APPENDIX 3F NOISE MONITORING DATA







Peabody

Noise Monitoring Reports



Wilpinjong Coal

Environmental Noise Monitoring January 2022

Prepared for Wilpinjong Coal Pty Ltd



Noise and Vibration Analysis and Solutions

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Wilpinjong Coal

Environmental Noise Monitoring January 2022

Reference: 22019_R01 Report date: 24 February 2022

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Table of Contents

1 INTRODUCTION	1
1.1 Background	1
1.2 Monitoring Locations	1
1.3 Terminology & Abbreviations	3
2 REGULATOR REQUIREMENTS AND NOISE CRITERIA	4
2.1 Development Consent	4
2.2 Environment Protection Licence	4
2.3 Noise Monitoring Program	4
2.4 Project Specific Criteria	4
2.5 Modifying Factors	5
3 METHODOLOGY	6
3.1 Overview	6
3.2 Attended Noise Monitoring	6
3.3 Modifying Factors	7
3.4 Noise Monitoring Equipment	7
4 RESULTS	8
4.1 Total Measured Noise Levels	8
4.2 Modifying Factors	8
4.3 Attended Noise Monitoring	9
4.4 Atmospheric Conditions	
5 DISCUSSION	11
5.1 Noted Noise Sources	11
5.1.1 N6	
5.1.2 N14	
5.1.3 N15	
5.1.4 N17	
5.1.5 N19	16
5.1.6 N20	

6	SUMMARY	18

Page iii

Appendices

Α	REGULATOR DOCUMENTS	.19
B	CALIBRATION CERTIFICATES	.29

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 27/28 January 2022 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

NMP Descriptor	Monitoring Location
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)

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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.
LAmax	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
LA10	The noise level which is exceeded for 10 percent of the time.
LAeq	The average noise A-weighted energy during a measurement period.
LA50	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
LA90	The level exceeded for 90 percent of the time. The LA90 level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
LAmin	The minimum A-weighted noise level over a time period.
LCeq	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 Development Consent

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

Day Evening NMP **Monitoring Location** Night Descriptor / LAeq,15minute LAeq,15minute / LAeq,15minute Resident LA1,1minute Number $N6^1$ 37/45 St Laurence O'Toole Catholic Church 36 37 N14 'Tichular' 35 35 35/45N15 Wollar Village 37 37/45 36 N17² Mogo Road, off Araluen Road 38/4536 36 N19 North Mogo Road 35 35/4535 N20 Ringwood Road, off Wollar Road 35 35 35/45

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of low-frequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and 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 LAeq,15minute and LA1,1minute (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 $L_{A1,1minute}$ 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_{Amax} , 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 noise.

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.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	LA90 dB	L _{Amin} dB
N6	27/01/2022 22:48	45	40	37	36	36	35	31
N14	27/01/2022 23:15	56	54	52	49	48	42	33
N15	27/01/2022 22:30	47	39	38	37	37	35	33
N17	28/01/2022 01:12	53	36	35	34	34	33	31
N19	28/01/2022 00:47	51	47	42	40	40	37	34
N20	28/01/2022 00:00	52	49	43	41	39	36	33

Table 4.1: MEASURED NOISE LEVELS – JANUARY 2022¹

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: LAeg. 15minute GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JANUARY 2022

Location	Start Date and Time	ate and Wind Speed Stability ne m/s ¹ Class ¹		Criterion dB	Criterion Applies? ²	WCP L _{Aeq,15min} dB ³	Exceedance
N6	27/01/2022 22:48	1.1	Е	37	Yes	IA	Nil
N14	27/01/2022 23:15	1.6	Е	35	Yes	IA	Nil
N15	27/01/2022 22:30	1.2	Е	37	Yes	IA	Nil
N17	28/01/2022 01:12	1.2	Е	38	Yes	IA	Nil
N19	28/01/2022 00:47	1.5	Е	35	Yes	IA	Nil
N20	28/01/2022 00:00	1.8	Е	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 LAeq,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: LA1, 1minute GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JANUARY 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1} min dB ³	Exceedance
N6	27/01/2022 22:48	1.1	Е	45	Yes	IA	Nil
N14	27/01/2022 23:15	1.6	Е	45	Yes	IA	Nil
N15	27/01/2022 22:30	1.2	Е	45	Yes	IA	Nil
N17	28/01/2022 01:12	1.2	Е	45	Yes	IA	Nil
N19	28/01/2022 00:47	1.5	Е	45	Yes	IA	Nil
N20	28/01/2022 00:00	1.8	Е	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 LA1,1minute 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.

Location	Start Date And Time	Temperature ° C	Wind Speed m/s	Wind Direction ° MN	Cloud Cover eighths
N6	27/01/2022 22:48	22	0.0	-	0
N14	27/01/2022 23:15	19	1.0	120	0
N15	27/01/2022 22:30	22	0.0	-	0
N17	28/01/2022 01:12	21	0.0	-	0
N19	28/01/2022 00:47	22	0.0	-	0
N20	28/01/2022 00:00	21	0.7	260	0

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – JANUARY 2022

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 L_{A1} result by a small margin but is entirely accurate for L_{Aeq} .

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.

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

An aircraft was also noted.

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	Dec 2021
LAeq	IA	IA	<20	IA	30	30	IA	<25	IA	IA	31	IA	IA
LA1,1min	IA	IA	<20	IA	31	35	IA	<25	IA	IA	33	IA	IA

5.1.2 N14



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

WCP was inaudible.

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

Another industrial continuum and birds were was 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	Dec 2021
LAeq	IA	<25	<25	IA	<25	<20	<25	IA	IA	IA	<25	IA	IA
L _{A1,1} min	IA	28	<25	IA	27	<20	26	IA	IA	IA	25	IA	IA

5.1.3 N15



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

WCP was inaudible.

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

Livestock were also noted.

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	Dec 2021
LAeq	IA	IA	IA	IA	34	30	IA	<25	IA	NM	33	IA	IA
LA1,1min	IA	IA	IA	IA	44	40	IA	<30	IA	NM	41	IA	IA

5.1.4 N17



WCP was inaudible.

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

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	Dec 2021
LAeq	<25	26	IA	IA	33	25	IA	IA	<20	IA	<20	IA	IA
LA1,1min	28	35	IA	IA	42	31	IA	IA	<20	IA	<25	IA	IA

5.1.5 N19



WCP was inaudible.

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

A local low-frequency continuum 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	Dec 2021
LAeq	IA	<20	IA	IA	<25	<20	IA	IA	<20	IA	IA	IA	IA
L _{A1,1} min	IA	<20	IA	IA	<30	<20	IA	IA	<20	IA	IA	IA	IA

5.1.6 N20



WCP was inaudible.

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

Dogs 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	Dec 2021
LAeq	IA	IA	IA	IA	<25	IA							
L _{A1,1} min	IA	IA	IA	IA	31	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 27/28 January 2022 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the January 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

APPENDIX

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

, 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

Table 3: Noise criteria dB(A)

 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.

	Day	Evening	Night			
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(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		.2		
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

- The Applicant must: 4.
 - (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;
 - co-ordinate noise management at the site with the noise management at Moolarben and Ulan (e) mines to minimise cumulative noise impacts; and
 - carry out regular monitoring to determine whether the development is complying with the relevant (f) 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:
 - be prepared in consultation with the EPA; (a)
 - describe the measures that would be implemented to ensure compliance with the noise criteria (b) 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

- 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

 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.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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:
 - monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - 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.
- 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.

Hz/dB(Z)	One-	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

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

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). Operatorattended 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.

Location	Site	Туре	Easting ¹	Northing ¹	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

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	-	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 Rd⁴	-	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 ³	-	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
- 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	 As per Table 7, Figure 3 and Figure 4
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).

Notes: ¹ 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.
APPENDIX

B CALIBRATION CERTIFICATES

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	Level Meter 61672-3.2013
Calibrat	on Certificate
Calibration Number	C21058
Client Detail	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
Equipment Tested/ Model Number Instrument Serial Number Microphone Serial Number Pre-amplifier Serial Number	Rion NA-28 30131882 04739 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 William
Clause and Characteristic Tested	esult Clause and Characteristic Tested Resu
 Acoustical Sig. tests of a frequency weighting Electrical Sig. tests of frequency weightings Frequency and time weightings at 1 kHz Long Term Stability Level linearity on the reference level range 	Pass 17: Level linearity incl. the level range control Pass Pass 18: Toneburst response Pass Pass 19: C Weighted Peak Sound Level Pass Pass 20: Overload Indication Pass Pass 21: High Level Stability Pass
The sound level meter submitted for testing has successfully co conditions under	npleted the class 1 periodic tests of IEC 61672-3:2013, for the environment which the tests were performed.
As public evidence was available, from an independent testing performed in accordance with IEC 61672-2:2013, to demonstra IEC 61672-1:2013, the sound level meter submitted for	organisation responsible for approving the results of pattern evaluation test e that the model of sound level meter fully conformed to the requirements in testing conforms to the class 1 requirements of IEC 61672-1:2013.

 Acoustic Tests
 Environmental Conditions

 125Hz $\pm 0.12dB$ Temperature

 1kHz $\pm 0.11dB$ Relative Humidity

 8kHz $\pm 0.13dB$ Barometric Pressure

 Electrical Tests
 $\pm 0.10dB$

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



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

		Sound	Calibra	ator		
		IEC	60942-201	7		
	Cali	bratio	on Cei	tificate		
	Calibration	Number	C21059			
	Clier	nt Details	Global Acc 12/16 Hunt Thornton N	ustics Pty Ltd ingdale Drive ISW 2322		
Equip	ment Tested/ Model ? Instrument Serial ?	Number : Number :	Pulsar Moc 78226	lel 105		
		Atmosph	neric Condit	ions		
	Ambient Temp	erature :	23.3°C			
	Barometric F	ressure :	100.27kPa			
Calibration Techr	nician : Jeff Yu		Se	condary Check	: May	Moore
Cambration	Approved Si	gnatory :	the	anes	. 31	Ken Williams
Characteristic Test	ed	Re	sult			
Generated Sound Pres Frequency Generated Total Distortion	ssure Level	Pa Pa Pa	ass ass ass			
	Nominal Level 94	Nominal 1	Frequency	Measured 94.02	Level	Measured Frequency 1000.40
	been shown to conform to t	he class 1 req	uirements for pe	riodic testing, desc l conditions under	ribed in A which the	nnex B of IEC 60942:2017 for tests were performed.
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Wilpinjong Coal

Environmental Noise Monitoring February 2022

Prepared for Wilpinjong Coal Pty Ltd



Noise and Vibration Analysis and Solutions

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Wilpinjong Coal

Environmental Noise Monitoring February 2022

Reference: 22032_R01 Report date: 15 March 2022

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Table of Contents

1 INTRODUCTION	1
1.1 Background	1
1.2 Monitoring Locations	1
1.3 Terminology & Abbreviations	
2 REGULATOR REQUIREMENTS AND NOISE CRITERIA	4
2.1 Development Consent	4
2.2 Environment Protection Licence	4
2.3 Noise Monitoring Program	4
2.4 Project Specific Criteria	4
2.5 Modifying Factors	5
3 METHODOLOGY	6
3.1 Overview	6
3.2 Attended Noise Monitoring	6
3.3 Modifying Factors	7
3.4 Noise Monitoring Equipment	7
4 RESULTS	8
4.1 Total Measured Noise Levels	
4.2 Modifying Factors	8
4.3 Attended Noise Monitoring	9
4.4 Atmospheric Conditions	
5 DISCUSSION	11
5.1 Noted Noise Sources	
5.1.1 N6	
5.1.2 N14	
5.1.3 N15	
5.1.4 N17	
5.1.5 N19	
5.1.6 N20	

6	SUMMARY	.18

Page iii

Appendices

A	REGULATOR DOCUMENTS	.19
B	CALIBRATION CERTIFICATES	.29

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 10/11 February 2022 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.

NMP Descriptor	Monitoring Location
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

Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS



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

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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 _{Amax}	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
LAeq	The average noise A-weighted energy during a measurement period.
L_{A50}	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The LA90 level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 Development Consent

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

NMP Descriptor/ Resident Number	Monitoring Location	Day L _{Aeq} ,15minute	Evening LAeq,15minute	Night L _{Aeq,1} 5minute/ L _{A1,1} minute
N6 ¹	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 ²	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

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of low-frequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and 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 LAeq,15minute and LA1,1minute (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 $L_{A1,1minute}$ corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or $L_{Amax'}$ 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 noise.

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. Lowfrequency 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 106 acoustic calibrator	81334	24/11/2022		

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.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	10/02/2022 23:19	49	44	42	41	41	38	35
N14	11/02/2022 00:30	52	50	48	45	45	39	32
N15	10/02/2022 23:00	48	43	37	36	36	35	33
N17	10/02/2022 22:26	49	36	34	32	32	30	27
N19	10/02/2022 22:00	52	41	38	36	35	34	31
N20	10/02/2022 23:45	52	51	50	47	47	42	36

Table 4.1: MEASURED NOISE LEVELS – FEBRUARY 2022¹

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: LAea.15minute GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – FEBRUARY 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq,} 15min dB ³	Exceedance 4
N6	10/02/2022 23:19	2.1	Е	37	Yes	IA	Nil
N14	11/02/2022 00:30	1.7	D	35	Yes	IA	Nil
N15	10/02/2022 23:00	2.3	Е	37	Yes	IA	Nil
N17	10/02/2022 22:26	2.3	Е	38	Yes	IA	Nil
N19	10/02/2022 22:00	3.9	Е	35	No	IA	NA
N20	10/02/2022 23:45	2.2	Е	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 LAeq, 15 minute 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: LA1.Iminute GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – FEBRUARY 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP LA1,1min dB ³	Exceedance
N6	10/02/2022 23:19	2.1	Е	45	Yes	IA	Nil
N14	11/02/2022 00:30	1.7	D	45	Yes	IA	Nil
N15	10/02/2022 23:00	2.3	Е	45	Yes	IA	Nil
N17	10/02/2022 22:26	2.3	Ε	45	Yes	IA	Nil
N19	10/02/2022 22:00	3.9	Ε	45	No	IA	NA
N20	10/02/2022 23:45	2.2	Е	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 LA1,1minute 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.

Location	Start Date And Time	Temperature ° C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	10/02/2022 23:19	21	0.7	140	4
N14	11/02/2022 00:30	21	0.0	-	3
N15	10/02/2022 23:00	21	0.8	140	7
N17	10/02/2022 22:26	21	0.0	-	4
N19	10/02/2022 22:00	25	0.0	-	6
N20	10/02/2022 23:45	20	0.0	-	4

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – FEBRUARY 2022

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 L_{A1} result by a small margin but is entirely accurate for L_{Aeq} .

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.

Insects generated the measured noise levels.

Dogs, breeze in foliage, and residential noise were also noted.

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	Jan 2022
L _{Aeq}	IA	IA	<20	IA	30	30	IA	<25	IA	IA	31	IA	IA
L _{A1,1} min	IA	IA	<20	IA	31	35	IA	<25	IA	IA	33	IA	IA

Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6

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 generated the measured noise levels.

Birds 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	Dec 2021	Jan 2022
L _{Aeq}	IA	<25	<25	IA	<25	<20	<25	IA	IA	IA	<25	IA	IA	IA
L _{A1,1} min	IA	28	<25	IA	27	<20	26	IA	IA	IA	25	IA	IA	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.

Road traffic and insects generated the measured L_{A1} . Insects generated the measured L_{A10} , $L_{Aeq'}$, L_{A50} , and L_{A90} .

Dogs were also noted.

Month Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan 2020 2021 2021 2021 2021 2021 2021 2021 2021 2021 2021 2021 2022 2021 IA <25 IA IA IA IA 34 30 IA NM 33 IA IA IA LAeq IA IA IA IA IA 44 40 IA <30 NM 41 IA IA IA LA1,1min

Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15

5.1.4 N17



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

WCP was inaudible during the measurement.

Insects generated the measured noise levels.

Local engine noise, thunder, and birds 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	Dec 2021	Jan 2022
L _{Aeq}	<25	26	IA	IA	33	25	IA	IA	<20	IA	<20	IA	IA	IA
L _{A1,1} min	28	35	IA	IA	42	31	IA	IA	<20	IA	<25	IA	IA	IA

5.1.5 N19



WCP was inaudible during the measurement.

Insects and thunder generated the measured L_{A1} . Insects generated the measured L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} .

Breeze in foliage and an aircraft were also noted.

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	Dec 2021	Jan 2022
LAeq	IA	<20	IA	IA	<25	<20	IA	IA	<20	IA	IA	IA	IA	IA
L _{A1,1} min	IA	<20	IA	IA	<30	<20	IA	IA	<20	IA	IA	IA	IA	IA

Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19

5.1.6 N20



Figure 8: Environmental Noise Levels, N20 - Ringwood Road

WCP was inaudible during the measurement.

Insects generated the measured noise levels.

An aircraft was 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	Dec 2021	Jan 2022
L _{Aeq}	IA	IA	IA	IA	<25	IA								
L _{A1,1} min	IA	IA	IA	IA	31	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 10/11 February 2022 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the February 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

APPENDIX

A REGULATOR DOCUMENTS

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

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

102 903 908 933 and 959	
102,000,000,000,000	

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

 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)

A	Day	Evening	Night		
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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;
 - 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.
- 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.

Hz/dB(Z)	One	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

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

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 facade, but not closer than 3 metres where any dwelling

on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve

b) With the 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.

Location	Site	Туре	Easting ¹	Northing ¹	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

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	-	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 Rd⁴	-	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 ³	-	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
- 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	 As per Table 7, Figure 3 and Figure 4 			
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.			
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5). 			

Notes: ¹ 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.

APPENDIX

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 DS Pty Ltd www.acousticresearch.com.au

Sound Level Meter IEC 61672-3.2013

Calibration Certificate

Calibration Number C20674

Client Details Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322 Equipment Tested/ Model Number : Rion NA-28 Instrument Serial Number : 00370304 Microphone Serial Number : 10421 Pre-amplifier Serial Number: 60313 **Pre-Test Atmospheric Conditions** Post-Test Atmospheric Conditions Ambient Temperature : 22°C Ambient Temperature : 21.9°C Relative Humidity : 50.6% **Relative Humidity :** 50.1% Barometric Pressure: 100.08kPa **Barometric Pressure :** 100.09kPa Calibration Technician : Lucky Jaiswal Secondary Check: Max Moore Calibration Date: 24 Nov 2020 Report Issue Date : 25 Nov 2020 Approved Signatory : Ken Williams 15 Cams 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 19: C Weighted Peak Sound Level Pass Pass 15: Long Term Stability 20: Overload Indication Pass Pass 16: Level linearity on the reference level range 21: High Level Stability Pass 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.

