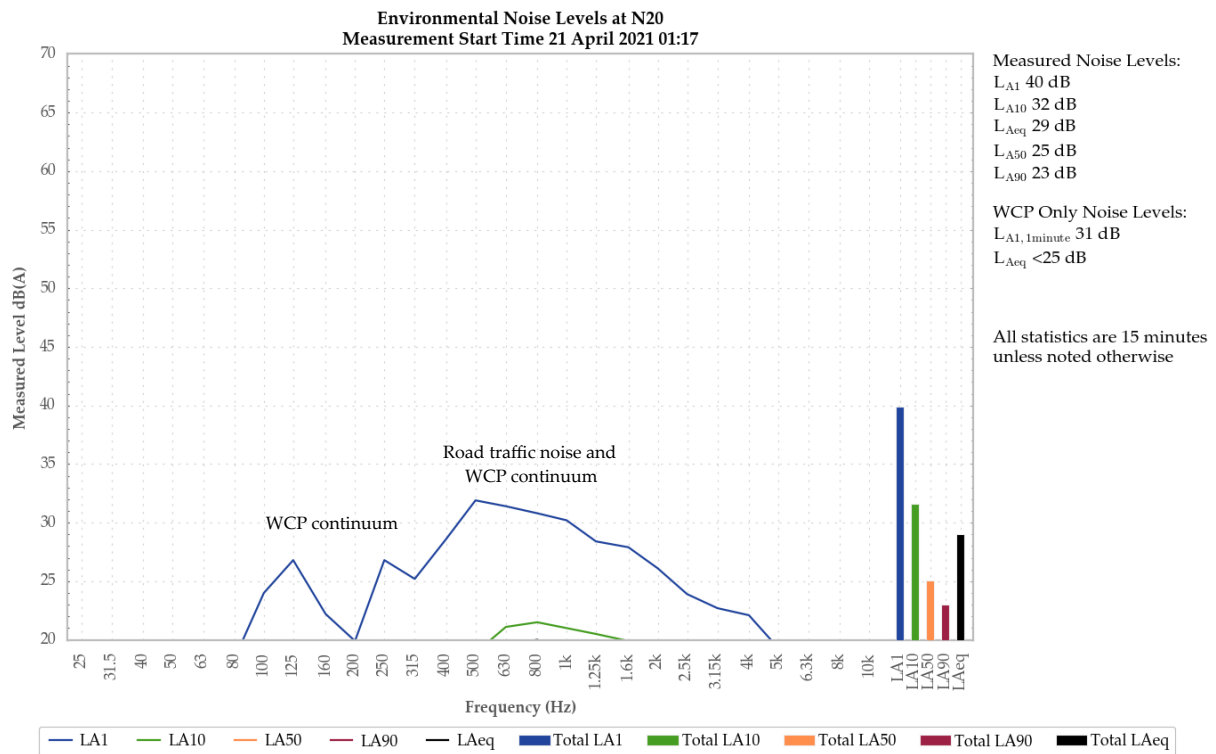


**Figure 6: Environmental Noise Levels - N19, Upper Mogo Road**

A mining continuum from WCP was audible at low levels during the measurement and generated a site-only LAeq of less than 25 dB and LA1,1minute of less than 30 dB.

Continuum and mining noise sources from WCP contributed to the measured LA50 and LA90. Frogs and insects primarily generated the measured LA1, LA10 and LAeq. Aircraft also contributed to the measured LA1.

### 5.1.6 N20



**Figure 7: Environmental Noise Levels, N20 - Ringwood Road**

A mining continuum from WCP was audible at low levels during the measurement and generated the site-only LAeq of less than 25 dB and LA1,1minute of 31 dB.

Continuum and mining noise sources from WCP combined with road traffic noise to generate the measured levels.

A nearby creek was also noted.

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 20/21 April 2021 at six monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the April 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.



- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquill stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per <b>Table 7</b>,</li> <li><b>Figure 3</b> and <b>Figure 4</b></li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in <b>Table 7</b> to validate real-time noise monitoring data (<b>Section 6.5</b>).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in **Table 8** during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in **Section 4** of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C21058

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

**Equipment Tested/ Model Number :** Rion NA-28  
**Instrument Serial Number :** 30131882  
**Microphone Serial Number :** 04739  
**Pre-amplifier Serial Number :** 11942

**Pre-Test Atmospheric Conditions**  
**Ambient Temperature :** 23.5°C  
**Relative Humidity :** 46.7%  
**Barometric Pressure :** 100.28kPa

**Post-Test Atmospheric Conditions**  
**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.25kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 8 Feb 2021

**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 2021

**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	
125Hz:	±0.12dB	Temperature	±0.2°C
1kHz:	±0.11dB	Relative Humidity	±2.4%
8kHz:	±0.13dB	Barometric Pressure	±0.015kPa
Electrical Tests	±0.10dB		

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



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

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

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


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

PAGE 1 OF 1



**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C21059

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Pulsar Model 105
<b>Instrument Serial Number :</b>	78226
<b>Atmospheric Conditions</b>	
<b>Ambient Temperature :</b>	23.3°C
<b>Relative Humidity :</b>	47.7%
<b>Barometric Pressure :</b>	100.27kPa
<b>Calibration Technician :</b>	Jeff Yu
<b>Calibration Date :</b>	08 Feb 2021
<b>Secondary Check:</b>	Max Moore
<b>Report Issue Date :</b>	9 Feb 2021
<b>Approved Signatory :</b>	 Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.02	1000.40

The sound calibrator has been shown to conform to the class 1 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	±0.14dB	Temperature	±0.2°C
Frequency	±0.09%	Relative Humidity	±2.4%
Distortion	±0.09%	Barometric Pressure	±0.015kPa

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

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



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

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

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

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



# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
May 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring May 2021

Reference: 21126\_R01

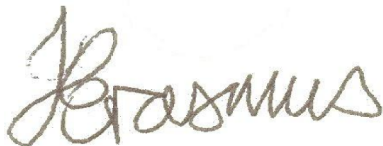
Report date: 3 June 2021

#### Prepared for

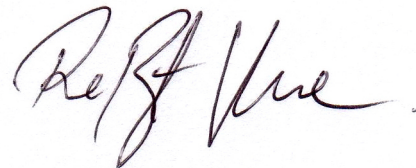
Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Jonathan Erasmus  
Consultant



QA Review: Robert Kirwan  
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*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 4/5 May 2021 at six locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

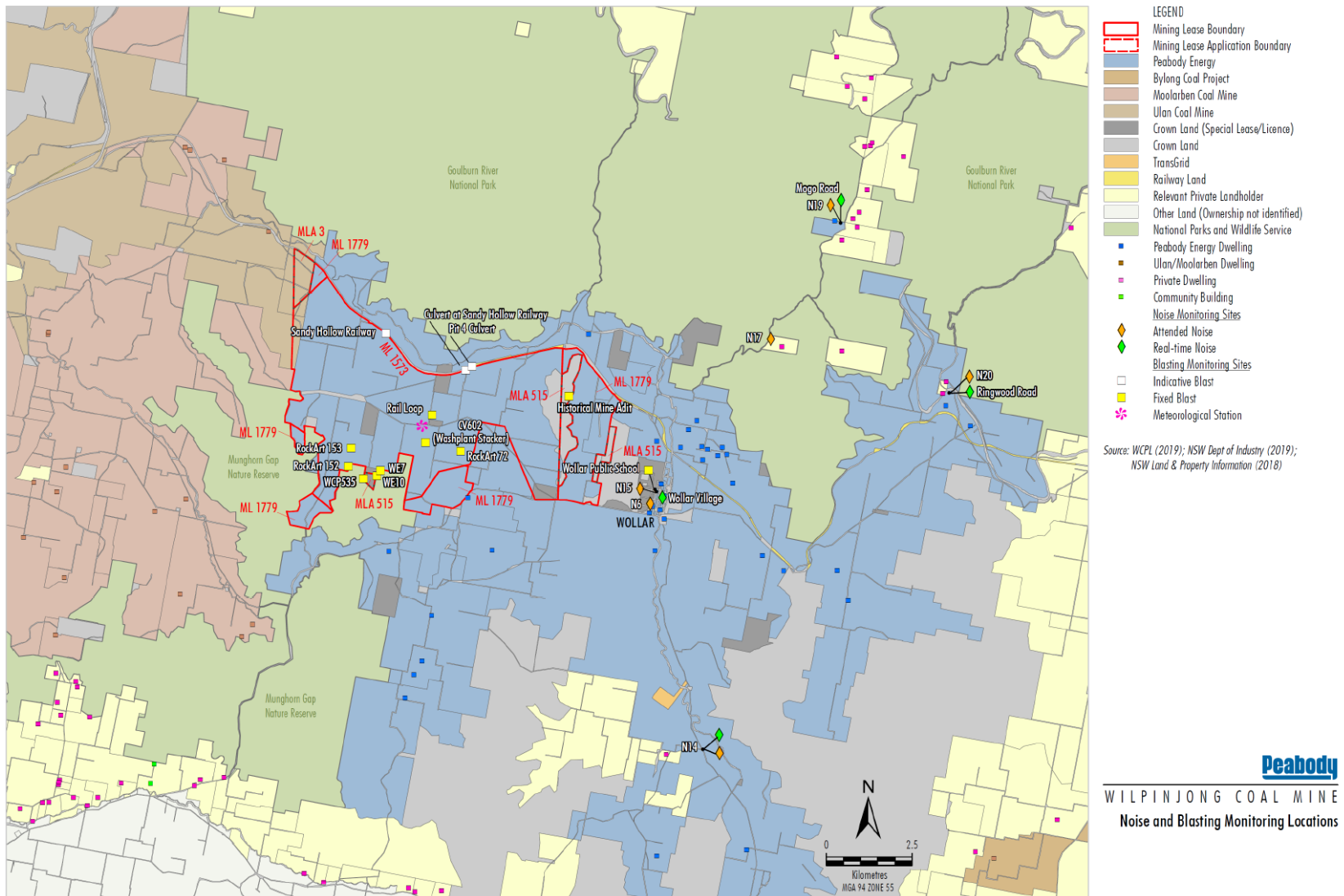


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2019)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

- N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
- N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.



## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Jonathan Erasmus.

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

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

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

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

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

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

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

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

### 3.3 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	78226	08/02/2023

### 3.4 Modifying Factors

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

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

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

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	03/05/2021 23:19	47	36	33	30	29	26	24
N14	04/05/2021 00:45	51	32	26	24	21	19	18
N15	03/05/2021 23:00	72	58	39	46	31	28	25
N17	03/05/2021 22:30	48	33	28	27	26	24	21
N19	03/05/2021 22:00	39	36	31	28	26	22	17
N20	04/05/2021 00:00	46	32	26	23	21	19	18

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.4.

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MAY 2021

Location	Start Date and Time	Wind Speed $m/s^1$	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	03/05/2021 23:19	0.0	F	37	Yes	30	Nil
N14	04/05/2021 00:45	1.0	F	35	Yes	<20	Nil
N15	03/05/2021 23:00	0.0	F	37	Yes	30	Nil
N17	03/05/2021 22:30	0.0	F	38	Yes	25	Nil
N19	03/05/2021 22:00	0.7	F	35	Yes	<20	Nil
N20	04/05/2021 00:00	0.6	F	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MAY 2021

Location	Start Date and Time	Wind Speed $m/s^1$	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	03/05/2021 23:19	0.0	F	45	Yes	35	Nil
N14	04/05/2021 00:45	1.0	F	45	Yes	<20	Nil
N15	03/05/2021 23:00	0.0	F	45	Yes	40	Nil
N17	03/05/2021 22:30	0.0	F	45	Yes	31	Nil
N19	03/05/2021 22:00	0.7	F	45	Yes	<20	Nil
N20	04/05/2021 00:00	0.6	F	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – MAY 2021

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	03/05/2021 23:19	12	0.0	-	8
N14	04/05/2021 00:45	13	0.0	-	8
N15	03/05/2021 23:00	11	0.0	-	8
N17	03/05/2021 22:30	15	0.0	-	6
N19	03/05/2021 22:00	19	0.3	250	4
N20	04/05/2021 00:00	11	0.0	-	8

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

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

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

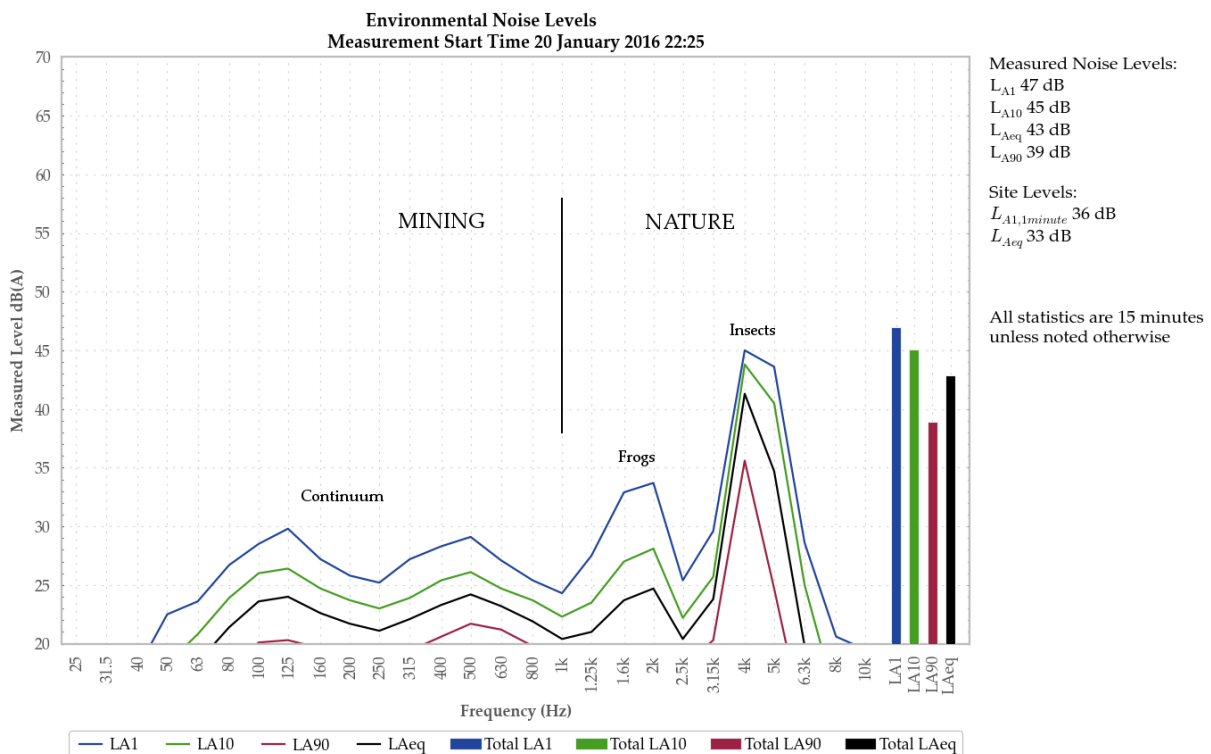
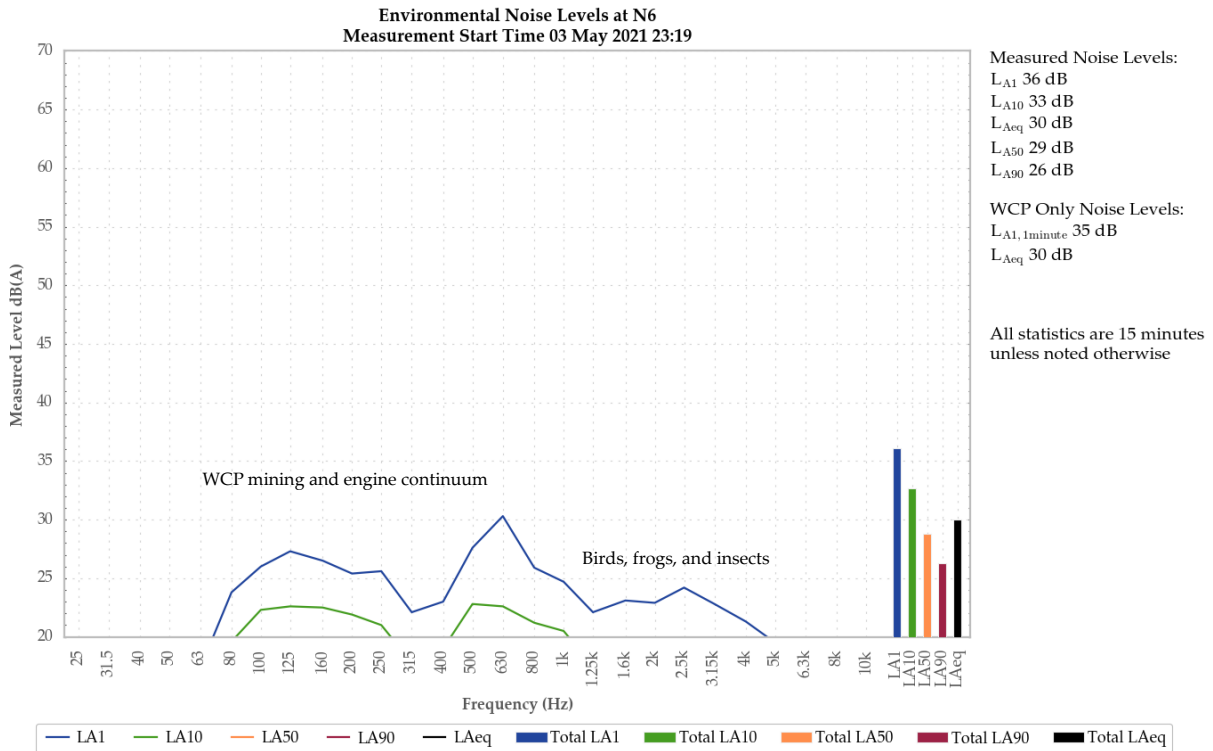


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6



**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

A mining continuum from WCP was audible throughout the measurement and generated the measured site-only LAeq,15minute of 30 dB. An engine surge generated the measured LA1,1minute of 35 dB. Impact noise from WCP was also noted.

Mining noise from WCP and wildlife noise generated the measured LA1. WCP generated the measured LA10, LAeq, LA50, and LA90.



5.1.2 N14

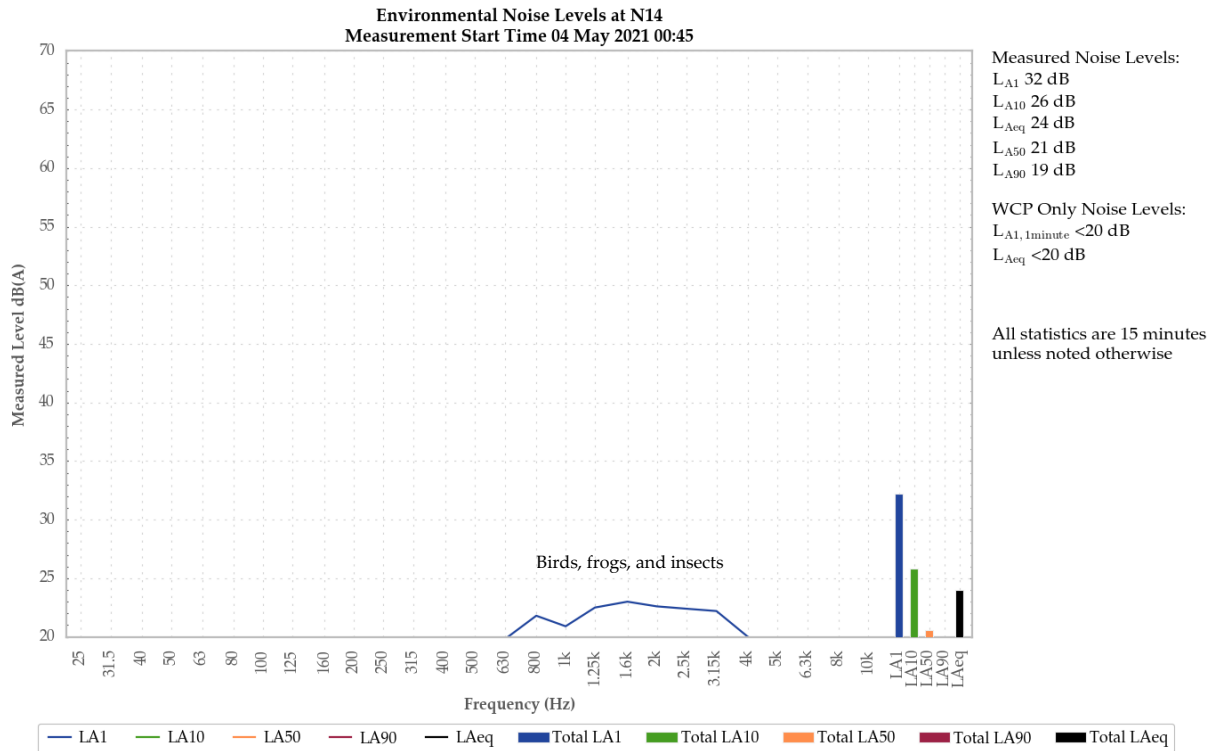
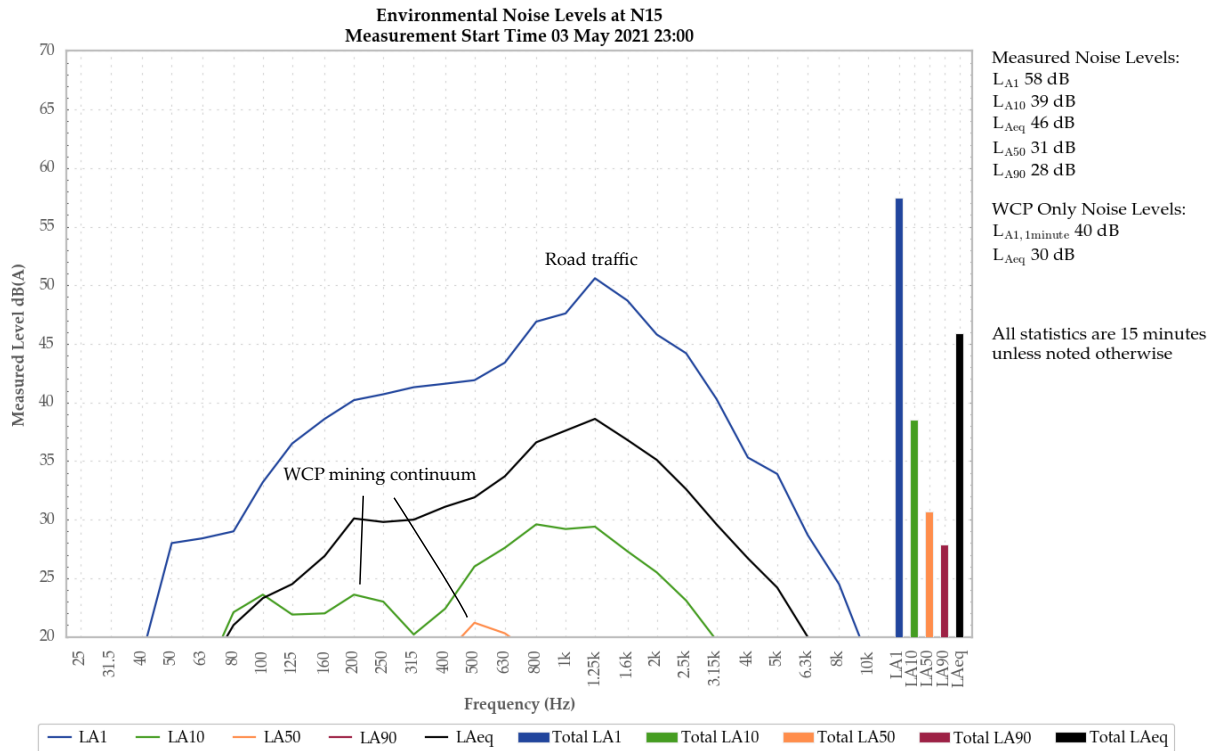


Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads

Low-level mining noise from WCP was audible during the measurement generating the site-only LAeq and LA1,1minute of less than 20 dB.

Birds, frogs, and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

### 5.1.3 N15



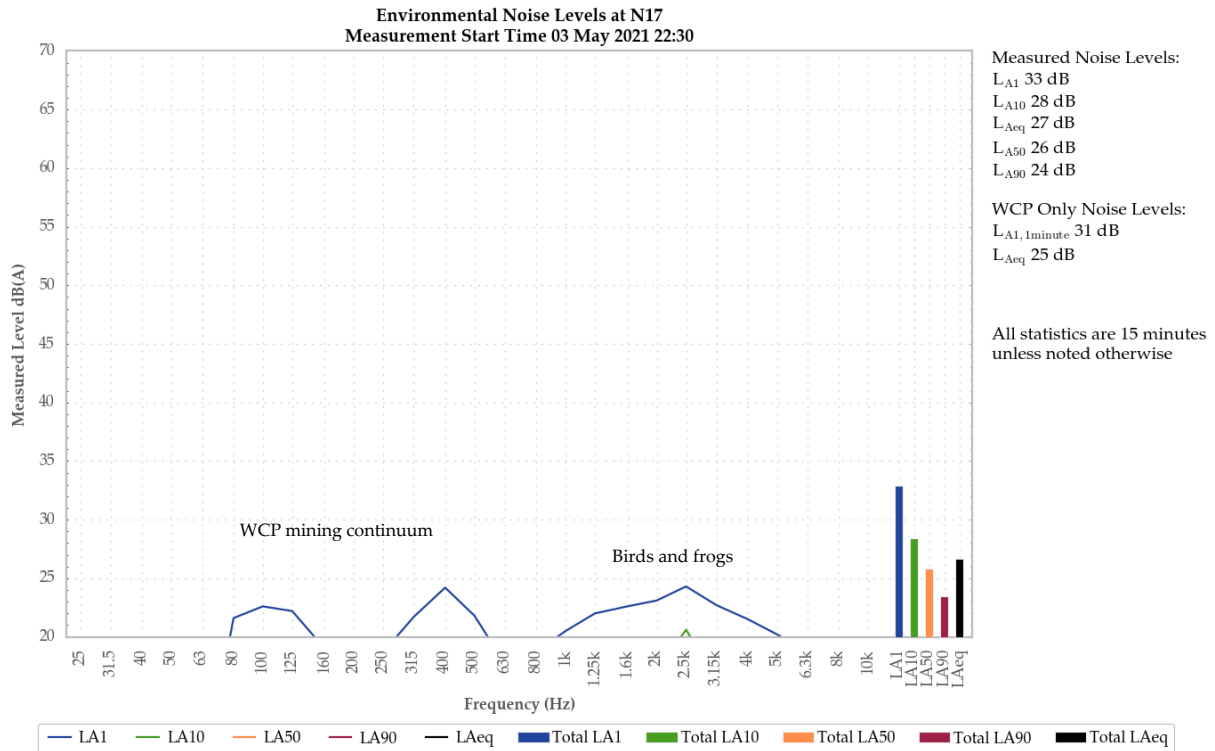
**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum and track noise from WCP was audible throughout the measurement generating the site-only LAeq of 30 dB. Impact noise from WCP generated the site-only LA1,1minute of 40 dB.

Road traffic generated the measured LA1, LA10, and LAeq. Traffic and mining noise from WCP generated the measured LA50. WCP generated the measured LA90.

Birds, frogs, insects, aircraft, and bats were also noted.

5.14 N17

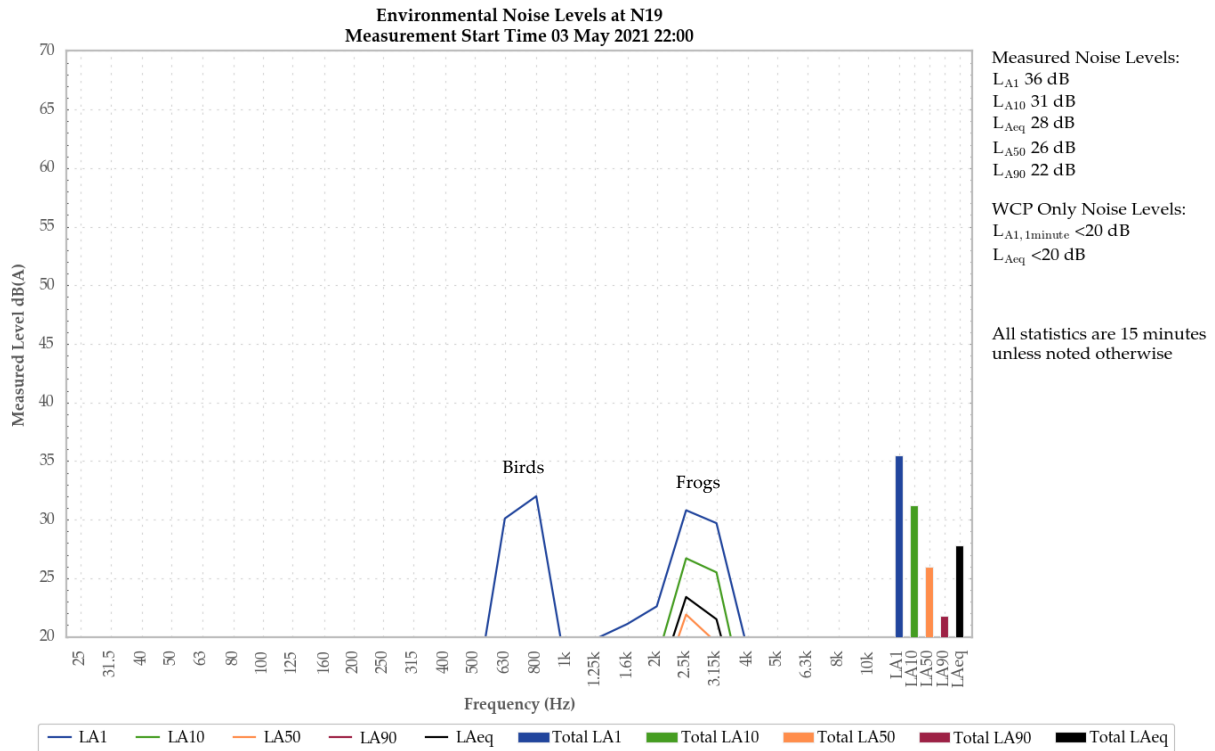


**Figure 6: Environmental Noise Levels – N17 Mogo Road, off Araluen Road**

A mining continuum from WCP was audible throughout the measurement generating the site-only LAeq of 25 dB. Engine surge generated the site-only LA1,1minute of 31 dB.

Birds, frogs, and mining noise from WCP generated the measured LA1, LA10, LAeq and LA50. WCP generated the measured LA90.

### 5.1.5 N19



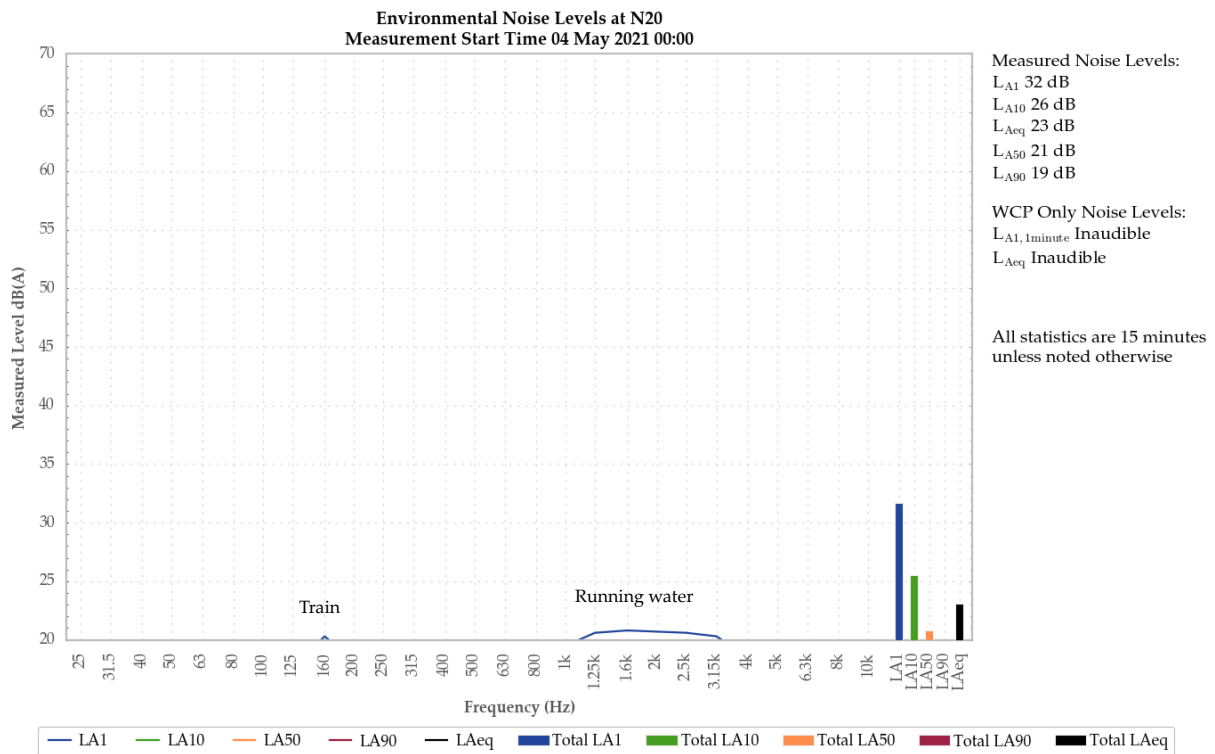
**Figure 7: Environmental Noise Levels – N19, Upper Mogo Road**

Low-level mining noise from WCP was audible during the measurement generating the site-only LAeq and LA1,1minute of less than 20 dB.

Birds, frogs, and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

An aircraft was also noted.

### 5.1.6 N20



**Figure 8: Environmental Noise Levels, N20 – Ringwood Road**

WCP was inaudible during the measurement.

Water flowing down the Goulburn river was responsible for the measured LA1, LA10, LAeq, LA50, and LA90.

A train was also noted.

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 4/5 May 2021 at six monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the May 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.



### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per Table 7,</li> <li>Figure 3 and Figure 4</li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.



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## APPENDIX

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### **B CALIBRATION CERTIFICATES**



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C21058

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	30131882
<b>Microphone Serial Number :</b>	04739
<b>Pre-amplifier Serial Number :</b>	11942
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
<b>Ambient Temperature :</b> 23.5°C	<b>Ambient Temperature :</b> 23.3°C
<b>Relative Humidity :</b> 46.7%	<b>Relative Humidity :</b> 47.7%
<b>Barometric Pressure :</b> 100.28kPa	<b>Barometric Pressure :</b> 100.25kPa
<b>Calibration Technician :</b> Jeff Yu	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 8 Feb 2021	<b>Report Issue Date :</b> 9 Feb 2021
<b>Approved Signatory :</b>	Ken Williams

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

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

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

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

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



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

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

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

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



**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C21059

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

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

**Atmospheric Conditions**

**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.27kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 08 Feb 2021  
**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 2021

**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
94	1000	94.02	1000.40

The sound calibrator has been shown to conform to the class 1 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.