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

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



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

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

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

	Sound	l Calibrator
	IEC	60942-2017
	Calibrati	ion Certificate
	Calibration Number	· C20676
	Client Details	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
Equip	ment Tested/ Model Number Instrument Serial Number	: Pulsar Model 106 : 81334
	Ambient T	pheric Conditions
	Relative Humidity Barometric Pressure	: 50.6% : 100.09kPa
Calibration Tech Calibration	nician : Lucky Jaiswal n Date : 24 Nov 2020	Secondary Check: Max Moore Report Issue Date : 25 Nov 2020
	Approved Signatory	: Ken Will
Characteristic Tes	ted P	lesult
Frequency Generated Total Distortion	ssure Level	Pass Pass Pass
	Nominal Level Nomina	Frequency Measured Level Measured Frequ
The sound calibrator has the sound pressu	i been shown to conform to the class 2 n ire level(s) and frequency(ies) stated, fo Least Uncer	equirements for periodic testing, described in Annex B of IEC 60942:20 r the environmental conditions under which the tests were performed. Tamities of Measurement –
Generated SPL	±0.14dB	Temperature ±0.2°C
rrequency	±0.09%	Barométric Pressure ±0.015kPa
Distortion		ashe with the table of the second sec
Distortion	All uncertainties are derived at the	93% confidence level with a coverage factor of 2.
Distortion *	All uncertainties are derived at the The tests <1000 kHz are not covered by	y Acoustic Research Labs Pty Ltd NATA accreditation.
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Distortion *	All uncertainties are derived at the The tests <1000 kHz are not covered b This calibration certificate ts to be r Acoustic Research Labs Pty Ltd is Accredited for compliance with ISO	y Acoustic Research Labs Pty Ltd NATA accreditation. read in conjunction with the calibration test report. NATA Accredited Laboratory Number 14172. MEC 17025 - calibration.
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104

Wilpinjong Coal

Environmental Noise Monitoring March 2022

Prepared for Wilpinjong Coal Pty Ltd



Noise and Vibration Analysis and Solutions

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Wilpinjong Coal

Environmental Noise Monitoring March 2022

Reference: 22043_R01 Report date: 18 April 2022

Prepared for

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Prepared:

Jonathan Erasmus Consultant QA Review:

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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

Table of Contents

1 INTRODUCTION	1
1.1 Background	1
1.2 Monitoring Locations	1
1.3 Terminology & Abbreviations	
2 REGULATOR REQUIREMENTS AND NOISE CRITERIA	4
2.1 Development Consent	4
2.2 Environment Protection Licence	4
2.3 Noise Monitoring Program	4
2.4 Project Specific Criteria	4
2.5 Modifying Factors	5
3 METHODOLOGY	6
3.1 Overview	6
3.2 Attended Noise Monitoring	6
3.3 Modifying Factors	7
3.4 Noise Monitoring Equipment	7
4 RESULTS	8
4.1 Total Measured Noise Levels	
4.2 Modifying Factors	8
4.3 Attended Noise Monitoring	9
4.4 Atmospheric Conditions	
5 DISCUSSION	11
5.1 Noted Noise Sources	
5.1.1 N6	
5.1.2 N14	
5.1.3 N15	
5.1.4 N17	
5.1.5 N19	
5.1.6 N20	

6	UMMARY	18

Page iii

Appendices

A	REGULATOR DOCUMENTS	.19
B	CALIBRATION CERTIFICATES	.29

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 March 2022 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.

NMP Descriptor	Monitoring Location
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

Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS



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

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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 _{Amax}	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
LAeq	The average noise A-weighted energy during a measurement period.
L_{A50}	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The LA90 level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 Development Consent

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

NMP Descriptor/ Resident Number	Monitoring Location	Day L _{Aeq} ,15minute	Evening LAeq,15minute	Night L _{Aeq,1} 5minute/ L _{A1,1} minute
N6 ¹	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 ²	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

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of low-frequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and 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 LAeq,15minute and LA1,1minute (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 $L_{A1,1minute}$ corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or $L_{Amax'}$ 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 noise.

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. Lowfrequency 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	29/11/2023

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.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	02/03/2022 23:19	45	42	42	41	41	40	38
N14	03/03/2022 00:30	45	37	37	36	36	35	33
N15	02/03/2022 23:00	45	38	36	35	34	33	31
N17	02/03/2022 22:30	46	41	31	30	28	26	23
N19	02/03/2022 22:06	52	36	35	34	34	33	31
N20	02/03/2022 23:46	41	35	33	32	32	31	30

Table 4.1: MEASURED NOISE LEVELS – MARCH 2022¹

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: LAeq,15minute GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MARCH 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP LAeq,15min dB ³	Exceedance 4
N6	02/03/2022 23:19	2.4	D	37	Yes	IA	Nil
N14	03/03/2022 00:30	1.3	D	35	Yes	IA	Nil
N15	02/03/2022 23:00	1.0	D	37	Yes	IA	Nil
N17	02/03/2022 22:30	1.7	Е	38	Yes	IA	Nil
N19	02/03/2022 22:06	1.7	D	35	Yes	IA	Nil
N20	02/03/2022 23:46	1.8	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 LAeq, 15 minute 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: LA1.1minute GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MARCH 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP LA1,1min dB ³	Exceedance
N6	02/03/2022 23:19	2.4	D	45	Yes	IA	Nil
N14	03/03/2022 00:30	1.3	D	45	Yes	IA	Nil
N15	02/03/2022 23:00	1.0	D	45	Yes	IA	Nil
N17	02/03/2022 22:30	1.7	Е	45	Yes	IA	Nil
N19	02/03/2022 22:06	1.7	D	45	Yes	IA	Nil
N20	02/03/2022 23:46	1.8	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 LA1,1minute 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.

Location	Start Date And Time	Temperature ° C	Wind Speed m/s	Wind Direction ° MN	Cloud Cover eighths
N6	02/03/2022 23:19	22	0.0	-	8
N14	03/03/2022 00:30	22	0.0	-	8
N15	02/03/2022 23:00	22	0.5	120	8
N17	02/03/2022 22:30	23	0.0	-	8
N19	02/03/2022 22:06	20	0.7	220	8
N20	02/03/2022 23:46	21	0.0	-	8

 Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – MARCH 2022

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 L_{A1} result by a small margin but is entirely accurate for L_{Aeq} .

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.

Frogs and insects generated the measured noise levels.

Livestock and road traffic were also noted.

Month May Dec Feb Mar Apr Iun Jul Aug Sep Oct Nov Ian 2020 2021 2021 2021 2021 2021 2021 2021 2021 2021 2021 2022 2021 LAeq IA IA <20 IA 30 30 IA <25 IA IA 31 IA IA <25 IA 33 IA IA <20 IA 31 35 IA IA

Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6

LA1,1min

Feb

2022

IA

IA

Jan

IA

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 and insects generated the measured noise levels.

Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT NI4

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	Dec 2021	Jan 2022	Feb 2022
LAeq	IA	<25	<25	IA	<25	<20	<25	IA	IA	IA	<25	IA	IA	IA	IA
L _{A1,1} min	IA	28	<25	IA	27	<20	26	IA	IA	IA	25	IA	IA	IA	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.

Frogs and insects generated the measured noise levels.

Road traffic and livestock were also noted.

Month May Dec Ian Feb Mar Jun Jul Aug Sep Oct Nov Dec Ian Apr 2020 2021 2021 2021 2021 2021 2021 2021 2021 2021 2021 2021 2022 2021 LAeq IA IA IA IA 34 30 IA <25 IA NM 33 IA IA IA IA IA IA IA 44 40 IA <30 IA NM 41 IA IA IA LA1,1min

Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15

Feb

2022

IA

IA

5.1.4 N17



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

WCP was inaudible during the measurement.

Water dripping generated the measured $L_{A1.}$ Insects generated the measured L_{A10} , L_{Aeq} , L_{A50} , and $L_{A90.}$

Thunder and local engine noise were also noted.

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	Dec 2021	Jan 2022	Feb 2022
LAeq	<25	26	IA	IA	33	25	IA	IA	<20	IA	<20	IA	IA	IA	IA
L _{A1,1} min	28	35	IA	IA	42	31	IA	IA	<20	IA	<25	IA	IA	IA	IA

Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17

5.1.5 N19



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

WCP was inaudible during the measurement.

Insects generated the measured noise levels.

Breeze in the foliage was also noted.

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	Dec 2021	Jan 2022	Feb 2022
LAeq	IA	<20	IA	IA	<25	<20	IA	IA	<20	IA	IA	IA	IA	IA	IA
L _{A1,1} min	IA	<20	IA	IA	<30	<20	IA	IA	<20	IA	IA	IA	IA	IA	IA

Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19

5.1.6 N20



Figure 8: Environmental Noise Levels, N20 - Ringwood Road

WCP was inaudible during the measurement.

Insects generated the measured noise levels.

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	Dec 2021	Jan 2022	Feb 2022
LAeq	IA	IA	IA	IA	<25	IA									
L _{A1,1} min	IA	IA	IA	IA	31	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 March 2022 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the March 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

APPENDIX

A **REGULATOR DOCUMENTS**

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

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

102 903 908 933 and 959	
102,000,000,000,000	

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

 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)

	Day	Evening	Night			
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(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						

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

- 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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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:
 - monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - 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.
- 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.

Hz/dB(Z)	One	One-third octave Lzeg, 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

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

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 facade, but not closer than 3 metres where any dwelling

on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve

b) With the 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). Operatorattended 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.

Location	Site	Туре	Easting ¹	Northing ¹	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

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	-	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 Rd⁴	-	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 ³	-	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
- 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	 As per Table 7, Figure 3 and Figure 4 		
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.		
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5). 		

Notes: ¹ 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.

APPENDIX

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 Labs Pty Ltd www.acousticresearch.com.au

Sound Level Meter IEC 61672-3.2013

Calibration Certificate

Calibration Number C20674

Client Details	Global Acoustics Pty Ltd
	12/16 Huntingdale Drive
	Thornton NSW 2322
Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	00370304
Microphone Serial Number :	10421
Pre-amplifier Serial Number :	60313
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 22°C	Ambient Temperature : 21.9°C
Relative Humidity : 50.6%	Relative Humidity : 50.1%
Barometric Pressure : 100.08kPa	Barometric Pressure : 100.09kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Max Moore
Calibration Date: 24 Nov 2020	Report Issue Date : 25 Nov 2020
Approved Signatory :	Holliams Ken Williams
Clause and Characteristic Tested Re	sult Clause and Characteristic Tested Result
12: Acoustical Sig. tests of a frequency weighting P.	ass 17: Level linearity incl. the level range control Pass
13: Electrical Sig. tests of frequency weightings P.	ass 18: Toneburst response Pass
14: Frequency and time weightings at 1 kHz Pa	ass 19: C Weighted Peak Sound Level Pass
15: Long Term Stability P	ass 20: Overload Indication Pass
16: Level linearity on the reference level range Pl	ass 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.

	Lea	st Uncertainties of Measurement -		
Acoustic Tests		Environmental Conditions		
125H= 1kH= 8kH= Electrical Tests	±0.12dB ±0.11dB ±0.13dB ±0.10dB	Temperature Relative Humidity Barometric Pressure	=0.2°C =2.4% =0.015kPa	

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



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

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

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Equip	ment Tested/ Model Num Instrument Serial Num	nber: Pulsar Mo nber: 81334	del 105		
-	Ambient Tempera	tmospheric Condi ture : 25°C	tions		
	Relative Hum Barometric Pres	idity: 49.6% sure: 100.8kPa			
Calibration Techn Calibration	Date: 29 Nov 2021	S Re	econdary Check: port Issue Date :	Harrison Kim 2 Dec 2021	
	Approved Signa	tory: Allen	~		Ken Williams
Characteristic Test Generated Sound Pres Frequency Generated Total Distortion	ed ssure Level	Pass Pass Pass Pass			
	Nominal Level No 94	minal Frequency 1000	Measured Lo 94.19	evel Measur	red Frequency 1000.30
The sound calibrator has the sound pressu Specific Tests Generated SPL Frequency Distortion	been shown to conform to the e re level(s) and frequency(ies) str U ±0.11dB =0.07% ±0.50% All uncertainties are derived	hass 2 requirements for j ted, for the environmer neertainties of Measure Environmer <i>Tempe</i> <i>Relativ</i> <i>Barom</i> <i>I at the 95% confidence</i>	neriodic testing, describ tal conditions under wh ment - al Conditions vature e Humidity etric Pressure level with a coverage fo	ed in Annex B of II nich the tests were p ±0.1°C ±1.9% ±0.014kPa inctor of 2.	EC 60942:2017 for erformed.
	This calibration certificate is	s to be read in conjuncti	on with the calibration	test report.	
	Acoustic Research Labs Pty Accredited for compliance v	Ltd is NATA Accredit with ISO/IEC 17025 - C	d Laboratory Number alibration.	14172.	
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Wilpinjong Coal

Environmental Noise Monitoring April 2022

Prepared for Wilpinjong Coal Pty Ltd



Noise and Vibration Analysis and Solutions

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Wilpinjong Coal

Environmental Noise Monitoring April 2022

Reference: 22055_R01 Report date: 18 May 2022

Prepared for

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Table of Contents

1 INTRODUCTION	1
1.1 Background	1
1.2 Monitoring Locations	1
1.3 Terminology & Abbreviations	3
2 REGULATOR REQUIREMENTS AND NOISE CRITERIA	4
2.1 Development Consent	4
2.2 Environment Protection Licence	4
2.3 Noise Monitoring Program	4
2.4 Project Specific Criteria	4
2.5 Modifying Factors	5
3 METHODOLOGY	6
3.1 Overview	6
3.2 Attended Noise Monitoring	6
3.3 Modifying Factors	7
3.4 Noise Monitoring Equipment	7
4 RESULTS	8
4.1 Total Measured Noise Levels	8
4.2 Modifying Factors	8
4.3 Attended Noise Monitoring	9
4.4 Atmospheric Conditions	10
5 DISCUSSION	11
5.1 Noted Noise Sources	11
5.1.1 N6	12
5.1.2 N14	13
5.1.3 N15	14
5.1.4 N17	15
5.1.5 N19	16
5.1.6 N20	17

~		~
6	UMMARY	5

Page iii

Appendices

A	REGULATOR DOCUMENTS	.19
B	CALIBRATION CERTIFICATES	.29

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 28/29 April 2022 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.

NMP Descriptor	Monitoring Location			
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			

Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS



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

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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 _{Amax}	The maximum A-weighted noise level over a time period.					
L _{A1}	The noise level which is exceeded for 1 per cent of the time.					
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.					
LA10	The noise level which is exceeded for 10 percent of the time.					
LAeq	The average noise A-weighted energy during a measurement period.					
LA50	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.					
L _{A90}	The level exceeded for 90 percent of the time. The LA90 level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.					
L _{Amin}	The minimum A-weighted noise level over a time period.					
L _{Ceq}	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 Development Consent

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

NMP Descriptor / Resident Number	Monitoring Location	Day L _{Aeq} ,15minute	Evening L _{Aeq,} 15minute	Night L _{Aeq,15minute} / L _{A1,1minute}
N6 ¹	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 ²	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

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of low-frequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and 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 Will Moore.

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 LAeq,15minute and LA1,1minute (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 $L_{A1,1minute}$ corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or $L_{Amax'}$ 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 noise.

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. Lowfrequency 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.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	29/04/2022 01:15	46	42	35	34	33	32	30
N14	28/04/2022 23:46	53	46	42	41	41	40	39
N15	28/04/2022 23:00	56	51	43	41	36	34	31
N17	28/04/2022 22:25	52	36	32	30	29	28	27
N19	28/04/2022 22:00	44	41	38	34	31	28	27
N20	29/04/2022 00:30	49	43	35	33	30	28	26

Table 4.1: MEASURED NOISE LEVELS – APRIL 2022¹

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: LAea,15minute GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – APRIL 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP LAeq,15min dB ³	Exceedance 4
N6	29/04/2022 01:15	0.8	Е	37	Yes	<20	Nil
N14	28/04/2022 23:46	0.0	D	35	Yes	<25	Nil
N15	28/04/2022 23:00	0.0	Е	37	Yes	23	Nil
N17	28/04/2022 22:25	0.0	Е	38	Yes	<20	Nil
N19	28/04/2022 22:00	0.0	Е	35	Yes	IA	Nil
N20	29/04/2022 00:30	1.2	Ε	35	Yes	<25	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 LAeq, 15 minute 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: LA1.1minute GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – APRIL 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1} min dB ³	Exceedance
N6	29/04/2022 01:15	0.8	Е	45	Yes	23	Nil
N14	28/04/2022 23:46	0.0	D	45	Yes	<25	Nil
N15	28/04/2022 23:00	0.0	Ε	45	Yes	32	Nil
N17	28/04/2022 22:25	0.0	Ε	45	Yes	23	Nil
N19	28/04/2022 22:00	0.0	Е	45	Yes	IA	Nil
N20	29/04/2022 00:30	1.2	Е	45	Yes	<25	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 LA1,1minute 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.

Location	Start Date And Time	Temperature ° C	Wind Speed m/s	Wind Direction ° MN	Cloud Cover eighths
N6	29/04/2022 01:15	19	0.0	-	4
N14	28/04/2022 23:46	18	0.0	-	7
N15	28/04/2022 23:00	20	0.0	-	6
N17	28/04/2022 22:25	19	0.0	-	6
N19	28/04/2022 22:00	19	0.5	85	6
N20	29/04/2022 00:30	19	0.0	-	7

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – APRIL 2022

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 L_{A1} result by a small margin but is entirely accurate for L_{Aeq} .

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

A mining continuum from WCP was audible at very low levels during the measurement, generating a siteonly L_{Aeq} of less than 20 dB. Engine surges were responsible for generating the $L_{A1,1minute}$ of 23 dB.