Specific Tests	Least Uncertainties of Measurement - Environmental Conditions	
Generated SPL	±0.14dB	Temperature ±0.2°C
Frequency	±0.09%	Relative Humidity ±2.4%
Distortion	±0.09%	Barometric Pressure ±0.015kPa

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

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



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

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

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

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

PAGE 1 OF 1

# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
June 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring June 2021

Reference: 21155\_R01

Report date: 30 June 2021

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Robert Kirwan  
Consultant



QA Review: Jesse Tribby  
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*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 22/23 June 2021 at eight locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N13	'Coonaroo' off Moolarben Road, Moolarben
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar
N21	'Wandoona', Barigan Road, Wollar



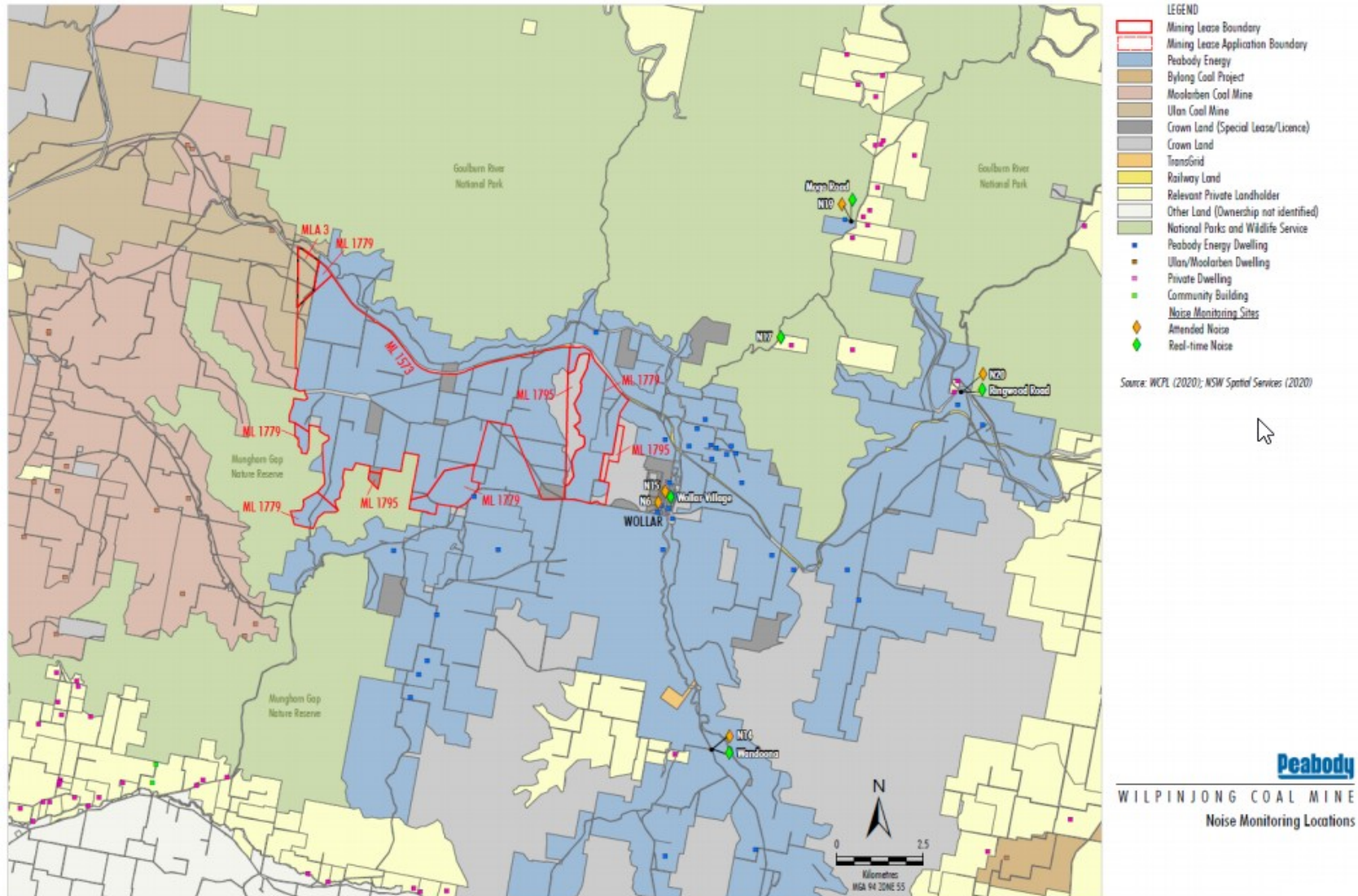


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Robert Kirwan.

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

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

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

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

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

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

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

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

### 3.3 Modifying Factors

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

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

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

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	00701424	02/06/2023
Pulsar 106 acoustic calibrator	79631	26/05/2023

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	22/06/2021 23:54	53	41	30	30	28	26	24
N14	22/06/2021 23:30	48	41	38	35	34	31	27
N15	22/06/2021 23:00	42	35	29	27	25	22	20
N17	22/06/2021 22:25	47	30	26	24	23	21	18
N19	22/06/2021 22:00	42	29	27	24	23	19	17
N20	23/06/2021 00:30	42	30	25	23	23	21	20

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

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

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JUNE 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	22/06/2021 23:54	2.0	E	37	Yes	IA	Nil
N14	22/06/2021 23:30	2.0	F	35	Yes	<25	Nil
N15	22/06/2021 23:00	0.9	F	37	Yes	IA	Nil
N17	22/06/2021 22:25	0.8	F	38	Yes	IA	Nil
N19	22/06/2021 22:00	1.0	F	35	Yes	IA	Nil
N20	23/06/2021 00:30	1.6	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JUNE 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	22/06/2021 23:54	2.0	E	45	Yes	IA	Nil
N14	22/06/2021 23:30	2.0	F	45	Yes	26	Nil
N15	22/06/2021 23:00	0.9	F	45	Yes	IA	Nil
N17	22/06/2021 22:25	0.8	F	45	Yes	IA	Nil
N19	22/06/2021 22:00	1.0	F	45	Yes	IA	Nil
N20	23/06/2021 00:30	1.6	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.



## 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, hail, or wind speeds above 5 m/s at microphone height.

*Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – JUNE 2021*

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	22/06/2021 23:54	9	0.0	-	8
N14	22/06/2021 23:30	8	0.9	120	8
N15	22/06/2021 23:00	9	0.0	-	8
N17	22/06/2021 22:25	11	0.0	-	8
N19	22/06/2021 22:00	13	0.7	60	8
N20	23/06/2021 00:30	8	0.5	40	8

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

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

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

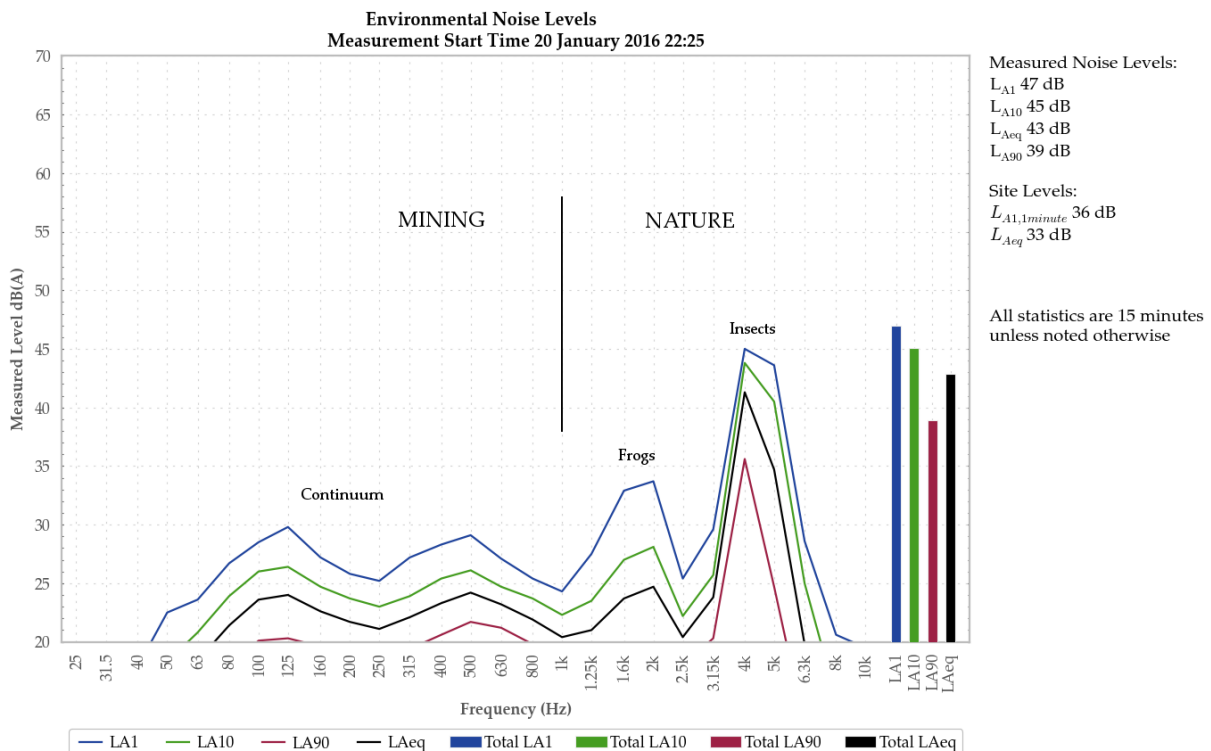
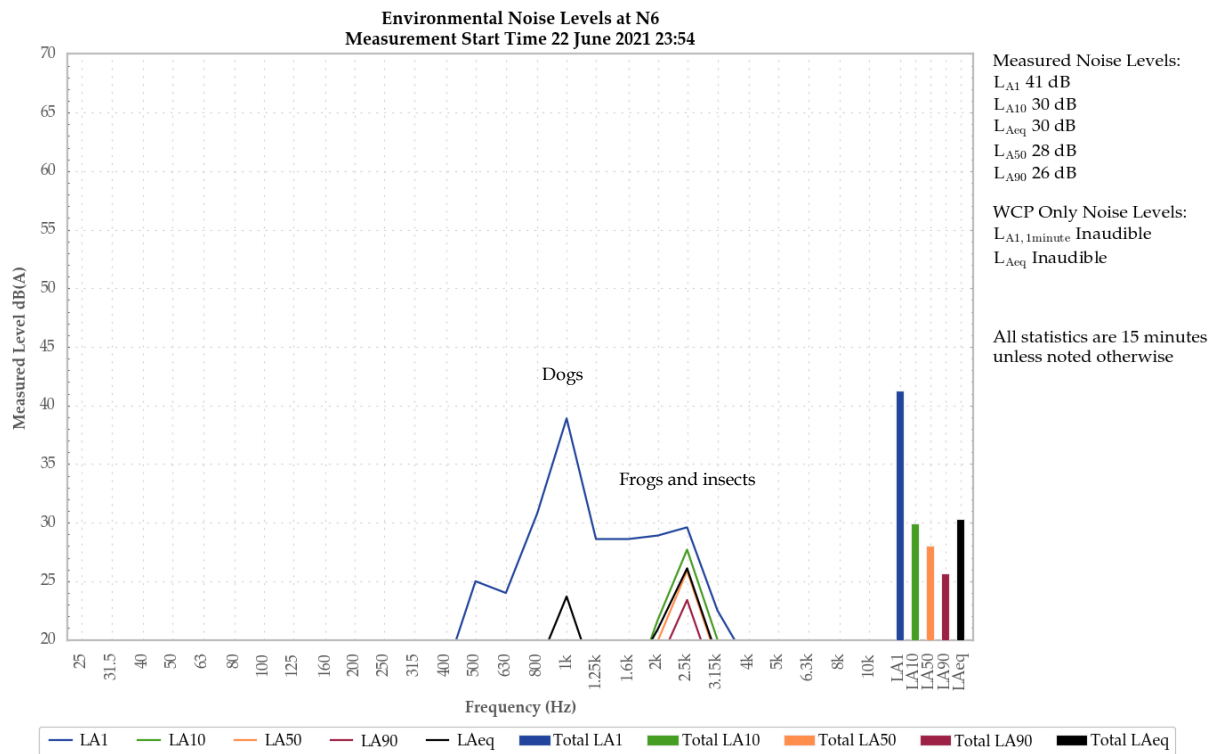


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

### 5.1.1 N6

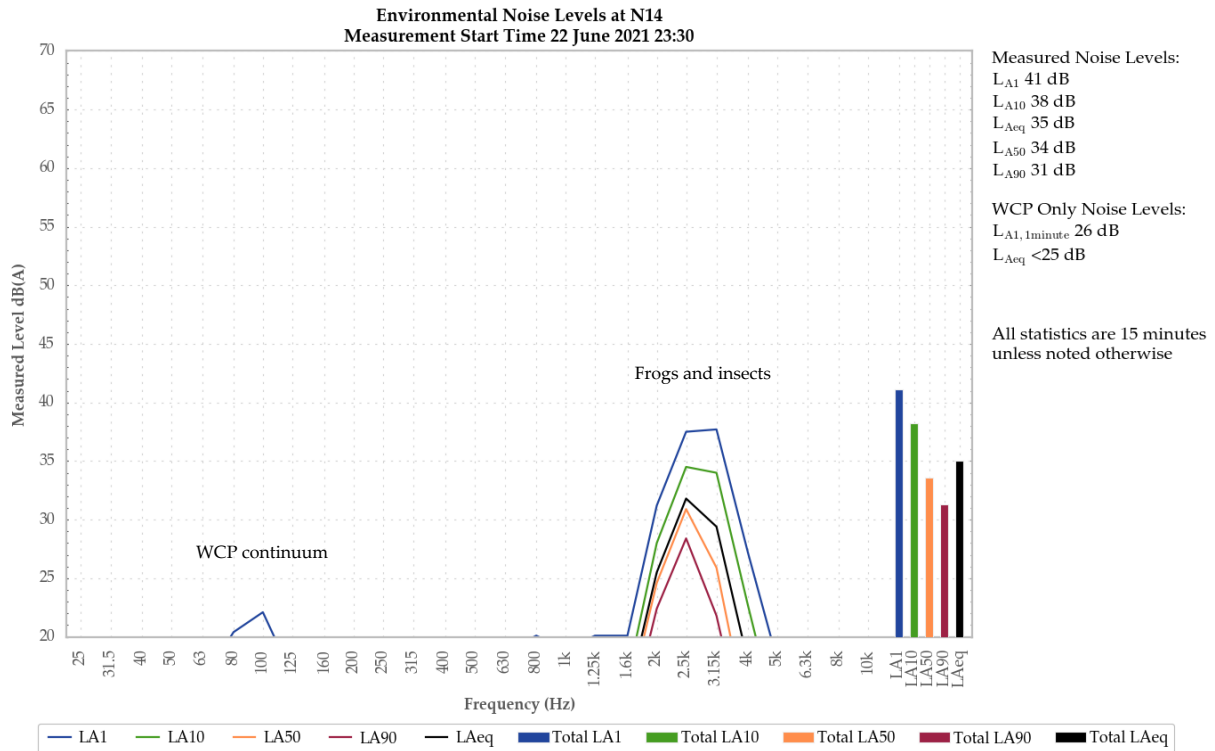


**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

WCP was inaudible during the measurement.

Dogs, frogs and insects generated the measured LA1 and LAeq. Frogs and insects generated the measured LA10, LA50 and LA90.

5.1.2 N14



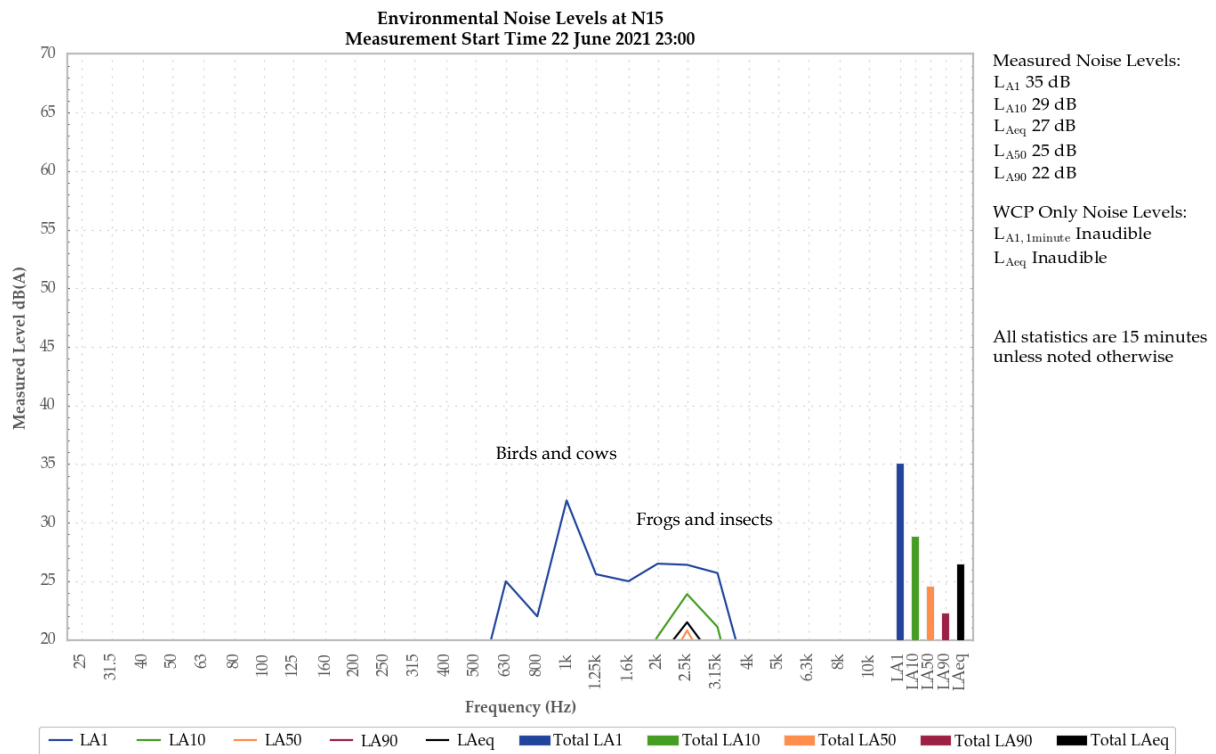
**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

A mining continuum from WCP was audible at very low levels during the measurement and generated the site-only LAeq of less than 25 dB. Surges in this continuum were responsible for the measured site-only LA1,1minute of 26 dB.

Frogs and insects were responsible for the measured noise levels.

Dogs were also noted.

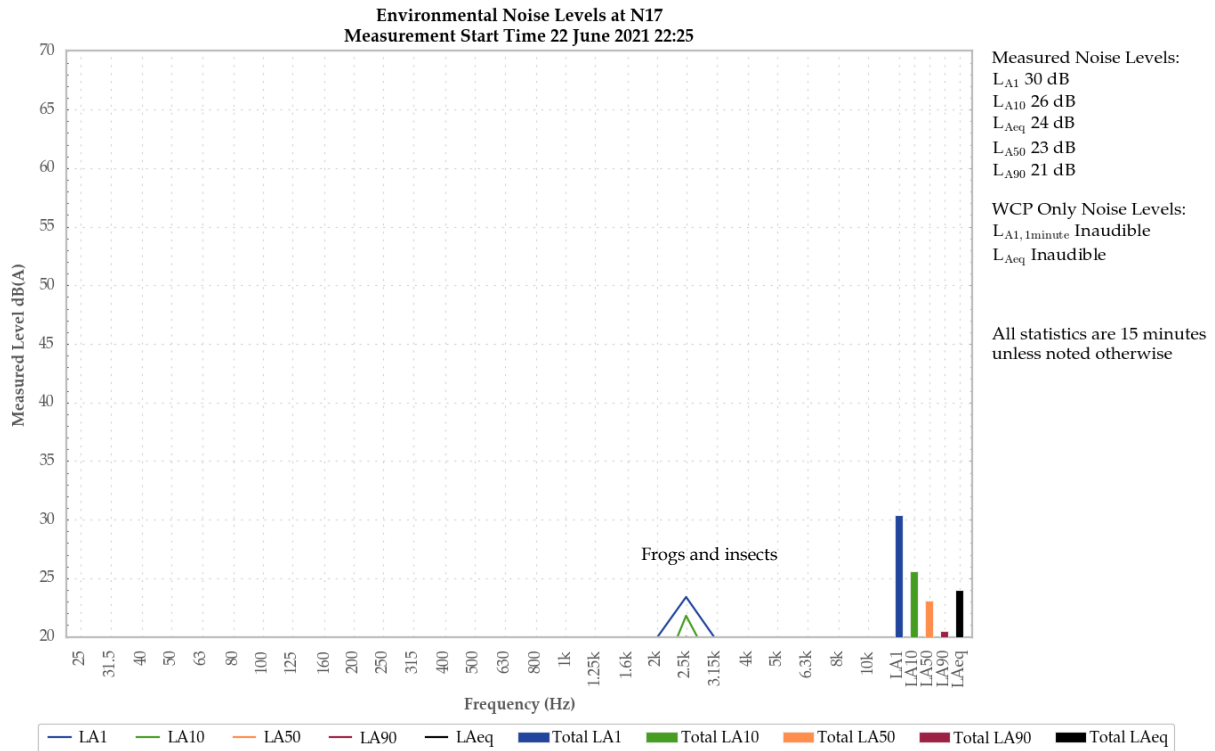
### 5.1.3 N15



WCP was inaudible during the measurement.

Birds, cows, frogs and insects generated the measured LA1 and LAeq. Frogs and insects generated the measured LA10, LA50 and LA90.

5.1.4 N17



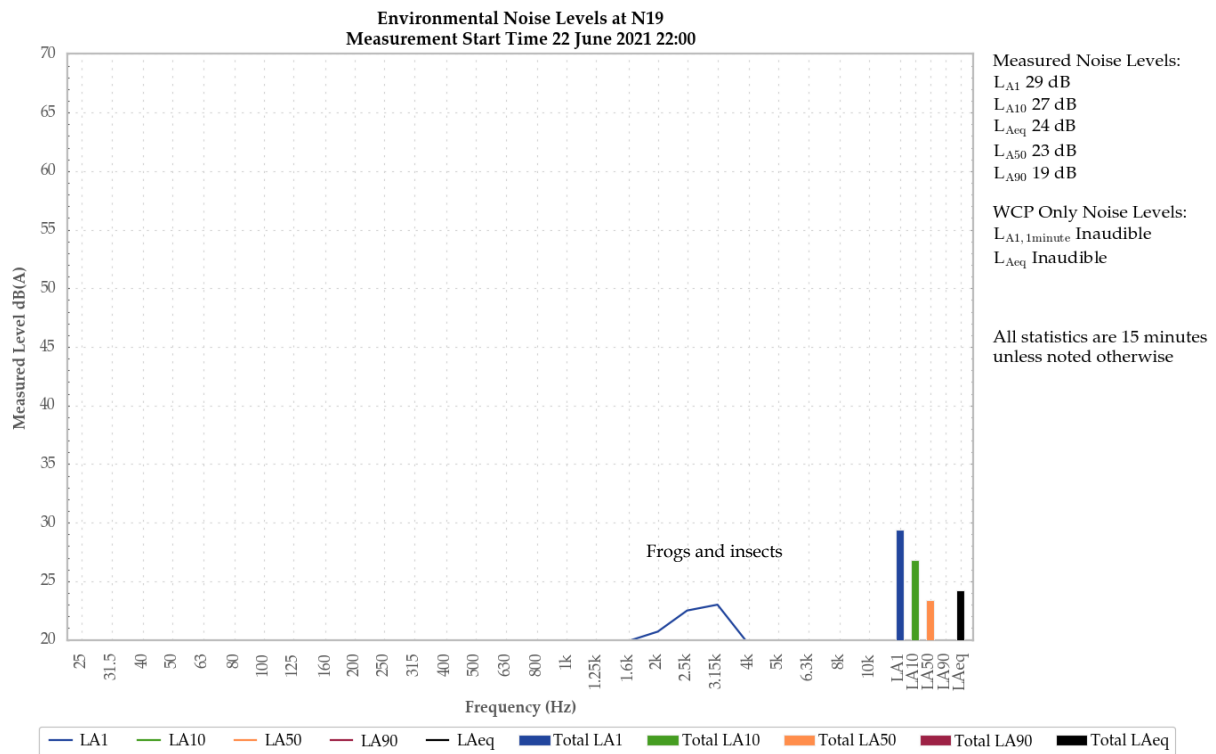
**Figure 6: Environmental Noise Levels - N17 Mogo Road, off Araluen Road**

WCP was inaudible during the measurement.

Frogs and insects generated the measured noise levels.

A distant train was also noted.

### 5.1.5 N19



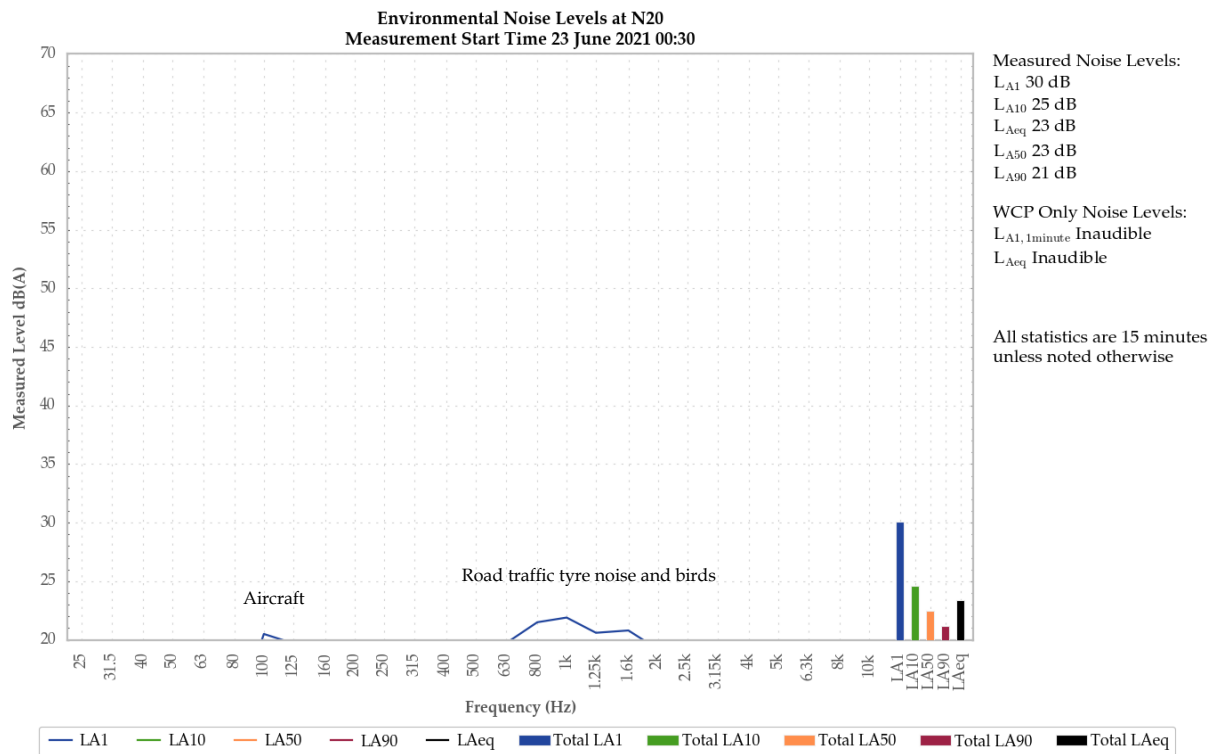
**Figure 7: Environmental Noise Levels - N19, Upper Mogo Road**

WCP was inaudible during the measurement.

Frogs and insects generated the measured noise levels.

Breeze in foliage and an aircraft were also noted.

### 5.1.6 N20



**Figure 8: Environmental Noise Levels, N20 - Ringwood Road**

WCP was inaudible during the measurement.

Road traffic tyre noise, birds and an aircraft generated the measured levels.



## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 22/23 June 2021 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the June 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{A1}(1 \text{ minute})$
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions



Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per Table 7,</li> <li>Figure 3 and Figure 4</li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C21344

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

**Equipment Tested/ Model Number :** Rion NA-28  
**Instrument Serial Number :** 00701424  
**Microphone Serial Number :** 01916  
**Pre-amplifier Serial Number :** 01463

**Pre-Test Atmospheric Conditions**  
**Ambient Temperature :** 20.6°C  
**Relative Humidity :** 47%  
**Barometric Pressure :** 101.05kPa

**Post-Test Atmospheric Conditions**  
**Ambient Temperature :** 22.4°C  
**Relative Humidity :** 44%  
**Barometric Pressure :** 100.91kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 2 Jun 2021

**Secondary Check:** Harrison Kim  
**Report Issue Date :** 2 Jun 2021

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

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

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



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

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

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

PAGE 1 OF 1



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

**Sound Calibrator**  
IEC 60942-2017

**Calibration Certificate**

Calibration Number C21341

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

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

**Atmospheric Conditions**

**Ambient Temperature :** 22.7°C  
**Relative Humidity :** 47.5%  
**Barometric Pressure :** 100.64kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 26 May 2021  
**Secondary Check:** Harrison Kim  
**Report Issue Date :** 26 May 2021

**Approved Signatory :** *Ken Williams* Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.02	1000.40

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

Least Uncertainties of Measurement - Environmental Conditions			
Specific Tests		Environmental Conditions	
Generated SPL	±0.14dB	Temperature	±0.2°C
Frequency	±0.09%	Relative Humidity	±2.4%
Distortion	±0.09%	Barometric Pressure	±0.015kPa

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

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

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



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

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# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
July 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring July 2021

Reference: 21174\_R01

Report date: 23 August 2021

#### Prepared for

Wilpinjong Coal Pty Ltd

Locked Bag 2005

Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd

PO Box 3115

Thornton NSW 2322



Prepared: Ryan Bruniges  
Consultant

QA Review: Tony Welbourne  
Director

*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*



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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 6/7 July 2021 at eight locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar



### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

- N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
- N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Ryan Bruniges.

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

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

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

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

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



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

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

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

### 3.3 Modifying Factors

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

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

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

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	78226	08/02/2023

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	07/07/2021 00:56	61	54	48	43	31	24	22
N14	07/07/2021 00:30	38	32	29	26	24	20	18
N15	06/07/2021 23:01	38	37	35	33	32	27	23
N17	06/07/2021 22:27	44	24	19	18	16	15	14
N19	06/07/2021 22:00	36	23	20	19	18	17	16
N20	06/07/2021 23:45	46	26	23	22	20	19	19

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

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

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JULY 2021**

Location	Start Date and Time	Wind Speed $m/s^1$	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	07/07/2021 00:56	0.6	F	37	Yes	<25	Nil
N14	07/07/2021 00:30	0	F	35	Yes	IA	Nil
N15	06/07/2021 23:01	0	G	37	No	<25	NA
N17	06/07/2021 22:27	0	G	38	No	IA	NA
N19	06/07/2021 22:00	0.7	F	35	Yes	IA	Nil
N20	06/07/2021 23:45	0	F	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JULY 2021**

Location	Start Date and Time	Wind Speed $m/s^1$	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	07/07/2021 00:56	0.6	F	45	Yes	<25	Nil
N14	07/07/2021 00:30	0	F	45	Yes	IA	Nil
N15	06/07/2021 23:01	0	G	45	No	<30	NA
N17	06/07/2021 22:27	0	G	45	No	IA	NA
N19	06/07/2021 22:00	0.7	F	45	Yes	IA	Nil
N20	06/07/2021 23:45	0	F	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – JULY 2021

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	07/07/2021 00:56	-1	0	-	0
N14	07/07/2021 00:30	1	0	-	0
N15	06/07/2021 23:01	1	0	-	0
N17	06/07/2021 22:27	6	0	-	0
N19	06/07/2021 22:00	7	0	-	0
N20	06/07/2021 23:45	-2	0.4	30	0

Notes:

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

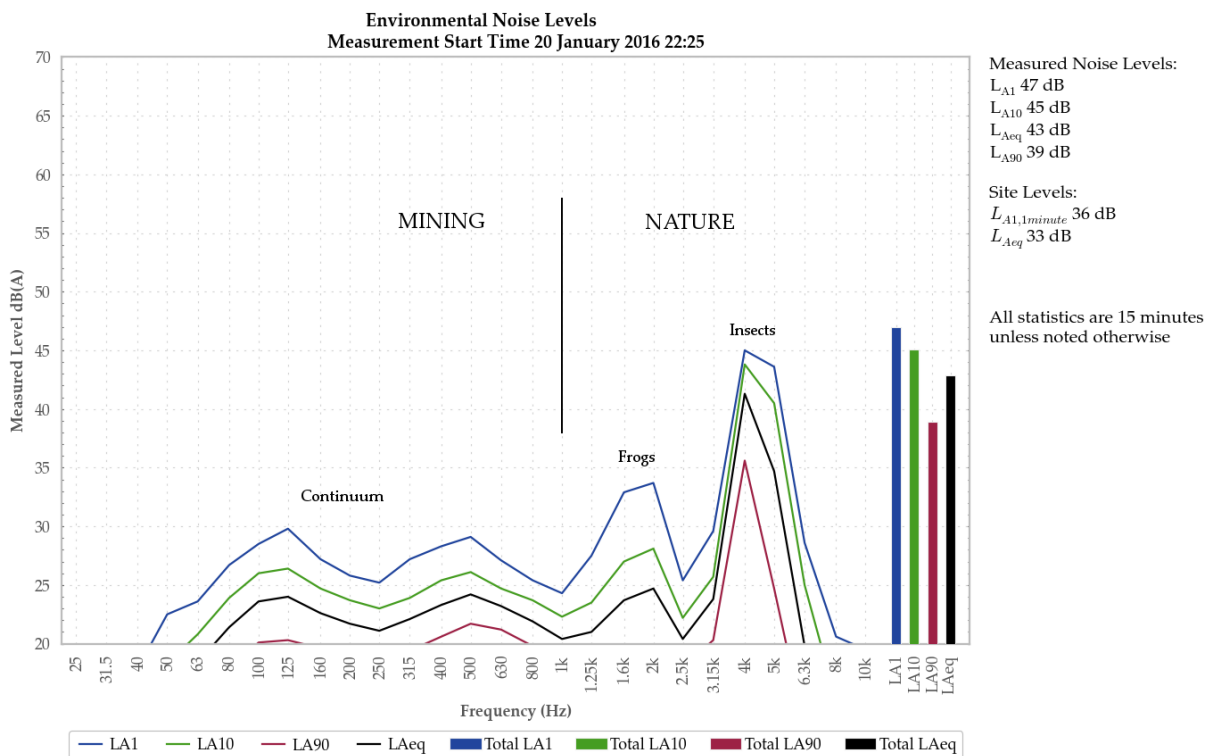
Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

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

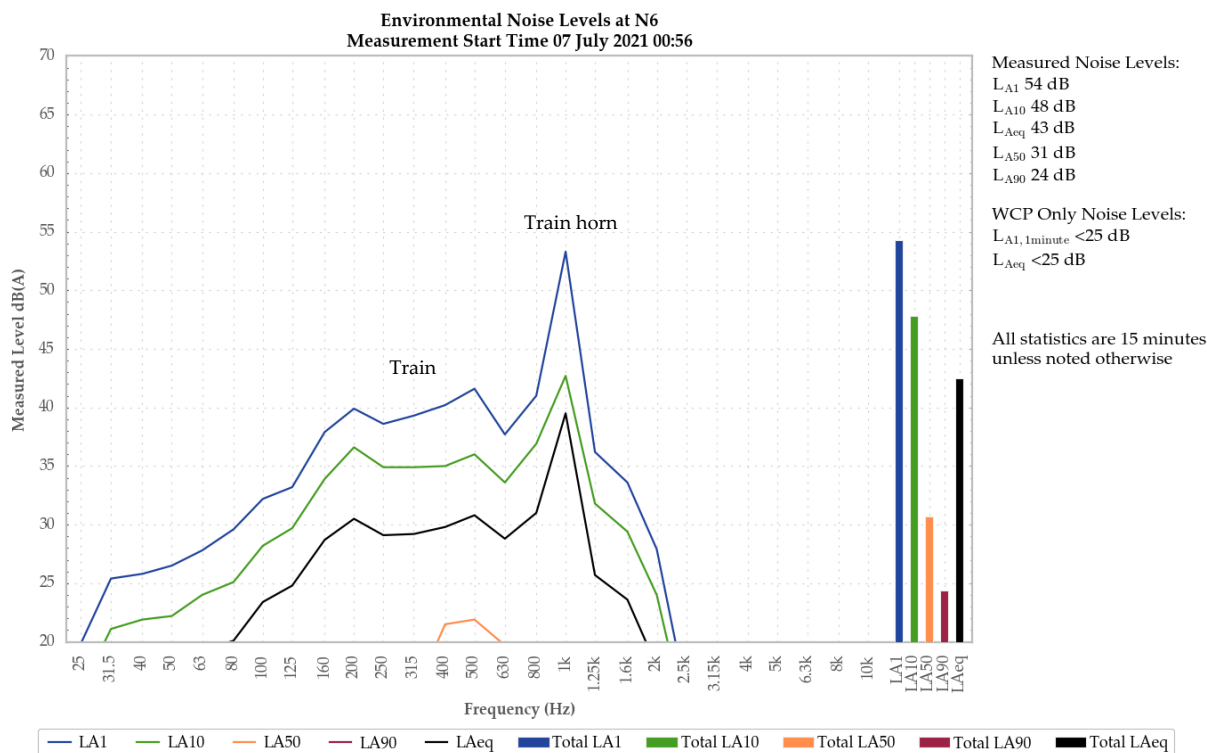
An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic. It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the  $L_{A1}$  result by a small margin but is entirely accurate for  $L_{Aeq}$ .