Frogs and insects were responsible for the measured noise levels.

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
L _{Aeq}	30	30	IA	<25	IA	IA	31	IA	IA	IA	IA	IA
L _{A1,1} min	31	35	IA	<25	IA	IA	33	IA	IA	IA	IA	IA

Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6

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, generating a siteonly L_{Aeq} and $L_{A1,1minute}$ of less than 25 dB. Track noise was also noted.

Frogs and insects were responsible for the measured noise levels.

A train and birds were also noted.

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
L _{Aeq}	<25	<20	<25	IA	IA	IA	<25	IA	IA	IA	IA	IA
L _{A1,1} min	27	<20	26	IA	IA	IA	25	IA	IA	IA	IA	IA

Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14

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 at low levels throughout the measurement, generating a siteonly L_{Aeq} of 23 dB. Engine surges were responsible for generating the $L_{A1,1minute}$ of 32dB.

A train was primarily responsible for the measured L_{A1} , L_{A10} , and L_{Aeq} . Frogs and insects contributed to the measured L_{Aeq} and were responsible for the L_{A50} and L_{A90}

Raindrops from recent rainfall were also noted.

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
L _{Aeq}	34	30	IA	<25	IA	NM	33	IA	IA	IA	IA	IA
LA1,1min	44	40	IA	<30	IA	NM	41	IA	IA	IA	IA	IA

Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15

5.1.4 N17



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

A mining continuum from WCP was audible at very low levels during the measurement, generating a L_{Aeq} of less than 20 dB. Engine surges were responsible for generating the $L_{A1,1minute}$ of 23dB.

Frogs and insects were primarily responsible for the measured noise levels, with drops on the ground from recent rainfall contributing to the L_{A1} .

Nearby animals and a plane were also noted

				LESTIN								
Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
L _{Aeq}	33	25	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA
LA1,1min	42	31	IA	IA	<20	IA	<25	IA	IA	IA	IA	IA

Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17

5.1.5 N19



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

WCP was inaudible during this measurement.

Frogs and insects were responsible for measured noise levels.

Bats and a plane were also noted.

Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
L _{Aeq}	<25	<20	IA	IA	<20	IA						
L _{A1,1} min	<30	<20	IA	IA	<20	IA						

5.1.6 N20



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

A train was responsible for the measured L_{A1} and contributed to the measured L_{A10} and L_{Aeq} . Frogs and insects also contributed to the measured L_{A10} and L_{Aeq} and were responsible for the measured L_{A50} and L_{A90} .

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
L _{Aeq}	<25	IA										
LA1,1min	31	IA										

Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20

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 28/29 April 2022 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the April 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

APPENDIX

A REGULATOR DOCUMENTS

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

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

102 903 908 933 and 959	
102,000,000,000,000	

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

 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)

	Day	Evening	Night		
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(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

- 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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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:
 - monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - 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.
- 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.

Hz/dB(Z)	One-	One-third octave Lzeq,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

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

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 facade, but not closer than 3 metres where any dwelling

on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve

b) With the 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.

Location	Site	Туре	Easting ¹	Northing ¹	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

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	-	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 Rd⁴	-	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 ³	-	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
- 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	 As per Table 7, Figure 3 and Figure 4
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).

Notes: ¹ 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.

APPENDIX

B CALIBRATION CERTIFICATES

	Sou	nd Lev	el Meter			
	П	EC 61672	2-3.2013			
	Calibra	ation	Certificate	е		
	Calibration Nun	nber C2	21058			
	Client De	tails Glo 12/ The	bal Acoustics Pty Ltd 16 Huntingdale Drive ornton NSW 2322			
Equ	ipment Tested/ Model Numl Instrument Serial Numl Microphone Serial Numl	ber: Rio ber: 301 ber: 047	n NA-28 31882 39			
Dra Tast	Pre-amplifier Serial Numl	ber: 119	42 Boot Toot At			
Ambient T	emperature : 23.5°C		Post-Test Ati Ambien	t Temperature :	23.3°C	
Baromet	ric Pressure : 100.28kPa	Relative Humidity : Barometric Pressure :			47.7% 100.25kPa	
Calibration Tec Calibrati	hnician : Jeff Yu on Date : 8 Feb 2021		Secondary Chec Report Issue Dat	e: 9 Feb 2021		
	Approved Signate	ory:	Rains		Ken Wil	
Clause and Char	acteristic Tested	Result	Clause and Chara	acteristic Tested	R	
13: Electrical Sig. te	sts of frequency weightings	Pass	18: Toneburst respon	se	ntrol	
15: Long Term Stab	ility	Pass	20: Overload Indicati	Sound Level on		
16: Level linearity o	n the reference level range	Pass	21: High Level Stabil	îty	4	
The sound level meter	submitted for testing has successfull conditions up	ly completed inder which the	he class 1 periodic tests of tests were performed	IEC 61672-3:2013, for	the environm	
As public evidence of performed in accorda IEC 61672-1	was available, from an independent te nee with IEC 61672-2:2013, to demo ;2013, the sound level meter submitt	esting organis instrate that th ed for testing	ation responsible for appro e model of sound level met conforms to the class 1 req	ving the results of patte ter fully conformed to t uirements of IEC 6167	rn evaluation he requireme 2-1:2013.	
Acoustic Tests	Least U	Incertainties o Envi	of Measurement - ronmental Conditions			
125H= IkH=	±0.12dB ±0.11dB		Temperature Relative Humidity	=0.2°C =2.4%		
8kHz Electrical Tests	$\begin{array}{c} \pm 0.13 dB \\ \pm 0.10 dB \end{array}$		Barometric Pressure	±0.015kPa		

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

- 4

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ACCREDITATION

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C	Labs	Pty Ltd	www.acc	84 0800 A.B.N	. 65 160 39 ch.com.	9119 au
		Sound	Calibra	tor		
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	Calibrati	IDFall	C21059	tificate		
_	Claudina	ient Details	Global Aco	ustics Ptv I td		
		tent Details	12/16 Hunt Thornton N	ingdale Drive ISW 2322		
Equi	oment Tested/ Mode Instrument Seria	l Number : l Number :	Pulsar Mod 78226	el 105		
	Ambient Ter	Atmosph nperature ·	23.3°C	ons		
	Relative Barometrie	Humidity : Pressure :	47.7% 100.27kPa			
Calibration Tech Calibratio	nician : Jeff Yu n Date : 08 Feb 20	21	Sec Rep	condary Check: ort Issue Date :	Max Moo 9 Feb 20	ore 21
	Approved	Signatory :	Bill	ams		Ken Willia
Characteristic Tes	sted	Re	sult			
Frequency Generated Total Distortion	d	Pi Pi Pi	ass ass ass			
	Nominal Level	Nominal	Frequency	Measured L	evel Me	asured Frequen
The sound calibrator ha	s been shown to conform to ure level(s) and frequency	to the class 1 req	uirements for pe	riodic testing, descril	bed in Annex E	3 of IEC 60942:2017
Specific Tests		Least Uncerta	inties of Measur Environmenta	ement - Conditions		
Generated SPL Frequency	±0.14dB ±0.09%		Tempera Relative	ture Humidity	=0,2°C =2.4%	
Distortion	±0.09%		Baromet	ric Pressure	±0.015kPa	
	All uncertainties are	derived at the 95	5% confidence le	vel with a coverage J	factor of 2.	
	⁵ The tests <1000 kHz are	not covered by a	Acoustic Researc	h Labs Pty Ltd NAT	A accreditation	n.
	⁶ The tests <1000 kHz are	not covered by a	Acoustic Researc	h Labs Pty Ltd NAT	A accreditation	n.
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Wilpinjong Coal

Environmental Noise Monitoring

May 2022

Prepared for Wilpinjong Coal Pty Ltd

Wilpinjong Coal

Environmental Noise Monitoring

May 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	18/06/2022	Will Moore	Tony Welbourne	Final

Approved by

J. Weller

Tony Welbourne Associate Director 18 June 2022

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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TABLE OF CONTENTS

1	Introc	luction	1
	1.1	Background	1
	1.2	Monitoring locations	1
	1.3	Terminology and abbreviations	1
2	Regul	ator requirements and noise criteria	2
	2.1	Development consents	2
	2.2	Environment protection licence	2
	2.3	Noise Monitoring Program	2
	2.4	Project Specific Criteria	2
	2.5	Modifying Factors	3
3	Meth	odology	4
	3.1	Overview	4
	3.2	Attended noise monitoring	4
	3.3	Modifying factors	5
	3.4	Attended noise monitoring equipment	5
4	Result	ts	6
	4.1	Total measured noise levels	6
	4.2	Modifying factors	6
	4.3	Attended noise monitoring results	7
	4.4	Atmospheric conditions	8
5	Discus	ssion	9
	5.1	Noted noise sources	9
6	Summ	nary	16

Appendices

Appendix A	Regulator documents		
Appendix B	Calibration certificates		

Tables

Table 1.1	Attended monitoring locations	1
Table 1.2	Terminology and abbreviations	1
Table 2.1	WCP project specific criteria, dB	2
Table 3.1	Attended noise monitoring equipment	5
Table 4.1	Measured noise levels - May 2022	6
Table 4.2	LAeq,15minute generated by WCP against project specific criteria - May 2022	7
Table 4.3	LA1,1minute generated by WCP against project specific criteria - May 2022	7
Table 4.4	Measured atmospheric conditions – May 2022	8
Table 5.1	Historical WCP only Levels at N6	10
Table 5.2	Historical WCP only noise levels at N14	11
Table 5.3	Historical WCP only noise levels at N15	12
Table 5.4	Historical WCP only noise levels at N17	13
Table 5.5	Historical WCP only noise levels at N19	14
Table 5.6	Historical WCP only noise levels at N20	15

Figures

Figure 1.1	Wilpinjong noise monitoring locations	2
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	9
Figure 5.2	Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village	10
Figure 5.2	Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads	11
Figure 5.3	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	12
Figure 5.4	Environmental noise levels N17, Mogo Road, off Araluen Road	13
Figure 5.5	Environmental noise levels N19, Upper Mogo Road	14
Figure 5.6	Environmental noise levels N20, Ringwood Road	15

1 Introduction

1.1 Background

Global Acoustics (now part of EMM) 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 northeast 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 16/17 May 2022 at eight locations.

1.2 Monitoring locations

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

Table 1.1 Attended monitoring locations

NMP Descriptor	Monitoring Location
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 1.1 Wilpinjong noise monitoring locations

1.3 Terminology and abbreviations

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

Table 1.2Terminology and abbreviations

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
LAmax	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
L _{Aeq}	The average noise A-weighted energy during a measurement period.
L _{A50}	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The LA90 level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent 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	Day ^L Aeq,15minute	Evening ^L Aeq,15minute	Night ^L Aeq,15minute	Night ^L A1,1minute
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	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.

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and 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 Will Moore.

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}minute and L_{A1,1}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 (eg 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 (eg 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 $L_{A1,1minute}$ 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_{Amax} , received from the site during the entire measurement period (ie 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 noise.

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 (eg "<20 dB" or "<30 dB").

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 Attended noise monitoring equipment

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

Table 3.1 Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	1070590	11/06/2022
Pulsar 106 acoustic calibrator	74813	10/06/2022

4 **Results**

4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring 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.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	LA50 dB	LA90 dB	L _{Amin} dB
N6	17/05/2022 00:30	48	47	45	39	29	27	25
N14	16/05/2022 23:30	52	34	32	30	28	26	23
N15	16/05/2022 23:00	44	40	37	34	33	30	26
N17	16/05/2022 22:25	45	37	34	33	32	30	28
N19	16/05/2022 22:00	47	42	32	30	25	22	20
N20	17/05/2022 00:00	38	31	29	27	27	25	23

Table 4.1Measured noise levels - May 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.2 Modifying factors

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

There were no modifying factors applicable to site during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low-frequency modifying factors, as defined in the NPfl.

4.3 Attended noise monitoring results

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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ^{4,5}
N6	17/05/2022 00:30	0.0	F	37	Yes	<25	Nil
N14	16/05/2022 23:30	0.0	F	35	Yes	IA	Nil
N15	16/05/2022 23:00	0.0	F	37	Yes	34	Nil
N17	16/05/2022 22:25	0.0	F	38	Yes	32	Nil
N19	16/05/2022 22:00	1.1	F	35	Yes	<20	Nil
N20	17/05/2022 00:00	0.0	D	35	Yes	22	Nil

Table 4.2LAeq,15minute generated by WCP against project specific criteria - May 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3 LA1,1minute generated by WCP against project specific criteria - May 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{A1,1} min dB ^{3,4}	Exceedance dB ^{4,5}
N6	17/05/2022 00:30	0.0	F	45	Yes	<25	Nil
N14	16/05/2022 23:30	0.0	F	45	Yes	IA	Nil
N15	16/05/2022 23:00	0.0	F	45	Yes	38	Nil
N17	16/05/2022 22:25	0.0	F	45	Yes	37	Nil
N19	16/05/2022 22:00	1.1	F	45	Yes	<20	Nil
N20	17/05/2022 00:00	0.0	D	45	Yes	28	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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.

Location	Start Date and Time	Temperature ° C	Wind Speed m/s	Wind Direction ^o Magnetic North ¹	Cloud Cover 1/8s
N6	17/05/2022 00:30	7	0.4	50	0
N14	16/05/2022 23:30	9	0.0	-	0
N15	16/05/2022 23:00	11	0.0	-	0
N17	16/05/2022 22:25	11	0.0	-	0
N19	16/05/2022 22:00	11	0.6	80	0
N20	17/05/2022 00:00	9	0.4	120	0

Table 4.4 Measured atmospheric conditions – May 2022

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 considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are 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 5.1 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} .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.



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

5.1.1 N6



Figure 5.2 Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village

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

A train was responsible for the measured L_{A1} , L_{A10} and L_{Aeq} . Cattle generated the measured L_{A50} . Frogs, insects, and cattle all contributed to the measured L_{A90} .

Table 5.1Historical WCP only Levels at N6

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	30	IA	<25	IA	IA	31	IA	IA	IA	IA	IA	<20
LA1,1min	35	IA	<25	IA	IA	33	IA	IA	IA	IA	IA	23

5.1.2 N14



Figure 5.2 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Ducks were responsible for the measured L_{A10} . Frogs and insects generated the measured L_{Aeq} , L_{A50} , and L_{A90} .

Noise from a plane and a low continuum from a substation was also noted.

Table 5.2Historical WCP only noise levels at N14

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	<20	<25	IA	IA	IA	<25	IA	IA	IA	IA	IA	<25
LA1,1min	<20	26	IA	IA	IA	25	IA	IA	IA	IA	IA	<25

5.1.3 N15



Figure 5.3 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 34 dB. Engine surges were responsible for generating the site only L_{A1,1minute} of 38 dB. Horns and track noise were also noted.

Continuum from WCP was responsible for measured noise levels.

Noise from cattle, frogs, and insects was also noted.

Table 5.3Historical WCP only noise levels at N15

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	30	IA	<25	IA	NM	33	IA	IA	IA	IA	IA	23
LA1,1min	40	IA	<30	IA	NM	41	IA	IA	IA	IA	IA	32

5.1.4 N17



Figure 5.4 Environmental noise levels N17, Mogo Road, off Araluen Road

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 32. Dumping noise generated the site only L_{A1,1minute} of 37 dB. Track noise, horns and a reverse quacker were also noted

Continuum from WCP was responsible for measured noise levels.

Noise from frogs, insects, and a bird was also noted.

Table 5.4Historical WCP only noise levels at N17

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	25	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA	<20
LA1,1min	31	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA	23

5.1.5 N19



Figure 5.5 Environmental noise levels N19, Upper Mogo Road

A low mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} and $L_{A1,1minute}$ of less than 20 dB.

Frogs and insects generated measured noise levels.

Noise from a plane and dog was also noted.

Table 5.5Historical WCP only noise levels at N19

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	<20	IA	IA	<20	IA	IA						
LA1,1min	<20	IA	IA	<20	IA	IA						

5.1.6 N20



Figure 5.6 Environmental noise levels N20, Ringwood Road

A mining continuum from WCP was audible throughout the measurement, generating the site only L_{Aeq} of 22 dB. Engine surges and track noise generated the site only L_{A1,1}minute of 28dB.

A continuum from WCP was responsible for the measured L_{A1} , L_{A10} and L_{Aeq} . The WCP continuum, and noise from frogs, insects, and running water all contributed to the measured L_{A50} and L_{A90} .

Table 5.6Historical WCP only noise levels at N20

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	IA	<25										
LA1,1min	IA	<25										

6 Summary

Global Acoustics (now part of EMM) 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 done around WCP during the night period of 16/17 May 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during May 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Appendix A Regulator documents



SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

 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	
ote: 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

 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)

	Day	Evening	Night			
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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		2		
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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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.
- 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.

Hz/dB(Z)	One	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

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

A.2 Environment 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.

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.

Location	Site	Туре	Easting ¹	Northing ¹	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	

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	10	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 ⁴	-*	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 ³	0	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	As per Table 7, Figure 3 and Figure 4			
Period	 Night-time period (10 pm to 7 am) being the most sensitive time period for noise. 			
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5). 			

Notes: ¹ 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.

Appendix B Calibration certificates



B.1 Calibration Certificates



Acoustic Unit 36/14 Loyalty Rd Research Ph: +61 2 9484 0800 A.B.N. 65 160 199 119 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 Thomson NSW 2322				
Equipment Tested/ Model Number :	Rion NA+28				
Instrument Serial Number :	01070590				
Microphone Serial Number :	08184				
Pre-amplifier Serial Number :	52329				
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditi	ions			
Ambient Temperature : 21.1°C	Ambient Temperature :	21.8°C			
Relative Humidity : 57.8%	Relative Humidity :	56.5%			
Barometric Pressure : 101.27kPa	Barometric Pressure :	101.17kPa			
Calibration Technician : Jeff Yu	Secondary Check: Max Moore				
Calibration Date : 11 Jun 2020	Report-Issue Date : 15 Jun 2020				
Approved Signatory :	15 Camo	Ken Williams			
Clause and Characteristic Tested Re	sult Clause and Characteristic Tested	Result			
12: Acoustical Sig. tests of a frequency weighting Pa	ner 17: Level linearity incl. the level mage cor	itrol Pain			
13: Electrical Sig. tests of frequency weightings Pa	nsr 18. Teneburst response	Pass			
14: Prequency and time weightings at 1 kHz Pr	riv 19: C Weighted Peak Sound Lavel	Pass			
151 Long Term Statisticy	its 20 Overford Indication	Pape			
to: Lover intearity on the relenance level range Pa	as 21 High Level Stability	P'13.8.N			

The sound fevel meter submitted for testing has successfully completed the class 1 periods: tests of (EQ 61672-32013, for the environmental sounditions under which the tests were performed

As public evidence was available, from an independent terring organisation responsible for approving the results of performed in accordance with IEC 61672-2 2013, to demonstrate that the model of sound level meter fully constrained to the requirements in IEC 01672-1 2013, the sound level meter administration test of the class 1 requirements of IEC 61672-1 2013.