**Figure 2: Example graph (refer to Section 5.1 for explanatory note)**

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 5.1 to Table 5.6.

### 5.1.1 N6



**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

Engine noise from WCP was audible at times during the measurement and generated the measured site-only LAeq and LA1,1minute of less than 25 dB.

Rail noise was responsible for all measured noise levels.

Dogs were also noted.

*Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6*

Month	Jul 2020	Aug <sup>1</sup> 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021
LAeq	<25	40	<25	IA	<25	IA	IA	<20	IA	30	30	IA
LA1,1min	30	46	<25	IA	<25	IA	IA	<20	IA	31	35	IA

Notes:

- No exceedance was recorded during August 2020 monitoring. Criteria were not applicable at this location due to atmospheric conditions outside those specified in EPL.

### 5.1.2 N14

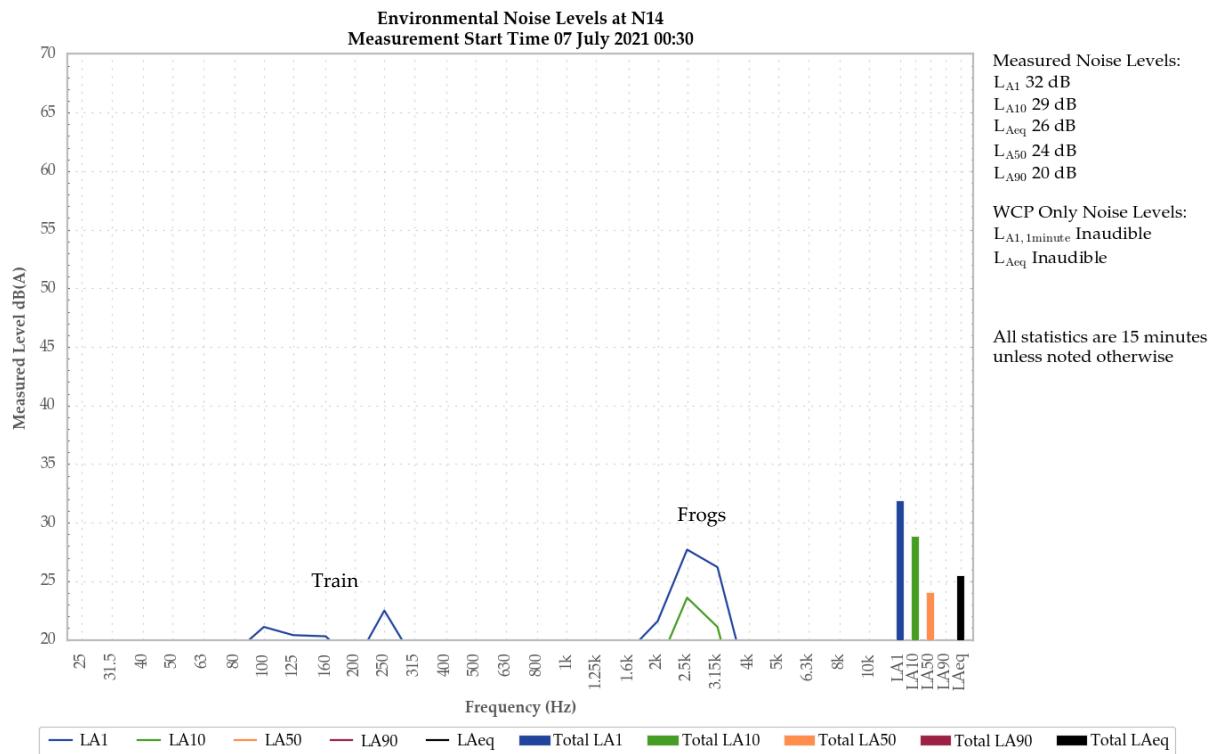


Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible.

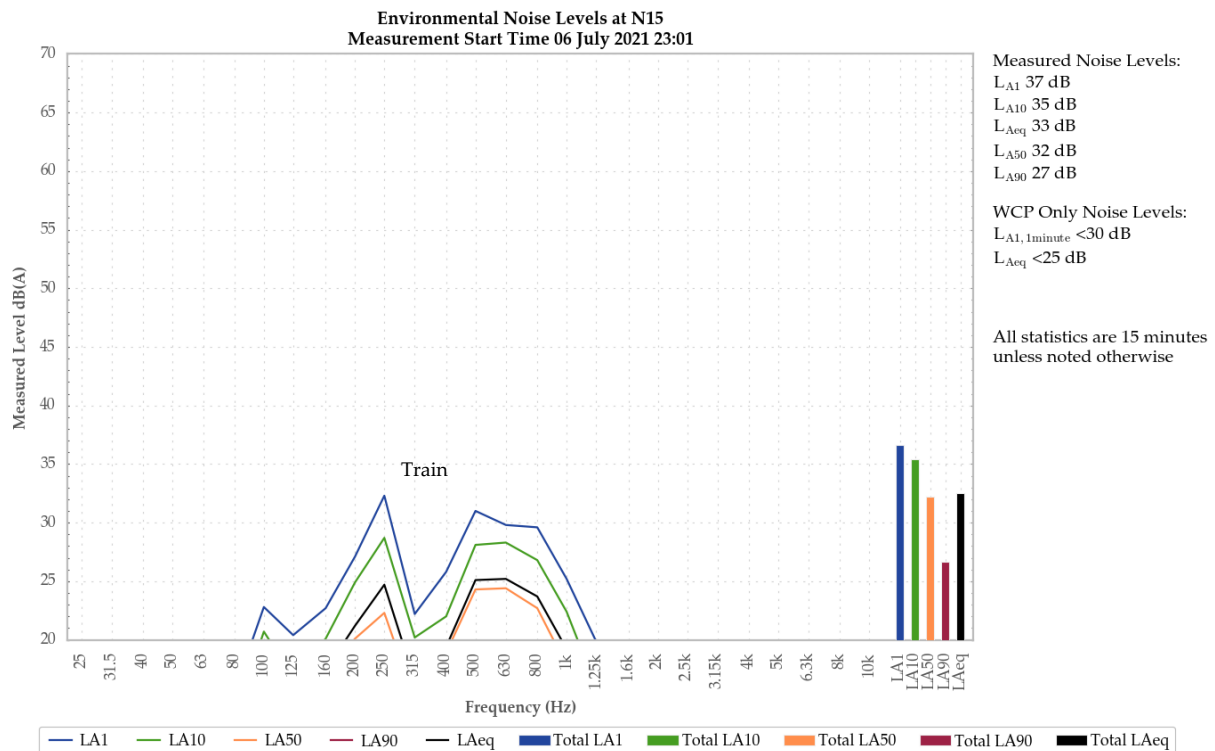
Frogs were responsible for measured noise levels.

Low-level train noise was also noted.

Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14

Month	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021
L <sub>Aeq</sub>	IA	IA	25	IA	23	IA	<25	<25	IA	<25	<20	<25
L <sub>A1,1min</sub>	IA	IA	29	IA	26	IA	28	<25	IA	27	<20	26

### 5.1.3 N15



**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

Engine noise from WCP was audible at times during the measurement and generated the measured site-only LAeq of less than 25 dB and LA1,1minute of less than 30 dB.

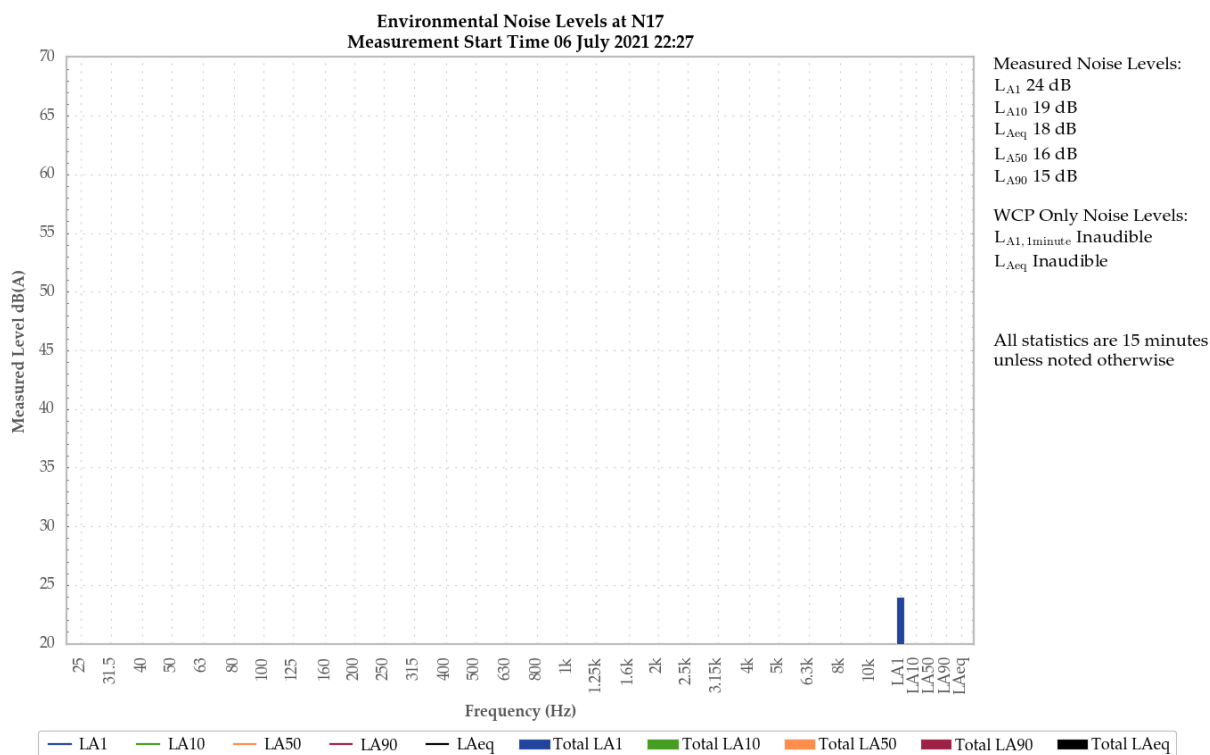
A rail continuum was responsible for all measured noise levels.

*Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15*

Month	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021
LAeq	<25	37	27	1A	27	1A	1A	1A	1A	34	30	1A
LA1,1min	28	43	45	1A	30	1A	1A	1A	1A	44	40	1A



### 5.1.4 N17



**Figure 6: Environmental Noise Levels - N17 Mogo Road, off Araluen Road**

WCP was inaudible.

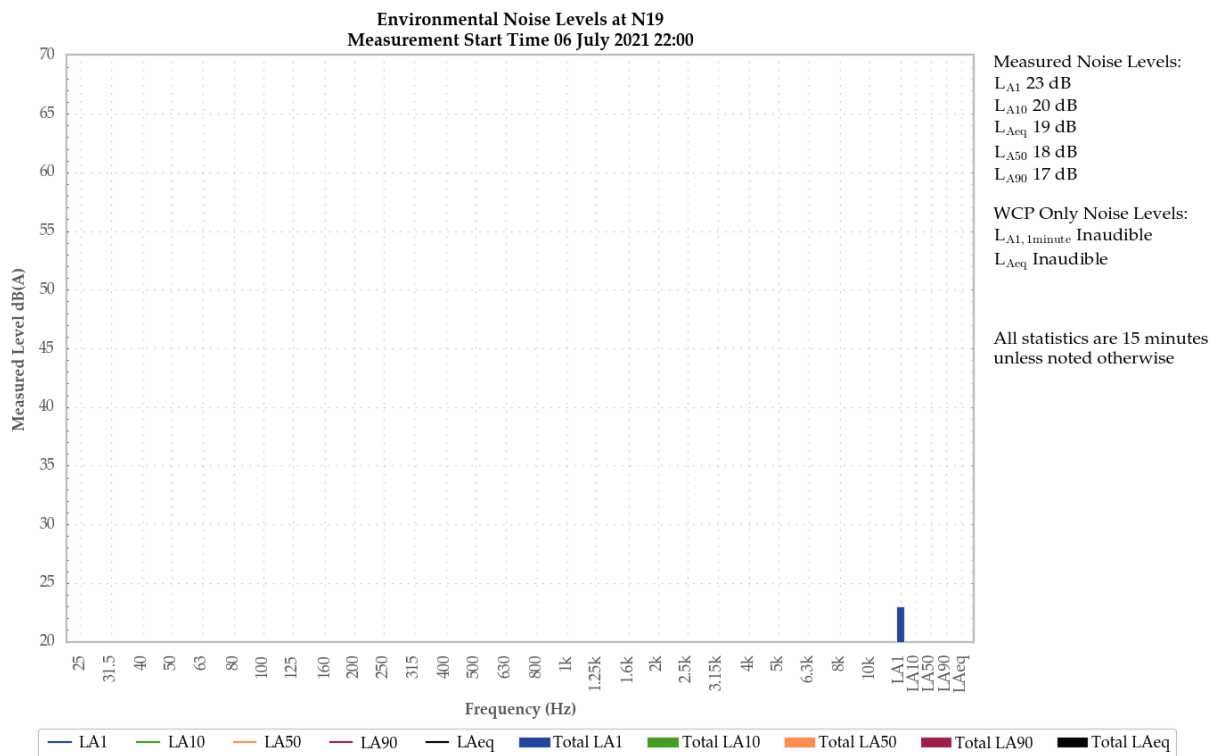
A train and aircraft were responsible for the measured LA1 and LA10 and contributed to the measured LAeq. The noise floor of the sound level meter contributed to the measured LAeq and was the measured LA50 and LA90.

Very low-level noise from animals in foliage was also noted.

*Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17*

Month	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021
LAeq	<25	32	<20	IA	<20	<25	26	IA	IA	33	25	IA
LA1,1min	27	36	<25	IA	<25	28	35	IA	IA	42	31	IA

### 5.1.5 N19



**Figure 7: Environmental Noise Levels - N19, Upper Mogo Road**

WCP was inaudible.

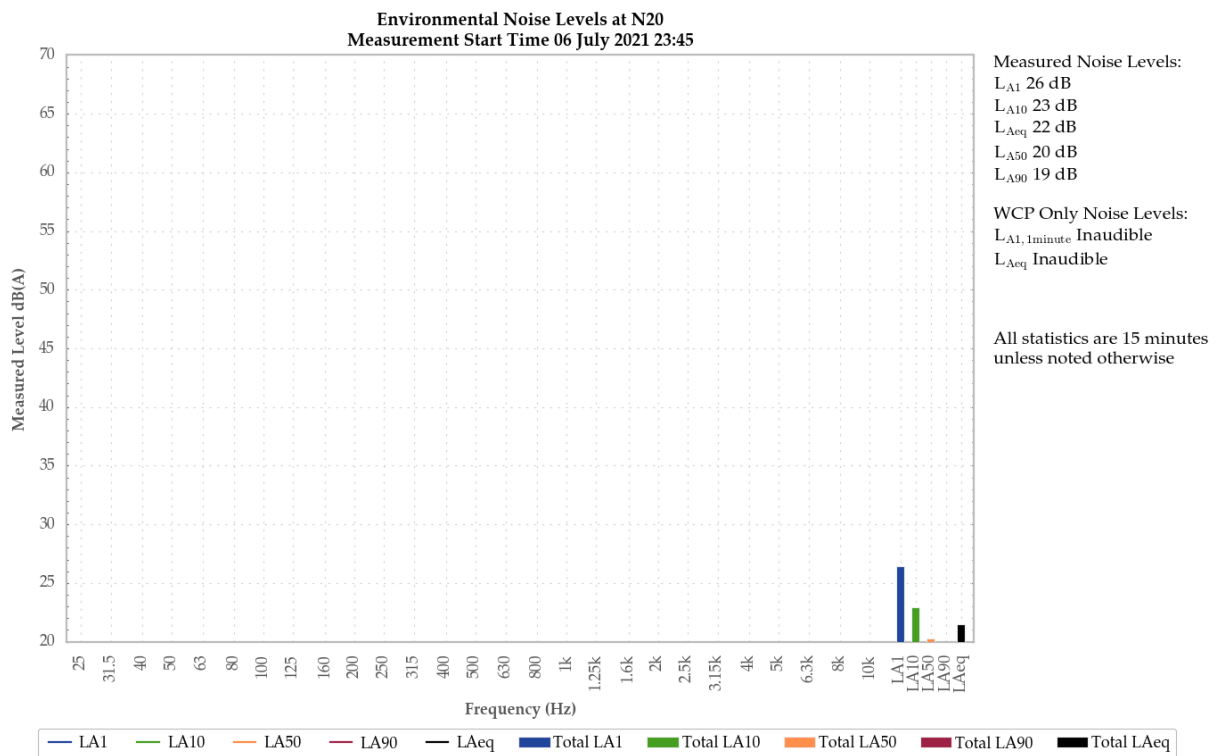
Insects and the noise floor of the sound level meter combined were all measured noise levels.

Low-level noise from birds and a local pump were also noted.

*Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19*

Month	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021
L <sub>Aeq</sub>	IA	<25	<20	IA	IA	IA	<20	IA	IA	<25	<20	IA
L <sub>A1,1min</sub>	IA	30	<25	IA	IA	IA	<20	IA	IA	<30	<20	IA

### 5.1.6 N20



**Figure 8: Environmental Noise Levels, N20 – Ringwood Road**

WCP was inaudible.

Breeze in the foliage was primarily responsible for all measured noise levels. Distant road traffic tyre noise contributed to the measured LA1, LA10 and LAeq.

*Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20*

Month	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021
LAeq	IA	<25	<25	IA	IA	IA	IA	IA	IA	<25	IA	IA
LA1,1min	IA	<25	28	IA	IA	IA	IA	IA	IA	31	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 6/7 July 2021 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the July 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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



## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquill stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per <b>Table 7</b>,</li> <li><b>Figure 3</b> and <b>Figure 4</b></li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in <b>Table 7</b> to validate real-time noise monitoring data (<b>Section 6.5</b>).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in **Table 8** during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and *AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'*. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in **Section 4** of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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### *B CALIBRATION CERTIFICATES*



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C21058

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	30131882
<b>Microphone Serial Number :</b>	04739
<b>Pre-amplifier Serial Number :</b>	11942
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
<b>Ambient Temperature :</b> 23.5°C	<b>Ambient Temperature :</b> 23.3°C
<b>Relative Humidity :</b> 46.7%	<b>Relative Humidity :</b> 47.7%
<b>Barometric Pressure :</b> 100.28kPa	<b>Barometric Pressure :</b> 100.25kPa
<b>Calibration Technician :</b> Jeff Yu	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 8 Feb 2021	<b>Report Issue Date :</b> 9 Feb 2021
<b>Approved Signatory :</b>	Ken Williams

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

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

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

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

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



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

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

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

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





Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

**Sound Calibrator**  
IEC 60942-2017

**Calibration Certificate**

Calibration Number C21059

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

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

**Atmospheric Conditions**

**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.27kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 08 Feb 2021  
**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 2021

**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
94	1000	94.02	1000.40

The sound calibrator has been shown to conform to the class 1 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	±0.14dB	Temperature	±0.2°C
Frequency	±0.09%	Relative Humidity	±2.4%
Distortion	±0.09%	Barometric Pressure	±0.015kPa

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

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



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

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

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

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# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
August 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring August 2021

Reference: 21199\_R01

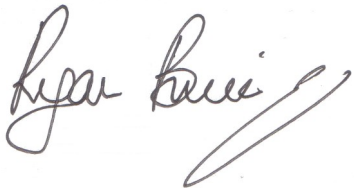
Report date: 21 September 2021

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Ryan Bruniges  
Consultant



QA Review: Jesse Tribby  
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*

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## 1 INTRODUCTION

### 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 12/13 August 2021 at eight locations.

### 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

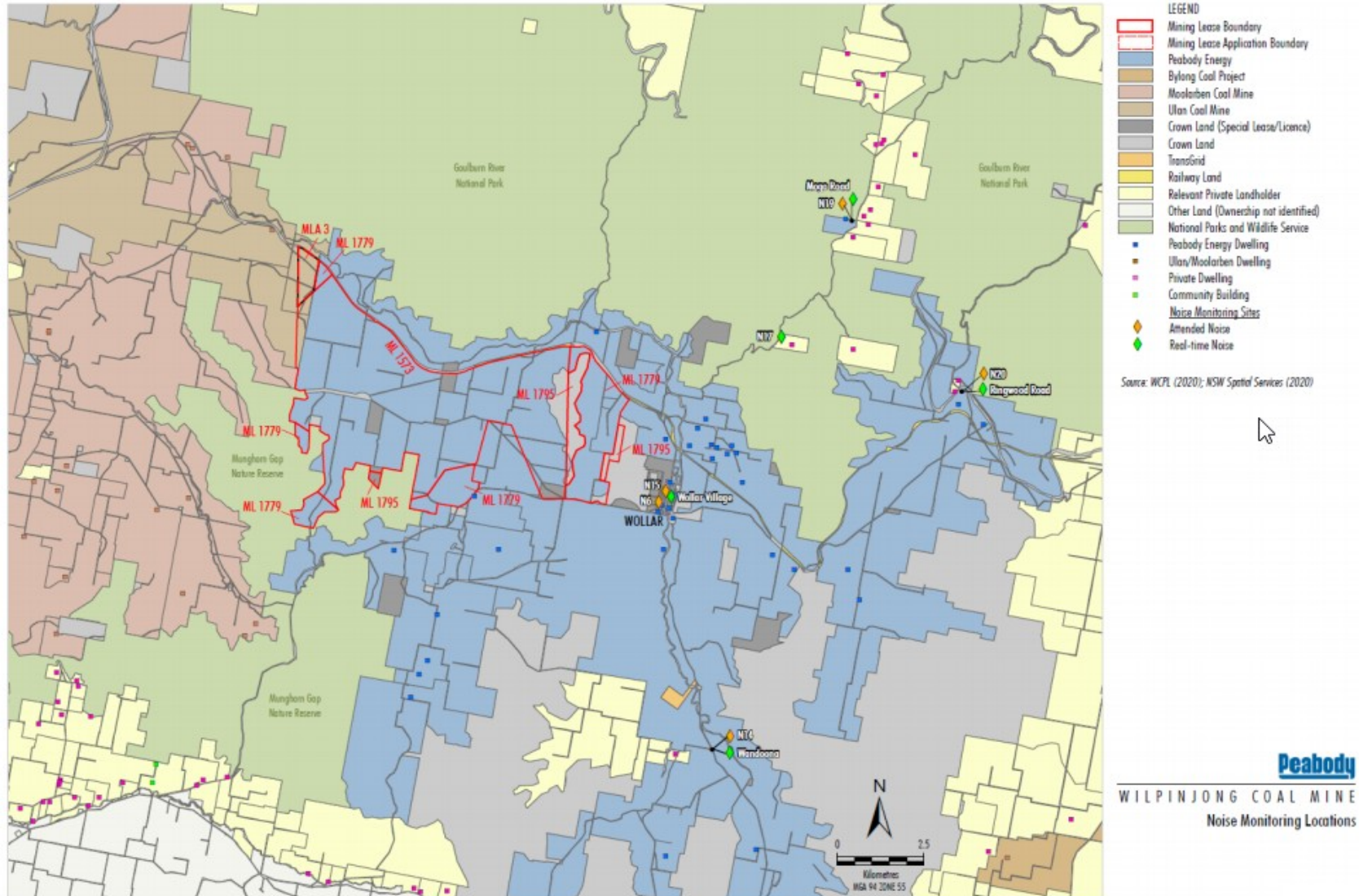


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.



## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

- N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
- N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Ryan Bruniges.

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

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

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

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

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

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

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

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

### 3.3 Modifying Factors

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

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

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

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	78226	08/02/2023

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	13/08/2021 00:40	55	51	46	41	32	30	29
N14	13/08/2021 00:15	55	46	44	41	40	35	30
N15	12/08/2021 23:00	44	39	35	32	31	28	27
N17	12/08/2021 22:25	33	25	23	23	23	22	20
N19	12/08/2021 22:00	36	27	26	25	25	24	22
N20	12/08/2021 23:31	60	58	40	44	30	25	22

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

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

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – AUGUST 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	13/08/2021 00:40	0.0	G	37	No	IA	NA
N14	13/08/2021 00:15	0.7	G	35	No	IA	NA
N15	12/08/2021 23:00	0.7	G	37	No	IA	NA
N17	12/08/2021 22:25	0.8	G	38	No	<20	NA
N19	12/08/2021 22:00	0.6	G	35	No	<20	NA
N20	12/08/2021 23:31	0.4	G	35	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – AUGUST 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	13/08/2021 00:40	0.0	G	45	No	IA	NA
N14	13/08/2021 00:15	0.7	G	45	No	IA	NA
N15	12/08/2021 23:00	0.7	G	45	No	IA	NA
N17	12/08/2021 22:25	0.8	G	45	No	<20	NA
N19	12/08/2021 22:00	0.6	G	45	No	<20	NA
N20	12/08/2021 23:31	0.4	G	45	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – AUGUST 2021

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	13/08/2021 00:40	4	0.0	-	0
N14	13/08/2021 00:15	5	0.0	-	0
N15	12/08/2021 23:00	4	0.0	-	0
N17	12/08/2021 22:25	7	0.0	-	0
N19	12/08/2021 22:00	8	0.0	-	0
N20	12/08/2021 23:31	4	0.0	-	0

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic. It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

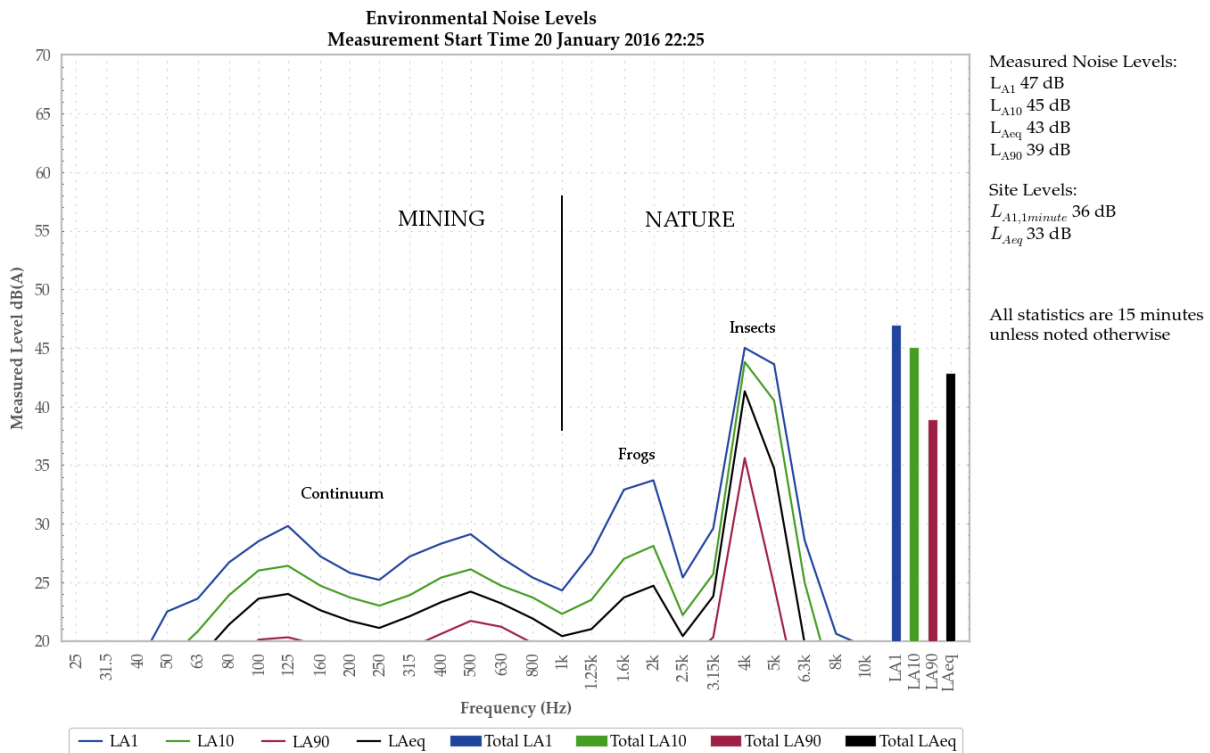


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 5.1 to Table 5.6.



5.1.1 N6

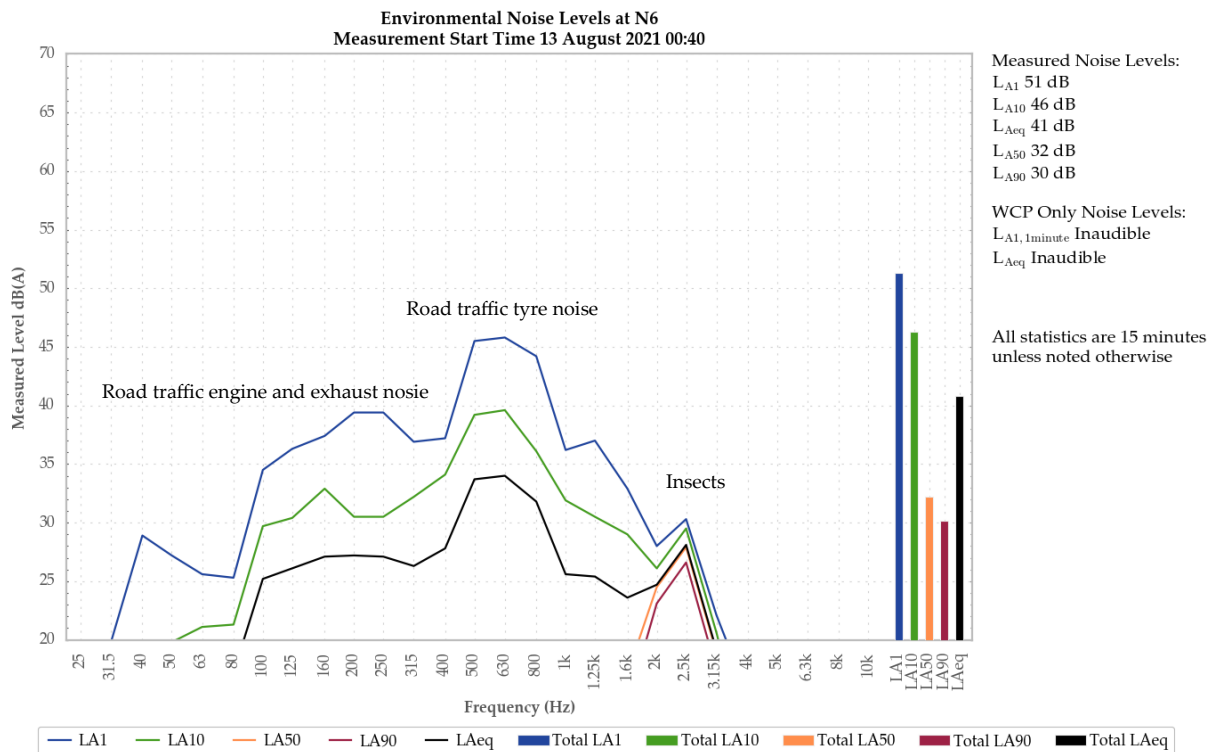


Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible during the measurement.

Road traffic tyre, engine and exhaust noise were responsible for the measured LA1, LA10 and LAeq. Insects generated the measured LA50 and LA90.

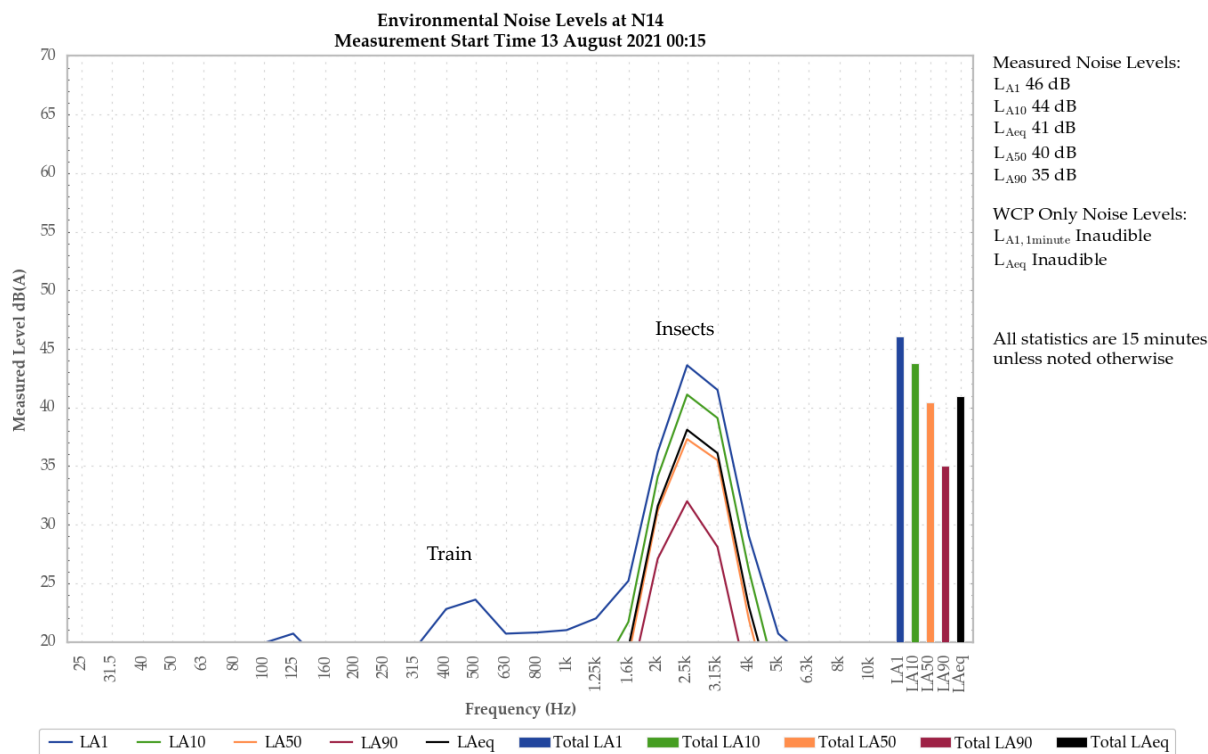
Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6

Month	Aug <sup>1</sup> 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021
LAeq	40	<25	IA	<25	IA	IA	<20	IA	30	30	IA	<25
LA1,1min	46	<25	IA	<25	IA	IA	<20	IA	31	35	IA	<25

Notes:

1. No exceedance was recorded during August 2020 monitoring. Criteria were not applicable at this location due to atmospheric conditions outside those specified in EPL.

### 5.1.2 N14



**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

WCP was inaudible during the measurement.

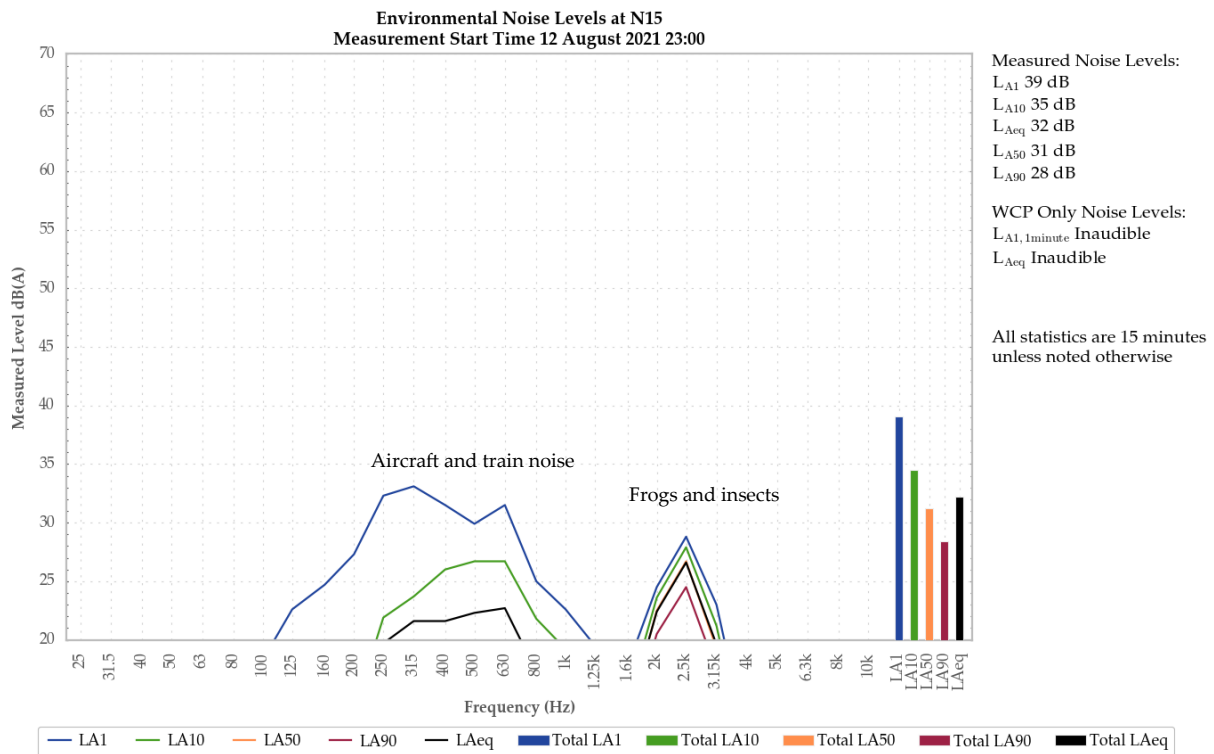
Frogs were responsible for the measured noise levels.

Distant train noise was also noted at low levels.

*Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14*

Month	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021
LAeq	IA	25	IA	23	IA	<25	<25	IA	<25	<20	<25	IA
LA1,1min	IA	29	IA	26	IA	28	<25	IA	27	<20	26	IA

### 5.1.3 N15



**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

WCP was inaudible.

Frogs were primarily responsible for the measured LA10, LA50, LAeq and LA90. A plane and train generated the measured LA1 and contributed to the measured LA10 and LAeq.

Birds were also noted.

*Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15*

Month	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021
LAeq	37	27	IA	27	IA	IA	IA	IA	34	30	IA	<25
LA1,1min	43	45	IA	30	IA	IA	IA	IA	44	40	IA	<30

5.14 N17

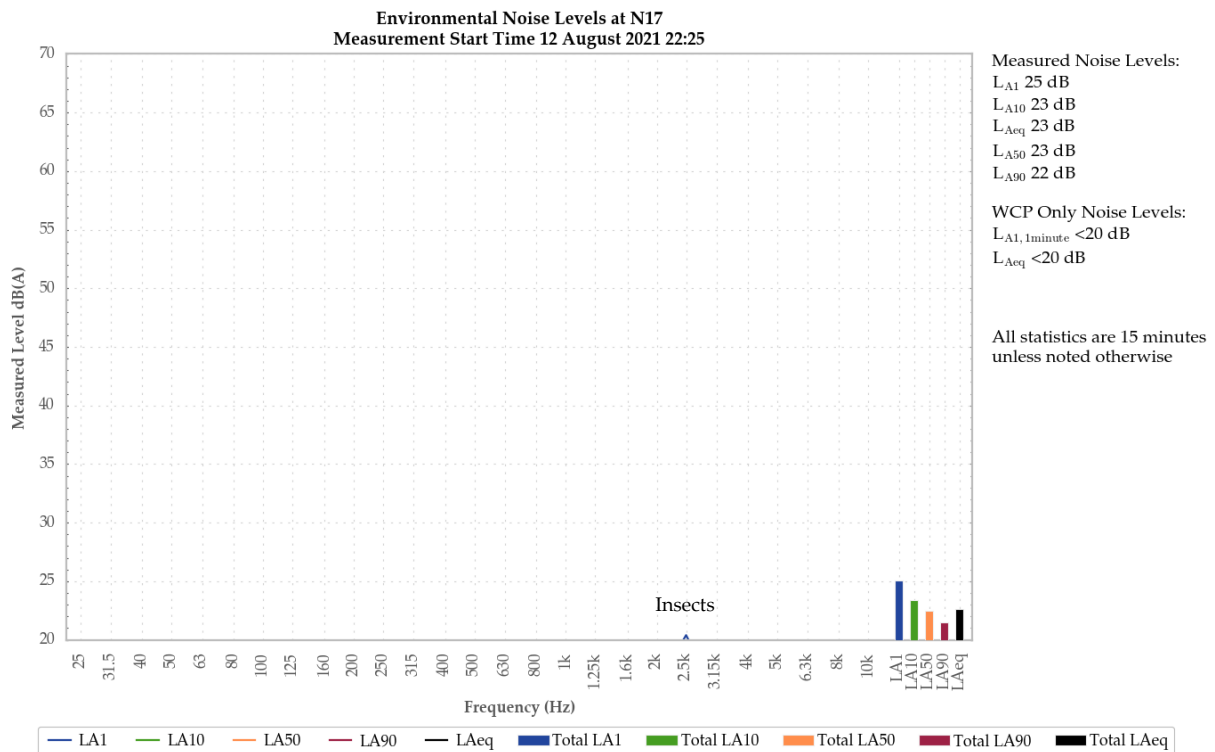


Figure 6: Environmental Noise Levels - N17 Mogo Road, off Araluen Road

A low-level continuum from WCP was audible throughout the measurement and generated the site-only LAeq and LA1,1minute of less than 20 dB.

Insects were responsible for the measured noise levels.

Animals in foliage were also noted.

Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17

Month	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021
LAeq	32	<20	IA	<20	<25	26	IA	IA	33	25	IA	IA
LA1,1min	36	<25	IA	<25	28	35	IA	IA	42	31	IA	IA

5.1.5 N19

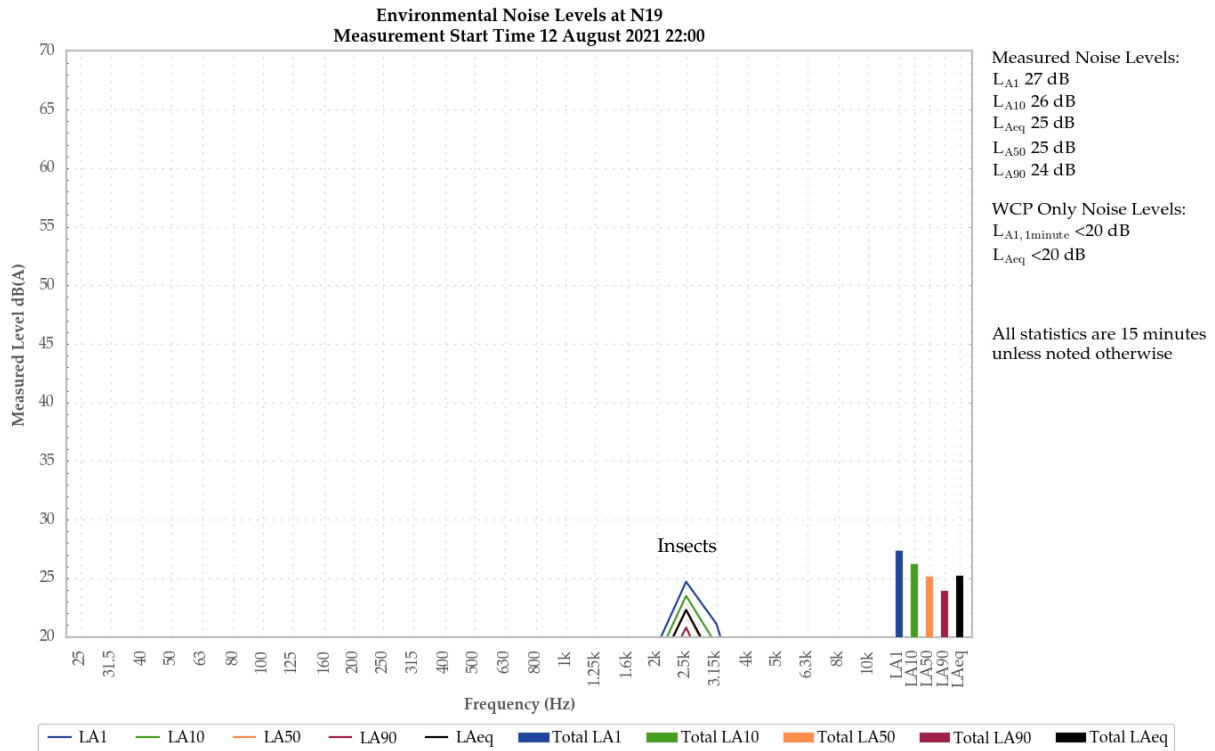


Figure 7: Environmental Noise Levels - N19, Upper Mogo Road

A low-level continuum from WCP was audible throughout the measurement and generated the site-only LAeq and LA1,1minute of less than 20 dB.

Insects were responsible for the measured noise levels

Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19

Month	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021
LAeq	<25	<20	IA	IA	IA	<20	IA	IA	<25	<20	IA	IA
LA1,1min	30	<25	IA	IA	IA	<20	IA	IA	<30	<20	IA	IA

### 5.1.6 N20

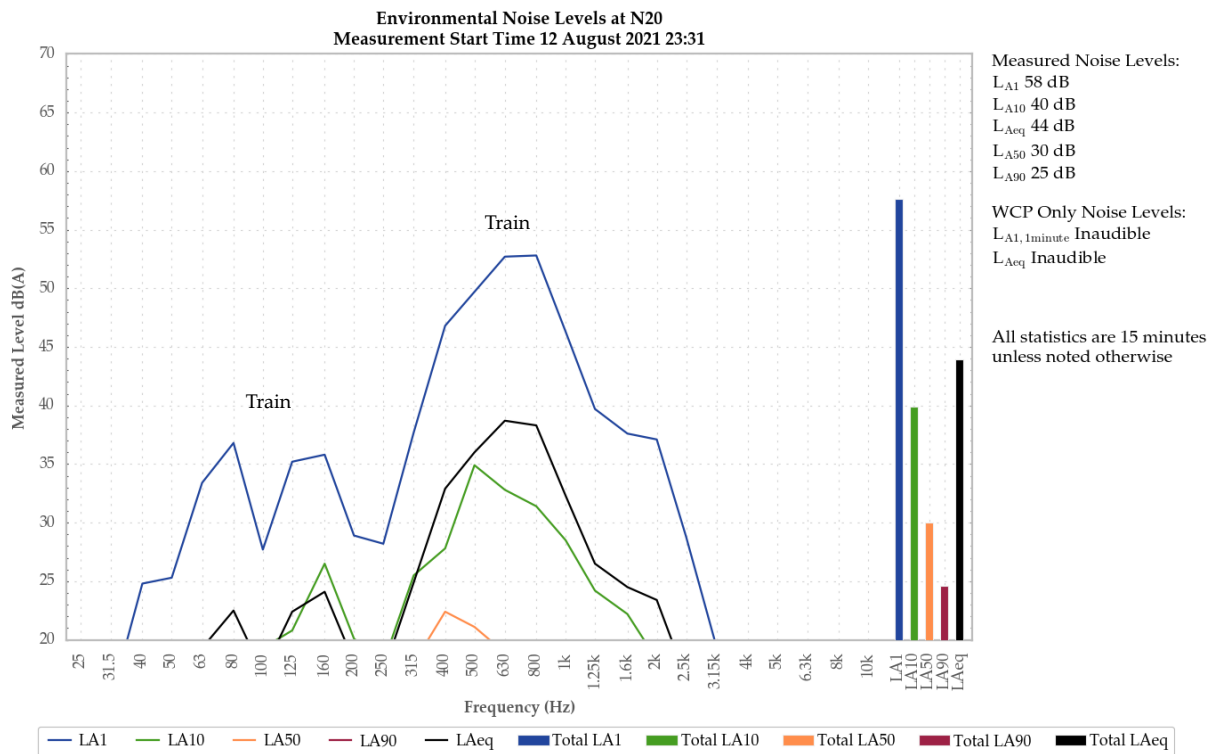


Figure 8: Environmental Noise Levels, N20 - Ringwood Road

WCP was inaudible during the measurement.

A train was responsible for the measured noise levels.

Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20

Month	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021
LAeq	<25	<25	IA	IA	IA	IA	IA	IA	<25	IA	IA	IA
LA1,1min	<25	28	IA	IA	IA	IA	IA	IA	31	IA	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 12/13 August 2021 at eight monitoring locations.

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

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*



## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{A1}(1 \text{ minute})$
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per <b>Table 7</b>,</li> <li><b>Figure 3</b> and <b>Figure 4</b></li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in <b>Table 7</b> to validate real-time noise monitoring data (<b>Section 6.5</b>).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in **Table 8** during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in **Section 4** of the INP (EPA, 2000) during the evaluation of attending monitoring results.



### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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





# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
September 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring September 2021

Reference: 21227\_R02

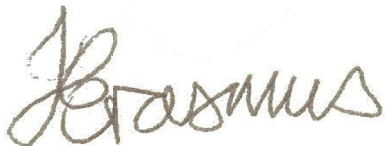
Report date: 14 October 2021

#### Prepared for

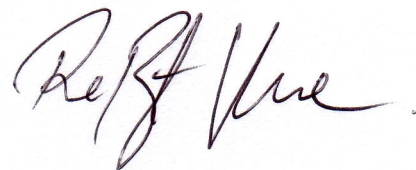
Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Jonathan Erasmus  
Consultant



QA Review: Robert Kirwan  
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*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 2/3 September 2021 at eight locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

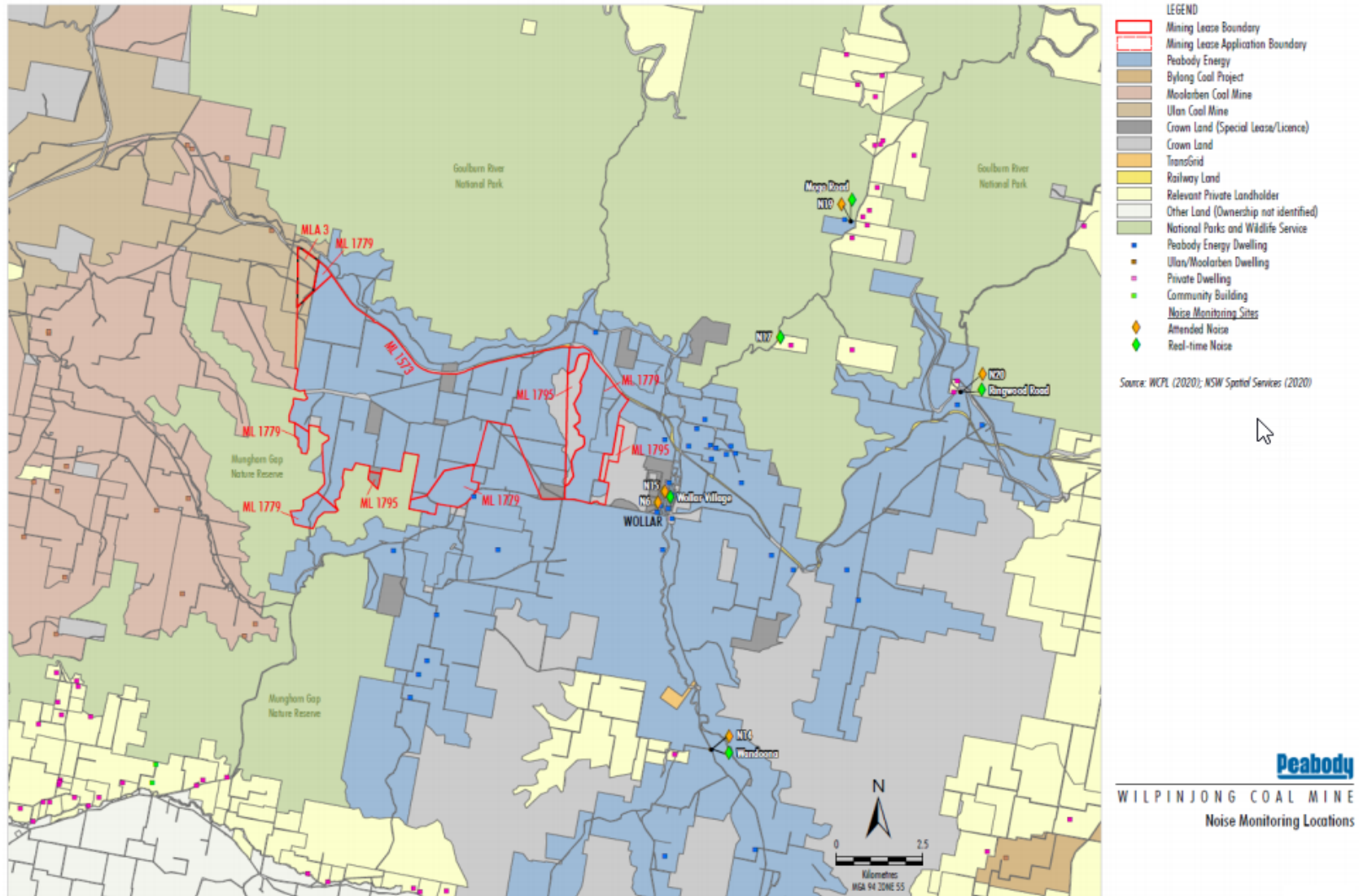


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The “C” weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

- N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
- N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Jonathan Erasmus.

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

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

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

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

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

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

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

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

### 3.3 Modifying Factors

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

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

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

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	78226	08/02/2023

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	02/09/2021 23:19	44	33	31	31	30	29	28
N14	03/09/2021 00:45	57	56	55	53	53	51	41
N15	02/09/2021 23:00	47	39	32	31	30	29	28
N17	02/09/2021 22:24	36	27	25	24	23	23	21
N19	02/09/2021 22:00	46	42	39	37	36	35	29
N20	03/09/2021 00:00	41	32	23	23	21	20	19

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

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

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



### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – SEPTEMBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	02/09/2021 23:19	0.0	G	37	No	IA	NA
N14	03/09/2021 00:45	0.0	G	35	No	IA	NA
N15	02/09/2021 23:00	0.0	G	37	No	NM	NA
N17	02/09/2021 22:24	0.0	F	38	Yes	IA	Nil
N19	02/09/2021 22:00	0.3	F	35	Yes	IA	Nil
N20	03/09/2021 00:00	0.0	G	35	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – SEPTEMBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	02/09/2021 23:19	0.0	G	45	No	IA	NA
N14	03/09/2021 00:45	0.0	G	45	No	IA	NA
N15	02/09/2021 23:00	0.0	G	45	No	NM	NA
N17	02/09/2021 22:24	0.0	F	45	Yes	IA	Nil
N19	02/09/2021 22:00	0.3	F	45	Yes	IA	Nil
N20	03/09/2021 00:00	0.0	G	45	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – SEPTEMBER 2021

Location	Start Date And Time	Temperature ° C	Wind Speed m/s	Wind Direction ° MN	Cloud Cover eighths
N6	02/09/2021 23:19	12	0.0	-	0
N14	03/09/2021 00:45	13	0.0	-	0
N15	02/09/2021 23:00	12	0.7	120	0
N17	02/09/2021 22:24	14	0.0	-	0
N19	02/09/2021 22:00	19	0.0	-	0
N20	03/09/2021 00:00	10	1.0	260	0

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

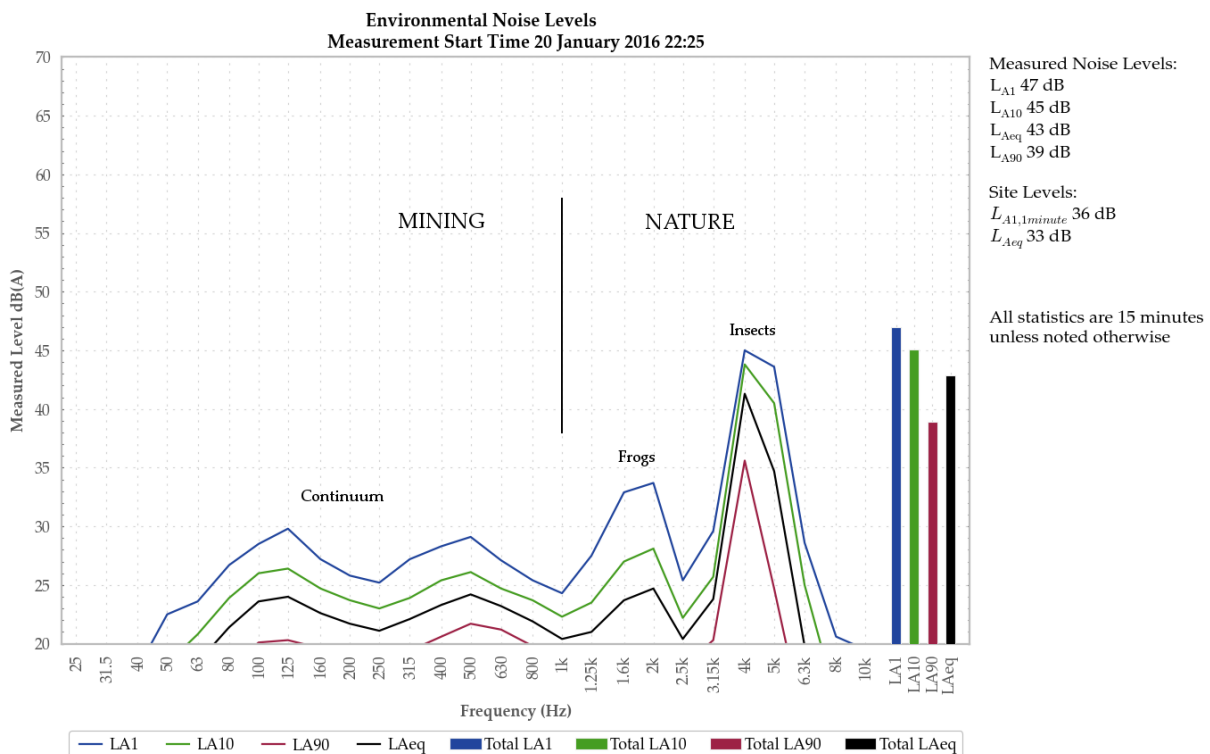
## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50, and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

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

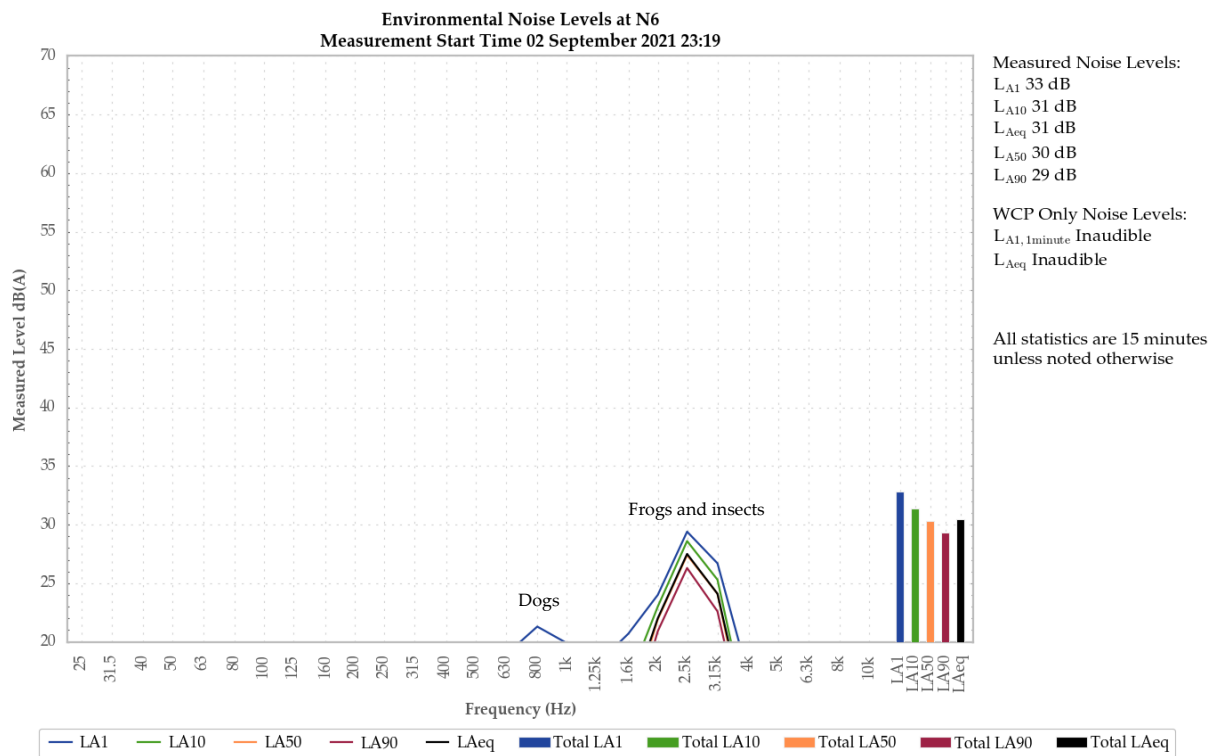
It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.



**Figure 2: Example graph (refer to Section 5.1 for explanatory note)**

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 5.1 to Table 5.6.

### 5.1.1 N6



**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

WCP was inaudible during the measurement.

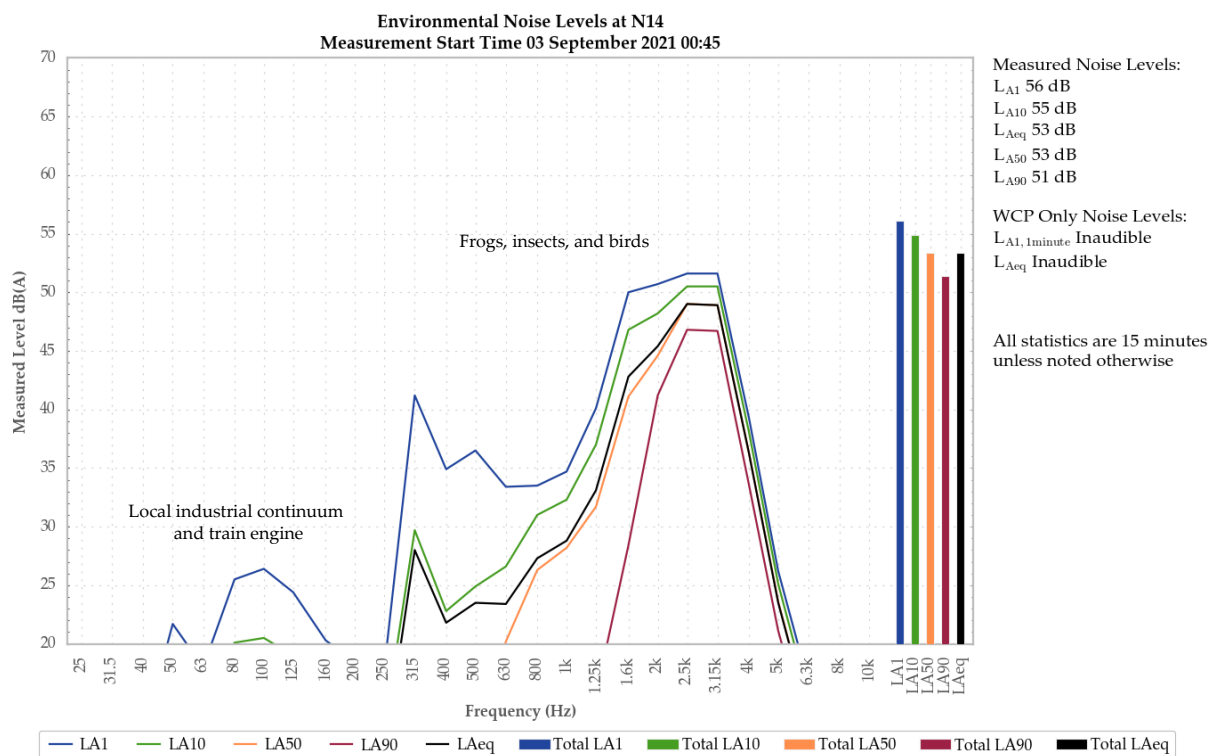
Frogs and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

Dogs and birds were also noted.

*Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6*

Month	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
LAeq	<25	IA	<25	IA	IA	<20	IA	30	30	IA	<25	IA
LA1,1min	<25	IA	<25	IA	IA	<20	IA	31	35	IA	<25	IA

### 5.1.2 N14



**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

WCP was inaudible during the measurement.

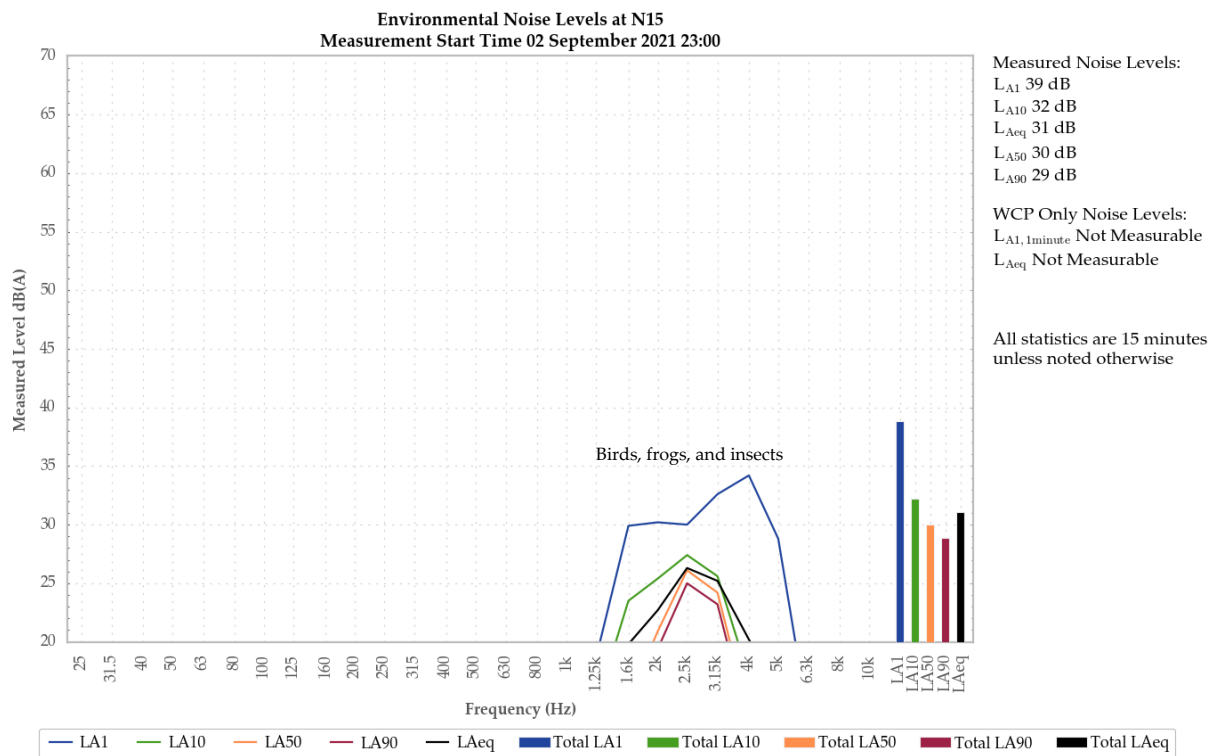
Frogs, insects, and birds generated the measured LA1. Frogs and insects generated the measured LA10, LAeq, LA50, and LA90.

A local industrial continuum and train were also noted.

*Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14*

Month	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
<b>LAeq</b>	25	IA	23	IA	<25	<25	IA	<25	<20	<25	IA	IA
<b>LA1,1min</b>	29	IA	26	IA	28	<25	IA	27	<20	26	IA	IA

### 5.1.3 N15



**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

A low-level mining continuum from WCP was noted during the measurement but was not measurable.