		Least Uncertaintics of Measurement +	
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Electrical Temi	+11.11);73		

All uncertaintian are derived at the 99% coefficience level with a coverage factor of 2.

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



Accountly Research Labs Phy Ltd in NATA Accredited Laboratory Number 14172 Australia of the compliance with ISO(II)C (2025 - calibration

The results of the term, calibrations and an invasionments included in this documient are integable to \$1 units

NATA is a signatory to the 0.AC Misual Recognition Attangement for the manual recognition of the equivalence of testing, medicul testing, calibration and inspection reports.

Pyle 1 mill



Acoustic Research Labs my Ltd

Sound Calibrator IEC 60942-2017

Calibration Certificate

Client Details Global Acoustics (Pty 1:14 12:16 Huningshic Drive Thornton NSW 2323 Equipment Tested/ Model Number: Pulsar Model 106 Instrument Serial Number: Instrument Serial Number: 74413 Atmospheric Conditions Ambient Temperature: 21:57 (C Relative Hunidity: Antisch Temperature: 21:57 (C Relative Hunidity: Calibration Date: Jeff Yu Approved Signatory: Mars Moore Report Issue Date: Calibration Date: Jeff Yu Approved Signatory: Mars Moore Report Issue Date: Transcretristic Tested Result Constrained Antheresson Lawel Pass Togetory: Mars Moore Report Issue Date: 15:Jun 2020 Mariateristic Tested Result Constrained Neurol Presson Lawel Pass Togetory: Mars Moore Result Neuroined Level Mariateristic Tested Nominal Frequency Conclusion 1000.0 Tested pressort Presson 1000 0.3.96 1000.10 He seend pressort Presson Construmental Code to the set of the comparety of the set of the comparety of the code to the teste 2 requerence of the cod		Calibration N	umber	C20332			
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Wilpinjong Coal

Environmental Noise Monitoring

June 2022

Prepared for Wilpinjong Coal Pty Ltd
Wilpinjong Coal

Environmental Noise Monitoring

June 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	27/06/2022	Will Moore	Tony Welbourne	Final

Approved by

J. Weller

Tony Welbourne Associate Director 27 June 2022

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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TABLE OF CONTENTS

1	Intro	duction	1
	1.1	Background	1
	1.2	Monitoring locations	1
	1.3	Terminology and abbreviations	1
2	Regul	lator requirements and noise criteria	2
	2.1	Development consents	2
	2.2	Environment protection licence	2
	2.3	Noise Monitoring Program	2
	2.4	Project Specific Criteria	2
	2.5	Modifying Factors	3
3	Meth	odology	4
	3.1	Overview	4
	3.2	Attended noise monitoring	4
	3.3	Modifying factors	5
	3.4	Attended noise monitoring equipment	5
4	Resul	lts	6
	4.1	Total measured noise levels	6
	4.2	Modifying factors	6
	4.3	Attended noise monitoring results	7
	4.4	Atmospheric conditions	8
5	Discu	ssion	9
	5.1	Noted noise sources	9
6	Sumn	nary	17
Ар	pendice	es	

Appendix A	Regulator documents	A.1
Appendix B	Calibration certificates	B.1

Tables

Table 1.1	Attended monitoring locations	1
Table 1.2	Terminology and abbreviations	1
Table 2.1	WCP project specific criteria, dB	2
Table 3.1	Attended noise monitoring equipment	5
Table 4.1	Measured noise levels - June 2022	6
Table 4.2	LAeq,15minute generated by WCP against project specific criteria - June 2022	7
Table 4.3	LA1,1minute generated by WCP against project specific criteria - June 2022	7
Table 4.4	Measured atmospheric conditions – June 2022	8
Table 5.1	Historical WCP only noise levels at N6	10
Table 5.2	Historical WCP only noise levels at N14	11
Table 5.3	Historical WCP only noise levels at N15	12
Table 5.4	Historical WCP only noise levels at N15	13
Table 5.5	Historical WCP only noise levels at N17	14
Table 5.6	Historical WCP only noise levels at N19	15
Table 5.7	Historical WCP only noise levels at N20	16

Figures

Figure 1.1	Wilpinjong noise monitoring locations	2
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	9
Figure 5.2	Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village	10
Figure 5.3	Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads	11
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	12
Figure 5.5	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	13
Figure 5.6	Environmental noise levels N17, Mogo Road, off Araluen Road	14
Figure 5.7	Environmental noise levels N19, Upper Mogo Road	15
Figure 5.8	Environmental noise levels N20, Ringwood Road	16

1 Introduction

1.1 Background

Global Acoustics (now part of EMM) 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 northeast 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 15/16 June 2022 at eight locations.

1.2 Monitoring locations

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

Table 1.1 Attended monitoring locations

NMP Descriptor	Monitoring Location
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 1.1 Wilpinjong noise monitoring locations



1.3 Terminology and abbreviations

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

Table 1.2Terminology and 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 _{Amax}	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
L _{Aeq}	The average noise A-weighted energy during a measurement period.
LA50	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The L _{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	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 Development consents

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

NMP Descriptor	Day ^L Aeq,15minute	Evening ^L Aeq,15minute	Night ^L Aeq,15minute	Night ^L A1,1minute
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Table 2.1 WCP project specific criteria, dB

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.

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfl. Low-frequency modifying factors have been assessed in accordance with both the development consent and NPfl.

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 Will Moore.

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 LAeq,15minute and LA1,1minute (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 (eg 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 (eg 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 $L_{A1,1minute}$ 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_{Amax} , received from the site during the entire measurement period (ie 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 noise.

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 (eg "<20 dB" or "<30 dB").

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 Attended noise monitoring equipment

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

Table 3.1 Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	00370304	24/11/2022
Pulsar 105 acoustic calibrator	81334	29/11/2023

4 **Results**

4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring 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.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	LA50 dB	LA90 dB	L _{Amin} dB
N6	16/06/2022 1:15	41	37	32	30	29	27	24
N14	16/06/2022 0:00	40	32	29	27	26	24	21
N15	15/06/2022 23:00	59	55	43	43	37	34	29
N15 remeasure	15/06/2022 23:30	45	39	36	35	34	32	30
N17	15/06/2022 22:25	45	35	32	28	26	23	20
N19	15/06/2022 22:00	39	23	22	21	21	20	18
N20	16/06/2022 0:45	40	27	24	23	23	21	20

Table 4.1Measured noise levels - June 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.2 Modifying factors

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

There were no modifying factors applicable to site during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low-frequency modifying factors, as defined in the NPfI.

4.3 Attended noise monitoring results

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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ^{4,5}
N6	16/06/2022 1:15	0.0	G	37	No	30	Nil
N14	16/06/2022 0:00	0.0	F	35	Yes	IA	Nil
N15	15/06/2022 23:00	0.0	F	37	Yes	38	1
N15 remeasure	15/06/2022 23:30	0.0	F	37	Yes	34	Nil
N17	15/06/2022 22:25	0.0	F	38	Yes	23	Nil
N19	15/06/2022 22:00	0.0	F	35	Yes	IA	Nil
N20	16/06/2022 0:45	0.0	F	35	Yes	IA	Nil

Table 4.2 LAeq.15minute generated by WCP against project specific criteria - June 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3 LA1,1minute generated by WCP against project specific criteria - June 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{A1,1} min dB ^{3,4}	Exceedance dB ^{4,5}
N6	16/06/2022 1:15	0.0	G	45	No	37	Nil
N14	16/06/2022 0:00	0.0	F	45	Yes	IA	Nil
N15	15/06/2022 23:00	0.0	F	45	Yes	42	Nil
N15 remeasure	15/06/2022 23:30	0.0	F	45	Yes	35	Nil
N17	15/06/2022 22:25	0.0	F	45	Yes	28	Nil
N19	15/06/2022 22:00	0.0	F	45	Yes	IA	Nil
N20	16/06/2022 0:45	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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.

Location	Start Date and Time	Temperature ° C	Wind Speed m/s	Wind Direction ^o Magnetic North ¹	Cloud Cover 1/8s
N6	16/06/2022 1:15	2	0.0	-	2
N14	16/06/2022 0:00	4	0.4	320	0
N15	15/06/2022 23:00	3	0.0	-	2
N15 remeasure	15/06/2022 23:30	2	0.0	-	0
N17	15/06/2022 22:25	6	0.0	-	7
N19	15/06/2022 22:00	5	0.7	40	0
N20	16/06/2022 0:45	0	0.0	-	2

Table 4.4 Measured atmospheric conditions – June 2022

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 considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are 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 5.1 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} .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.



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

5.1.1 N6



Figure 5.2 Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 30 dB. Engine surges were responsible for the site only $L_{A1,1minute}$ of 37 dB. Track noise was also noted.

WCP continuum was responsible for all measured noise levels.

Table 5.1 Historical WCP only noise levels at N6

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
L _{Aeq}	IA	<25	IA	IA	31	IA	IA	IA	IA	IA	<20	<25
L _{A1,1} min	IA	<25	IA	IA	33	IA	IA	IA	IA	IA	23	<25

5.1.2 N14



Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Cattle were responsible for the measured L_{A1} and contributed to the L_{A10} . Frogs and a train generated the measured L_{A10} and L_{Aeq} . Frogs generated the measured L_{A50} , and L_{A90} .

A low continuum from a substation was also noted.

Table 5.2Historical WCP only noise levels at N14

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
L _{Aeq}	<25	IA	IA	IA	<25	IA	IA	IA	IA	IA	<25	IA
L _{A1,1} min	26	IA	IA	IA	25	IA	IA	IA	IA	IA	<25	IA

5.1.3 N15



Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 38 dB. Engine surges were responsible for generating the site only L_{A1,1minute} of 42 dB. Horns and track noise were also noted

A train was responsible for the measured L_{A1} and contributed to the L_{A10} and L_{Aeq} . Continuum from WCP contributed to the measured L_{A10} and L_{Aeq} . WCP continuum was responsible for the L_{A50} and L_{A90} .

Noise from cattle, and birds was also noted.

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
L _{Aeq}	IA	<25	IA	NM	33	IA	IA	IA	IA	IA	23
L _{A1,1} min	IA	<30	IA	NM	41	IA	IA	IA	IA	IA	32

Table 5.3Historical WCP only noise levels at N15

5.1.4 N15 remeasure



Figure 5.5 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the second measurement, generating a site only L_{Aeq} of 34 dB. Engine surges were responsible for generating the site only L_{A1,1minute} of 35 dB. Track noise was also noted.

Continuum from WCP was responsible for measured noise levels.

Noise from cattle, and birds was also noted.

Table 5.4Historical WCP only noise levels at N15

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
L _{Aeq}	IA	<25	IA	NM	33	IA	IA	IA	IA	IA	23	34
L _{A1,1} min	IA	<30	IA	NM	41	IA	IA	IA	IA	IA	32	38



Figure 5.6 Environmental noise levels N17, Mogo Road, off Araluen Road

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 23 dB. Engine surges were responsible for generated the site only L_{A1,1minute} of 28 dB.

A train was responsible for the measured LA1, LA10, LA50 and LAeq.

Low-level noise from a plane was also noted

Table 5.5 Historical WCP only noise levels at N17

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
L _{Aeq}	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA	<20	32
L _{A1,1} min	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA	23	37

5.1.6 N19



Figure 5.7 Environmental noise levels N19, Upper Mogo Road

WCP was inaudible during the measurement.

A continuum from a generator in a nearby paddock and the noise floor of the instrument were responsible for the measured noise levels.

Table 5.6Historical WCP only noise levels at N19

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
L _{Aeq}	IA	IA	<20	IA	IA	<20						
L _{A1,1} min	IA	IA	<20	IA	IA	<20						



Figure 5.8 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A bird was responsible for the measured L_{A1} . Cattle were responsible for the measured L_{A10} . Running water and the noise floor of the instrument generated the measured L_{Aeq} , L_{A50} and L_{A90} .

Table 5.7 Historical WCP only noise levels at N20

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
L _{Aeq}	IA	<25	22									
L _{A1,1} min	IA	<25	28									

6 Summary

Global Acoustics (now part of EMM) 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 done around WCP during the night period of 15/16 June 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations excluding the first measurement at N15. A remeasure was taken 15 minutes after and noise levels were compliant.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Appendix A Regulator documents



SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

 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	
e: 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

 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)

	Day	Evening	Nig	Night		
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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		.2		
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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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.
- 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.

Hz/dB(Z)	One	One-third octave L _{Zeg,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

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

A.2 Environment 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.

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.

Location	Site	Туре	Easting ¹	Northing ¹	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	1	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification		
Wollar Village ⁴	15	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 ⁴	-*	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 ³	0	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	 As per Table 7, Figure 3 and Figure 4
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).

Notes: ¹ 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.

Appendix B Calibration certificates





North Rocks NSW AUSTRALIA 2151 Ph: +61 2 9484 0800 A.B.N. 65 160 399 119 DS Pty Ltd www.acousticresearch.com.au

Sound Level Meter IEC 61672-3.2013

Calibration Certificate

Calibration Number C20674

Client Details	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322	
Equipment Tested/ Model Number :	Rion NA-28	
Instrument Serial Number :	00370304	
Microphone Serial Number :	10421	
Pre-amplifier Serial Number :	60313	
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions	
Ambient Temperature : 22°C	Ambient Temperature : 21.9%	C
Relative Humidity : 50.6%	Relative Humidity : 50.1%	0
Barometric Pressure : 100.08kPa	Barometric Pressure : 100.0	9kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Max Moore	_
Calibration Date : 24 Nov 2020	Report Issue Date : 25 Nov 2020	
Approved Signatory :	Hallems Ken	Williams
Clause and Characteristic Tested Res	sult Clause and Characteristic Tested	Result
 Acoustical Sig. tests of a frequency weighting Pa 	ass 17: Level linearity incl. the level range control	Pass
13: Electrical Sig. tests of frequency weightings Pc	as 18: Loneburst response	Pass
 Frequency and time weightings in 1 kHz P_L 	19: C Weighted Peak Sound Level	Pass
15: Long Lerm Stability Pz	238 20: Overload Indication	Pass
to, Level linearity on the reference level range Pb	23 214 High Level Stability	Pass

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

As public evidence was available, from an independent testing organization responsible for hipproving the results of pattern evaluation test performed in accordance with IEC 61672-2 2013, to doministrate that the model of search level inster fully conformed to the requirements in IEC 61672-1 2013, the sound level meter submitted for testing confirms to the class 1 requirements of IEC 61672-1 2013.

	Le	est Undertainties of Measurement -		
Acoustic Tests		Environmental Condinions		
12316	-0_12dli	Transportation	=0.2%	
181/=	=:0.11dB	Relative Humpdates	17.320	
Skill	×0.13dB	Rammen's Pressure	=0.013kPa	
Electrical Tests	+0,10dB			

All incertainties are derived at the 93% 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

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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 Client Details			C21832			
			Global Acou	istics Pty Ltd		
			Thornton N	SW 2322		
Equipment	Tested/ Mode	Number :	Pulsar Mode	1 105		
Ins	trument Seria	Number :	81334			
		Atmosph	eric Conditio	ons		
	Ambient Ten	perature :	25°C			
	Relative	Humidity :	49.6%			
	Barometric	Pressure :	100.8kPa			
Calibration Technician	: Lucky Jai	swal	Sec	ondary Check:	Harrison Kir	n
Calibration Date	: 29 Nov 20	021	Repo	ort Issue Date :	2 Dec 2021	
	Approved	Signatory :	15 am	2		Ken Williams
Characteristic Tested		Re	sult			
Generated Sound Pressure I	evel	Pa	288			
Frequency Generated		PI	985			
Total Distortion		Pi	283			
Nor	ninal Level	Nominal	Frequency	Measured Le	vel Measu	red Frequency
	94	-11	100	94.19		1000.30
The sound califyrator furs been s the sound pressure leve	hove accordom a	o the class 2 request) stated, for t	airements for per	odic testing, describe conditions under whi	ed in Annex B of ch the tests were	IEC 60942,2017 for performed
		Uncertainti	es of Measureme	nt -		
specific Tests	a 1. m		Environmental	Conditions	AL 1 1947	
Elemenated SPL	0.040		Peteron	line .	10.12	
Distortion	11 51280		Rominet	Pressure	nn14kPa	
- Tallit Milli	N.S. I. P.		and against			
#11	WIPEYSTRATIPY INP.	derived in the 92	Ni confidence les	of with a coverage fa	chor of -	

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



Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - Calibration. The results of the texts, calibrations and/or measurements included in this document are traceable to SI UTID-4

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Wilpinjong Coal

Environmental Noise Monitoring

July 2022

Prepared for Wilpinjong Coal Pty Ltd
Wilpinjong Coal

Environmental Noise Monitoring

July 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	14/08/2022	Will Moore	Jesse Tribby	

Approved by

Jene hilly

Jesse Tribby Senior Acoustic Consultant 14 August 2022

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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TABLE OF CONTENTS

1	Introc	luction	1
	1.1	Background	1
	1.2	Monitoring locations	1
	1.3	Terminology and abbreviations	3
2	Regul	ator requirements and noise criteria	4
	2.1	Development consents	4
	2.2	Environment protection licence	4
	2.3	Noise Monitoring Program	4
	2.4	Project Specific Criteria	4
	2.5	Modifying Factors	5
3	Meth	odology	6
	3.1	Overview	6
	3.2	Attended noise monitoring	6
	3.3	Modifying factors	7
	3.4	Attended noise monitoring equipment	7
4	Result	ts	8
	4.1	Total measured noise levels	8
	4.2	Modifying factors	8
	4.3	Attended noise monitoring results	9
	4.4	Atmospheric conditions	10
5	Discus	ssion	11
	5.1	Noted noise sources	11
6	Summ	nary	18

Appendices

Appendix A	Regulator documents
Appendix B	Calibration certificates

Tables

Table 1.1	Attended monitoring locations	1
Table 1.2	Terminology and abbreviations	3
Table 2.1	WCP project specific criteria, dB	4
Table 3.1	Attended noise monitoring equipment	7
Table 4.1	Measured noise levels ¹ - July 2022	8
Table 4.2	$L_{Aeq,15minute}$ generated by WCP against project specific criteria – July 2022	9
Table 4.3	LA1,1minute generated by WCP against project specific criteria - July 2022	9
Table 4.4	Measured atmospheric conditions – July 2022	10
Table 5.1	Historical WCP only noise levels at N6	12
Table 5.2	Historical WCP only noise levels at N14	13
Table 5.3	Historical WCP only noise levels at N15	14
Table 5.4	Historical WCP only noise levels at N17	15
Table 5.5	Historical WCP only noise levels at N19	16
Table 5.6	Historical WCP only noise levels at N20	17

Figures

Figure 1.1	Wilpinjong noise monitoring locations	2
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	11
Figure 5.2	Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village	12
Figure 5.3	Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads	13
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	14
Figure 5.5	Environmental noise levels N17, Mogo Road, off Araluen Road	15
Figure 5.6	Environmental noise levels N19, Upper Mogo Road	16
Figure 5.7	Environmental noise levels N20, Ringwood Road	17

1 Introduction

1.1 Background

Global Acoustics (now part of EMM) 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 northeast 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 28/29 July 2022 at eight locations.