Birds generated the measured LA1. Frogs and insects generated the measured LA10, LAeq, LA50, and LA90.

Breeze in foliage and dogs were also noted.

*Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15*

Month	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
LAeq	27	IA	27	IA	IA	IA	IA	34	30	IA	<25	IA
LA1,1min	45	IA	30	IA	IA	IA	IA	44	40	IA	<30	IA

5.14 N17

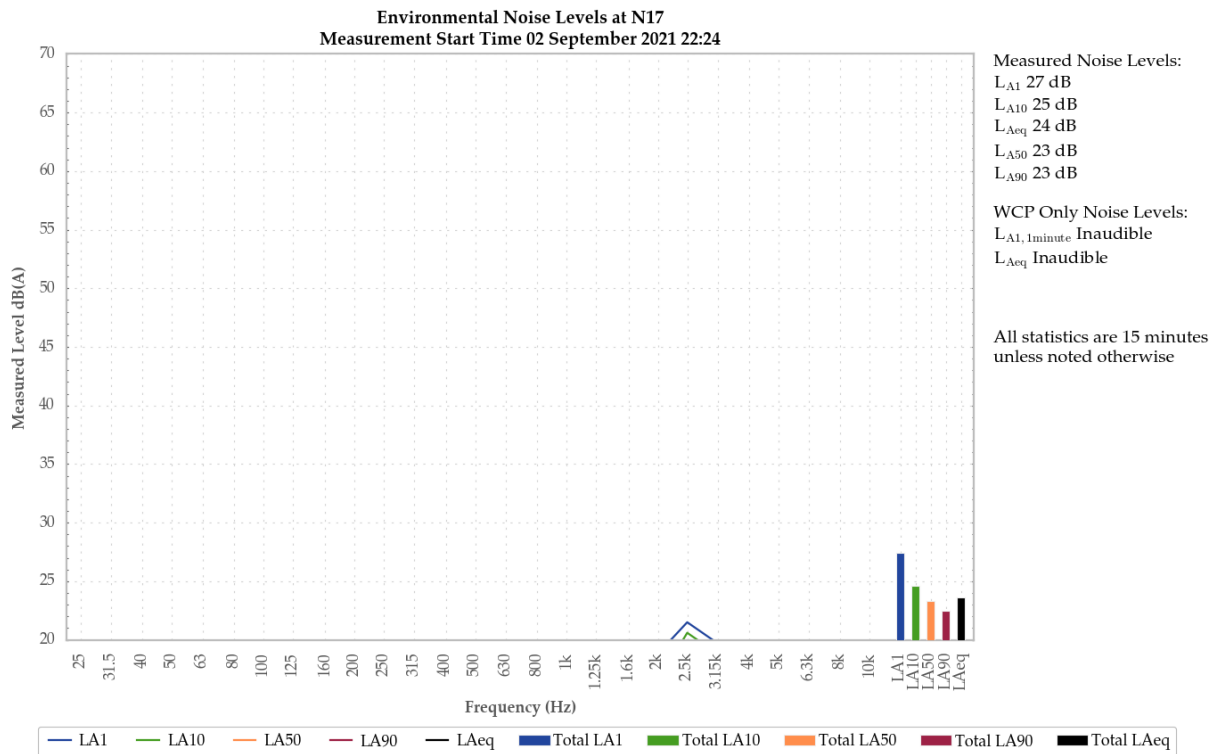


Figure 6: Environmental Noise Levels – N17 Mogo Road, off Araluen Road

WCP was inaudible during the measurement.

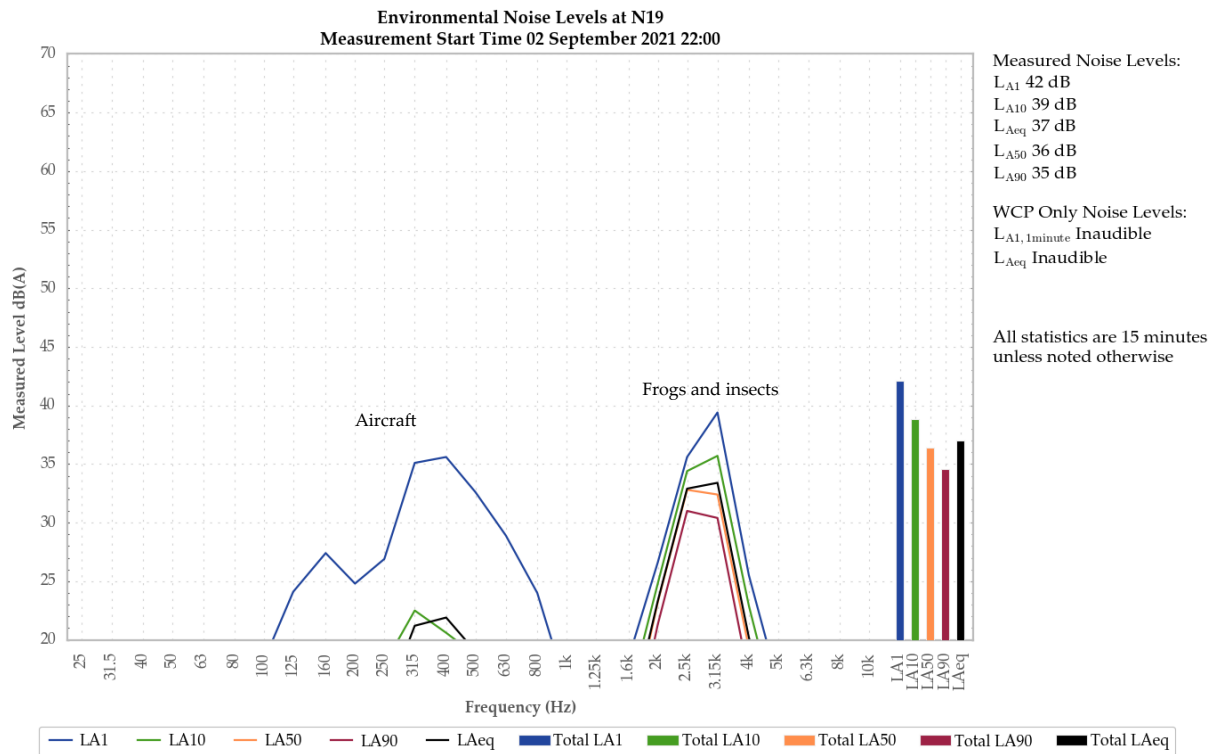
Frogs and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

Gun shots and a train horn were also noted.

Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17

Month	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
LAeq	<20	IA	<20	<25	26	IA	IA	33	25	IA	IA	<20
LA1,1min	<25	IA	<25	28	35	IA	IA	42	31	IA	IA	<20

### 5.1.5 N19



**Figure 7: Environmental Noise Levels – N19, Upper Mogo Road**

WCP was inaudible during the measurement.

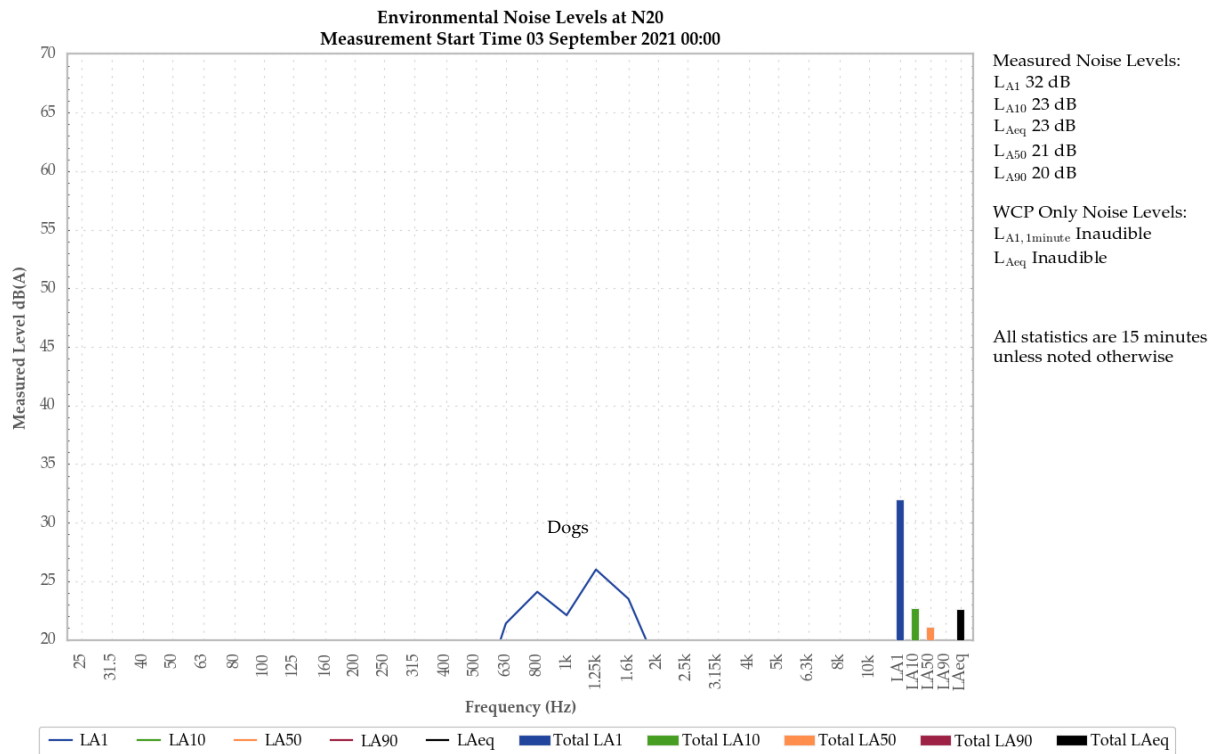
Frogs, insects and an aircraft generated the measured LA1. Frogs and insects generated the measured LA10, LAeq, LA50, and LA90.

*Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19*

Month	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
LAeq	<20	IA	IA	IA	<20	IA	IA	<25	<20	IA	IA	<20
LA1,1min	<25	IA	IA	IA	<20	IA	IA	<30	<20	IA	IA	<20



### 5.1.6 N20



**Figure 8: Environmental Noise Levels, N20 – Ringwood Road**

WCP was inaudible during the measurement.

Dogs generated the measured LA1. Running water and insects generated the measured LA10, LAeq, LA50, and LA90.

*Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20*

Month	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
LAeq	<25	IA	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA
LA1,1min	28	IA	IA	IA	IA	IA	IA	31	IA	IA	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 2/3 September 2021 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the September 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{A1}(1 \text{ minute})$
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.



## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per Table 7,</li> <li>Figure 3 and Figure 4</li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- a) The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- b) Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- a) Take immediate action in accordance with the NMS;
- b) Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- c) Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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### **B CALIBRATION CERTIFICATES**



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C21058

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	30131882
<b>Microphone Serial Number :</b>	04739
<b>Pre-amplifier Serial Number :</b>	11942
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
<b>Ambient Temperature :</b> 23.5°C	<b>Ambient Temperature :</b> 23.3°C
<b>Relative Humidity :</b> 46.7%	<b>Relative Humidity :</b> 47.7%
<b>Barometric Pressure :</b> 100.28kPa	<b>Barometric Pressure :</b> 100.25kPa
<b>Calibration Technician :</b> Jeff Yu	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 8 Feb 2021	<b>Report Issue Date :</b> 9 Feb 2021
<b>Approved Signatory :</b>	Ken Williams

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

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

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

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

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



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

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

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

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

PAGE 1 OF 1



**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C21059

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

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

**Atmospheric Conditions**

**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.27kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 08 Feb 2021  
**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 2021

**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
94	1000	94.02	1000.40

The sound calibrator has been shown to conform to the class 1 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.

Specific Tests	Least Uncertainties of Measurement - Environmental Conditions	
Generated SPL	±0.14dB	Temperature ±0.2°C
Frequency	±0.09%	Relative Humidity ±2.4%
Distortion	±0.09%	Barometric Pressure ±0.015kPa

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

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



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

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

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

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

PAGE 1 OF 1

# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
October 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734



## Wilpinjong Coal

### Environmental Noise Monitoring October 2021

Reference: 21245\_R01

Report date: 15 October 2021

#### Prepared for

Wilpinjong Coal Pty Ltd

Locked Bag 2005

Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd

PO Box 3115

Thornton NSW 2322



Prepared: Ryan Bruniges  
Consultant



QA Review: Robert Kirwan  
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*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 6/7 October 2021 at eight locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

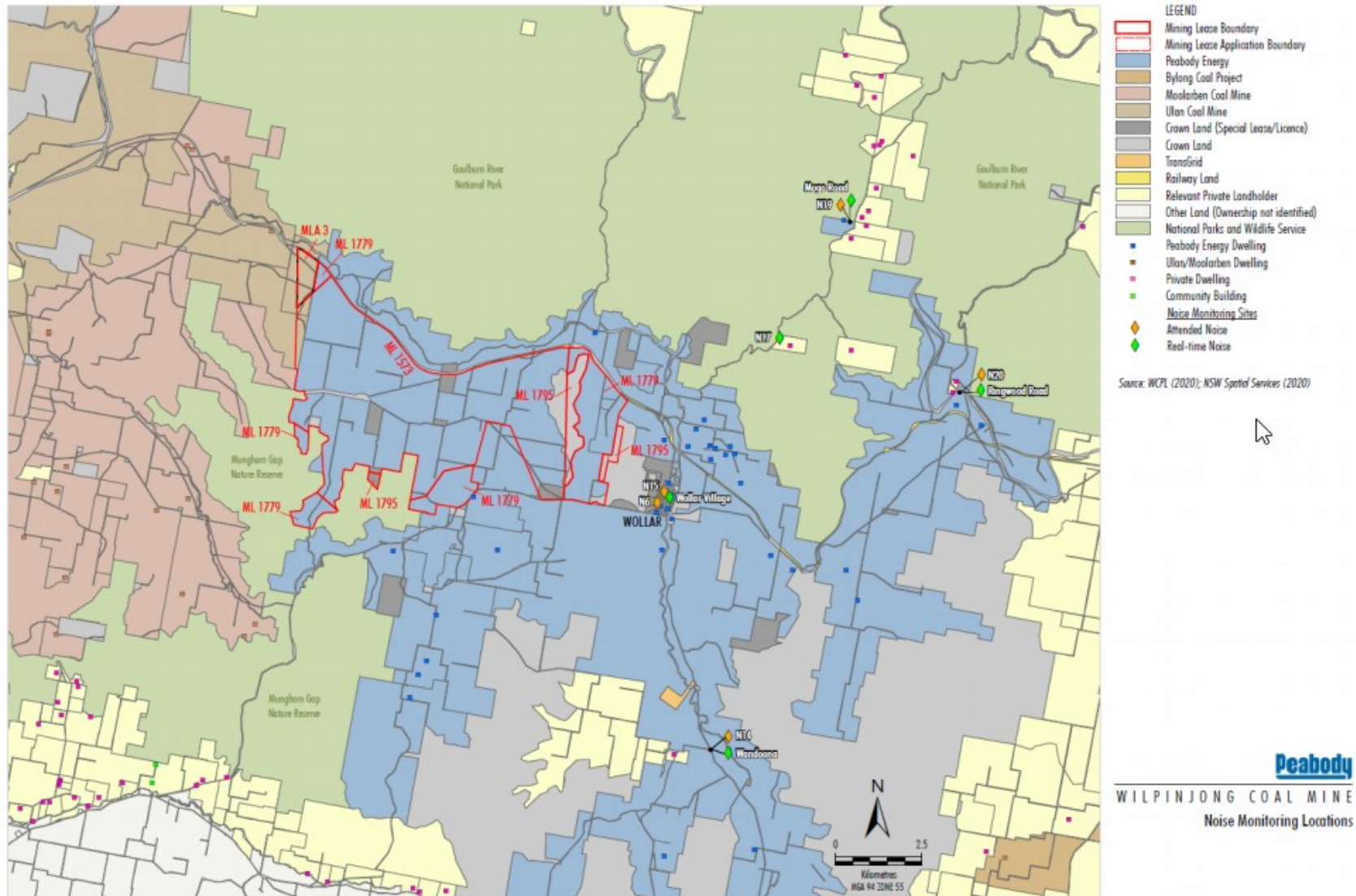


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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



## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Ryan Bruniges.

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

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

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

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

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

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

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

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

### 3.3 Modifying Factors

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

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

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

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	1070590	11/06/2022
Pulsar 105 acoustic calibrator	74813	10/06/2022

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	06/10/2021 23:23	42	36	33	31	31	29	26
N14	07/10/2021 00:45	47	36	32	30	28	26	24
N15	06/10/2021 23:00	43	39	36	33	33	29	26
N17	06/10/2021 22:27	34	24	22	20	19	18	16
N19	06/10/2021 22:00	42	23	19	18	17	16	15
N20	07/10/2021 00:00	49	45	39	35	30	23	20

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

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

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – OCTOBER 2021

Location	Start Date and Time	Wind Speed $m/s^1$	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	06/10/2021 23:23	0.0	G	37	No	31	NA
N14	07/10/2021 00:45	0.8	G	35	No	<25	NA
N15	06/10/2021 23:00	0.0	G	37	No	33	NA
N17	06/10/2021 22:27	0.0	G	38	No	<20	NA
N19	06/10/2021 22:00	0.7	G	35	No	IA	NA
N20	07/10/2021 00:00	0.7	G	35	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – OCTOBER 2021

Location	Start Date and Time	Wind Speed $m/s^1$	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	06/10/2021 23:23	0.0	G	45	No	33	NA
N14	07/10/2021 00:45	0.8	G	45	No	25	NA
N15	06/10/2021 23:00	0.0	G	45	No	41	NA
N17	06/10/2021 22:27	0.0	G	45	No	<25	NA
N19	06/10/2021 22:00	0.7	G	45	No	IA	NA
N20	07/10/2021 00:00	0.7	G	45	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 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, hail, or wind speeds above 5 m/s at microphone height.

*Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – OCTOBER 2021*

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	06/10/2021 23:23	6	0.0	-	0
N14	07/10/2021 00:45	9	0.0	-	0
N15	06/10/2021 23:00	8	0.0	-	0
N17	06/10/2021 22:27	14	0.0	-	0
N19	06/10/2021 22:00	15	0.0	-	0
N20	07/10/2021 00:00	7	0.0	-	0

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

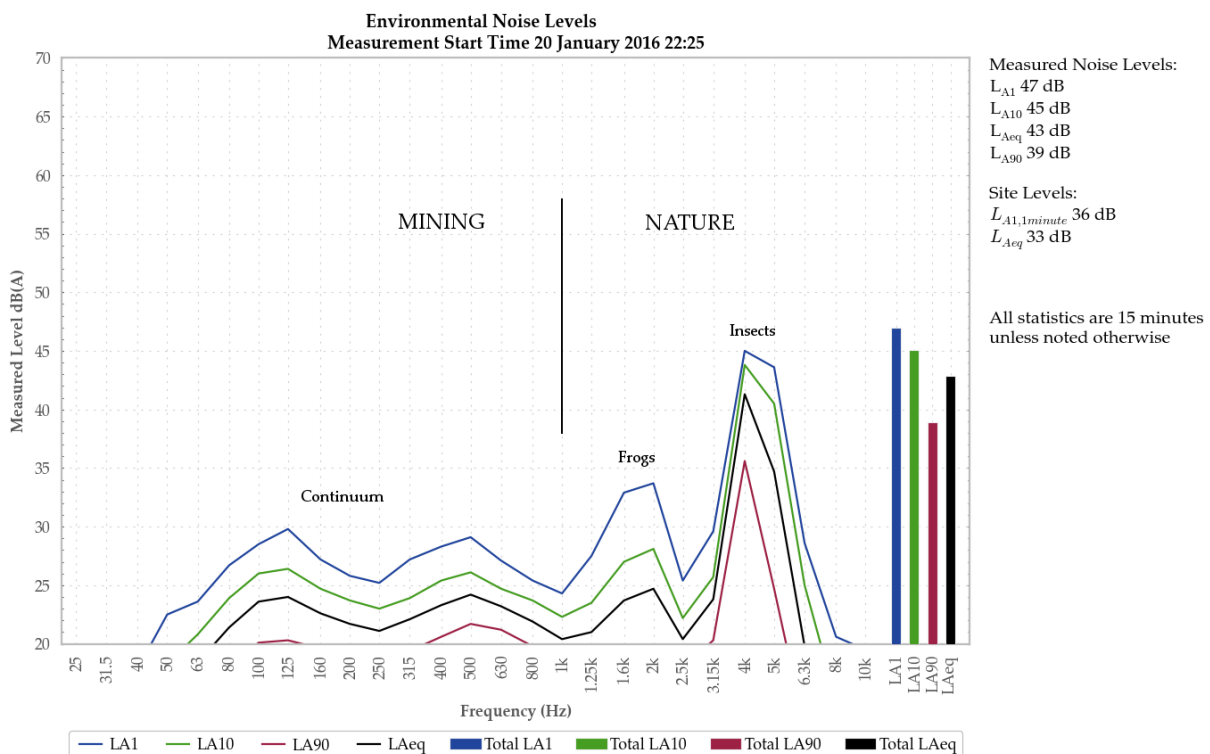
## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

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

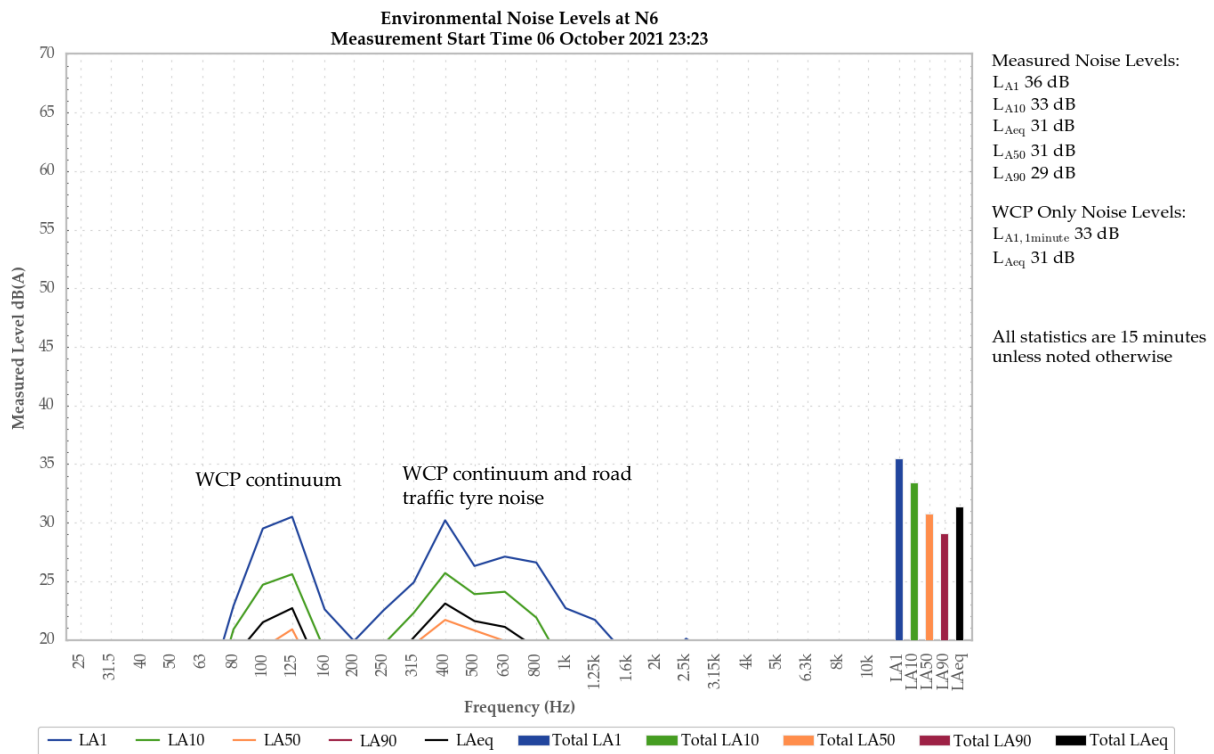
It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.



**Figure 2: Example graph (refer to Section 5.1 for explanatory note)**

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 4.4 to Table 5.6.

### 5.1.1 N6



**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

A mining continuum from WCP was audible throughout the measurement and generated the measured site-only LAeq of 31 dB and LA1,1minute of 33 dB. Dozer track noise was noted.

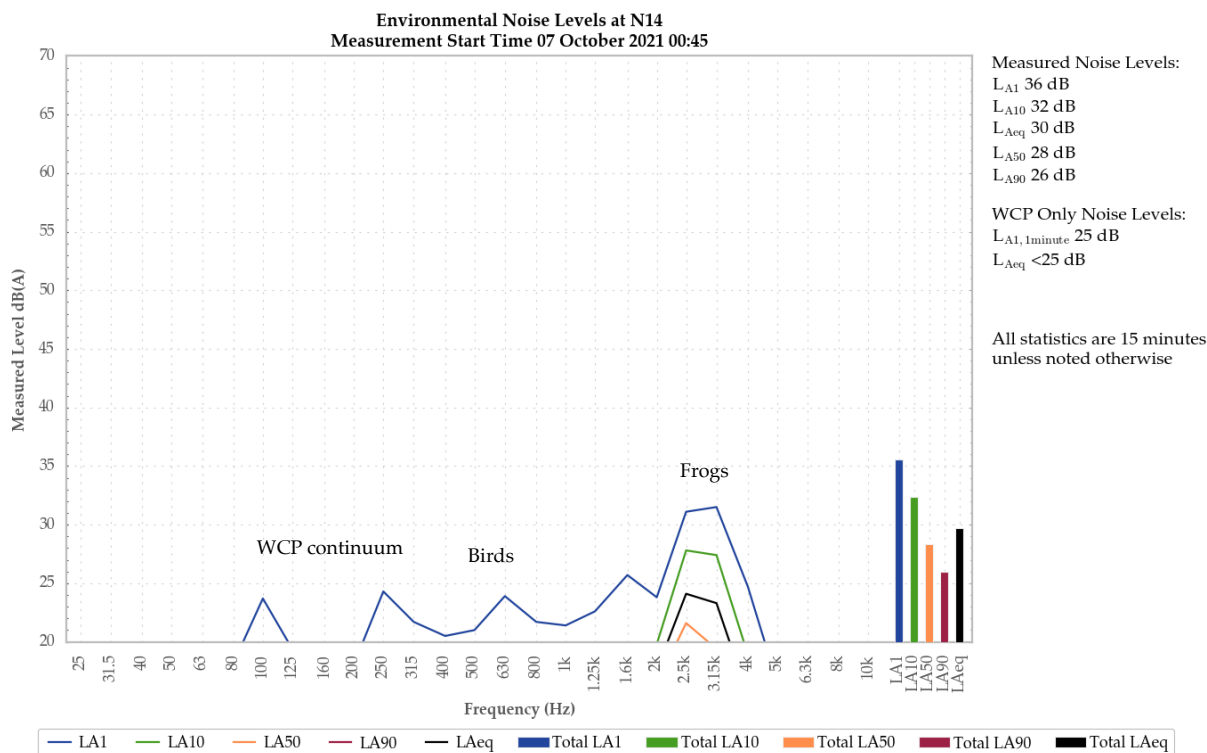
The continuum from WCP was primarily responsible for the measured noise levels. Road traffic tyre noise contributed to the measured LA1 and LA10.

Insects were noted.

*Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6*

Month	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021
LAeq	IA	<25	IA	IA	<20	IA	30	30	IA	<25	IA	IA
LA1,1min	IA	<25	IA	IA	<20	IA	31	35	IA	<25	IA	IA

### 5.1.2 N14



**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

A mining continuum from WCP was audible at very low levels during the measurement and generated the site-only LAeq,15minute of less than 25 dB and LA1,1minute of 25 dB.

Frogs were responsible for the measured noise levels.

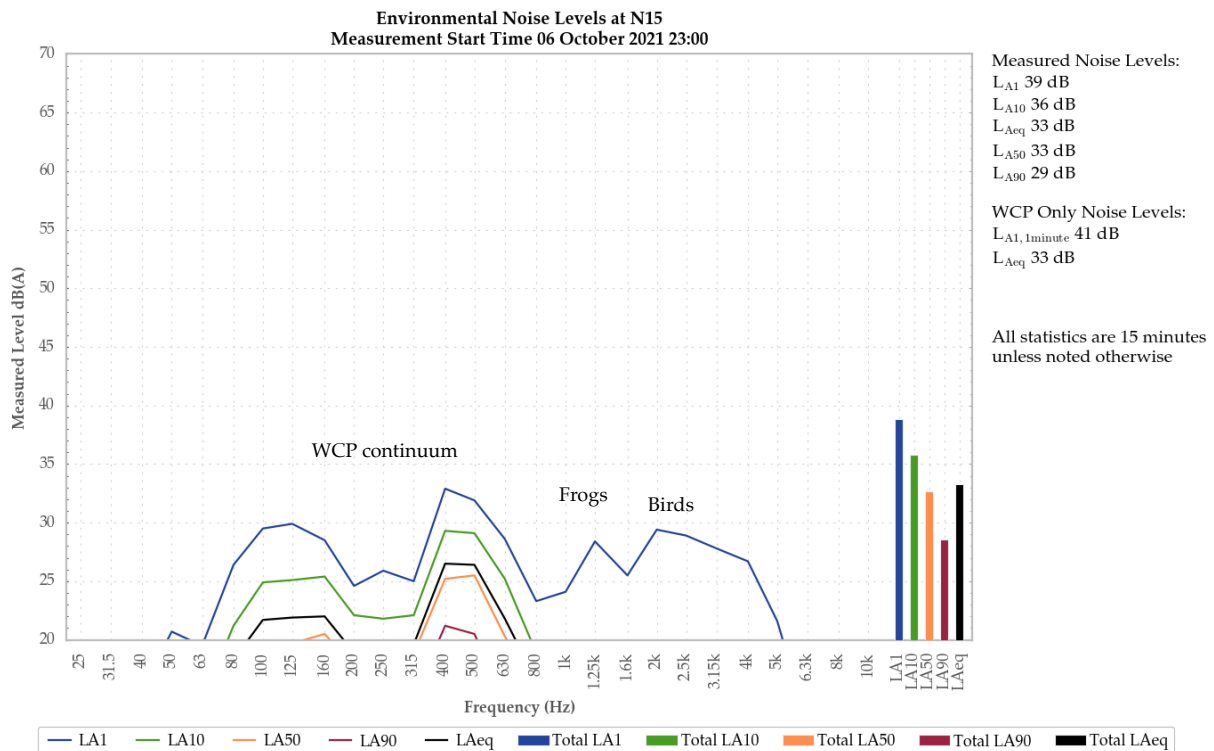
Birds and bats were noted.

*Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14*

Month	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021
LAeq	IA	23	IA	<25	<25	IA	<25	<20	<25	IA	IA	IA
LA1,1min	IA	26	IA	28	<25	IA	27	<20	26	IA	IA	IA



### 5.1.3 N15



**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum from WCP was audible throughout the measurement and generated the site-only LAeq,15minute of 33 dB. Rear-dump truck engine and fan noise was regularly audible above the continuum and was responsible for the measured site-only LA1,1minute of 41 dB. A horn was also noted.

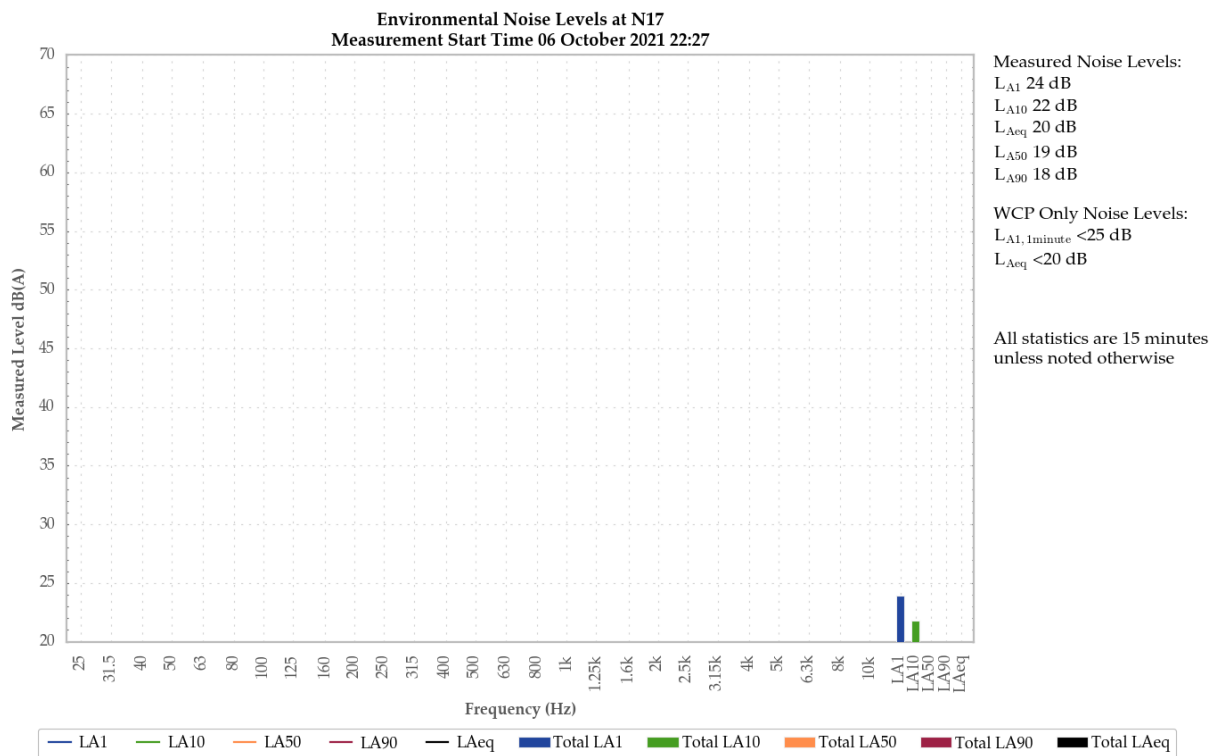
The continuum from WCP was primarily responsible for all measured noise levels. Frogs and birds contributed to the measured LA1.

Bats, sheep and distant road traffic noise were noted.

*Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15*

Month	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021
LAeq	IA	27	IA	IA	IA	IA	34	30	IA	<25	IA	NM
LA1,1min	IA	30	IA	IA	IA	IA	44	40	IA	<30	IA	NM

### 5.1.4 N17



**Figure 6: Environmental Noise Levels – N17 Mogo Road, off Araluen Road**

A low-level continuum from WCP was audible throughout the measurement and generated the site-only LAeq,15minute of less than 20 dB dB and LA1,1minute of less than 25 dB.