1.2 Monitoring locations

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

Table 1.1 Attended monitoring locations

NMP Descriptor	Monitoring Location
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 and abbreviations

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

Table 1.2Terminology and 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 _{Amax}	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
L _{A1,1} minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
L _{Aeq}	The average noise A-weighted energy during a measurement period.
L _{A50}	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent 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	Day L _{Aeq,15minute}	Evening L _{Aeq,15minute}	Night L _{Aeq,15minute}	Night L _{A1,1minute}
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	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.

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and 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 Will Moore.

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,15minute} and L_{A1,1minute} (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 (eg 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 (eg 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 $L_{A1,1minute}$ 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_{Amax} , received from the site during the entire measurement period (ie 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 noise.

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 (eg "<20 dB" or "<30 dB").

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 Attended noise monitoring equipment

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

Table 3.1 Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	01070590	09/06/2024
Pulsar 106 acoustic calibrator	74813	09/06/2024

4 **Results**

4.1 Total measured noise levels

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

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	28/07/2022 23:19	58	44	37	35	32	28	27
N14	29/07/2022 00:34	61	54	36	40	29	26	24
N15	28/07/2022 23:00	42	36	33	30	30	28	26
N17	28/07/2022 22:25	42	34	31	29	29	27	25
N19	28/07/2022 22:00	59	45	38	35	31	27	25
N20	29/07/2022 00:00	45	35	32	29	29	27	25

Table 4.1Measured noise levels 1 - July 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.2 Modifying factors

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

There were no modifying factors applicable to site during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low-frequency modifying factors, as defined in the NPfI.

4.3 Attended noise monitoring results

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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ^{4,5}
N6	28/07/2022 23:19	0.0	G	37	No	IA	NA
N14	29/07/2022 00:34	0.0	G	35	No	IA	NA
N15	28/07/2022 23:00	0.0	G	37	No	29	NA
N17	28/07/2022 22:25	0.2	G	38	No	27	NA
N19	28/07/2022 22:00	1.2	G	35	No	IA	NA
N20	29/07/2022 00:00	0.0	G	35	No	IA	NA

Table 4.2 L_{Aeq,15minute} generated by WCP against project specific criteria – July 2022

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.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3 LA1,1minute generated by WCP against project specific criteria - July 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ^{4,5}
N6	28/07/2022 23:19	0.0	G	45	No	IA	NA
N14	29/07/2022 00:34	0.0	G	45	No	IA	NA
N15	28/07/2022 23:00	0.0	G	45	No	40	NA
N17	28/07/2022 22:25	0.2	G	45	No	30	NA
N19	28/07/2022 22:00	1.2	G	45	No	IA	NA
N20	29/07/2022 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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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.

Location	Start Date and Time	Temperature ° C	Wind Speed m/s	Wind Direction ^o Magnetic North ¹	Cloud Cover 1/8s
N6	28/07/2022 23:19	4	0.0	-	0
N14	29/07/2022 00:34	3	1.0	340	0
N15	28/07/2022 23:00	10	0.0	-	0
N17	28/07/2022 22:25	8	0.0	-	0
N19	28/07/2022 22:00	10	0.0	-	0
N20	29/07/2022 00:00	4	0.9	290	0

Table 4.4 Measured atmospheric conditions – July 2022

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 considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are 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 5.1 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} .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.



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

5.1.1 N6



Figure 5.2 Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village

WCP was inaudible throughout the measurement.

Road traffic and residential activity was primarily responsible for the measured L_{A1} , L_{A10} , L_{Aeq} , and L_{A50} . Frogs contributed to the measured L_{A10} , L_{Aeq} , and L_{A50} , and were responsible for the measured L_{A90} .

Table 5.1Historical WCP only noise levels at N6

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
L _{Aeq}	<25	IA	IA	31	IA	IA	IA	IA	IA	<20	<25	30
L _{A1,1min}	<25	IA	IA	33	IA	IA	IA	IA	IA	23	<25	37



Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Livestock was responsible for the measured L_{A1} and L_{Aeq} and contributed to the measured L_{A10} . Frogs were responsible for the L_{A50} and L_{A90} , and also contributed to the measured L_{A10} .

Table 5.2Historical WCP only noise levels at N14

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
L _{Aeq}	IA	IA	IA	<25	IA	IA	IA	IA	IA	<25	IA	IA
L _{A1,1min}	IA	IA	IA	25	IA	IA	IA	IA	IA	<25	IA	IA

5.1.3 N15



Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 29 dB. Track noise was responsible for generating the site only $L_{A1,1minute}$ of 40 dB. Engine surges were also noted.

WCP continuum was primarily responsible for the measured L_{A1} , L_{A10} , L_{Aeq} and L_{A50} and contributed to the L_{A90} . Frogs contributed to the measured L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} .

Noise from nearby residents was also noted.

Table 5.3Historical WCP only noise levels at N15

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 ¹
L_{Aeq}	<25	IA	NM	33	IA	IA	IA	IA	IA	23	34	38/34
L _{A1,1min}	<30	IA	NM	41	IA	IA	IA	IA	IA	32	38	42/35

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.



Figure 5.5 Environmental noise levels N17, Mogo Road, off Araluen Road

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 27 dB. Engine surges were responsible for generated the site only $L_{A1,1minute}$ of 30 dB.

An aeroplane was primarily responsible for the measured L_{A1} and contributed to the measured L_{A10} . WCP continuum contributed to measured noise levels. Frogs contributed to the measured L_{A10} and was primarily responsible for the measured L_{Aeq} , L_{A50} and L_{A90} .

Table 5.4Historical WCP only noise levels at N17

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
L _{Aeq}	IA	<20	IA	<20	IA	IA	IA	IA	IA	<20	32	23
L _{A1,1min}	IA	<20	IA	<20	IA	IA	IA	IA	IA	23	37	28

5.1.5 N19



Figure 5.6 Environmental noise levels N19, Upper Mogo Road

WCP was inaudible during the measurement.

An aeroplane was responsible for the measured L_{A1} and L_{A10} . Frogs and insects were responsible for the measured L_{Aeq} , L_{A50} and L_{A90} .

Noise from a train was also noted.

Table 5.5Historical WCP only noise levels at N19

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
L _{Aeq}	IA	<20	IA	IA	<20	IA						
L _{A1,1min}	IA	<20	IA	IA	<20	IA						

5.1.6 N20



Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

Running water was responsible for measured noise levels.

Noise from livestock was also noted.

Table 5.6Historical WCP only noise levels at N20

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
L _{Aeq}	IA	<25	22	IA								
L _{A1,1min}	IA	<25	28	IA								

6 Summary

Global Acoustics (now part of EMM) 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 done around WCP during the night period of 28/29 July 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the July 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Appendix A Regulator documents



SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

 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							
e: 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

 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)

	Day	Evening	Night			
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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		.2		
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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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.
- 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.

Hz/dB(Z)	One-third octave Lzeg, 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

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

A.2 Environment 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.

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.

Location	Site	Туре	Easting ¹	Northing ¹	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	1	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification	
Wollar Village ⁴	10	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 ⁴	-*	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 ³	0	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	 As per Table 7, Figure 3 and Figure 4
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).

Notes: ¹ 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.

Appendix B Calibration certificates





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

Sound Level Meter IEC 61672-3:2013

Calibration Certificate

Calibration Number C22373

Client Details	EMM Consulting Suite 6, Level 1, 146 Hunter Street Newcastle NSW 2300	
Equipment Tested/ Model Number :	Rion NA-28	
Instrument Serial Number :	01070590	
Microphone Serial Number :	08184	
Pre-amplifier Serial Number :	52329	
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Condition	ons
Ambient Temperature : 25.7°C	Ambient Temperature :	25.4°C
Relative Humidity : 31.9%	Relative Humidity :	32.4%
Barometric Pressure : 100.18kPa	Barometric Pressure :	100.11kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Max Moore	
Calibration Date : 9 Jun 2022	Report Issue Date : 20 Jun 2022	
Approved Signatory :	Hallans	Ken Williams
Clause and Characteristic Tested Res	sult Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting Pa	17: Level linearity incl. the level range con	trol Pass
13: Electrical Sig. tests of frequency weightings Pa	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz Pa	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability Pa	ass 20: Overload Indication	Pass
16: Level linearity on the reference level range Pa	ass 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.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

		Uncertainties of Measurement -		
Acoustic Tests		Environmental Conditions		
125Hz	±0.13dB	Temperature	±0.1°C	
1kHz	±0.13dB	Relative Humidity	±1.9%	
SkHz	±0.14dB	Barometric Pressure	±0.014kPa	
Electrical Tests	±0.13dB		ALCONDUCT OF	

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.



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 C22374

	lient Details	EMM Cons	ulting al 1 146 Hunter	Street		
			Newcastle 1	VSW 2300	Jueen	54
Equipment T	ested/Mode	I Number :	Pulsar Mod	el 106		
Instru	ument Seria	l Number :	74813			
		Atmosph	eric Conditi	ons		
A	mbient Ter	nperature :	25.8°C			
	Relative	Humidity :	33.6%			
	Barometri	c Pressure :	100.19kPa			
Calibration Technician :	Lucky Jai	swal	Sec	ondary Check:	Max	Moore
Calibration Date :	09 Jun 20	22	Rep	ort Issue Date :	20	Jun 2022
	Approved	Signatory :	Blan	1		Ken Williams
Characteristic Tested		Re	sult			
Generated Sound Pressure Lev	rel	Pe	155			
Frequency Generated		Pe	355			
Total Distortion		Pe	955			
Nomi	al Level	Nominal	Frequency	Measured L	evel	Measured Frequency
	94	10	000	94.09		1000.30
The sound calibrator has been sho	an to conform	to the class 2 reg	uirements for per	iodic testing, describ	bed in A	nnex B of IEC 60942:2017 for
the sound pressure level(s)	and frequency	(ies) stated, for th	he environmental	conditions under w	hich the	tests were performed
and a second		Uncertainti	es of Measureme	ent -		2 - 1 - 2 - 3
Specific Tests	ecific Tests			Conditions		
Generated SPL ±0.10dB			Temperat	ure	±0.1%	
E	Frequency ±0.13%					

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.



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

Environmental Noise Monitoring

August 2022

Prepared for Wilpinjong Coal Pty Ltd

Wilpinjong Coal

Environmental Noise Monitoring

August 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	14/09/2022	Will Moore	Jesse Tribby	

Approved by

Jene hilly

Jesse Tribby Senior Acoustic Consultant 14 September 2022

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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TABLE OF CONTENTS

1 Introduction								
	1.1	Background	1					
	1.2	Monitoring locations	1					
	1.3	Terminology and abbreviations	3					
2	Regul	ator requirements and noise criteria	4					
	2.1	Development consents	4					
	2.2	Environment protection licence	4					
	2.3	Noise Monitoring Program	4					
	2.4	Project Specific Criteria	4					
	2.5	Modifying Factors	5					
3	Methodology							
	3.1	Overview	6					
	3.2	Attended noise monitoring	6					
	3.3	Modifying factors	7					
	3.4	Attended noise monitoring equipment	7					
4	Resul	ts	8					
	4.1	Total measured noise levels	8					
	4.2	Modifying factors	8					
	4.3	Attended noise monitoring results	9					
	4.4	Atmospheric conditions	10					
5	Discu	ssion	11					
	5.1	Noted noise sources	11					
6	Sumn	nary	18					

1 Introduction

1.1 Background

Global Acoustics (now part of EMM) 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 northeast 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 25/26 August 2022 at eight locations.

1.2 Monitoring locations

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

Table 1.1 Attended monitoring locations

NMP Descriptor	Monitoring Location
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 and abbreviations

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

Table 1.2Terminology and 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 _{Amax}	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
L _{A1,1minute}	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
L _{Aeq}	The average noise A-weighted energy during a measurement period.
L _{A50}	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The L _{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 micro pascals.
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 Regulatory requirements and noise criteria

2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent 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	Day L _{Aeq,15minute}	Evening L _{Aeq,15minute}	Night L _{Aeq,15minute}	Night L _{A1,1minute}
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	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.

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and 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 Will Moore.

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,15minute} and L_{A1,1minute} (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 $L_{A1,1minute}$ 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_{Amax} , 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 noise.

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 "<30 dB").

Assessment of low frequency modifying factors is a two-step process as follows:

- 1. Comparison of C-weighted and A-weighted source contribution (in this case WCP). If the difference between these values is 15 dB(A) or more, then proceed to step 2.
- 2. Comparison of Z-weighted source noise levels in the range of 10-160 Hz against the third-octave reference threshold reproduced from NPfI Fact Sheet C. Where any third-octave noise level from the source exceeds the reference threshold below, a 2 dB or 5 dB positive adjustment is applied to the source L_{Aeq}, depending on the extent of the exceedance above the reference threshold.

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

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

dB(Z) = decibel (Z frequency weighted).

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 Attended noise monitoring equipment

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

Table 3.1 Attended noise monitoring equipment

Model	Serial number	Calibration due date		
Rion NA-28 sound level meter	01070590	09/06/2024		
Pulsar 106 acoustic calibrator	74813	09/06/2024		

4 **Results**

4.1 Total measured noise levels

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

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	26/08/2022 00:45	44	35	30	27	25	24	23
N14	25/08/2022 23:30	56	49	44	39	27	24	23
N15	25/08/2022 23:00	53	47	41	37	29	24	22
N17	25/08/2022 22:23	40	38	35	31	28	25	23
N19	25/08/2022 22:00	55	49	37	37	31	27	22
N20	26/08/2022 00:15	42	37	32	29	27	24	22

Table 4.1Measured noise levels 1 - August 2022

Notes: 1. Levels in this table are not necessarily the result of activity 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. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

4.3 Attended noise monitoring results

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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ^{4,5}
N6	26/08/2022 00:45	0.0	F	37	Yes	IA	Nil
N14	25/08/2022 23:30	0.0	G	35	No	IA	NA
N15	25/08/2022 23:00	0.8	F	37	Yes	IA	Nil
N17	25/08/2022 22:23	1.0	F	38	Yes	IA	Nil
N19	25/08/2022 22:00	0.0	F	35	Yes	IA	Nil
N20	26/08/2022 00:15	0.0	F	35	Yes	IA	Nil

Table 4.2 LAeq,15minute generated by WCP against project specific criteria – August 2022

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.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3 LA1,1minute generated by WCP against project specific criteria - August 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ^{4,5}
N6	26/08/2022 00:45	0.0	F	45	Yes	IA	Nil
N14	25/08/2022 23:30	0.0	G	45	No	IA	NA
N15	25/08/2022 23:00	0.8	F	45	Yes	IA	Nil
N17	25/08/2022 22:23	1.0	F	45	Yes	IA	Nil
N19	25/08/2022 22:00	0.0	F	45	Yes	IA	Nil
N20	26/08/2022 00:15	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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.

Location	Start Date and Time	Temperature ° C	Wind Speed m/s	Wind Direction ^o Magnetic North ¹	Cloud Cover 1/8s
N6	26/08/2022 00:45	0.0	-	5	0.0
N14	25/08/2022 23:30	0.0	-	0	0.0
N15	25/08/2022 23:00	0.0	-	0	0.0
N17	25/08/2022 22:23	0.0	-	0	0.0
N19	25/08/2022 22:00	0.8	25	0	0.8
N20	26/08/2022 00:15	0.0	-	4	0.0

Table 4.4 Measured atmospheric conditions – August 2022

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 considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are 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 5.1 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} .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.



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

5.1.1 N6



Figure 5.2 Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village

WCP was inaudible throughout the measurement.

A train contributed to the L_{Aeq} and was responsible for the measured L_{A1} and L_{A10} . Frogs and insects were responsible for the measured L_{A50} and L_{A90} , and also contributed to the L_{Aeq} .

Noise from road traffic was also noted.

Table 5.1Historical WCP only noise levels at N6

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
L _{Aeq}	IA	IA	31	IA	IA	IA	IA	IA	<20	<25	30	IA
L _{A1,1min}	IA	IA	33	IA	IA	IA	IA	IA	23	<25	37	IA

N14

5.1.2



Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Frogs and insects were primarily responsible for measured noise levels. Livestock contributed to the measured L_{A1} , L_{10} , and L_{Aeq} .

Noise from road traffic was also noted

Table 5.2Historical WCP only noise levels at N14

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
L _{Aeq}	IA	IA	<25	IA	IA	IA	IA	IA	<25	IA	IA	IA
L _{A1,1min}	IA	IA	25	IA	IA	IA	IA	IA	<25	IA	IA	IA

5.1.3 N15



Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible during the measurement.

A train was responsible for measured L_{A1} , L_{10} , and L_{Aeq} . Frogs and insects generated the measured L_{A50} and L_{A90} . Noise from dogs and an owl was also noted.

Table 5.3Historical WCP only noise levels at N15

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 ¹	July 2022
L _{Aeq}	IA	NM	33	IA	IA	IA	IA	IA	23	34	38/34	29
L _{A1,1min}	IA	NM	41	IA	IA	IA	IA	IA	32	38	42/35	40

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.



Figure 5.5 Environmental noise levels N17, Mogo Road, off Araluen Road

WCP was inaudible during the measurement.

Frogs and insects were responsible for measured noise levels.

Noise from an aeroplane was also noted.

Table 5.4Historical WCP only noise levels at N17

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
L _{Aeq}	<20	IA	<20	IA	IA	IA	IA	IA	<20	32	23	27
L _{A1,1min}	<20	IA	<20	IA	IA	IA	IA	IA	23	37	28	30



Figure 5.6 Environmental noise levels N19, Upper Mogo Road

WCP was inaudible during the measurement.

Frogs and insects were responsible for measured noise levels.

Noise from an aeroplane was also noted.

Table 5.5Historical WCP only noise levels at N19

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
L _{Aeq}	<20	IA	IA	<20	IA	IA						
L _{A1,1min}	<20	IA	IA	<20	IA	IA						

5.1.6 N20



Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A train was responsible for the measured L_{A1} and L_{A10} . Frogs and insects were responsible for the measured L_{Aeq} , L_{A50} and L_{A90} .

Noise from road traffic was also noted.

Table 5.6Historical WCP only noise levels at N20

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
L _{Aeq}	IA	<25	22	IA	IA							
L _{A1,1min}	IA	<25	28	IA	IA							

6 Summary

Global Acoustics (now part of EMM) 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 done around WCP during the night period of 25/26 August 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the August 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Appendix A Regulator documents



SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

 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	
e: 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

 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)

	Day	Evening	Night		
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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		.2	
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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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.
- 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.

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

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

A.2 Environment 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.

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.

Location	Site	Туре	Easting ¹	Northing ¹	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	1	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	10	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 ⁴	-*	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 ³	0	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	 As per Table 7, Figure 3 and Figure 4
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).

Notes: ¹ 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.

Appendix B Calibration certificates





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

Sound Level Meter IEC 61672-3:2013

Calibration Certificate

Calibration Number C22373

Client Details	EMM Consulting Suite 6, Level 1, 146 Hunter Street Newcastle NSW 2300
Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	01070590
Microphone Serial Number :	08184
Pre-amplifier Serial Number :	52329
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 25.7°C	Ambient Temperature : 25.4°C
Relative Humidity : 31.9%	Relative Humidity : 32.4%
Barometric Pressure : 100.18kPa	Barometric Pressure : 100.11kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Max Moore
Calibration Date : 9 Jun 2022	Report Issue Date : 20 Jun 2022
Approved Signatory :	Hallow Ken Williams
Clause and Characteristic Tested Re	sult Clause and Characteristic Tested Result
12: Acoustical Sig. tests of a frequency weighting P	ass 17: Level linearity incl. the level range control Pass
13: Electrical Sig. tests of frequency weightings Pl	ass 18: Toneburst response Pass
14: Frequency and time weightings at 1 kHz P	ass 19: C Weighted Peak Sound Level Pass
15: Long Term Stability P	ass 20: Overload Indication Pass
16: Level linearity on the reference level range Pa	ass 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.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

		Uncertainties of Measurement -		
Acoustic Tests		Environmental Conditions		
125Hz	±0.13dB	Temperature	±0.1°C	
1kHz	±0.13dB	Relative Humidity	±1.9%	
SkHz	±0.14dB	Barometric Pressure	±0.014kPa	
Electrical Tests	±0.13dB			

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



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 C22374

Client Details		EMM Cons	ulting al 1 146 Hunter	Street	2.5	
			Newcastle 1	VSW 2300	Jueer	
Equipment T	ested/Mode	I Number :	Pulsar Mod	el 106		
Instru	ument Seria	l Number :	74813			
		Atmosph	eric Conditi	ons		
A	mbient Ter	nperature :	25.8°C			
	Relative	Humidity :	33.6%			
	Barometri	c Pressure :	100.19kPa			
Calibration Technician :	Lucky Jai	iswal	Sec	ondary Check:	Max	Moore
Calibration Date :	09 Jun 20	22	Rep	ort Issue Date :	20 J	un 2022
	Approved	Signatory :	Blan	1		Ken Williams
Characteristic Tested		Re	sult			
Generated Sound Pressure Lev	rel	P	155			
Frequency Generated		P	355			
Total Distortion		P	955			
Nomi	al Level	Nominal	Frequency	Measured La	evel	Measured Frequency
	94	10	000	94.09		1000.30
The sound calibrator has been sho	an to conform	to the class 2 reg	uirements for per	iodic testing, describ	ed in An	mex B of IEC 60942:2017 for
the sound pressure level(s)	and frequency	(ies) stated, for the	he environmental	conditions under wi	hich the t	ests were performed.
and the second se		Uncertainti	es of Measureme	ent -		
Specific Tests			Environmental	Conditions		
Generated SPL ±0.1	UaB		Temperat	ure	±0.1°C	
	1000				1.7.00.	

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.



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

Environmental Noise Monitoring

September 2022

Prepared for Wilpinjong Coal Pty Ltd

Wilpinjong Coal

Environmental Noise Monitoring

September 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	06/10/2022	Will Moore	Ryan Bruniges	Final

Approved by

kyper barrie /

Ryan Bruniges Senior Acoustic Consultant 6 October 2022

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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TABLE OF CONTENTS

1	Introduction 1			
	1.1	Background	1	
	1.2	Monitoring locations	1	
	1.3	Terminology and abbreviations	3	
2	Regul	atory requirements and noise criteria	4	
	2.1	Development consents	4	
	2.2	Environment protection licence	4	
	2.3	Noise Monitoring Program	4	
	2.4	Project Specific Criteria	4	
	2.5	Modifying Factors	5	
3 Methodology				
	3.1	Overview	6	
	3.2	Attended noise monitoring	6	
	3.3	Modifying factors	7	
	3.4	Attended noise monitoring equipment	7	
4	l Results		8	
	4.1	Total measured noise levels	8	
	4.2	Modifying factors	8	
	4.3	Attended noise monitoring results	9	
	4.4	Atmospheric conditions	10	
5	Discus	ssion	11	
	5.1	Noted noise sources	11	
6	Summary		18	

Appendices

Appendix A	Regulator documents	A.1
Appendix B	Calibration certificates	B.1

Tables

Table 1.1	Attended monitoring locations	1
Table 1.2	Terminology and abbreviations	3
Table 2.1	WCP project specific criteria, dB	4
Table 3.1	Attended noise monitoring equipment	7
Table 4.1	Measured noise levels ¹ - September 2022	8
Table 4.2	$L_{Aeq,15minute}$ generated by WCP against project specific criteria – September 2022	9
Table 4.3	$L_{A1,1minute}$ generated by WCP against project specific criteria - September 2022	9
Table 4.4	Measured atmospheric conditions – September 2022	10
Table 5.1	Historical WCP only noise levels at N6	12
Table 5.2	Historical WCP only noise levels at N14	13
Table 5.3	Historical WCP only noise levels at N15	14
Table 5.4	Historical WCP only noise levels at N17	15
Table 5.5	Historical WCP only noise levels at N19	16
Table 5.6	Historical WCP only noise levels at N20	17

Figures

Figure 1.1	Wilpinjong noise monitoring locations	2
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	11
Figure 5.2	Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village	12
Figure 5.3	Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads	13
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	14
Figure 5.5	Environmental noise levels N17, Mogo Road, off Araluen Road	15
Figure 5.6	Environmental noise levels N19, Upper Mogo Road	16
Figure 5.7	Environmental noise levels N20, Ringwood Road	17
1 Introduction

1.1 Background

Global Acoustics (now part of EMM) 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 northeast 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 19/20 September 2022 at eight locations.

1.2 Monitoring locations

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

Table 1.1 Attended monitoring locations

NMP Descriptor	Monitoring Location
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 and abbreviations

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

Table 1.2Terminology and 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 _{Amax}	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
L _{A1,1} minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
L _{Aeq}	The average noise A-weighted energy during a measurement period.
L _{A50}	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The L _{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 micro pascals.
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 Regulatory requirements and noise criteria

2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent 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	Day L _{Aeq,15minute}	Evening L _{Aeq,15minute}	Night L _{Aeq,15minute}	Night L _{A1,1minute}
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	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.

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and 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 Will Moore.

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,15minute} and L_{A1,1minute} (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 $L_{A1,1minute}$ 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_{Amax} , 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 noise.

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 "<30 dB").

Assessment of low frequency modifying factors is a two-step process as follows:

- 1. Comparison of C-weighted and A-weighted source contribution (in this case WCP). If the difference between these values is 15 dB(A) or more, then proceed to step 2.
- 2. Comparison of Z-weighted source noise levels in the range of 10-160 Hz against the third-octave reference threshold reproduced from NPfI Fact Sheet C. Where any third-octave noise level from the source exceeds the reference threshold below, a 2 dB or 5 dB positive adjustment is applied to the source L_{Aeq}, depending on the extent of the exceedance above the reference threshold.

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

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

dB(Z) = decibel (Z frequency weighted).

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 Attended noise monitoring equipment

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

Table 3.1 Attended noise monitoring equipment

Model	Serial number	Calibration due date		
Rion NA-28 sound level 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 monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5 of this report.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	20/09/2022 00:42	50	48	43	37	28	27	26
N14	20/09/2022 00:15	59	53	43	41	30	28	25
N15	19/09/2022 23:00	47	34	30	29	28	26	25
N17	19/09/2022 22:28	52	44	42	41	41	40	38
N19	19/09/2022 22:00	51	36	34	33	33	31	29
N20	19/09/2022 23:31	50	48	44	41	39	36	32

Table 4.1Measured noise levels 1 - September 2022

Notes: 1. Levels in this table are not necessarily the result of activity 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. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

4.3 Attended noise monitoring results

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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ^{4,5}
N6	20/09/2022 00:42	0.8	G	37	No	IA	NA
N14	20/09/2022 00:15	0.0	G	35	No	<25	NA
N15	19/09/2022 23:00	0.0	G	37	No	<25	NA
N17	19/09/2022 22:28	1.3	F	38	Yes	27	Nil
N19	19/09/2022 22:00	0.0	F	35	Yes	<25	Nil
N20	19/09/2022 23:31	0.0	G	35	No	IA	NA

Table 4.2LAeq, 15minute generated by WCP against project specific criteria – September 2022

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.

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 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ^{4,5}
N6	20/09/2022 00:42	0.8	G	45	No	IA	NA
N14	20/09/2022 00:15	0.0	G	45	No	<25	NA
N15	19/09/2022 23:00	0.0	G	45	No	<25	NA
N17	19/09/2022 22:28	1.3	F	45	Yes	34	Nil
N19	19/09/2022 22:00	0.0	F	45	Yes	26	Nil
N20	19/09/2022 23:31	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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.

Location	Start Date and Time	Temperature ° C	Wind Speed m/s	Wind Direction ^o Magnetic North ¹	Cloud Cover 1/8s
N6	20/09/2022 00:42	4	0.0	-	0
N14	20/09/2022 00:15	4	0.0	-	0
N15	19/09/2022 23:00	6	0.0	-	0
N17	19/09/2022 22:28	12	0.0	-	0
N19	19/09/2022 22:00	12	0.0	-	0
N20	19/09/2022 23:31	7	0.0	-	0

Table 4.4 Measured atmospheric conditions – September 2022

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 considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are 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 5.1 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} .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.



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

5.1.1 N6



Figure 5.2 Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village

WCP was inaudible throughout the measurement.

A train was responsible for the measured L_{A1} , L_{A10} and $L_{Aeq.}$ Insects were responsible for the measured L_{A50} and L_{A90} . Noise from dogs and local continuum was also noted.

Table 5.1Historical WCP only noise levels at N6

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
L _{Aeq}	IA	31	IA	IA	IA	IA	IA	<20	<25	30	IA	IA
L _{A1,1min}	IA	33	IA	IA	IA	IA	IA	23	<25	37	IA	IA

5.1.2

N14



Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads Figure 5.3

A mining continuum from WCP was audible during the measurement, generating a site only LAeq and LA1,1minute of less than 25 dB.

Cattle were responsible for the measured LA1, LA10 and LAeq. Frogs and insects were responsible for measured LA90 and LA50.

Table 5.2 Historical WCP only noise levels at N14

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
L _{Aeq}	IA	<25	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA
L _{A1,1min}	IA	25	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA

5.1.3 N15



Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} and $L_{A1,1minute}$ of less than 25 dB. Track noise was also noted.

Frogs and insects were responsible for the measured noise levels.

Noise from birds was also noted.

Table 5.3Historical WCP only noise levels at N15

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 ¹	July 2022	Aug 2022
L _{Aeq}	NM	33	IA	IA	IA	IA	IA	23	34	38/34	29	IA
L _{A1,1min}	NM	41	IA	IA	IA	IA	IA	32	38	42/35	40	IA

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.



Figure 5.5 Environmental noise levels N17, Mogo Road, off Araluen Road

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} of 27 dB. Engine surges generated a site only $L_{A1,1minute}$ of 34 dB.

Frogs and insects were responsible for measured noise levels.

Noise from birds was also noted.

Table 5.4Historical WCP only noise levels at N17

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
L _{Aeq}	IA	<20	IA	IA	IA	IA	IA	<20	32	23	27	IA
L _{A1,1min}	IA	<20	IA	IA	IA	IA	IA	23	37	28	30	IA



Figure 5.6 Environmental noise levels N19, Upper Mogo Road

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} of less than 25 dB. Engine surges generated a site only $L_{A1,1minute}$ of 26 dB.

Frogs and insects were responsible for measured noise levels.

Noise from an aeroplane and wildlife was also noted.

Table 5.5 Historical WCP only noise levels at N19

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
L _{Aeq}	IA	IA	<20	IA	IA	IA						
L _{A1,1min}	IA	IA	<20	IA	IA	IA						



Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A train was responsible for the measured L_{A1} , primarily responsible for the L_{A10} and contributed to the L_{Aeq} . Frogs and insects contributed to the L_{A10} and L_{Aeq} and were responsible for the measured L_{A50} and L_{A90} .

Noise from road traffic and running water was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
L _{Aeq}	IA	<25	22	IA	IA	IA						
L _{A1,1min}	IA	<25	28	IA	IA	IA						

6 Summary

Global Acoustics (now part of EMM) 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 done around WCP during the night period of 19/20 September 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the September 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Appendix A Regulator documents



SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

 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						
lote: 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)

	Day	Evening	Nig	Night		
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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		.2		
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;
 - 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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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.
- 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.

Hz/dB(Z)	One	One-third octave Lzeq.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

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

A.2 Environment 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.

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.

Location	Site	Туре	Easting ¹	Northing ¹	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

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	-	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 Rd⁴	-	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 ³	-	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	 As per Table 7, Figure 3 and Figure 4
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).

Notes: ¹ 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.

Appendix B Calibration certificates





All uncertainties are derived in the 95% confidence level with it converge factor of 2.

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



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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 Secondary Check: Harrison Kim Calibration Date : 26 May 2021 Report Issue Date : 26 May 2021 Approved Signatory : Mala Ken Williams Characteristic Tested Result Generated Sound Pressure Level Pairs Frequency Generated Pare Total Distortion Pass Nominal Frequency Nominal Level Measured Level Measured Frequency 0.4 1000 94.02 1000.40 The sound enlibrator has been shown to conform in the class 2 requirements for periodic testing, described in Amex B of IEC 60942:2017 for the sound pressure level(s) and frequency(res) stated, for the environmental conditions under which the tests were performed Least Uncertainties of Measurement Specific Tests Environmental Conditions Generated SPL Frequency 10.09% Temperatore Relative Humidity ±02°C 17.4% Distortion 土(1.89911) Barometric Pressure ±0.02.NkPa All substitutions are derived at the 85% confidence level with a coverage factor of 2 * The tests <1000 EIG are not covered by Acoustic Research Labs Pty Ltd NATA assered/lation This calibration certificate is to be read in conjunction with the calibration test report. Accessite Research Lubs Pty Lid & NATA Accessited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - calibration. The results of the tests, calibrations and/or measurements included in this documents are traccable to \$1 NATA is a signifiery to the ILAC Mutual Recognition Arrangement for the numual recognition of the equivalence of resting, medical testing, calibration and inspection reports-

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Wilpinjong Coal

Environmental Noise Monitoring

October 2022

Prepared for Wilpinjong Coal Pty Ltd

Wilpinjong Coal

Environmental Noise Monitoring

October 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	20/10/2022	Will Moore	Ryan Bruniges	Final

Approved by

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Ryan Bruniges Senior Acoustic Consultant 20 October 2022

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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TABLE OF CONTENTS

1	Introduction		1
	1.1	Background	1
	1.2	Monitoring locations	1
	1.3	Terminology and abbreviations	3
2	Regulatory requirements and noise criteria		4
	2.1	Development consents	4
	2.2	Environment protection licence	4
	2.3	Noise Monitoring Program	4
	2.4	Project Specific Criteria	4
	2.5	Modifying Factors	5
3	Methodology		6
	3.1	Overview	6
	3.2	Attended noise monitoring	6
	3.3	Modifying factors	7
	3.4	Attended noise monitoring equipment	7
4 Results		ts	8
	4.1	Total measured noise levels	8
	4.2	Modifying factors	8
	4.3	Attended noise monitoring results	9
	4.4	Atmospheric conditions	10
5	Discussion		11
	5.1	Noted noise sources	11
6 Summary		18	

Appendices

Appendix A	Regulator documents	A.1
Appendix B	Calibration certificates	B.1

Tables

Table 1.1	Attended monitoring locations	1
Table 1.2	Terminology and abbreviations	3
Table 2.1	WCP project specific criteria, dB	4
Table 3.1	Attended noise monitoring equipment	7
Table 4.1	Measured noise levels ¹ - October 2022	8
Table 4.2	$L_{Aeq,15minute}$ generated by WCP against project specific criteria – October 2022	9
Table 4.3	$L_{A1,1minute}$ generated by WCP against project specific criteria - October 2022	9
Table 4.4	Measured atmospheric conditions – October 2022	10
Table 5.1	Historical WCP only noise levels at N6	12
Table 5.2	Historical WCP only noise levels at N14	13
Table 5.3	Historical WCP only noise levels at N15	14
Table 5.4	Historical WCP only noise levels at N17	15
Table 5.5	Historical WCP only noise levels at N19	16
Table 5.6	Historical WCP only noise levels at N20	17

Figures

Figure 1.1	Wilpinjong noise monitoring locations	2
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	11
Figure 5.2	Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village	12
Figure 5.3	Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads	13
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	14
Figure 5.5	Environmental noise levels N20, Ringwood Road	17

1 Introduction

1.1 Background

Global Acoustics (now part of EMM) 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 northeast 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 October 2022 at four locations. Due to flood waters locations N14, N17 and N19 were not accessible. There was no suitable location to represent N17 and N19, so no measurements were undertaken for these locations. The measurement at N14 was done north of Wollar Creek, approximately 1km closer to WCP than the regular location for N14.