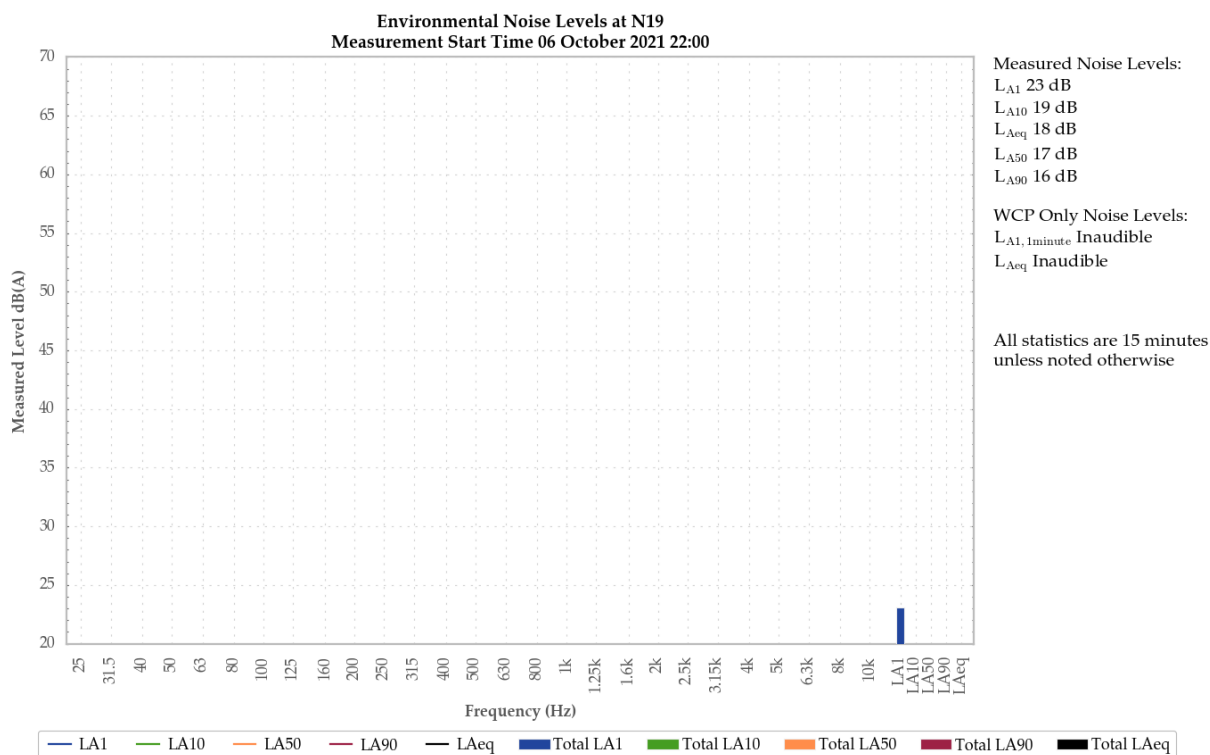
The continuum from WCP and the noise floor of the sound level meter were responsible for all measured noise levels.

Animals in the foliage and bats were noted.

*Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17*

Month	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021
<b>LAeq</b>	IA	<20	<25	26	IA	IA	33	25	IA	IA	<20	IA
<b>LA1,1min</b>	IA	<25	28	35	IA	IA	42	31	IA	IA	<20	IA

### 5.1.5 N19



**Figure 7: Environmental Noise Levels – N19, Upper Mogo Road**

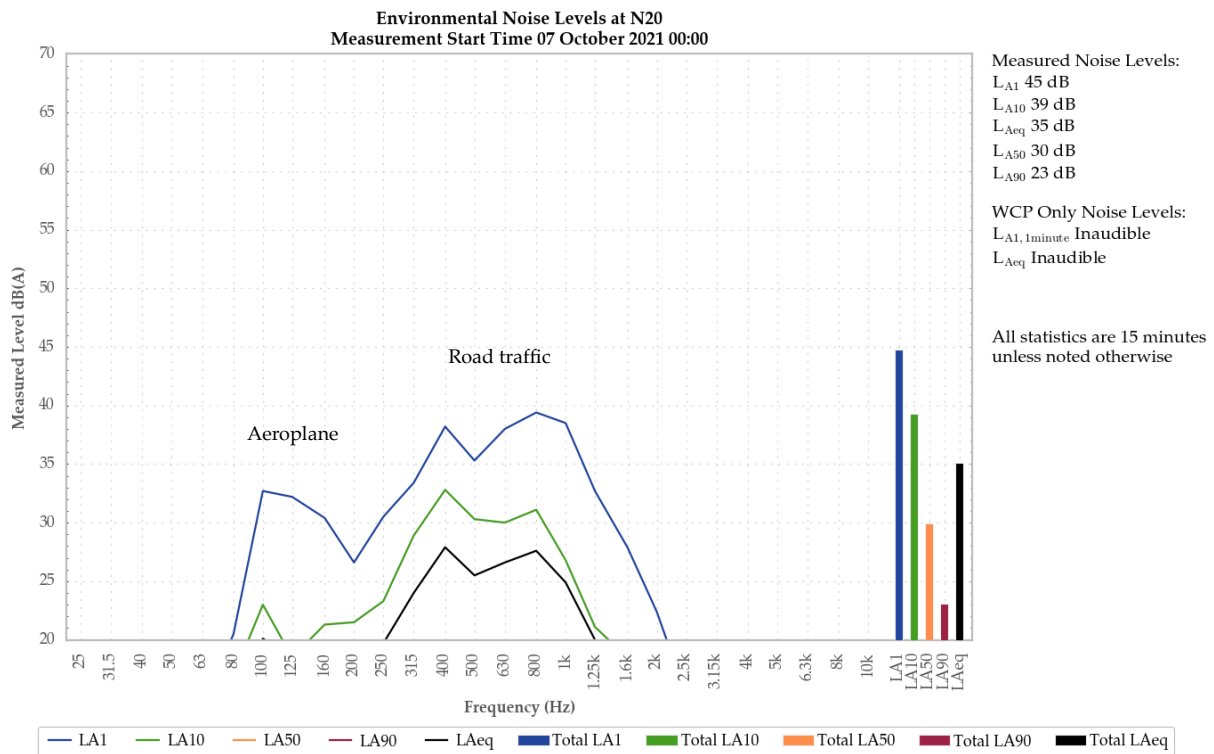
WCP was inaudible during the measurement.

The noise floor of the sound level meter was primarily responsible for all measured noise levels. Animals in the foliage contributed to the measured LA1, LA10 and LAeq.

*Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19*

Month	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021
<b>LAeq</b>	IA	IA	IA	<20	IA	IA	<25	<20	IA	IA	<20	IA
<b>LA1,1min</b>	IA	IA	IA	<20	IA	IA	<30	<20	IA	IA	<20	IA

### 5.1.6 N20



**Figure 8: Environmental Noise Levels, N20 – Ringwood Road**

WCP was inaudible during the measurement.

Road traffic noise was responsible for the measured LA1, LA10 and LAeq. An idling train was responsible for the measured LA50 and LA90.

An aeroplane was noted.

*Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20*

Month	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021
LAeq	IA	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	IA	31	IA	IA	IA	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 6/7 October 2021 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the October 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A REGULATOR DOCUMENTS

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandoona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to **Section 6.5**.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per <b>Table 7</b>,</li> <li><b>Figure 3</b> and <b>Figure 4</b></li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in <b>Table 7</b> to validate real-time noise monitoring data (<b>Section 6.5</b>).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in **Table 8** during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and *AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'*. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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### *B CALIBRATION CERTIFICATES*





Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
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 C20331

**Client Details** Global Acoustics Pty Ltd  
12/16 Huntingdale Drive  
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**  
**Ambient Temperature :** 21.1°C  
**Relative Humidity :** 57.8%  
**Barometric Pressure :** 101.27kPa

**Post-Test Atmospheric Conditions**  
**Ambient Temperature :** 21.8°C  
**Relative Humidity :** 56.5%  
**Barometric Pressure :** 101.17kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 11 Jun 2020

**Secondary Check:** Max Moore  
**Report Issue Date :** 15 Jun 2020

**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 - Environmental Conditions			
Acoustic Tests		Environmental Conditions	
125Hz	±0.15dB	Temperature	±0.2°C
1kHz	±0.13dB	Relative Humidity	±2.4%
8kHz	±0.14dB	Barometric Pressure	±0.015kPa
Electrical Tests	±0.10dB		

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



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

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

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

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



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C20332

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

**Equipment Tested/ Model Number :** Pulsar Model 106  
**Instrument Serial Number :** 74813

**Atmospheric Conditions**

**Ambient Temperature :** 21.5°C  
**Relative Humidity :** 56.9%  
**Barometric Pressure :** 101.46kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 10 Jun 2020  
**Secondary Check:** Max Moore  
**Report Issue Date :** 15 Jun 2020

**Approved Signatory :**  Ken Williams.

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	93.96	1000.30

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.

Specific Tests	Least Uncertainties of Measurement - Environmental Conditions		
	Temperature	±0.2°C	
Generated SPL	±0.14dB	Relative Humidity	±2.4%
Frequency	±0.09%	Barometric Pressure	±0.013kPa
Distortion	±0.09%		

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

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



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

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

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

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# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
November 2021*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)  
ABN 94 094 985 734

## Wilpinjong Coal

### Environmental Noise Monitoring November 2021

Reference: 21266\_R01

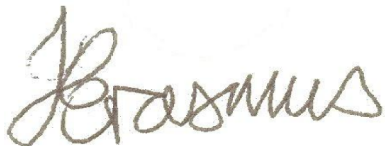
Report date: 27 November 2021

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Jonathan Erasmus  
Consultant



QA Review: Robert Kirwan  
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*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 1/2 November 2021 at eight locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

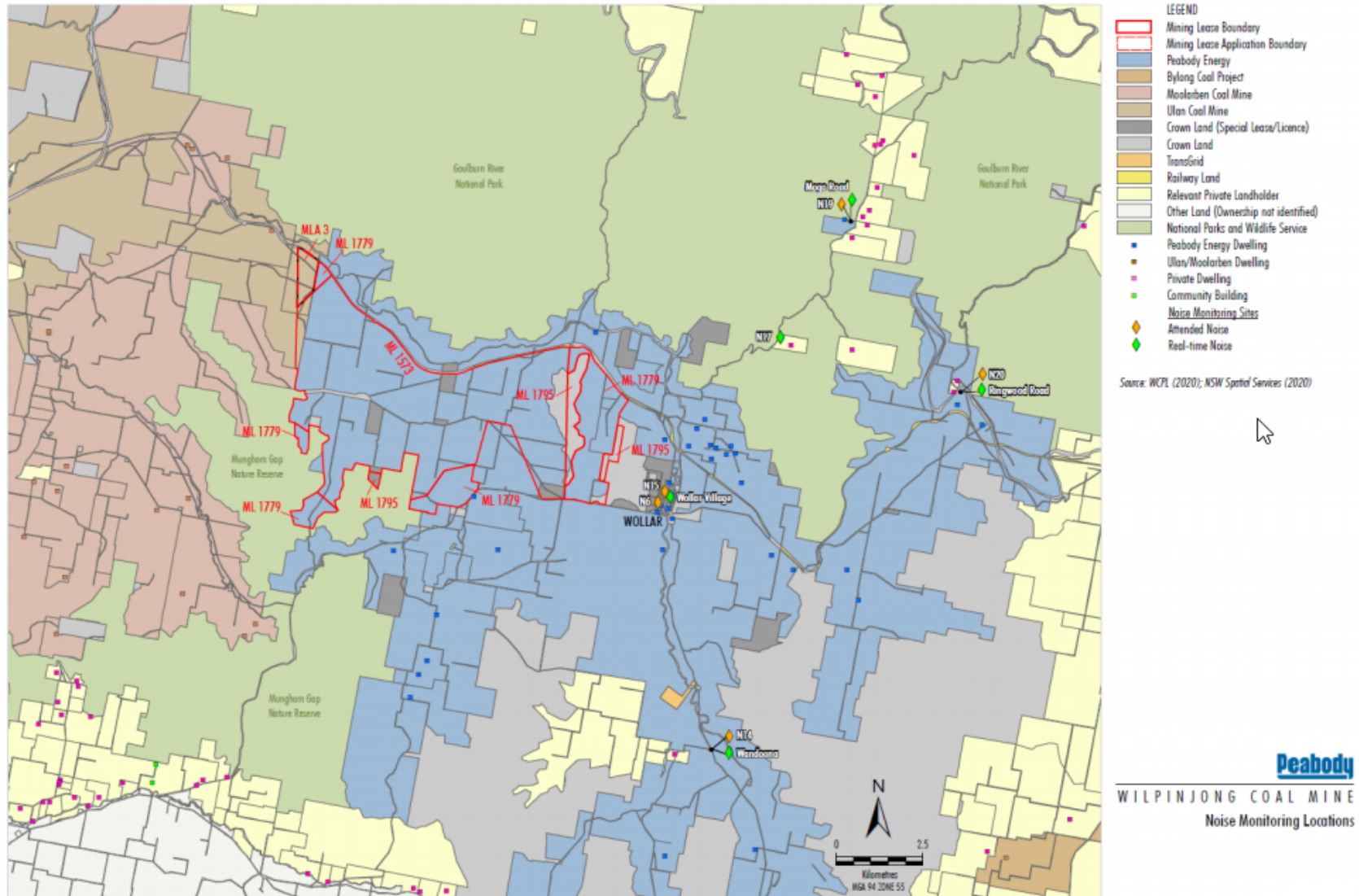


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)



### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has now replaced the previous consent (05-0021). The relevant noise conditions from the current project approval are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

- N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
- N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Jonathan Erasmus.

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

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

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

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

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

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

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

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

### 3.3 Modifying Factors

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

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

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

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	00370304	24/11/2022
Pulsar 105 acoustic calibrator	81334	12/02/2022

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	01/11/2021 23:18	43	36	27	25	22	19	17
N14	02/11/2021 00:18	45	36	28	26	22	19	15
N15	01/11/2021 23:00	51	47	44	39	26	18	16
N17	01/11/2021 22:24	48	47	41	36	30	26	23
N19	01/11/2021 22:00	40	35	34	31	29	27	25
N20	01/11/2021 23:45	79	77	59	63	36	23	19

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

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

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – NOVEMBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	01/11/2021 23:18	1.4	D	37	Yes	IA	Nil
N14	02/11/2021 00:18	0.0	F	35	Yes	IA	Nil
N15	01/11/2021 23:00	0.9	E	37	Yes	IA	Nil
N17	01/11/2021 22:24	1.5	D	38	Yes	IA	Nil
N19	01/11/2021 22:00	1.7	D	35	Yes	IA	Nil
N20	01/11/2021 23:45	1.2	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – NOVEMBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	01/11/2021 23:18	1.4	D	45	Yes	IA	Nil
N14	02/11/2021 00:18	0.0	F	45	Yes	IA	Nil
N15	01/11/2021 23:00	0.9	E	45	Yes	IA	Nil
N17	01/11/2021 22:24	1.5	D	45	Yes	IA	Nil
N19	01/11/2021 22:00	1.7	D	45	Yes	IA	Nil
N20	01/11/2021 23:45	1.2	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 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, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – NOVEMBER 2021

Location	Start Date And Time	Temperature ° C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	01/11/2021 23:18	16	0.0	-	1
N14	02/11/2021 00:18	13	0.0	-	0
N15	01/11/2021 23:00	19	0.0	-	0
N17	01/11/2021 22:24	18	0.3	20	0
N19	01/11/2021 22:00	19	0.7	30	0
N20	01/11/2021 23:45	14	1.0	260	2

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.



## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

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

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 5.1 to Table 5.6.

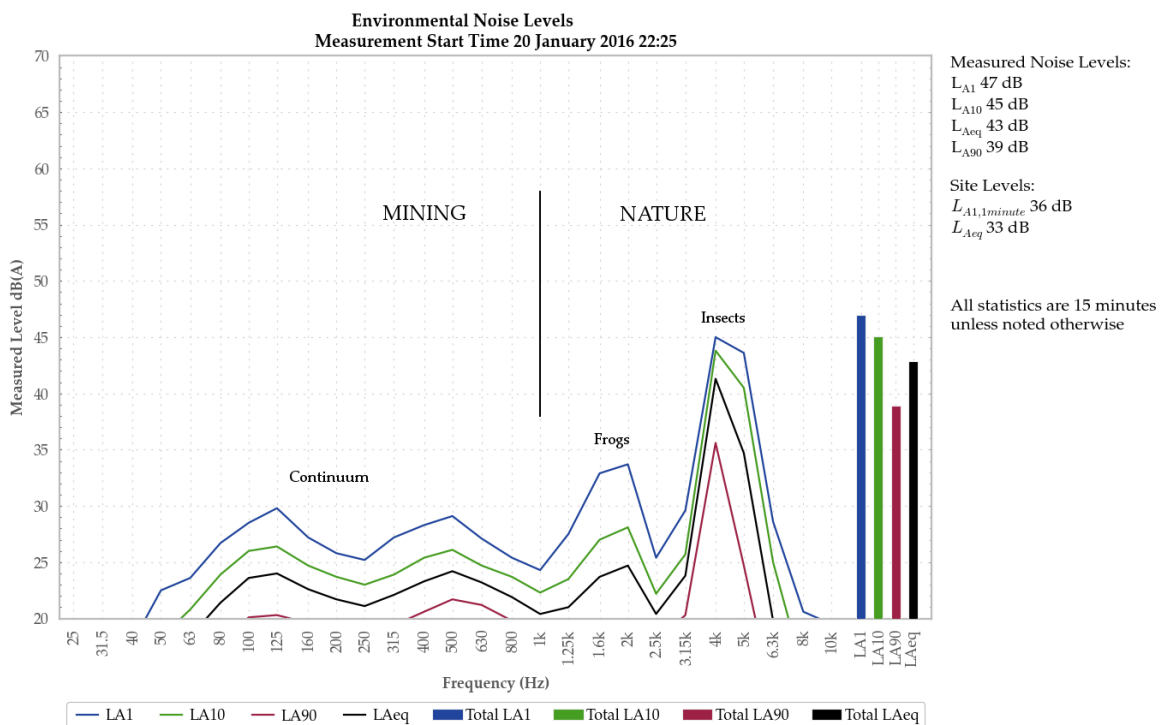


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6

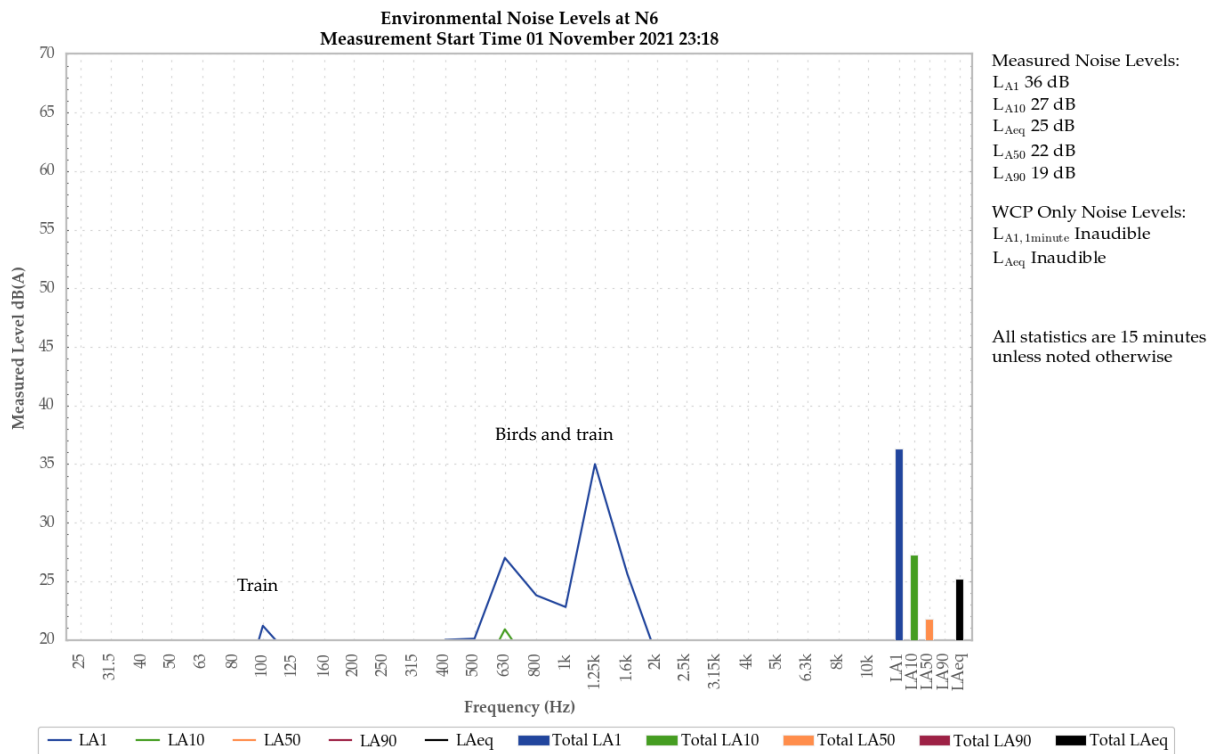


Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village

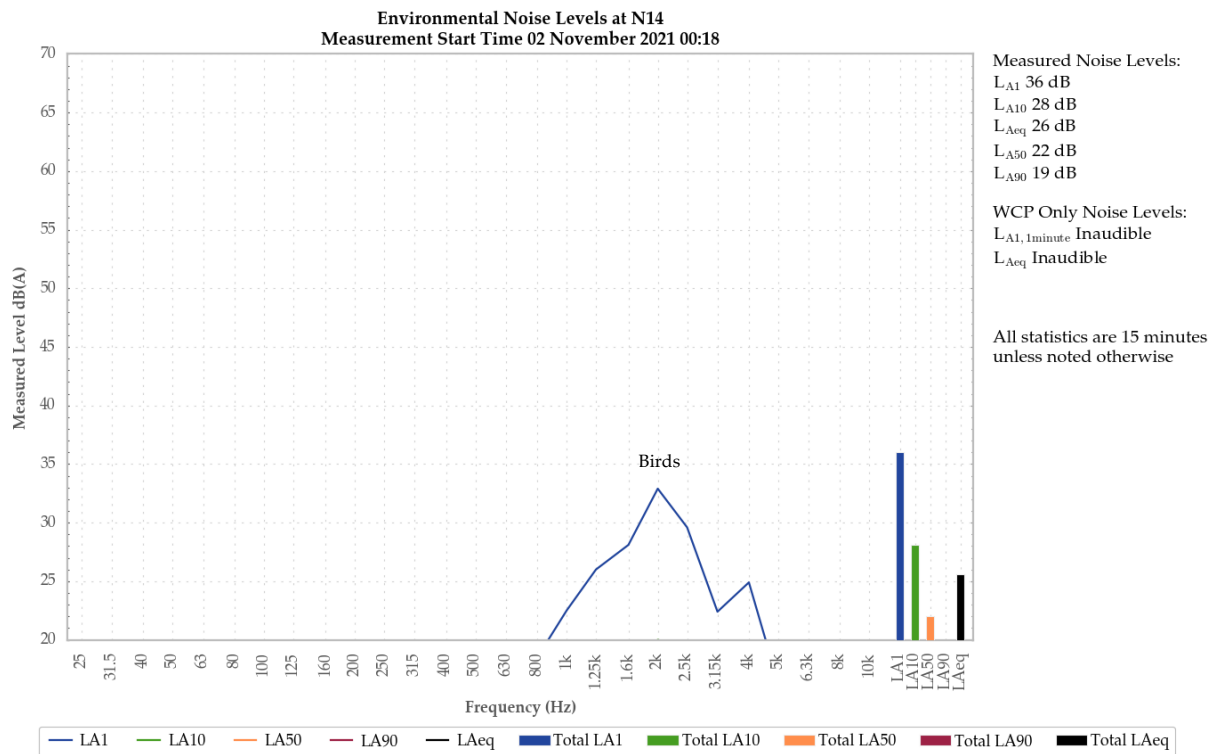
WCP was inaudible during the measurement.

Birds and a train generated the measured LA1 and LAeq. A train generated the measured LA10 and LA50. The noise floor of the sound-level meter, frogs, and insects generated the measured LA90.

Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
LAeq	IA	IA	<20	IA	30	30	IA	<25	IA	IA	31	IA
LA1,1min	IA	IA	<20	IA	31	35	IA	<25	IA	IA	33	IA

### 5.1.2 N14



**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

WCP was inaudible during the measurement.

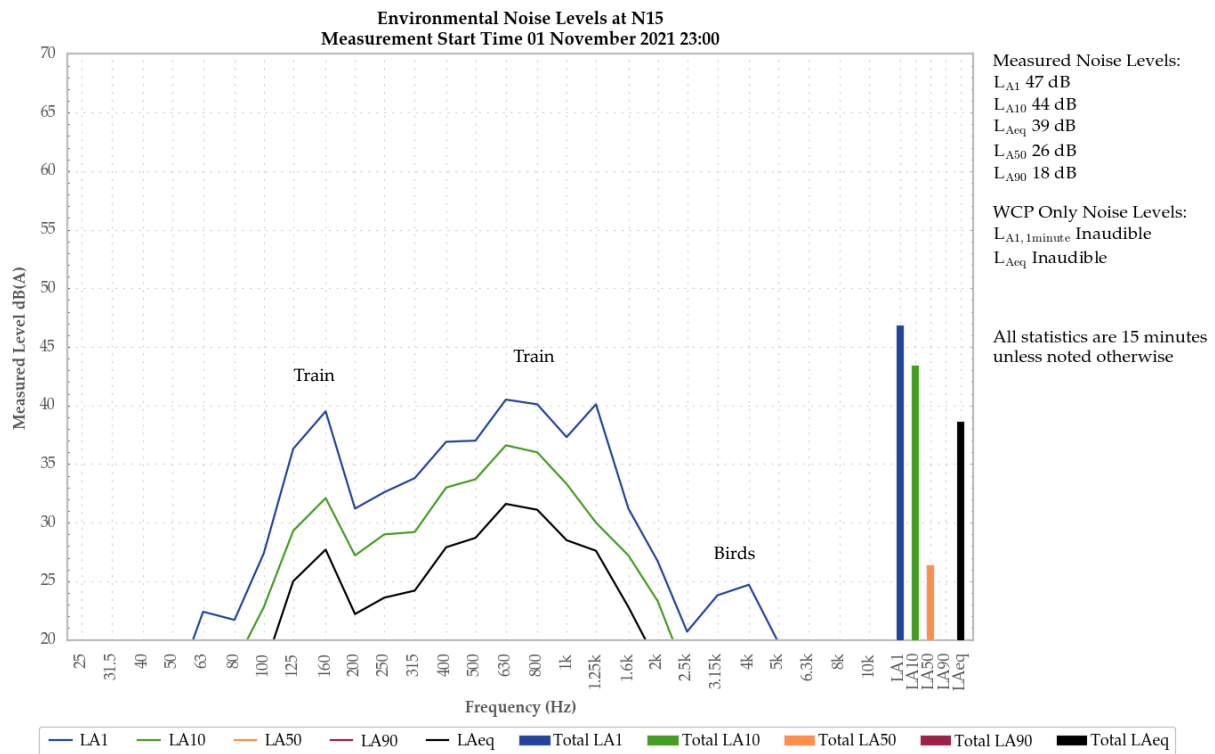
Birds generated the measured LA1 and LAeq. A local continuum generated the measured LA10, LA50, and LA90.

Frogs and insects were also noted.

*Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
LAeq	IA	<25	<25	IA	<25	<20	<25	IA	IA	IA	<25	IA
LA1,1min	IA	28	<25	IA	27	<20	26	IA	IA	IA	25	IA

### 5.1.3 N15



**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

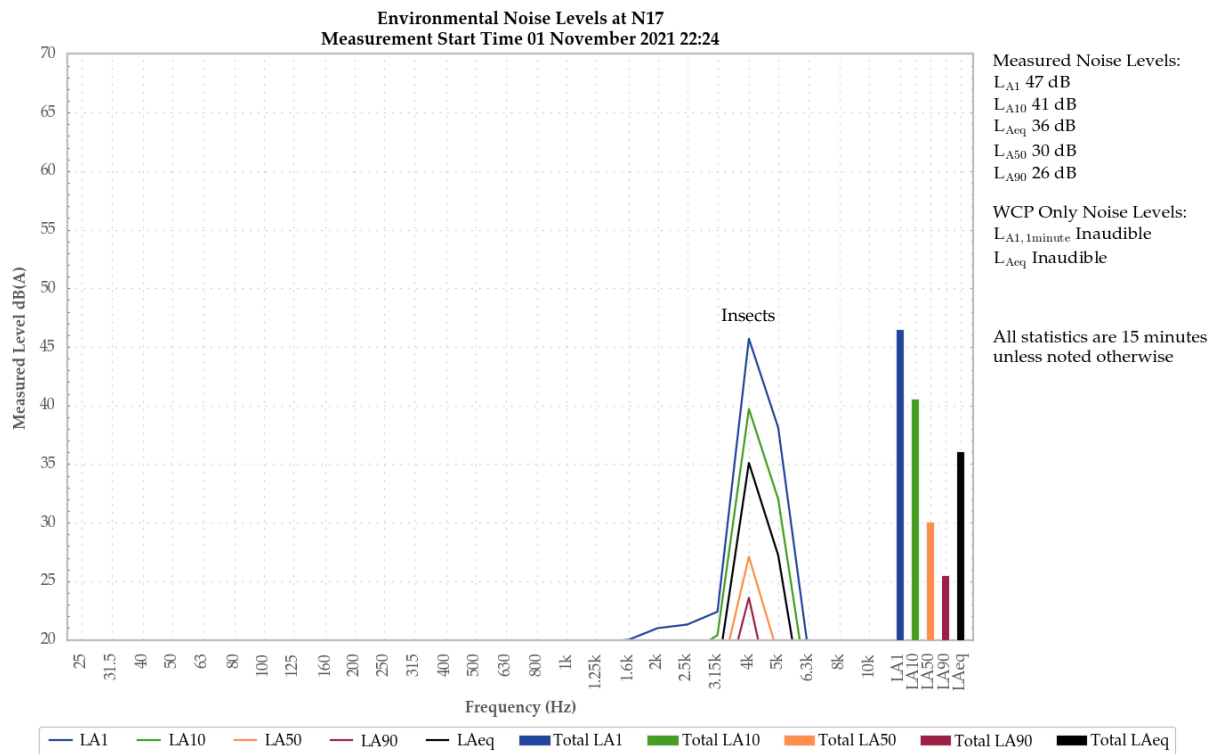
WCP was inaudible during the measurement.

A train generated the measured  $L_{A1}$ ,  $L_{A10}$ ,  $L_{Aeq}$  and  $L_{A50}$ . The noise floor of the sound-level meter generated the measured  $L_{A90}$ .

*Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
$L_{Aeq}$	IA	IA	IA	IA	34	30	IA	<25	IA	NM	33	IA
$L_{A1,1min}$	IA	IA	IA	IA	44	40	IA	<30	IA	NM	41	IA

### 5.14 N17



**Figure 6: Environmental Noise Levels – N17 Mogo Road, off Araluen Road**

WCP was inaudible during the measurement.

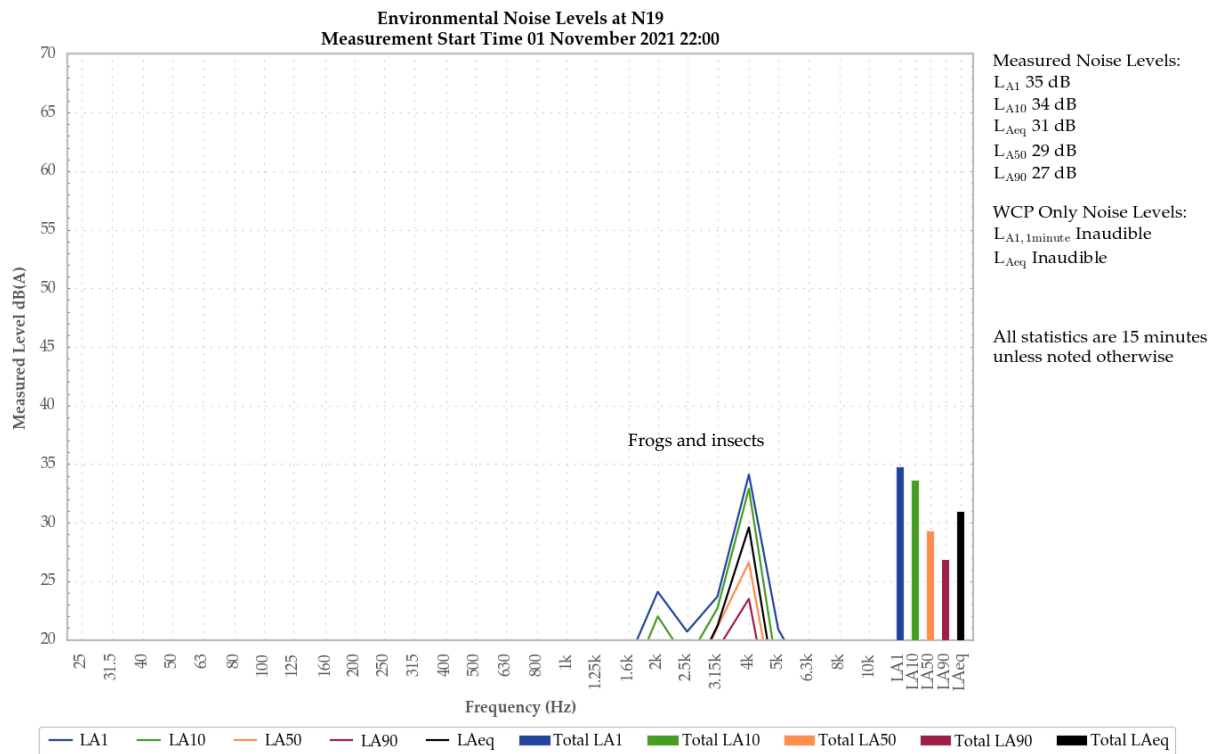
Insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

An aircraft, breeze in foliage, and frogs were also noted.

*Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
LAeq	<25	26	IA	IA	33	25	IA	IA	<20	IA	<20	IA
LA1,1min	28	35	IA	IA	42	31	IA	IA	<20	IA	<25	IA

### 5.1.5 N19



**Figure 7: Environmental Noise Levels – N19, Upper Mogo Road**

WCP was inaudible during the measurement.

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

Breeze in foliage was also noted.

*Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
LAeq	IA	<20	IA	IA	<25	<20	IA	IA	<20	IA	IA	IA
LA1,1min	IA	<20	IA	IA	<30	<20	IA	IA	<20	IA	IA	IA

5.1.6 N20

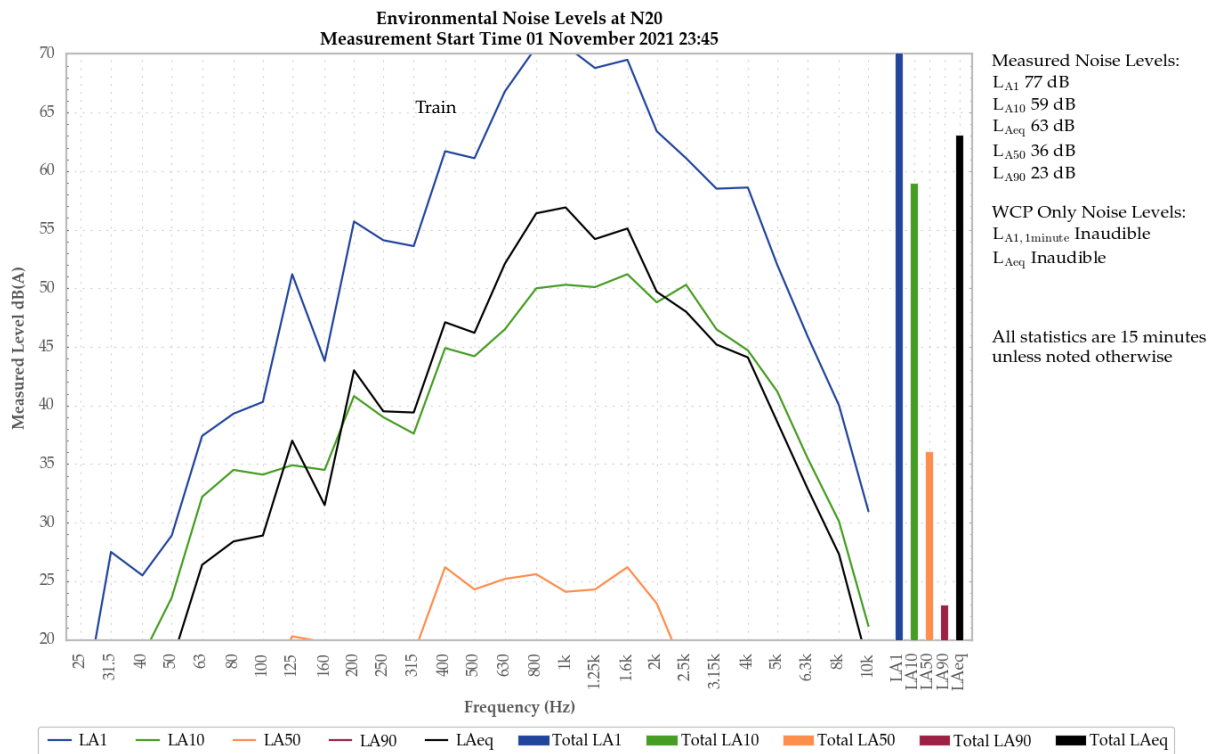


Figure 8: Environmental Noise Levels, N20 – Ringwood Road

WCP was inaudible during the measurement.

A train generated the measured  $L_{A1}$ ,  $L_{A10}$ ,  $L_{Aeq}$  and  $L_{A50}$ . Frogs and insects generated the measured  $L_{A90}$ .

Livestock and an aircraft were also noted.

Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
$L_{Aeq}$	IA	IA	IA	IA	<25	IA	IA	IA	IA	IA	IA	IA
$L_{A1,1min}$	IA	IA	IA	IA	31	IA	IA	IA	IA	IA	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 1/2 November 2021 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the November 2021 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**



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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{A1}(1 \text{ minute})$
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

### Operating Conditions

4. The Applicant must:
  - (a) implement all reasonable and feasible measures to minimise the construction, operational, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must 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;
  - (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; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### 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 12 times a year, 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.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ 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

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

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

L5.4 For the purpose of condition L5.3:

- The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
    - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
    - i) at the most affected point at a location where there is no dwelling at the location; or
    - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquill stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.



### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per Table 7,</li> <li>Figure 3 and Figure 4</li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- a) The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- b) Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- a) Take immediate action in accordance with the NMS;
- b) Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- c) Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

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

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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### **B CALIBRATION CERTIFICATES**



Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

## Sound Level Meter IEC 61672-3.2013 Calibration Certificate

Calibration Number C20674

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

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

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

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

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

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



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

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

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

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

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**Acoustic  
Research  
Labs Pty Ltd**

Unit 36/14 Loyalty Rd  
North Rocks NSW AUSTRALIA 2151  
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119  
www.acousticresearch.com.au

**Sound Calibrator  
IEC 60942-2017**

**Calibration Certificate**

Calibration Number C20082

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Pulsar Model 106
<b>Instrument Serial Number :</b>	81334
<b>Atmospheric Conditions</b>	
<b>Ambient Temperature :</b>	24.6°C
<b>Relative Humidity :</b>	48.9%
<b>Barometric Pressure :</b>	99.8kPa
<b>Calibration Technician :</b>	Lucky Jaiswal
<b>Secondary Check:</b>	Max Moore
<b>Calibration Date :</b>	12 Feb 2020
<b>Report Issue Date :</b>	13 Feb 2020
<b>Approved Signatory :</b>	 Ken Williams

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

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

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

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

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

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



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

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

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

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# *Wilpinjong Coal*

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## *Annual Environmental Monitoring Report 2021*

*Prepared for*

*Wilpinjong Coal Pty Ltd*

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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](mailto:global@globalacoustics.com.au)

ABN 94 094 985 734

## Wilpinjong Coal

### Annual Environmental Monitoring Report 2021

Reference: 21301\_R01\_Draft01

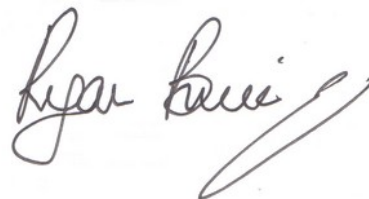
Report date: 10 March 2022

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Jesse Tribby  
Consultant

QA Review: Ryan Bruniges  
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 Wilpinjong Coal (WCP) Pty Ltd to provide an Annual Environmental Monitoring Report for 2021, in order to compare noise monitoring results against both relevant criteria and predictions in the most recently approved Environmental Impact Statement (EIS) for the Wilpinjong Extension Project.

This report summarises monthly attended noise monitoring surveys conducted around WCP during the reporting period 1 January to 31 December 2021. The purpose of the surveys was to quantify and describe the acoustic environment around the site and compare results with specified limits. The duration of each measurement was 15 minutes.

Attended noise monitoring described in this report was conducted on a monthly basis in accordance with Project Approval SSD-6764, the WCP Noise Management Plan, and Environment Protection Licence No. 12425.

### January to December 2021 Compliance

During 2021 attended noise monitoring, noise levels from WCP complied with relevant noise limits at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

### Long-Term Noise Trends

Site-only  $L_{Aeq}$  noise levels were low (either IA, NM, or less than 30 dB) for a large majority of measurements at all monitoring locations. Additional discussion of individual monitoring locations is provided below:

- At N14, N19, and N20, site-only  $L_{Aeq}$  noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements; and
- At N6, N15, and N17, site-only  $L_{Aeq}$  noise levels were occasionally above 30 dB during attended noise monitoring, but always below the relevant impact assessment criterion.

Long-term noise trend lines were largely constant or increased slightly.

### EIS Comparison

When comparable, measured noise levels were lower than predicted noise levels under corresponding meteorological conditions at all locations during all measurements, with a single exception. During the January 2021 measurement at N17 (Mogo Road), the measured site-only  $L_{Aeq}$  was 5 dB higher than predicted under calm conditions. However, the measured site-only  $L_{Aeq}$  was still 12 dB lower than the relevant criterion during this measurement.



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## **Appendices**

# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by WCP to provide an Annual Environmental Monitoring Report (AEMR) for 2021, in order to compare noise monitoring results against both relevant criteria and predictions in the most recently approved EIS for the Wilpinjong Extension Project (WEP).

This report summarises monthly attended noise monitoring surveys conducted around WCP during the reporting period 1 January to 31 December 2021. The purpose of the surveys was to quantify and describe the acoustic environment around the site and compare results with specified limits.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

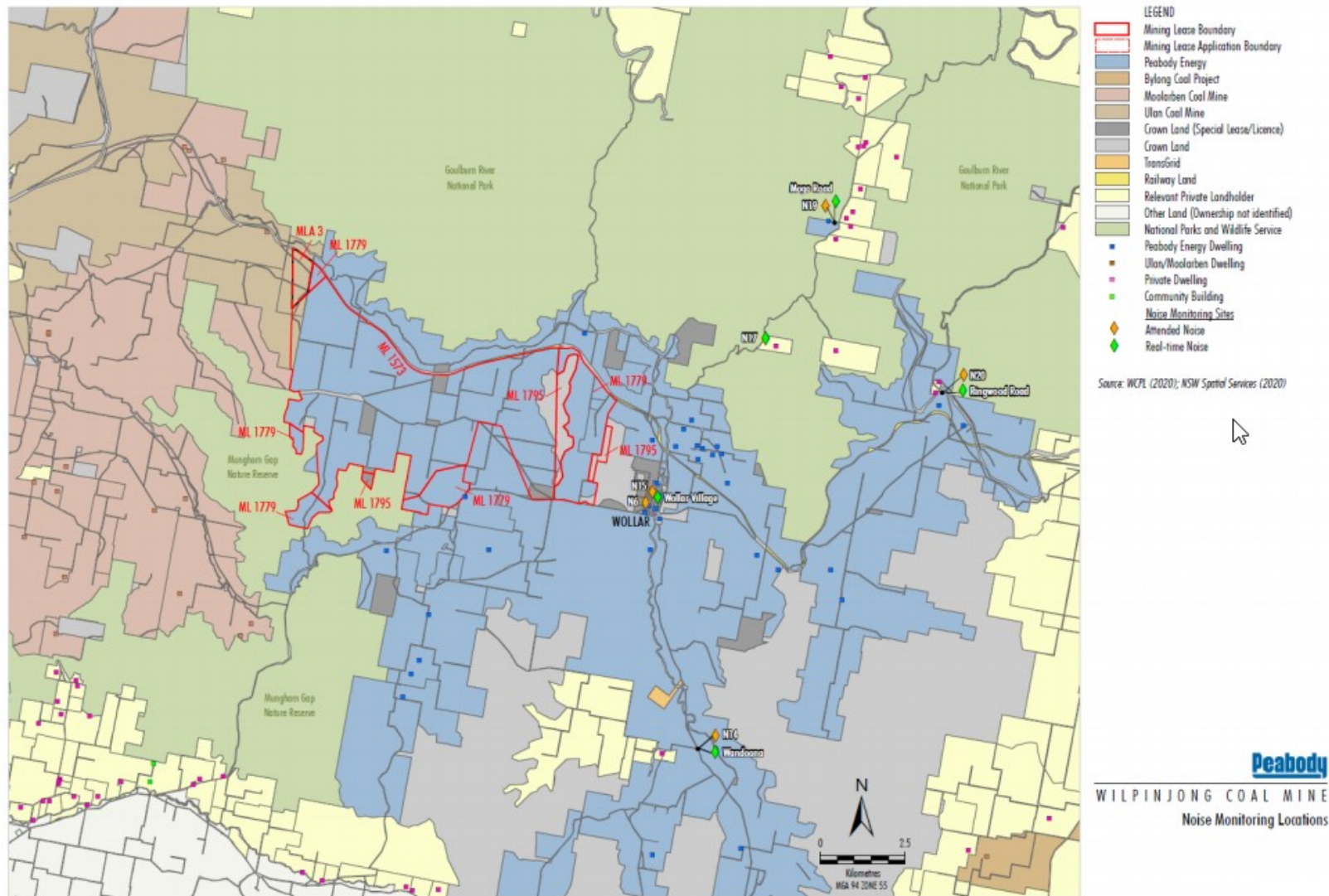


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The average C-weighted noise energy during a measurement period. The “C” weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 STATUTORY REQUIREMENTS AND CRITERIA

### 2.1 Project Approval

The most current approval associated with activities at WCP is the 'Wilpinjong Extension Project' (SSD-6764, April 2017). A noise and blasting assessment was prepared in November 2015 as part of an EIS to support project approval of the WEP.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021.

### 2.3 Noise Management Plan

Noise monitoring requirements are detailed in the WCP NMP. The most recent version of the NMP was approved in August 2020.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

- N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
- N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.



## 2.5 Modifying Factors

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

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location.

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

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

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

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

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

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

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

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

### 3.3 Modifying Factors

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

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

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

### 3.4 Attended Real-Time Noise Monitor Comparison

WCP-only noise levels from four attended monitoring locations are compared to results from nearby Sentinex units. Start times of attended and real-time measurements do not directly overlap. Real-time measurement with the most overlap with attended monitoring times are selected for comparison.

Attended monitoring locations and the real-time monitoring locations they represent are listed in Table 3.1.

Table 3.1: ATTENDED AND REAL-TIME MONITORING LOCATIONS FOR COMPARISON

NMP Descriptor	Real-Time Monitor ID	Monitoring Location
N15	SX33-N1	Wollar Village
N19	SX32-N1	North Mogo Road
N20	SX30-N1	Ringwood Road, off Wollar Road
N14	SX31-N1	'Tichular', intersection of Tichular and Barigan Roads, Tichular

### 3.5 Comparison with WEP EIS Model Predictions

A noise and blasting assessment was prepared in November 2015 as part of the EIS to support project approval for the WEP. The report assessed noise and blasting impacts associated with ongoing operations. As part of the modelling assessment, noise levels from WCP were predicted for representative operating scenarios, time periods and weather conditions. Predicted noise levels for “Year 2020” most closely aligned with the 2021 reporting year and have been compared with measured levels from attended compliance monitoring under corresponding meteorological conditions.

Table 11 of the noise and blasting assessment lists modelled meteorological conditions and is reproduced below.

Table 11 INP Assessable Meteorological Noise Modelling Parameters

Period	Meteorological Parameter	Air Temperature	Relative Humidity	Wind Speed and Direction	Temperature Gradient
Daytime	Calm	20°C	50%	0 m/s	0°C/100 m
	Autumn Wind 30% (occurrence)	19°C	55%	E 3 m/s	0°C/100 m
Evening	Calm	19°C	56%	0 m/s	0°C/100 m
	Autumn Wind 30% (occurrence)	18°C	63%	ESE 3 m/s	0°C/100 m
	Winter Wind 30% (occurrence)	10°C	71%	WNW, NW 3 m/s	0°C/100 m
Night-time	Calm	14°C	76%	0 m/s	0°C/100 m
	Summer Wind > 30% (occurrence)	19°C	68%	ESE, SE, E 3 m/s	0°C/100 m
	Strong Inversion (10% exceedance) <sup>1</sup>	6°C	86%	0 m/s	5.2°C/100 m

Note 1: Winter evening/night-time 10% exceedance temperature gradient in accordance with INP Appendix E Table 4.

Note 2: m/s = metres per second.

The following rules were used to allocate meteorological parameter bounds for each condition:

1. For night-time “calm” atmospheric conditions, wind speeds less than 0.5 metres per second (m/s), all wind directions, and temperature gradients in the range -1.5° and 1.5° C/100m were included. This vertical temperature gradient range corresponds with Stability Categories D and E according to Table D2 of the NPfI;
2. For night “summer wind” atmospheric conditions, wind speeds in the range 0.5 to 3.0 m/s and

vertical temperature gradients in the range  $-1.5^{\circ}$  and  $1.5^{\circ}$  C/100m were included. This vertical temperature gradient range corresponds with Stability Categories D and E according to Table D2 of the NPfl. The modelled wind directions were E (90 degrees), ESE (112.5 degrees), and SE (135 degrees). Wind directions 22.5 degrees either side of the modelled directions were included; and

3. For “strong inversion” atmospheric conditions with no wind, wind speeds up to 0.5 m/s and vertical temperature gradients in the range  $3.0^{\circ}$  to  $5.2^{\circ}$  C/100m were included. This vertical temperature gradient range corresponds with Stability Category F according to Table D2 of the NPfl.

Meteorological parameter bounds used to identify corresponding meteorological conditions during attended monitoring are outlined in Table 3.2.

*Table 3.2: APPLICABLE METEOROLOGICAL CONDITION DEFINITIONS*

Parameter	Night		
	Calm	Summer Wind	Strong Inversion
Wind speed (m/s)	0.0 – 0.5	0.5 – 3.0	0.0 – 0.5
Wind direction (°)	all	67.5°-157.5°	all
Stability category	D and E	D and E	F and G

## 4 RESULTS

### 4.1 January 2021

#### 4.1.1 Total Measured Noise Levels

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

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	26/01/2021 23:10	51	49	48	47	47	46	44
N14	26/01/2021 22:45	48	44	39	36	33	29	25
N15	26/01/2021 23:30	49	47	46	46	46	45	42
N17	26/01/2021 22:26	56	56	55	55	55	54	53
N19	26/01/2021 22:00	55	54	54	52	52	50	44
N20	26/01/2021 22:00	41	38	37	35	35	32	29

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

#### 4.1.2 Modifying Factors

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

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

### 4.1.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JANUARY 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	26/01/2021 23:10	1.7	E	37	Yes	IA	Nil
N14	26/01/2021 22:45	1.1	E	35	Yes	<25	Nil
N15	26/01/2021 23:30	2.3	E	37	Yes	IA	Nil
N17	26/01/2021 22:26	0.2	E	38	Yes	26	Nil
N19	26/01/2021 22:00	1.7	E	35	Yes	<20	Nil
N20	26/01/2021 22:00	1.7	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JANUARY 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	26/01/2021 23:10	1.7	E	45	Yes	IA	Nil
N14	26/01/2021 22:45	1.1	E	45	Yes	28	Nil
N15	26/01/2021 23:30	2.3	E	45	Yes	IA	Nil
N17	26/01/2021 22:26	0.2	E	45	Yes	35	Nil
N19	26/01/2021 22:00	1.7	E	45	Yes	<20	Nil
N20	26/01/2021 22:00	1.7	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.1.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.4. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.4: REAL-TIME AND ATTENDED NOISE LEVELS, JANUARY 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	26/01/2021 22:45	26/01/2021 22:45	41	37	24	23	29	<25
N15/SX33	26/01/2021 23:30	26/01/2021 23:30	37	34	28	21	45	IA
N19/SX32	26/01/2021 22:00	26/01/2021 22:00	43	42	15	11	50	<20
N20/SX30	26/01/2021 22:00	26/01/2021 22:00	NR	NR	NR	NR	32	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.



## 4.2 February 2021

### 4.2.1 Total Measured Noise Levels

Table 4.5: MEASURED NOISE LEVELS – FEBRUARY 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	12/02/2021 01:04	48	45	28	31	26	24	23
N14	11/02/2021 23:45	45	34	31	28	26	24	21
N15	11/02/2021 23:00	45	39	33	30	27	25	22
N17	11/02/2021 22:30	52	46	46	45	45	44	43
N19	11/02/2021 22:01	55	54	54	48	44	39	36
N20	12/02/2021 00:30	44	38	34	31	29	26	23

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2.2 Modifying Factors

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

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

### 4.2.3 Attended Noise Monitoring

Table 4.6 to Table 4.7 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.6:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – FEBRUARY 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	12/02/2021 01:04	0.0	G	37	No	<20	NA
N14	11/02/2021 23:45	0.0	G	35	No	<25	NA
N15	11/02/2021 23:00	0.0	G	37	No	IA	NA
N17	11/02/2021 22:30	0.0	F	38	Yes	IA	Nil
N19	11/02/2021 22:01	1.5	E	35	Yes	IA	Nil
N20	12/02/2021 00:30	0.0	G	35	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions; Prett
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.7:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – FEBRUARY 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	12/02/2021 01:04	0.0	G	45	No	<20	NA
N14	11/02/2021 23:45	0.0	G	45	No	<25	NA
N15	11/02/2021 23:00	0.0	G	45	No	IA	NA
N17	11/02/2021 22:30	0.0	F	45	Yes	IA	Nil
N19	11/02/2021 22:01	1.5	E	45	Yes	IA	Nil
N20	12/02/2021 00:30	0.0	G	45	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.2.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.8. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.8: REAL-TIME AND ATTENDED NOISE LEVELS, FEBRUARY 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	11/02/2021 23:45	11/02/2021 23:45	36	28	23	22	24	<25
N15/SX33	11/02/2021 23:00	11/02/2021 23:00	39	33	31	19	25	IA
N19/SX32	11/02/2021 22:01	11/02/2021 22:00	39	38	16	15	39	IA
N20/SX30	12/02/2021 00:30	12/02/2021 00:30	32	28	21	17	26	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.3 March 2021

### 4.3.1 Total Measured Noise Levels

Table 4.9: MEASURED NOISE LEVELS – MARCH 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	31/03/2021 00:41	37	33	30	27	25	23	22
N14	31/03/2021 00:15	40	33	31	29	29	27	24
N15	30/03/2021 23:00	63	52	46	42	30	25	23
N17	30/03/2021 22:28	43	41	38	35	34	32	31
N19	30/03/2021 22:00	49	44	38	36	34	32	30
N20	30/03/2021 23:30	38	34	31	28	28	25	22

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.3.2 Modifying Factors

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

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

### 4.3.3 Attended Noise Monitoring

Table 4.10 to Table 4.11 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.10:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MARCH 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	31/03/2021 00:41	2.0	D	37	Yes	IA	Nil
N14	31/03/2021 00:15	1.6	D	35	Yes	IA	Nil
N15	30/03/2021 23:00	1.8	E	37	Yes	IA	Nil
N17	30/03/2021 22:28	1.4	E	38	Yes	IA	Nil
N19	30/03/2021 22:00	2.9	D	35	Yes	IA	Nil
N20	30/03/2021 23:30	2.3	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.11:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MARCH 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	31/03/2021 00:41	2.0	D	45	Yes	IA	Nil
N14	31/03/2021 00:15	1.6	D	45	Yes	IA	Nil
N15	30/03/2021 23:00	1.8	E	45	Yes	IA	Nil
N17	30/03/2021 22:28	1.4	E	45	Yes	IA	Nil
N19	30/03/2021 22:00	2.9	D	45	Yes	IA	Nil
N20	30/03/2021 23:30	2.3	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.3.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.12. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.12: REAL-TIME AND ATTENDED NOISE LEVELS, MARCH 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	31/03/2021 00:15	31/03/2021 00:15	36	26	16	16	27	IA
N15/SX33	30/03/2021 23:00	30/03/2021 23:00	50	36	44	23	25	IA
N19/SX32	30/03/2021 22:00	30/03/2021 22:00	35	34	27	23	32	IA
N20/SX30	30/03/2021 23:30	30/03/2021 23:30	39	34	26	19	25	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.4 April 2021

### 4.4.1 Total Measured Noise Levels

Table 4.13: MEASURED NOISE LEVELS – APRIL 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	20/04/2021 23:52	47	39	35	33	32	29	26
N14	21/04/2021 00:30	53	35	35	27	25	23	21
N15	20/04/2021 23:31	46	44	37	34	30	27	25
N17	20/04/2021 22:29	49	38	35	34	33	31	28
N19	20/04/2021 22:01	48	41	35	31	26	23	20
N20	21/04/2021 01:17	54	40	32	29	25	23	21

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.4.2 Modifying Factors

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

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

#### 4.4.3 Attended Noise Monitoring

Table 4.14 to Table 4.15 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.14:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – APRIL 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	20/04/2021 23:52	0.0	G	37	No	30	NA
N14	21/04/2021 00:30	0.7	G	35	No	<25	NA
N15	20/04/2021 23:31	1.5	G	37	No	34	NA
N17	20/04/2021 22:29	0.9	G	38	No	33	NA
N19	20/04/2021 22:01	0.7	G	35	No	<25	NA
N20	21/04/2021 01:17	0.9	G	35	No	<25	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.15:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – APRIL 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	20/04/2021 23:52	0.0	G	45	No	31	NA
N14	21/04/2021 00:30	0.7	G	45	No	27	NA
N15	20/04/2021 23:31	1.5	G	45	No	44	NA
N17	20/04/2021 22:29	0.9	G	45	No	42	NA
N19	20/04/2021 22:01	0.7	G	45	No	<30	NA
N20	21/04/2021 01:17	0.9	G	45	No	31	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.



#### 4.4.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.16. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.16: REAL-TIME AND ATTENDED NOISE LEVELS, APRIL 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	21/04/2021 00:30	21/04/2021 00:30	25	23	25	22	23	<25
N15/SX33	20/04/2021 23:31	20/04/2021 23:30	36	28	36	28	27	34
N19/SX32	20/04/2021 22:01	20/04/2021 22:00	29	24	28	23	23	<25
N20/SX30	21/04/2021 01:17	21/04/2021 01:15	29	27	26	22	23	<25

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.5 May 2021

### 4.5.1 Total Measured Noise Levels

Table 4.17: MEASURED NOISE LEVELS – MAY 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	03/05/2021 23:19	47	36	33	30	29	26	24
N14	04/05/2021 00:45	51	32	26	24	21	19	18
N15	03/05/2021 23:00	72	58	39	46	31	28	25
N17	03/05/2021 22:30	48	33	28	27	26	24	21
N19	03/05/2021 22:00	39	36	31	28	26	22	17
N20	04/05/2021 00:00	46	32	26	23	21	19	18

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.5.2 Modifying Factors

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

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

### 4.5.3 Attended Noise Monitoring

Table 4.18 to Table 4.19 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.18:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MAY 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	03/05/2021 23:19	0.0	F	37	Yes	30	Nil
N14	04/05/2021 00:45	1.0	F	35	Yes	<20	Nil
N15	03/05/2021 23:00	0.0	F	37	Yes	30	Nil
N17	03/05/2021 22:30	0.0	F	38	Yes	25	Nil
N19	03/05/2021 22:00	0.7	F	35	Yes	<20	Nil
N20	04/05/2021 00:00	0.6	F	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.19:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MAY 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	03/05/2021 23:19	0.0	F	45	Yes	35	Nil
N14	04/05/2021 00:45	1.0	F	45	Yes	<20	Nil
N15	03/05/2021 23:00	0.0	F	45	Yes	40	Nil
N17	03/05/2021 22:30	0.0	F	45	Yes	31	Nil
N19	03/05/2021 22:00	0.7	F	45	Yes	<20	Nil
N20	04/05/2021 00:00	0.6	F	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.5.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.20. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.20: REAL-TIME AND ATTENDED NOISE LEVELS, MAY 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	04/05/2021 00:45	04/05/2021 00:45	22	19	22	19	19	<20
N15/SX33	03/05/2021 23:00	03/05/2021 23:00	37	30	34	30	28	30
N19/SX32	03/05/2021 22:00	03/05/2021 22:00	26	22	24	18	22	<20
N20/SX30	04/05/2021 00:00	04/05/2021 00:00	25	24	17	16	19	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.6 June 2021

### 4.6.1 Total Measured Noise Levels

Table 4.21: MEASURED NOISE LEVELS – JUNE 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	22/06/2021 23:54	53	41	30	30	28	26	24
N14	22/06/2021 23:30	48	41	38	35	34	31	27
N15	22/06/2021 23:00	42	35	29	27	25	22	20
N17	22/06/2021 22:25	47	30	26	24	23	21	18
N19	22/06/2021 22:00	42	29	27	24	23	19	17
N20	23/06/2021 00:30	42	30	25	23	23	21	20

Note:

1. Noise levels in this table are not necessarily the result of activities at WCP.

### 4.6.2 Modifying Factors

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

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

### 4.6.3 Attended Noise Monitoring

Table 4.22 to Table 4.23 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.22:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JUNE 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	22/06/2021 23:54	2.0	E	37	Yes	IA	Nil
N14	22/06/2021 23:30	2.0	F	35	Yes	<25	Nil
N15	22/06/2021 23:00	0.9	F	37	Yes	IA	Nil
N17	22/06/2021 22:25	0.8	F	38	Yes	IA	Nil
N19	22/06/2021 22:00	1.0	F	35	Yes	IA	Nil
N20	23/06/2021 00:30	1.6	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.23:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JUNE 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	22/06/2021 23:54	2.0	E	45	Yes	IA	Nil
N14	22/06/2021 23:30	2.0	F	45	Yes	26	Nil
N15	22/06/2021 23:00	0.9	F	45	Yes	IA	Nil
N17	22/06/2021 22:25	0.8	F	45	Yes	IA	Nil
N19	22/06/2021 22:00	1.0	F	45	Yes	IA	Nil
N20	23/06/2021 00:30	1.6	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.6.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.24. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.24: REAL-TIME AND ATTENDED NOISE LEVELS, JUNE 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	22/06/2021 23:30	22/06/2021 23:30	35	31	25	24	31	<25
N15/SX33	22/06/2021 23:00	22/06/2021 23:00	37	28	24	22	22	IA
N19/SX32	22/06/2021 22:00	22/06/2021 22:00	25	23	20	17	19	IA
N20/SX30	23/06/2021 00:30	23/06/2021 00:30	NR	NR	NR	NR	21	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.7 July 2021

### 4.7.1 Total Measured Noise Levels

Table 4.25: MEASURED NOISE LEVELS – JULY 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	07/07/2021 00:56	61	54	48	43	31	24	22
N14	07/07/2021 00:30	38	32	29	26	24	20	18
N15	06/07/2021 23:01	38	37	35	33	32	27	23
N17	06/07/2021 22:27	44	24	19	18	16	15	14
N19	06/07/2021 22:00	36	23	20	19	18	17	16
N20	06/07/2021 23:45	46	26	23	22	20	19	19

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.7.2 Modifying Factors

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

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



### 4.7.3 Attended Noise Monitoring

Table 4.26 to Table 4.27 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.26:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JULY 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	07/07/2021 00:56	0.6	F	37	Yes	<25	Nil
N14	07/07/2021 00:30	0.0	F	35	Yes	IA	Nil
N15	06/07/2021 23:01	0.0	G	37	No	<25	NA
N17	06/07/2021 22:27	0.0	G	38	No	IA	NA
N19	06/07/2021 22:00	0.7	F	35	Yes	IA	Nil
N20	06/07/2021 23:45	0.0	F	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.27:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JULY 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	07/07/2021 00:56	0.6	F	45	Yes	<25	Nil
N14	07/07/2021 00:30	0.0	F	45	Yes	IA	Nil
N15	06/07/2021 23:01	0.0	G	45	No	<30	NA
N17	06/07/2021 22:27	0.0	G	45	No	IA	NA
N19	06/07/2021 22:00	0.7	F	45	Yes	IA	Nil
N20	06/07/2021 23:45	0.0	F	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.7.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.28. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.28: REAL-TIME AND ATTENDED NOISE LEVELS, JULY 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	07/07/2021 00:30	07/07/2021 00:30	26	20	26	21	20	IA
N15/SX33	06/07/2021 23:01	06/07/2021 23:00	36	31	36	31	27	<25
N19/SX32	06/07/2021 22:00	06/07/2021 22:00	21	19	14	13	17	IA
N20/SX30	06/07/2021 23:45	06/07/2021 23:45	28	26	23	18	19	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.8 August 2021

### 4.8.1 Total Measured Noise Levels

Table 4.29: MEASURED NOISE LEVELS – AUGUST 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	13/08/2021 00:40	55	51	46	41	32	30	29
N14	13/08/2021 00:15	55	46	44	41	40	35	30
N15	12/08/2021 23:00	44	39	35	32	31	28	27
N17	12/08/2021 22:25	33	25	23	23	23	22	20
N19	12/08/2021 22:00	36	27	26	25	25	24	22
N20	12/08/2021 23:31	60	58	40	44	30	25	22

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.8.2 Modifying Factors

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

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

### 4.8.3 Attended Noise Monitoring

Table 4.30 to Table 4.31 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.30:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – AUGUST 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	13/08/2021 00:40	0.0	G	37	No	IA	NA
N14	13/08/2021 00:15	0.7	G	35	No	IA	NA
N15	12/08/2021 23:00	0.7	G	37	No	IA	NA
N17	12/08/2021 22:25	0.8	G	38	No	<20	NA
N19	12/08/2021 22:00	0.6	G	35	No	<20	NA
N20	12/08/2021 23:31	0.4	G	35	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.31:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – AUGUST 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	13/08/2021 00:40	0.0	G	45	No	IA	NA
N14	13/08/2021 00:15	0.7	G	45	No	IA	NA
N15	12/08/2021 23:00	0.7	G	45	No	IA	NA
N17	12/08/2021 22:25	0.8	G	45	No	<20	NA
N19	12/08/2021 22:00	0.6	G	45	No	<20	NA
N20	12/08/2021 23:31	0.4	G	45	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.8.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.32. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.32: REAL-TIME AND ATTENDED NOISE LEVELS, AUGUST 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	13/08/2021 00:15	13/08/2021 00:15	35	32	25	21	35	IA
N15/SX33	12/08/2021 23:00	12/08/2021 23:00	39	34	33	26	28	IA
N19/SX32	12/08/2021 22:00	12/08/2021 22:00	26	24	16	14	24	<20
N20/SX30	12/08/2021 23:31	12/08/2021 23:30	45	28	41	21	25	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.9 September 2021

### 4.9.1 Total Measured Noise Levels

Table 4.33: MEASURED NOISE LEVELS – SEPTEMBER 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	02/09/2021 23:19	44	33	31	31	30	29	28
N14	03/09/2021 00:45	57	56	55	53	53	51	41
N15	02/09/2021 23:00	47	39	32	31	30	29	28
N17	02/09/2021 22:24	36	27	25	24	23	23	21
N19	02/09/2021 22:00	46	42	39	37	36	35	29
N20	03/09/2021 00:00	41	32	23	23	21	20	19

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.9.2 Modifying Factors

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

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

### 4.9.3 Attended Noise Monitoring

Table 4.34 to Table 4.35 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.34:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – SEPTEMBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	02/09/2021 23:19	0.0	G	37	No	IA	NA
N14	03/09/2021 00:45	0.0	G	35	No	IA	NA
N15	02/09/2021 23:00	0.0	G	37	No	NM	NA
N17	02/09/2021 22:24	0.0	F	38	Yes	IA	Nil
N19	02/09/2021 22:00	0.3	F	35	Yes	IA	Nil
N20	03/09/2021 00:00	0.0	G	35	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.35:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – SEPTEMBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	02/09/2021 23:19	0.0	G	45	No	IA	NA
N14	03/09/2021 00:45	0.0	G	45	No	IA	NA
N15	02/09/2021 23:00	0.0	G	45	No	NM	NA
N17	02/09/2021 22:24	0.0	F	45	Yes	IA	Nil
N19	02/09/2021 22:00	0.3	F	45	Yes	IA	Nil
N20	03/09/2021 00:00	0.0	G	45	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.9.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.36. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.36: REAL-TIME AND ATTENDED NOISE LEVELS, SEPTEMBER 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	03/09/2021 00:45	03/09/2021 00:45	38	34	25	23	51	IA
N15/SX33	02/09/2021 23:00	02/09/2021 23:00	NR	NR	NR	NR	29	NM
N19/SX32	02/09/2021 22:00	02/09/2021 22:00	30	26	26	11	35	IA
N20/SX30	03/09/2021 00:00	03/09/2021 00:00	27	25	20	16	20	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.