1.2 Monitoring locations

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

NMP Descriptor	Monitoring Location
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

Table 1.1 Attended monitoring locations




1.3 Terminology and abbreviations

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

Table 1.2Terminology and 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 _{Amax}	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
L _{A1,1} minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
L _{Aeq}	The average noise A-weighted energy during a measurement period.
L _{A50}	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The L _{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 micro pascals.
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 Regulatory requirements and noise criteria

2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent 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	Day L _{Aeq,15minute}	Evening L _{Aeq,15minute}	Night L _{Aeq,15minute}	Night L _{A1,1minute}
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	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.

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and 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 Tom Maddock.

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,15minute} and L_{A1,1minute} (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 $L_{A1,1minute}$ 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_{Amax} , 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 noise.

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 "<30 dB").

Assessment of low frequency modifying factors is a two-step process as follows:

- 1. Comparison of C-weighted and A-weighted source contribution (in this case WCP). If the difference between these values is 15 dB(A) or more, then proceed to step 2.
- 2. Comparison of Z-weighted source noise levels in the range of 10-160 Hz against the third-octave reference threshold reproduced from NPfI Fact Sheet C. Where any third-octave noise level from the source exceeds the reference threshold below, a 2 dB or 5 dB positive adjustment is applied to the source L_{Aeq}, depending on the extent of the exceedance above the reference threshold.

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

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

dB(Z) = decibel (Z frequency weighted).

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 Attended noise monitoring equipment

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

Table 3.1 Attended noise monitoring equipment

Model	Serial number	Calibration due date		
Rion NA-28 sound level meter	01070590	09/06/2024		
Pulsar 106 acoustic calibrator	74813	09/06/2024		

4 **Results**

4.1 Total measured noise levels

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

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	11/10/2022 22:21	62	44	41	39	37	35	33
N14	11/10/2022 23:00	51	47	46	45	45	45	44
N15	11/10/2022 22:00	81	53	46	47	42	39	35
N20	11/10/2022 23:45	46	40	39	37	37	35	33

Table 4.1Measured noise levels 1 - October 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.2 Modifying factors

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

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

4.3 Attended noise monitoring results

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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ^{4,5}
N6	11/10/2022 22:21	2.1	E	37	Yes	IA	Nil
N14	11/10/2022 23:00	2.7	E	35	Yes	<25	Nil
N15	11/10/2022 22:00	2.0	E	37	Yes	IA	Nil
N20	11/10/2022 23:45	2.4	E	35	Yes	IA	Nil

Table 4.2LAeq,15minute generated by WCP against project specific criteria – October 2022

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.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3 LA1,1minute generated by WCP against project specific criteria - October 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ^{4,5}
N6	11/10/2022 22:21	2.1	E	45	Yes	IA	Nil
N14	11/10/2022 23:00	2.7	E	45	Yes	<25	Nil
N15	11/10/2022 22:00	2.0	E	45	Yes	IA	Nil
N20	11/10/2022 23:45	2.4	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, including modifying factors if applicable.

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.

Location	Start Date and Time	Temperature ° C	Wind Speed m/s	Wind Direction ^o Magnetic North ¹	Cloud Cover 1/8s
N6	11/10/2022 22:21	15	0.1	10	0
N14	11/10/2022 23:00	12	0.6	10	0
N15	11/10/2022 22:00	14	0.0	-	0
N20	11/10/2022 23:45	15	0.0	-	0

Table 4.4 Measured atmospheric conditions – October 2022

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 considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are 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 5.1 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} .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.



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

5.1.1 N6



Figure 5.2 Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village

WCP was inaudible throughout the measurement.

Frogs and insects generated measured noise levels. Animals in nearby bushland contributed to the measured L_{A1} . Noise from a car was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
L _{Aeq}	31	IA	IA	IA	IA	IA	<20	<25	30	IA	IA	IA
L _{A1,1min}	33	IA	IA	IA	IA	IA	23	<25	37	IA	IA	IA

5.1.2 N14



Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} and $L_{A1,1minute}$ of less than 25 dB.

Frogs and insects generated measured noise levels.

Noise from birds and running water was also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
L _{Aeq}	<25	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25
L _{A1,1min}	25	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25

5.1.3 N15



Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible throughout the measurement.

A train was responsible for the L_{A1} and contributed to the L_{A10} and L_{Aeq} . Local continuum contributed to the L_{A10} and L_{Aeq} . Frogs and insects generated the L_{A50} and L_{A90} and contributed to the L_{Aeq} and L_{A10} .

Table 5.3Historical WCP only noise levels at N15

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 ¹	July 2022	Aug 2022	Sept 2022
L _{Aeq}	33	IA	IA	IA	IA	IA	23	34	38/34	29	IA	<25
L _{A1,1min}	41	IA	IA	IA	IA	IA	32	38	42/35	40	IA	<25

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.

5.1.4 N17

Measurements could not be taken for N17 as access was flooded.

Table 5.4 Historical WCP only noise levels at N17

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
L _{Aeq}	<20	IA	IA	IA	IA	IA	<20	32	23	27	IA	27
L _{A1,1min}	<20	IA	IA	IA	IA	IA	23	37	28	30	IA	34

5.1.5 N19

Measurements could not be taken for N19 as access was flooded.

Table 5.5 Historical WCP only noise levels at N19

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
L _{Aeq}	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA	<25
L _{A1,1min}	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA	26

5.1.6 N20



Figure 5.5 Environmental noise levels N20, Ringwood Road

WCP was inaudible throughout the measurement. Frogs and insects generated measured noise levels. Noise from traffic was also noted.

Table 5.6Historical WCP only noise levels at N20

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
L _{Aeq}	IA	IA	IA	IA	IA	IA	<25	22	IA	IA	IA	IA
L _{A1,1min}	IA	IA	IA	IA	IA	IA	<25	28	IA	IA	IA	IA

6 Summary

Global Acoustics (now part of EMM) 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 done around WCP during the night period of 11/12 October 2022. Due to flood waters locations N14, N17 and N19 were not accessible. There was no suitable location to represent N17 and N19, so no measurements were undertaken for these locations. The measurement at N14 was done north of Wollar Creek, approximately 1km closer to WCP than the regular location for N14.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the October 2022 survey.

Appendix A Regulator documents



SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

 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	
lote: 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)

	Day	Evening	Night		
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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		.2	
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;
 - 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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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.
- 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.

Hz/dB(Z)	One	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	

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

A.2 Environment 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.

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.

Location	Site	Туре	Easting ¹	Northing ¹	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

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	-	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 Rd⁴	-	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 ³	-	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	 As per Table 7, Figure 3 and Figure 4
Period	Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).

Notes: ¹ 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.

Appendix B Calibration certificates





Sound Level Meter IEC 61672-3:2013

Calibration Certificate

Calibration Number C22373

Client Details	EMM Consulting Suite 6, Level 1, 146 Hunter Street Newcastle NSW 2300	
Equipment Tested/ Model Number :	Rion NA-28	
Instrument Serial Number :	01070590	
Microphone Serial Number :	08184	
Pre-amplifier Serial Number :	52329	
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditi	ons
Ambient Temperature : 25.7°C	Ambient Temperature :	25.4°C
Relative Humidity : 31.9%	Relative Humidity :	32.4%
Barometric Pressure : 100.18kPa	Barometric Pressure :	100.11kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Max Moore	
Calibration Date : 9 Jun 2022	Report Issue Date : 20 Jun 2022	
Approved Signatory :	Hallows	Ken Williams
Clause and Characteristic Tested Res	sult Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting Pa	iss 17: Level linearity incl. the level range con	trol Pass
13: Electrical Sig. tests of frequency weightings Pa	ass 18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz Pa	iss 19: C Weighted Peak Sound Level	Pass
15: Long Term Stability Pa	ass 20: Overload Indication	Pass
16: Level linearity on the reference level range Pa	iss 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.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

OWNER AND INC.		Uncertainties of Measurement -	
Acoustic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1 °C
1 kHz	±0.13dB	Relative Humidity	=1.9%
SkHz	±0.14dB	Barometric Pressure	=0.014kPa
Electrical Tests	±0.13dB		

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

12.23	This calibration certificate is to be read in conjunction with the calibration test report.
NATA	Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - Calibration.
V	The results of the tests, calibrations and/or measurements included in this document are traceable to St units.
WORLD RECOGNIESD	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 L OF 1



Acoustic Research Labs Pty Ltd

Sound Calibrator IEC 60942:2017

Calibration Certificate

Calibration Number C22374

	C	ient Details	EMM Cons	ulting		
			Suite 6, Lev	el 1, 146 Hunte	r Stree	t
			Newcastle 1	NSW 2300		
Equipm	nent Tested/ Mode	Number :	Pulsar Mod	el 106		
	Instrument Seria	l Number :	74813			
		Atmosph	eric Conditi	ons		
	Ambient Ter	nperature :	25.8°C			
	Relative	Humidity :	33.6%			
	Barometri	Pressure :	100.19kPa			
Calibration Techni	ician : Lucky Jai	swal	Sec	ondary Check:	Ma	x Moore
Calibration	Date : 09 Jun 20	22	Ren	ort Issue Date :	20	Jun 2022
Canoranon	Leuve et alle alle alle	5F.	2	or c rasure Durie .		an early services and
	Approved	Signatory :	Ballan	-0		Ken Williams
Characteristic Teste	d	Re	sult			
Generated Sound Press	are Level	P	255			
Frequency Generated		P_{i}	255			
Total Distortion		P	255			
	Nominal Level	Nominal	Frequency	Measured L	evel	Measured Frequency
	94	10	100	94.09		1000,30
The sound calibrator has h the sound pressure	een shown to conform elevel(s) and frequency	to the class 2 req (ies) stated, for t	urements for pe	riodic testing, descri l conditions under w	bed in A hich the	annex B of IEC 60942:2017 for tests were performed.
		Uncertainti	es of Measurem	ant -		
Specific Tests			Environmental	Conditions		
Generated SPL	$\pm 0.10 dB$	10dB		ture	±0.1%	2
Frequency	±0.13%	Relative Humidity ±1.9%			5. K	
Distortion	$\pm 0.20\%$		Baromet	ic Pressure	± 0.014	4kP a

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





Wilpinjong Coal

Environmental Noise Monitoring

November 2022

Prepared for Wilpinjong Coal Pty Ltd

Wilpinjong Coal

Environmental Noise Monitoring

November 2022

Wilpinjong Coal Pty Ltd

E220456 RP11

Version	Date	Prepared by	Approved by	Comments
1.0	23/11/2022	Will Moore	Tony Welbourne	Final

Approved by

T. Weller

Tony Welbourne Associate Director 12 December 2022

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. The contents of this report are private and confidential. This report is only for Wilpinjong Coal Pty Ltd's use in accordance with its agreement with EMM and is not to be relied on by or made available to any other party without EMM's prior written consent. Except as permitted by the *Copyright Act 1968* (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Wilpinjong Coal Pty Ltd (and subject to the terms of EMM's agreement with Wilpinjong Coal Pty Ltd).

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TABLE OF CONTENTS

Intro	duction	1
1.1	Background	1
1.2	Monitoring locations	1
1.3	Terminology and abbreviations	3
Regu	latory requirements and noise criteria	4
2.1	Development consents	4
2.2	Environment protection licence	4
2.3	Noise Monitoring Program	4
2.4	Project Specific Criteria	4
2.5	Modifying Factors	5
Meth	odology	6
3.1	Overview	6
3.2	Attended noise monitoring	6
3.3	Modifying factors	7
3.4	Attended noise monitoring equipment	7
Resu	lts	8
4.1	Total measured noise levels	8
4.2	Modifying factors	8
4.3	Attended noise monitoring results	9
4.4	Atmospheric conditions	10
Discu	ssion	11
5.1	Noted noise sources	11
Sumr	nary	17
	Intro 1.1 1.2 1.3 Regu 2.1 2.2 2.3 2.4 2.5 Meth 3.1 3.2 3.3 3.4 Resul 4.1 4.2 4.3 4.2 4.3 4.4 Discu 5.1 Summ	Introduction 1.1 Background 1.2 Monitoring locations 1.3 Terminology and abbreviations Reputation abbreviations Abvelopment consents Abvelopment consents Abvelopment protection licence Abvelopment protection licence Abvelopment protection licence Abvelopment protection Criteria Abvelopment Specific Criteria Attended noise monitoring Program Attended noise monitoring Attended noise monitoring Attended noise monitoring equipment Attended noise monitoring results Attended noise monitoring results Attended noise monitoring results Attended noise monitoring results Attended noise sources Attended noise sources </td

Appendices

Appendix A	Regulator documents
Appendix B	Calibration certificates

Tables

Table 1.1	Attended monitoring locations	1
Table 1.2	Terminology and abbreviations	3
Table 2.1	WCP project specific criteria, dB	4
Table 3.1	Attended noise monitoring equipment	7
Table 4.1	Measured noise levels ¹ - November 2022	8
Table 4.2	LAeq,15minute generated by WCP against project specific criteria – November 2022	9
Table 4.3	LA1,1minute generated by WCP against project specific criteria - November 2022	9
Table 4.4	Measured atmospheric conditions – November 2022	10
Table 5.1	Historical WCP only noise levels at N6	12
Table 5.2	Historical WCP only noise levels at N14	13
Table 5.3	Historical WCP only noise levels at N15	14
Table 5.4	Historical WCP only noise levels at N17	15
Table 5.5	Historical WCP only noise levels at N19	15
Table 5.6	Historical WCP only noise levels at N20	16

Figures

Figure 1.1	Wilpinjong noise monitoring locations	2
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	11
Figure 5.2	Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village	12
Figure 5.3	Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads	13
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	14
Figure 5.5	Environmental noise levels N20, Ringwood Road	16

1 Introduction

1.1 Background

Global Acoustics (now part of EMM) 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 northeast 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 15/16 November 2022 at four locations. Locations N17 and N19 were not accessible due to a road closure related to flooding. There were no suitable alternate locations to represent N17 and N19 that were accessible, so no monitoring occurred for these locations.

1.2 Monitoring locations

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

Table 1.1 Attended monitoring locations

NMP Descriptor	Monitoring Location
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 and abbreviations

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

Table 1.2Terminology and abbreviations

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
LAmax	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
L _{Aeq}	The average noise A-weighted energy during a measurement period.
LA50	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The L _{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 micro pascals.
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 Regulatory requirements and noise criteria

2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent 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	Day ^L Aeq,15minute	Evening ^L Aeq,15minute	Night ^L Aeq,15minute	Night ^L A1,1minute
N6 ¹	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17 ²	36	36	38	45
N19	35	35	35	45
N20	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.

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and 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 done 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 Will Moore.

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 LAeq,15minute and LA1,1minute (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 (eg, 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 (eg, 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.

For this assessment the measured L_{Amax} has been used as a conservative estimate of L_{A1,1minute}. The EPA accepts sleep disturbance analysis based on either the L_{A1,1minute} or L_{Amax} metrics, with the L_{Amax} resulting in a more conservative assessment of site noise emissions.

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 noise.

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 (eg "<20 dB" or "<30 dB").

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 Attended noise monitoring equipment

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

Table 3.1 Attended noise monitoring equipment

Model	Serial number	Calibration due date			
Rion NA-28 sound level meter	01070590	09/06/2024			
Pulsar 106 acoustic calibrator	74813	09/06/2024			

4 **Results**

4.1 Total measured noise levels

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

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	LA50 dB	L _{A90} dB	L _{Amin} dB
N6	15/11/2022 23:37	43	36	33	32	31	30	28
N14	15/11/2022 22:45	50	40	37	35	35	33	30
N15	15/11/2022 23:15	44	40	37	35	34	31	28
N20	15/11/2022 22:00	46	43	42	41	40	39	36

Table 4.1Measured noise levels 1 - November 2022

Notes: 1. Levels in this table are not necessarily the result of activity 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. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

4.3 Attended noise monitoring results

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.

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	15/11/2022 23:37	2.4	С	37	Yes	<25	Nil
N14	15/11/2022 22:45	3.0	D	35	Yes	<25	Nil
N15	15/11/2022 23:15	3.3	E	37	No	<25	NA
N20	15/11/2022 22:00	2.6	D	35	Yes	IA	Nil

Table 4.2LAeq, 15minute generated by WCP against project specific criteria – November 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3 LA1,1minute generated by WCP against project specific criteria - November 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{A1,1} min dB ^{3,4}	Exceedance dB ⁴
N6	15/11/2022 23:37	2.4	С	45	Yes	27	Nil
N14	15/11/2022 22:45	3.0	D	45	Yes	30	Nil
N15	15/11/2022 23:15	3.3	E	45	No	<25	NA
N20	15/11/2022 22:00	2.6	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, including modifying factors if applicable.

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 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.

Location	Start Date and Time	Temperature ° C	Wind Speed m/s	Wind Direction ^o Magnetic North ¹	Cloud Cover 1/8s
N6	15/11/2022 23:37	13	0.0	-	2
N14	15/11/2022 22:45	13	0.5	50	0
N15	15/11/2022 23:15	14	0.5	10	2
N20	15/11/2022 22:00	14	0.4	240	0

Table 4.4 Measured atmospheric conditions – November 2022

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 considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are 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 5.1 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} .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.



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

5.1.1 N6



Figure 5.2 Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} of less than 25 dB. Engine surges generated the site only $L_{A1,1minute}$ of 27 dB.

Frogs and insects generated measured noise levels.