## 4.10 October 2021

### 4.10.1 Total Measured Noise Levels

Table 4.37: MEASURED NOISE LEVELS – OCTOBER 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	06/10/2021 23:23	42	36	33	31	31	29	26
N14	07/10/2021 00:45	47	36	32	30	28	26	24
N15	06/10/2021 23:00	43	39	36	33	33	29	26
N17	06/10/2021 22:27	34	24	22	20	19	18	16
N19	06/10/2021 22:00	42	23	19	18	17	16	15
N20	07/10/2021 00:00	49	45	39	35	30	23	20

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.10.2 Modifying Factors

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

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

### 4.10.3 Attended Noise Monitoring

Table 4.38 to Table 4.39 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.38:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – OCTOBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	06/10/2021 23:23	0.0	G	37	No	31	NA
N14	07/10/2021 00:45	0.8	G	35	No	<25	NA
N15	06/10/2021 23:00	0.0	G	37	No	33	NA
N17	06/10/2021 22:27	0.0	G	38	No	<20	NA
N19	06/10/2021 22:00	0.7	G	35	No	IA	NA
N20	07/10/2021 00:00	0.7	G	35	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.39:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – OCTOBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	06/10/2021 23:23	0.0	G	45	No	33	NA
N14	07/10/2021 00:45	0.8	G	45	No	25	NA
N15	06/10/2021 23:00	0.0	G	45	No	41	NA
N17	06/10/2021 22:27	0.0	G	45	No	<25	NA
N19	06/10/2021 22:00	0.7	G	45	No	IA	NA
N20	07/10/2021 00:00	0.7	G	45	No	IA	NA

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.10.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.40. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.40: REAL-TIME AND ATTENDED NOISE LEVELS, OCTOBER 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	07/10/2021 00:45	07/10/2021 00:45	29	25	27	25	26	<25
N15/SX33	06/10/2021 23:00	06/10/2021 23:00	37	31	35	30	29	33
N19/SX32	06/10/2021 22:00	06/10/2021 22:00	19	18	13	10	16	IA
N20/SX30	07/10/2021 00:00	07/10/2021 00:00	29	27	27	19	23	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.11 November 2021

### 4.11.1 Total Measured Noise Levels

Table 4.41: MEASURED NOISE LEVELS – NOVEMBER 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	01/11/2021 23:18	43	36	27	25	22	19	17
N14	02/11/2021 00:18	45	36	28	26	22	19	15
N15	01/11/2021 23:00	51	47	44	39	26	18	16
N17	01/11/2021 22:24	48	47	41	36	30	26	23
N19	01/11/2021 22:00	40	35	34	31	29	27	25
N20	01/11/2021 23:45	79	77	59	63	36	23	19

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.11.2 Modifying Factors

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

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

### 4.11.3 Attended Noise Monitoring

Table 4.42 to Table 4.43 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

Table 4.42:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – NOVEMBER 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	01/11/2021 23:18	1.4	D	37	Yes	IA	Nil
N14	02/11/2021 00:18	0.0	F	35	Yes	IA	Nil
N15	01/11/2021 23:00	0.9	E	37	Yes	IA	Nil
N17	01/11/2021 22:24	1.5	D	38	Yes	IA	Nil
N19	01/11/2021 22:00	1.7	D	35	Yes	IA	Nil
N20	01/11/2021 23:45	1.2	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.43:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – NOVEMBER 2021

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	01/11/2021 23:18	1.4	D	45	Yes	IA	Nil
N14	02/11/2021 00:18	0.0	F	45	Yes	IA	Nil
N15	01/11/2021 23:00	0.9	E	45	Yes	IA	Nil
N17	01/11/2021 22:24	1.5	D	45	Yes	IA	Nil
N19	01/11/2021 22:00	1.7	D	45	Yes	IA	Nil
N20	01/11/2021 23:45	1.2	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.11.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.44. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.44: REAL-TIME AND ATTENDED NOISE LEVELS, NOVEMBER 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	02/11/2021 00:18	02/11/2021 00:15	31	17	21	17	19	IA
N15/SX33	01/11/2021 23:00	01/11/2021 23:00	42	17	39	16	18	IA
N19/SX32	01/11/2021 22:00	01/11/2021 22:00	34	29	17	14	27	IA
N20/SX30	01/11/2021 23:45	01/11/2021 23:45	42	25	37	18	23	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 4.12 December 2021

### 4.12.1 Total Measured Noise Levels

Table 4.45: MEASURED NOISE LEVELS – DECEMBER 2021<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	02/12/2021 00:57	53	47	43	39	35	34	32
N14	02/12/2021 00:30	67	65	63	60	59	55	48
N15	01/12/2021 23:00	51	49	47	45	44	42	40
N17	01/12/2021 22:28	49	45	45	44	44	44	42
N19	01/12/2021 22:02	53	50	49	48	48	48	47
N20	01/12/2021 23:46	49	45	43	41	40	38	35

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.12.2 Modifying Factors

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

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

### 4.12.3 Attended Noise Monitoring

Table 4.46 to Table 4.47 detail noise levels from WCP in the absence of other noise source. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.46:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – DECEMBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	02/12/2021 00:57	1.5	D	37	Yes	IA	Nil
N14	02/12/2021 00:30	2.5	D	35	Yes	IA	Nil
N15	01/12/2021 23:00	2.8	D	37	Yes	IA	Nil
N17	01/12/2021 22:28	3.4	D	38	No	IA	NA
N19	01/12/2021 22:02	3.0	D	35	Yes	IA	Nil
N20	01/12/2021 23:46	3.0	D	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.47:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – DECEMBER 2021**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	02/12/2021 00:57	1.5	D	45	Yes	IA	Nil
N14	02/12/2021 00:30	2.5	D	45	Yes	IA	Nil
N15	01/12/2021 23:00	2.8	D	45	Yes	IA	Nil
N17	01/12/2021 22:28	3.4	D	45	No	IA	NA
N19	01/12/2021 22:02	3.0	D	45	Yes	IA	Nil
N20	01/12/2021 23:46	3.0	D	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.



#### 4.12.4 Comparison of Real-Time and Attended Noise Results

A summary of attended monitoring data and that measured by the four real-time Sentinex units (omni-directional) is shown in Table 4.48. Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

Table 4.48: REAL-TIME AND ATTENDED NOISE LEVELS, DECEMBER 2021<sup>1</sup>

Location/ Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	02/12/2021 00:30	02/12/2021 00:30	46	42	17	17	55	IA
N15/SX33	01/12/2021 23:00	01/12/2021 23:00	67	63	33	31	42	IA
N19/SX32	01/12/2021 22:02	01/12/2021 22:00	49	47	36	30	48	IA
N20/SX30	01/12/2021 23:46	01/12/2021 23:45	41	40	32	31	38	IA

Notes:

1. Levels in this table are not necessarily the result of activity at WCP; and
2. NR – no Sentinex data recorded for this period.

## 5 LONG TERM NOISE TRENDS

Site-only  $L_{Aeq}$  noise levels measured during monthly attended environmental noise monitoring over a 5-year period from January 2017 to December 2021 have been collated and graphed to summarise WCP long-term noise performance. Less than five years of data was available at three locations due to monitoring commencing at those locations during the 5-year period.

Due to the qualitative nature of some attended noise monitoring descriptors, calculation of site noise statistics such as mean, median, and standard deviation is not always possible. Subsequently, site-only  $L_{Aeq}$  noise levels for each monitoring event have been grouped into one of three categories:

1. WCP-only  $L_{Aeq}$  was either inaudible (IA), not measurable (NM), or less than 30 dB, which together are represented by green bars;
2. WCP-only  $L_{Aeq}$  was between 30 dB and the relevant impact assessment criterion (inclusive), represented by blue bars; or
3. WCP-only  $L_{Aeq}$  was greater than the impact assessment criterion for that location, represented by red bars.

For each calendar year, the percentage of occurrence for each of these categories is shown, as well as annual trend lines over the entire five-year period. Figures show site-only  $L_{Aeq}$  noise levels, including adjustments due to modifying factors, as defined by the Environment Protection Authority (EPA) 'Noise Policy for Industry' (NPfI, current as of October 2017). Meteorological conditions and applicability of noise criteria have not been considered.

### 5.1 Noise Trend Graphs

Site-only  $L_{Aeq}$  noise levels measured during attended environmental noise monitoring over a 5-year period have been collated and graphed to summarise long-term noise trends. Figure 2 to Figure 7 provide percentage occurrence information for WCP noise levels at six monitoring locations.

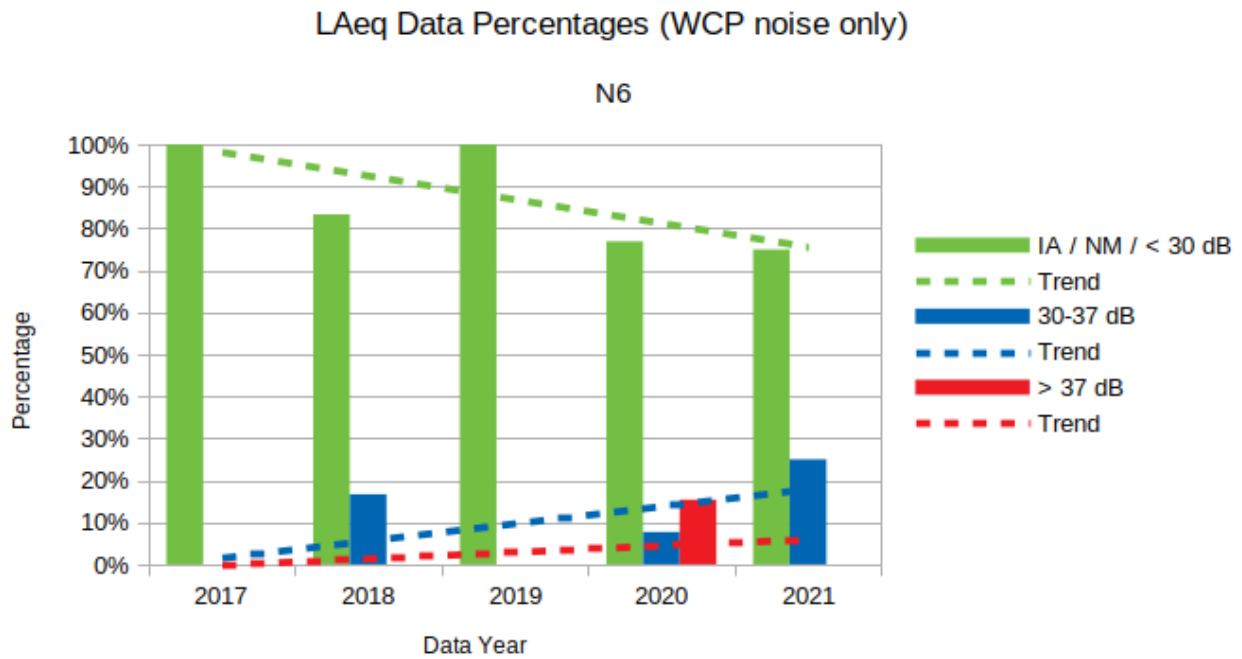


Figure 2: Attended noise monitoring data, N6

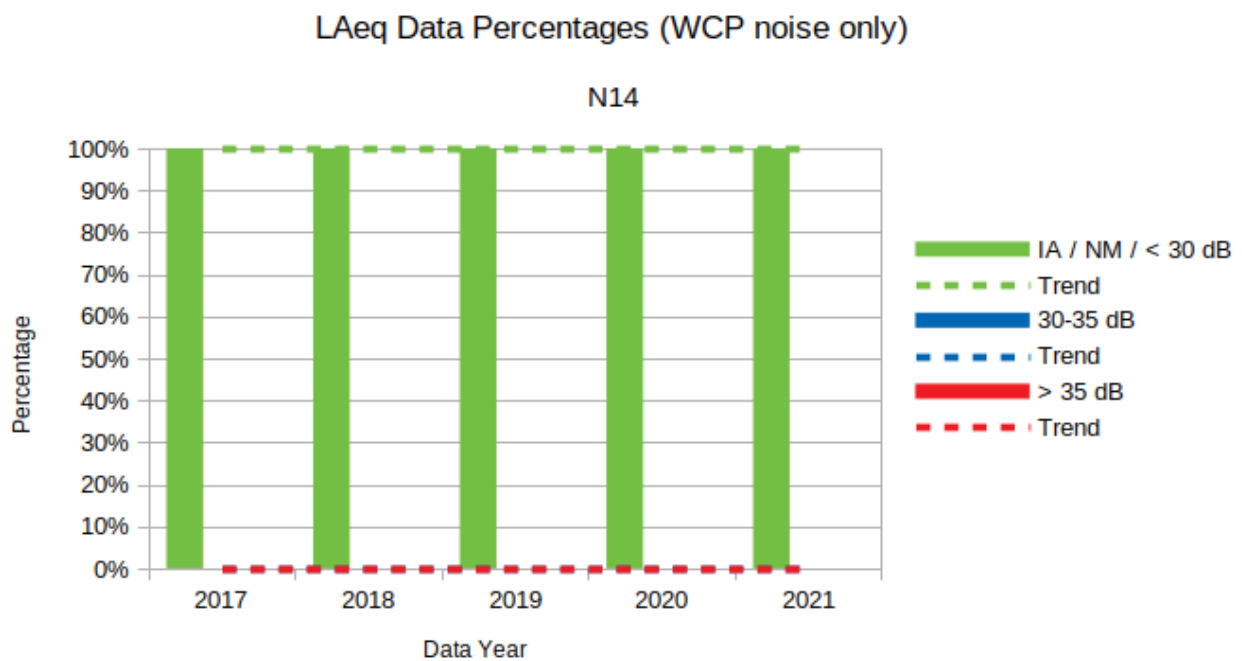


Figure 3: Attended noise monitoring data, N14

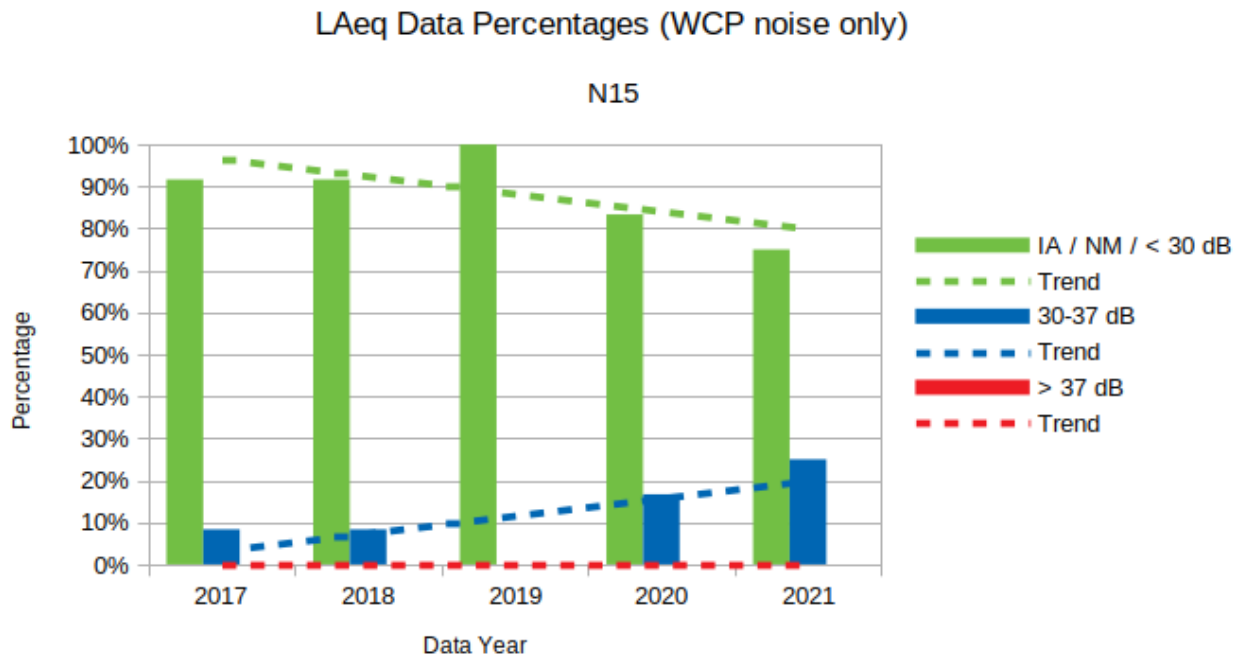


Figure 4: Attended noise monitoring data, N15

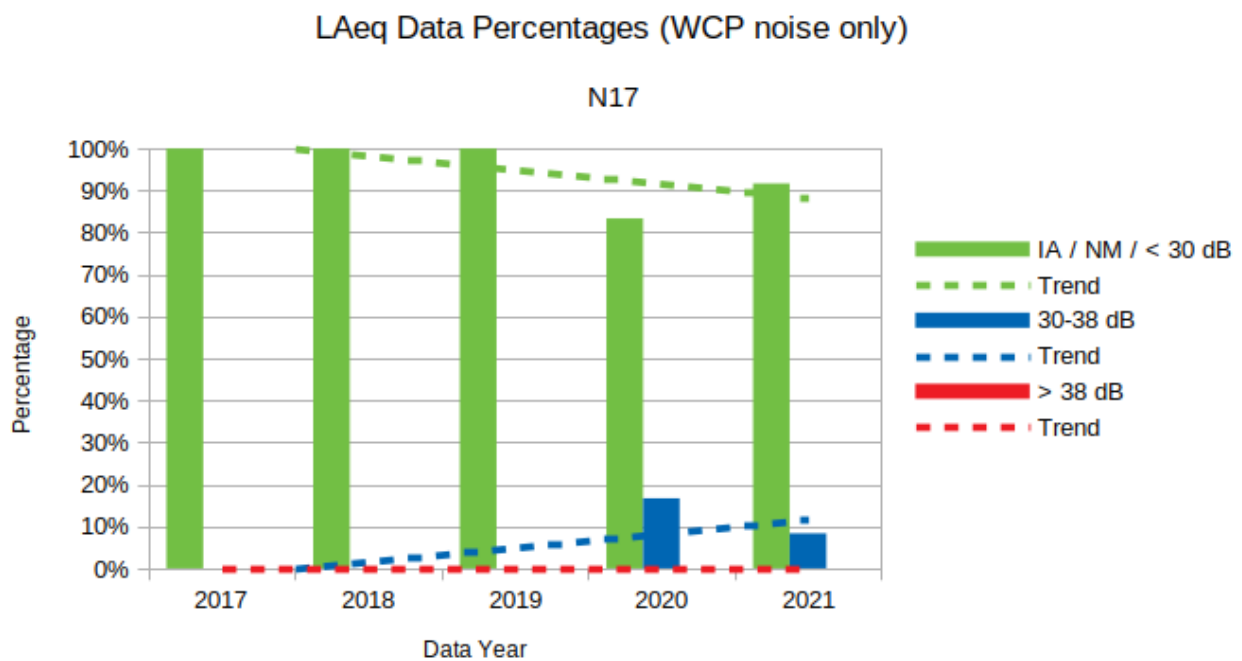


Figure 5: Attended noise monitoring data, N17

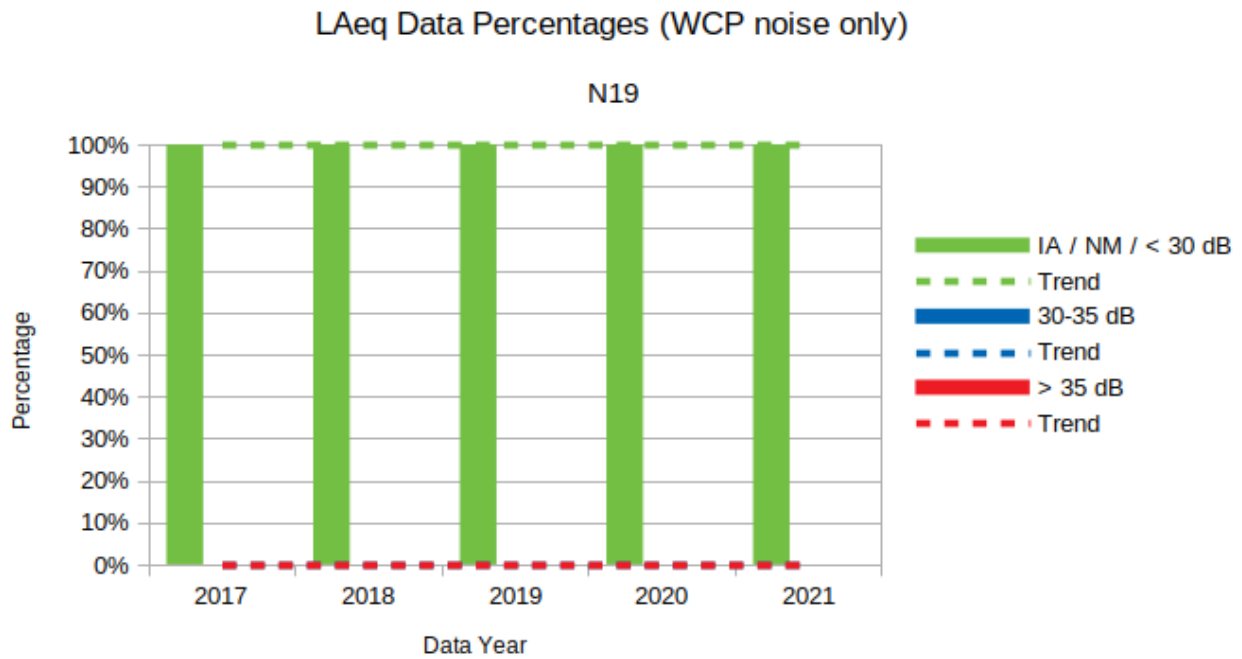


Figure 6: Attended noise monitoring data, N19

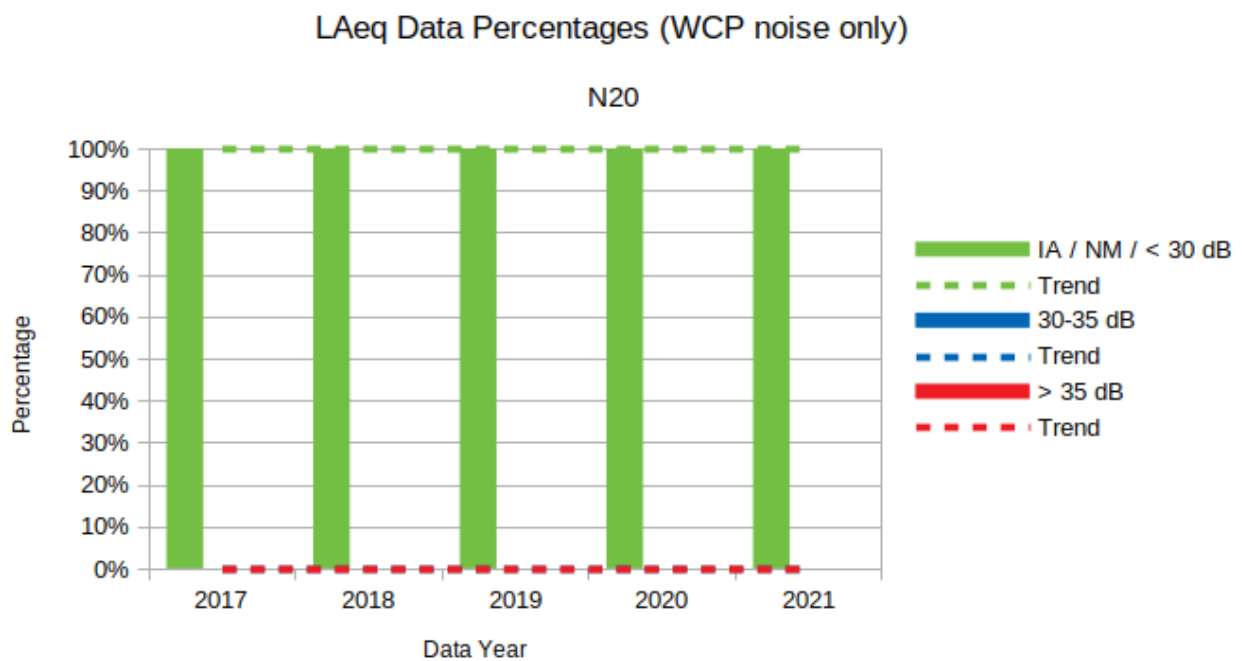


Figure 7: Attended noise monitoring data, N20

## 5.2 Discussion

There were no exceedances of WCP impact assessment  $L_{Aeq}$  noise criteria at any monitoring location during the 5-year period assessed. A single potential exceedance was measured at N6 in August 2020, but noise criteria were determined to be not applicable due to meteorological conditions during the measurement.

Site-only  $L_{Aeq}$  noise levels were low (either IA, NM, or less than 30 dB) for a large majority of measurements at all monitoring locations. Additional discussion of individual monitoring locations is provided below:

- At N14, N19, and N20, site-only  $L_{Aeq}$  noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements; and
- At N6, N15, and N17, site-only  $L_{Aeq}$  noise levels were occasionally above 30 dB during attended noise monitoring, but always below the relevant impact assessment criterion.

Long-term noise trend lines were largely constant or increased slightly.

## 6 COMPARISON WITH EIS MODELLED PREDICTIONS

A noise and blasting assessment was prepared in November 2015 as part of an EIS to support application of the WEP. As part of the modelling assessment, noise levels from WCP were predicted for representative operating scenarios, time periods and weather conditions.

Predicted noise levels for “Year 2020” most closely aligned with the 2021 reporting year and have been compared with measured levels from attended compliance monitoring under corresponding meteorological conditions. Table 6.1 summarises predicted noise levels for specific monitoring locations detailed in Table 26 and 27 of the noise and blasting assessment, under certain meteorological condition defined in Section 3.5 of this report.

*Table 6.1: WCP OPERATIONAL PREDICTIONS, YEAR 2020 – dB*

Monitoring Location ID	Location	Nearest Property ID	Night LAeq,15minute Calm	Night LAeq,15minute Wind or Inversion	Night LA1,1minute Wind or Inversion
N6	St Laurence O’Toole Catholic Church	(903) <sup>1</sup>	19	33	40
N14	Tichular	(153) <sup>1</sup>	13	31	38
N15	Wollar Village	(933) <sup>1</sup>	18	35	42
N17	Mogo Road	102	21	35	42
N19	North Mogo Road	104	19	31	37
N20	Ringwood Road	160	9	27	34

Notes:

1. Monitoring location is not at residence in brackets. Noise predictions for the nearest residence have been use for comparison.

Table 6.2 to Table 6.7 of this report compare the measured operational levels to predicted noise levels in the EIS for Year 2020. A positive difference indicates the measured level is greater than the predicted level and a negative difference indicates the measured levels are less than predicted in the EIS.

When meteorological conditions during the attended monitoring measurement do not correspond with those that are modelled, the meteorological conditions are considered “not applicable” (NA) and no further analysis is undertaken. When meteorological conditions during the measurement correspond with modelled conditions, but measured WCP noise levels were not directly quantifiable, measured and modelled noise levels are “not comparable” (NC) and no further analysis is required.

## 6.1 Results

### 6.1.1 N6, St Laurence O'Toole Catholic Church

Table 6.2: MEASURED WCP  $L_{Aeq,15minute}$  COMPARED TO YEAR 2021 PREDICTED  $L_{Aeq,15minute}$  AT N6, dB(A)

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference <sup>2,3</sup>	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference <sup>2,3</sup>
January	Wind	IA	33	NC	IA	40	NC
February	Inversion	<20	33	NC	<20	40	NC
March	NA	IA	-	NA	IA	-	NA
April	Inversion	30	33	-3	31	40	-9
May	Inversion	30	33	-3	35	40	-5
June	Wind	IA	33	NC	IA	40	NC
July	NA	<25	-	NA	<25	-	NA
August	Inversion	IA	33	NC	IA	40	NC
September	Inversion	IA	33	NC	IA	40	NC
October	Inversion	31	33	-2	33	40	-7
November	Wind	IA	33	NC	IA	40	NC
December	Wind	IA	33	NC	IA	40	NC

Notes:

1. Refer to Table 3.1 for applicable meteorological conditions;
2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
3. NC indicates measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.



## 6.1.2 N14, Tichular

Table 6.3: MEASURED WCP  $L_{Aeq,15minute}$  COMPARED TO YEAR 2021 PREDICTED  $L_{Aeq,15minute}$  AT N14, dB(A)

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference <sup>2,3</sup>	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference <sup>2,3</sup>
January	NA	<25	-	NA	28	-	NA
February	Inversion	<25	31	NC	<25	38	NC
March	NA	IA	-	NA	IA	-	NA
April	NA	<25	-	NA	27	-	NA
May	NA	<20	-	NA	<20	-	NA
June	NA	<25	-	NA	26	-	NA
July	Inversion	IA	31	NC	IA	38	NC
August	NA	IA	-	NA	IA	-	NA
September	Inversion	IA	31	NC	IA	38	NC
October	NA	<25	-	NA	25	-	NA
November	Inversion	IA	31	NC	IA	38	NC
December	Wind	IA	-	NA	IA	-	NA

Notes:

1. Refer to Table 3.1 for applicable meteorological conditions;
2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison;
3. NC indicates measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable; and
4. No predicted  $L_{A1,1minute}$  has been provided for calm conditions, so measured noise levels have been compared to the worst-case predicted  $L_{A1,1minute}$ .

### 6.1.3 N15, Wollar Village

Table 6.4: MEASURED WCP  $L_{Aeq,15minute}$  COMPARED TO YEAR 2021 PREDICTED  $L_{Aeq,15minute}$  AT N15, dB(A)

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference <sup>2,3</sup>	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference <sup>2,3</sup>
January	Wind	IA	35	NC	IA	42	NC
February	Inversion	IA	35	NC	IA	42	NC
March	Wind	IA	35	NC	IA	42	NC
April	NA	34	-	NA	44	-	NA
May	Inversion	30	35	-5	40	42	-2
June	NA	IA	-	NA	IA	-	NA
July	Inversion	<25	35	NC	<30	42	NC
August	NA	IA	-	NA	IA	-	NA
September	Inversion	NM	35	NC	NM	42	NC
October	Inversion	33	35	-2	41	42	-1
November	Wind	IA	35	NC	IA	42	NC
December	Wind	IA	35	NC	IA	42	NC

Notes:

1. Refer to Table 3.1 for applicable meteorological conditions;
2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
3. NC indicates measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

## 6.1.4 N17, Mogo Road

Table 6.5: MEASURED WCP  $L_{Aeq,15minute}$  COMPARED TO YEAR 2021 PREDICTED  $L_{Aeq,15minute}$  AT N17, dB(A)

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference <sup>2,3</sup>	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference <sup>2,3</sup>
January	Calm	26	21	+5	35	-	NA
February	Inversion	IA	35	NC	IA	42	NC
March	Wind	IA	35	NC	IA	42	NC
April	NA	33	-	NA	42	-	NA
May	Inversion	25	35	-10	31	42	-11
June	NA	IA	-	NA	IA	-	NA
July	Inversion	IA	35	NC	IA	42	NC
August	NA	<20	-	NA	<20	-	NA
September	Inversion	IA	35	NC	IA	42	NC
October	Inversion	<20	35	NC	<25	42	NC
November	Wind	IA	35	NC	IA	42	NC
December	NA	IA	-	NA	IA	-	NA

Notes:

1. Refer to Table 3.1 for applicable meteorological conditions;
2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
3. NC indicates measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

## 6.1.5 N19, North Mogo Road

Table 6.6: MEASURED WCP  $L_{Aeq,15minute}$  COMPARED TO YEAR 2021 PREDICTED  $L_{Aeq,15minute}$  AT N19, dB(A)

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference <sup>2,3</sup>	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference <sup>2,3</sup>
January	NA	<20	-	NA	<20	-	NA
February	Wind	IA	31	NC	IA	37	NC
March	Wind	IA	31	NC	IA	37	NC
April	NA	<25	-	NA	<30	-	NA
May	NA	<20	-	NA	<20	-	NA
June	NA	IA	-	NA	IA	-	NA
July	NA	IA	-	NA	IA	-	NA
August	NA	<20	-	NA	<20	-	NA
September	Inversion	IA	31	NC	IA	37	NC
October	NA	IA	-	NA	IA	-	NA
November	Wind	IA	31	NC	IA	37	NC
December	Wind	IA	31	NC	IA	37	NC

Notes:

1. Refer to Table 3.1 for applicable meteorological conditions;
2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison;
3. NC indicates measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable; and
4. No predicted  $L_{A1,1minute}$  has been provided for calm conditions, so measured noise levels have been compared to the worst-case predicted  $L_{A1,1minute}$ .

## 6.1.6 N20, Ringwood Road

Table 6.7: MEASURED WCP  $L_{Aeq,15minute}$  COMPARED TO YEAR 2021 PREDICTED  $L_{Aeq,15minute}$  AT N20, dB(A)

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference <sup>2,3</sup>	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference <sup>2,3</sup>
January	NA	IA	-	NA	IA	-	NA
February	Inversion	IA	27	NC	IA	34	NC
March	NA	IA	-	NA	IA	-	NA
April	NA	<25	-	NA	31	-	NA
May	NA	IA	-	NA	IA	-	NA
June	Wind	IA	27	NC	IA	34	NC
July	Inversion	IA	27	NC	IA	34	NC
August	Inversion	IA	27	NC	IA	34	NC
September	Inversion	IA	27	NC	IA	34	NC
October	NA	IA	-	NA	IA	-	NA
November	NA	IA	-	NA	IA	-	NA
December	Wind	IA	27	NC	IA	34	NC

Notes:

1. Refer to Table 3.1 for applicable meteorological conditions;
2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison;
3. NC indicates measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable; and
4. No predicted  $L_{A1,1minute}$  has been provided for calm conditions, so measured noise levels have been compared to the worst-case predicted  $L_{A1,1minute}$ .

## 6.2 Discussion

When comparable, measured noise levels were lower than predicted noise levels under corresponding meteorological conditions at all locations during all measurements, with a single exception. During the January 2021 measurement at N17 (Mogo Road), the measured site-only  $L_{Aeq}$  was 5 dB higher than predicted under calm conditions. However, the measured site-only  $L_{Aeq}$  was still 12 dB lower than the relevant criterion during this measurement.

## 7 SUMMARY

Global Acoustics was engaged by WCP to provide an Annual Environmental Monitoring Report for 2021, in order to compare noise monitoring results against both relevant criteria and predictions in the most recently approved EIS for the WEP.

This report summarises monthly attended noise monitoring surveys conducted around WCP during the reporting period 1 January to 31 December 2021. The purpose of the surveys was to quantify and describe the acoustic environment around the site and compare results with specified limits. The duration of each measurement was 15 minutes.

Attended noise monitoring described in this report was conducted on a monthly basis in accordance with Project Approval SSD-6764, the WCP NMP, and EPL No. 12425.

### 7.1 January to December 2021 Compliance

During 2021 attended noise monitoring, noise levels from WCP complied with relevant noise limits at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

### 7.2 Long-Term Noise Trends

Site-only  $L_{Aeq}$  noise levels were low (either IA, NM, or less than 30 dB) for a large majority of measurements at all monitoring locations. Additional discussion of individual monitoring locations is provided below:

- At N14, N19, and N20, site-only  $L_{Aeq}$  noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements; and
- At N6, N15, and N17, site-only  $L_{Aeq}$  noise levels were occasionally above 30 dB during attended noise monitoring, but always below the relevant impact assessment criterion.

Long-term noise trend lines were largely constant or increased slightly.

### 7.3 EIS Comparison

When comparable, measured noise levels were lower than predicted noise levels under corresponding meteorological conditions at all locations during all measurements, with a single exception. During the January 2021 measurement at N17 (Mogo Road), the measured site-only  $L_{Aeq}$  was 5 dB higher than predicted under calm conditions. However, the measured site-only  $L_{Aeq}$  was still 12 dB lower than the relevant criterion during this measurement.

## Global Acoustics Pty Ltd