Noise from bats, a dog, and an owl was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022
L _{Aeq}	IA	IA	IA	IA	IA	<20	<25	30	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	23	<25	37	IA	IA	IA	IA

E220456 | RP11 | v1

5.1.2 N14



Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} of less than 25 dB. Engine surges generated the site only $L_{A1,1minute}$ of 30 dB. Impact noise was also noted.

Frogs and insects generated measured noise levels.

Noise from cattle was also noted.

Table 5.2Historical WCP only noise levels at N14

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022
L _{Aeq}	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25
LA1,1min	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25

5.1.3 N15



Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} and $L_{A1,1minute}$ of less than 25 dB.

Frogs and insects generated measured noise levels.

Noise from sheep and breeze in nearby foliage was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 ¹	July 2022	Aug 2022	Sept 2022	Oct 2022
LAeq	IA	IA	IA	IA	IA	23	34	38/34	29	IA	<25	IA
LA1,1min	IA	IA	IA	IA	IA	32	38	42/35	40	IA	<25	IA

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.

5.1.4 N17

Measurement could not be taken for N17 as access was closed due to flooding.

Table 5.4 Historical WCP only noise levels at N17

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹
LAeq	IA	IA	IA	IA	IA	<20	32	23	27	IA	27	-
LA1,1min	IA	IA	IA	IA	IA	23	37	28	30	IA	34	-

Notes: 1. Measurement could not be taken as access to N17 was closed due to flooding.

5.1.5 N19

Measurement could not be taken for N19 as access was closed due to flooding.

Table 5.5Historical WCP only noise levels at N19

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹
L _{Aeq}	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA	<25	-
LA1,1min	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA	26	-

Notes: 1. Measurement could not be taken as access to N19 was closed due to flooding.

5.1.6 N20



Figure 5.5 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

Frogs and insects generated measured noise levels.

Noise from traffic and a plane were also noted.

Table 5.6Historical WCP only noise levels at N20

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022
L _{Aeq}	IA	IA	IA	IA	IA	<25	22	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	<25	28	IA	IA	IA	IA	IA

6 Summary

Global Acoustics (now part of EMM) 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 attended noise monitoring survey purpose 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 done around WCP during the night period of 15/16 November 2022. Locations N17 and N19 were not accessible due to a road closure related to flooding. There were no suitable alternate locations to represent N17 and N19 that were accessible, so no monitoring occurred for these locations.

Noise levels from WCP complied with relevant noise limits at all accessible monitoring locations during the November 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Appendix A Regulator documents



SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

 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	
ote: 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

 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)

	Day	Evening	Nig	iht
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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		2
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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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.
- 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.

Hz/dB(Z)	One	third oc	tave L	Zeq, 15mir	nute three	eshold le	evel						
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

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

A.2 Environment 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.

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.

Location	Site	Туре	Easting ¹	Northing ¹	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	1	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	10	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 ⁴	-*	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 ³	0	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	As per Table 7, Figure 3 and Figure 4
Period	 Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).

Notes: ¹ 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.

Appendix B Calibration certificates





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

Sound Level Meter IEC 61672-3:2013

Calibration Certificate

Calibration Number C22373

Client Detail	s EM Suit Nev	M Consulting te 6, Level 1, 146 Hunter Street veastle NSW 2300	
Equipment Tested/ Model Number	: Rio	n NA-28	_
Instrument Serial Number	: 010	70590	
Microphone Serial Number	: 081	84	
Pre-amplifier Serial Number	: 523	29	
Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditi	ons
Ambient Temperature : 25.7°C		Ambient Temperature :	25.4°C
Relative Humidity : 31.9%		Relative Humidity :	32.4%
Barometric Pressure : 100.18kPa		Barometric Pressure :	100.11kPa
Calibration Technician : Lucky Jaiswal Calibration Date : 9 Jun 2022		Secondary Check: Max Moore Report Issue Date : 20 Jun 2022	1
Approved Signatory	: 12	allams	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 con	trol 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.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

N 17 4 3 1		Uncertainties of Measurement -	
Aconstic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1°C
1kHz	±0.13dB	Relative Humidity	±1.9%
SkHz	±0.14dB	Barometric Pressure	±0.014kPa
Electrical Tests	±0.13dB		

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.



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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ACCREDITATION



Acoustic Research Labs Pty Ltd

Sound Calibrator IEC 60942:2017

Calibration Certificate

Calibration Number C22374

	C	ient Details	EMM Cons	ulting		
Construction of the second s			Suite 6, Lev	el 1, 146 Hunter	Street	
			Newcastle 1	NSW 2300		
Equipme	nt Tested/ Mod	l Number :	Pulsar Mod	el 106		
L L	nstrument Seria	l Number :	74813			
		Atmosph	eric Conditi	ons		
	Ambient Ter	nperature :	25.8°C			
	Relative	Humidity :	33.6%			
	Barometri	c Pressure :	100.19kPa			
Calibration Technici	an : Lucky Ja	swal	Sec	ondary Check:	Max M	Moore
Calibration Da	ite : 09 Jun 20	22	Rep	ort Issue Date :	20 Ju	n 2022
			· alla			nerge and the second
	Approved	Signatory :	Billan	0		Ken Williams
Characteristic Tested		Re	sult			
Generated Sound Pressur	e Level	Pe	255			
Frequency Generated		P_{i}	355			
Total Distortion		P_{i}	255			
N	ominal Level	Nominal	Frequency	Measured Le	vel	Measured Frequency
	94	10	000	94.09		1000.30
The sound calibrator has been the sound pressure le	n shown to conform vel(s) and frequency	to the class 2 req (ies) stated, for t	uirements for pe	riodic testing, describ l conditions under wh	ed in Ann ich the te	ex B of IEC 60942:2017 for sts were performed
		Uncertainti	es of Measurem	ent -		·
pecific Tests		Environmental	Conditions			
Generated SPL	$\pm 0.10 dB$		Temperature ±0.		±0.1°C	
Frequency	±0.1.3%	26		Humidity	±1.9%	
Distortion	±0.20%		Baromet	ric Pressure	±0.014kF	a

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



E220456 | RP11 | v1



Wilpinjong Coal

Environmental Noise Monitoring

December 2022

Prepared for Wilpinjong Coal Pty Ltd

Wilpinjong Coal

Environmental Noise Monitoring

December 2022

Wilpinjong Coal Pty Ltd

E220456 RP12

Version	Date	Prepared by	Approved by	Comments
1.0	06/01/2023	Will Moore	Jesse Tribby	Final

Approved by

ene hilly

Jesse Tribby Senior Acoustic Consultant 6 January 2023

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. The contents of this report are private and confidential. This report is only for Wilpinjong Coal Pty Ltd's use in accordance with its agreement with EMM and is not to be relied on by or made available to any other party without EMM's prior written consent. Except as permitted by the *Copyright Act 1968* (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Wilpinjong Coal Pty Ltd (and subject to the terms of EMM's agreement with Wilpinjong Coal Pty Ltd).

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TABLE OF CONTENTS

1.1 Background 1.2 Monitoring locations 1.3 Terminology and abbreviations 2 Regul→or requirements and noise criteria 2.1 Development consents 2.2 Environment protection licence 2.3 Noise Monitoring Program 2.4 Project Specific Criteria 2.5 Modifying Factors 3.1 Overview 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Attended noise monitoring results 4.2 Modifying factors 5 Discusion	1
 1.2 Monitoring locations 1.3 Terminology and abbreviations Reguitory requirements and noise criteria 2.1 Development consents 2.2 Environment protection licence 2.3 Noise Monitoring Program 2.4 Project Specific Criteria 2.5 Modifying Factors Mettology 3.1 Overview 3.2 Attended noise monitoring equipment 3.4 Attended noise monitoring equipment 4.1 Total measured noise levels 4.2 Modifying factors 3.3 Attended noise monitoring results 4.4 Attended noise monitoring results 4.5 Modifying factors 5 Discustory 	1
 1.3 Terminology and abbreviations Regui→ry requirements and noise criteria 2.1 Development consents 2.2 Environment protection licence 2.3 Noise Monitoring Program 2.4 Project Specific Criteria 2.5 Modifying Factors Meti→ology 3.1 Overview 3.2 Attended noise monitoring 3.4 Attended noise monitoring equipment Resui→ 4.1 Total measured noise levels 4.2 Modifying factors 3.3 Attended noise monitoring results 4.3 Attended noise monitoring results 4.3 Attended noise monitoring results 4.4 Attended noise monitoring results 4.5 Discui→ 	1
 Regulatory requirements and noise criteria 2.1 Development consents 2.2 Environment protection licence 2.3 Noise Monitoring Program 2.4 Project Specific Criteria 2.5 Modifying Factors Methology 3.1 Overview 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment Resulational devices 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.3 Attended noise monitoring results 4.4 Attended noise monitoring results 5 Discustor 	3
 2.1 Development consents 2.2 Environment protection licence 2.3 Noise Monitoring Program 2.4 Project Specific Criteria 2.5 Modifying Factors 3 Methology 3.1 Overview 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment 4 Results 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Attmospheric conditions 	4
 2.2 Environment protection licence 2.3 Noise Monitoring Program 2.4 Project Specific Criteria 2.5 Modifying Factors 3 Methology 3.1 Overview 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment 4 Results 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Attmospheric conditions 	4
 2.3 Noise Monitoring Program 2.4 Project Specific Criteria 2.5 Modifying Factors 3 Methology 3.1 Overview 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment 4 Attended noise monitoring equipment 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Attended noise monitoring results 5 Discustor 	4
 2.4 Project Specific Criteria 2.5 Modifying Factors 3 Meth→ology 3.1 Overview 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment 4 Result> 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Attended noise monitoring results 5 Discution 	4
 2.5 Modifying Factors Meth-Jology 3.1 Overview 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment Result 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Attended noise monitoring results 5 Discustor 	4
 Methology 0verview Attended noise monitoring Modifying factors Attended noise monitoring equipment 	5
 3.1 Overview 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment 4 Results 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Atmospheric conditions 5 Discustoria 	6
 3.2 Attended noise monitoring 3.3 Modifying factors 3.4 Attended noise monitoring equipment Attended noise monitoring equipment 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Attended noise monitoring results 5 Discusion 	6
 3.3 Modifying factors 3.4 Attended noise monitoring equipment A Results 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Atmospheric conditions 5 Discusion 	6
 3.4 Attended noise monitoring equipment A Result 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Atmospheric conditions 5 Discustorial 	6
 Results 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Atmospheric conditions Discusion 	7
 4.1 Total measured noise levels 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Atmospheric conditions 5 Discussion 	8
 4.2 Modifying factors 4.3 Attended noise monitoring results 4.4 Atmospheric conditions 5 Discussion 	8
 4.3 Attended noise monitoring results 4.4 Atmospheric conditions 5 Discussion 	8
4.4 Atmospheric conditions5 Discussion	9
5 Discussion	10
	11
5.1 Noted noise sources	11
6 Summary	17

Appendices

Appendix A	Regulator documents
Appendix B	Calibration certificates

Tables

Table 1.1	Attended monitoring locations	1
Table 1.2	Terminology and abbreviations	3
Table 2.1	WCP project specific criteria, dB	4
Table 3.1	Attended noise monitoring equipment	7
Table 4.1	Measured noise levels ¹ - December 2022	8
Table 4.2	$L_{Aeq,15minute}$ generated by WCP against project specific criteria – December 2022	9
Table 4.3	$L_{A1,1minute}$ generated by WCP against project specific criteria - December 2022	9
Table 4.4	Measured atmospheric conditions – December 2022	10
Table 5.1	Historical WCP only noise levels at N6	12
Table 5.2	Historical WCP only noise levels at N14	13
Table 5.3	Historical WCP only noise levels at N15	14
Table 5.4	Historical WCP only noise levels at N17	15
Table 5.5	Historical WCP only noise levels at N19	15
Table 5.6	Historical WCP only noise levels at N20	16

Figures

Figure 1.1	Wilpinjong noise monitoring locations	2
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	11
Figure 5.2	Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village	12
Figure 5.3	Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads	13
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	14
Figure 5.5	Environmental noise levels N20, Ringwood Road	16

1 Introduction

1.1 Background

Global Acoustics (now part of EMM) 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 northeast 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 December 2022 at four locations. Locations N17 and N19 were not accessible due to a road closure related to flooding. There were no suitable alternate locations to represent N17 and N19 that were accessible, so no monitoring occurred for these locations.

1.2 Monitoring locations

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

Table 1.1 Attended monitoring locations

NMP Descriptor	Monitoring Location
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 and abbreviations

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

Table 1.2Terminology and abbreviations

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
LAmax	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
L _{Aeq}	The average noise A-weighted energy during a measurement period.
LA50	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The L _{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	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 micro pascals.
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 Regulatory requirements and noise criteria

2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent 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	Day LAeq,15minute	Evening ^L Aeq,15minute	Night ^L Aeq,15minute	Night ^L A1,1minute
N6 ¹	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17 ²	36	36	38	45
N19	35	35	35	45
N20	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.

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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and 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 done 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 Will Moore.

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 LAeq,15minute and LA1,1minute (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 (eg, 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 (eg, 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.

For this assessment the measured L_{Amax} has been used as a conservative estimate of L_{A1,1minute}. The EPA accepts sleep disturbance analysis based on either the L_{A1,1minute} or L_{Amax} metrics, with the L_{Amax} resulting in a more conservative assessment of site noise emissions.

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 noise.

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 "<30 dB").

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 Attended noise monitoring equipment

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

Table 3.1 Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level 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 monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5 of this report.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	LA50 dB	L _{A90} dB	L _{Amin} dB
N6	6/12/2022 23:35	56	50	44	39	28	24	22
N14	6/12/2022 22:45	48	46	42	37	33	29	25
N15	6/12/2022 23:15	50	43	38	34	31	27	24
N20	6/12/2022 22:00	46	43	37	35	33	31	27

Table 4.1 Measured noise levels 1 - December 2022

Notes: 1. Levels in this table are not necessarily the result of activity 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. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

4.3 Attended noise monitoring results

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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ^{4,5}
N6	6/12/2022 23:35	0.4	F	37	Yes	<20	Nil
N14	6/12/2022 22:45	1.1	F	35	Yes	IA	Nil
N15	6/12/2022 23:15	0.0	G	37	No	<20	NA
N20	6/12/2022 22:00	0.7	F	35	Yes	IA	Nil

Table 4.2LAeq,15minute generated by WCP against project specific criteria – December 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3LA1,1minute generated by WCP against project specific criteria - December 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB ⁵	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ^{4,5}
N6	6/12/2022 23:35	0.4	F	45	Yes	<20	Nil
N14	6/12/2022 22:45	1.1	F	45	Yes	IA	Nil
N15	6/12/2022 23:15	0.0	G	45	No	<20	NA
N20	6/12/2022 22:00	0.7	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, including modifying factors if applicable.

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 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.

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction ^o Magnetic North ¹	Cloud Cover 1/8s
N6	6/12/2022 23:35	12	0.0	-	1
N14	6/12/2022 22:45	14	0.0	-	0
N15	6/12/2022 23:15	14	0.6	170	1
N20	6/12/2022 22:00	16	0.0	-	0

Table 4.4 Measured atmospheric conditions – December 2022

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 considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are 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 5.1 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} .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.



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

5.1.1 N6



Figure 5.2 Environmental noise levels N6, St Laurence O'Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} and $L_{A1,1minute}$ of less than 25 dB.

Birds were responsible for generating the measured L_{A1} , L_{A10} and L_{Aeq} . Frogs and insects generated measured L_{A50} and L_{A90} .

Noise from cattle, dogs, and a train was also noted.

Table 5.1Historical WCP only noise levels at N6

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022
L _{Aeq}	IA	IA	IA	IA	<20	<25	30	IA	IA	IA	IA	<25
LA1,1min	IA	IA	IA	IA	23	<25	37	IA	IA	IA	IA	27

5.1.2 N14



Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Birds were responsible for generating the measured L_{A1} , L_{A10} and L_{Aeq} . Frogs and insects were responsible for generating the measured L_{A50} and L_{A90} .

Continuum from an electric substation and noise from cattle and bats was also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022
L _{Aeq}	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25	<25
LA1,1min	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25	30

5.1.3 N15



Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only L_{Aeq} and LA1,1minute of less than 20 dB. Track noise was also noted.

Dogs were primarily responsible for generating the measured L_{A1} and contributed to the L_{A10} and L_{Aeq} . Birds contributed to the L_{A1} and L_{A10} . Frogs and insects were primarily responsible for generating the measured L_{Aeq} and generated the L_{A50} and L_{A90} .

Noise from aeroplane and cattle was also noted.

Table 5.3Historical WCP only noise levels at N15

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 ¹	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022
LAeq	IA	IA	IA	IA	23	34	38/34	29	IA	<25	IA	<25
LA1,1min	IA	IA	IA	IA	32	38	42/35	40	IA	<25	IA	<25

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.

5.1.4 N17

Measurement could not be taken for N17 as access was closed due to flooding.

Table 5.4 Historical WCP only noise levels at N17

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹
L _{Aeq}	IA	IA	IA	IA	<20	32	23	27	IA	27	-	-
LA1,1min	IA	IA	IA	IA	23	37	28	30	IA	34	-	-

Notes: 1. Measurement could not be taken as access to N17 was closed due to flooding.

5.1.5 N19

Measurement could not be taken for N19 as access was closed due to flooding.

Table 5.5Historical WCP only noise levels at N19

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹
L _{Aeq}	IA	IA	IA	IA	IA	<20	IA	IA	IA	<25	-	-
LA1,1min	IA	IA	IA	IA	IA	<20	IA	IA	IA	26	-	-

Notes: 1. Measurement could not be taken as access to N19 was closed due to flooding.

5.1.6 N20



Figure 5.5 Environmental noise levels N20, Ringwood Road

WCP was inaudible throughout the measurement.

A train generated the measured L_{A1} and contributed to the measured L_{A10} and L_{Aeq} . Frogs and insects contributed to the measured L_{A10} and L_{Aeq} , and generated the measured L_{A50} and L_{A90} .

Noise from flowing water was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022
L _{Aeq}	IA	IA	IA	IA	<25	22	IA	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	<25	28	IA	IA	IA	IA	IA	IA

6 Summary

Global Acoustics (now part of EMM) 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 done around WCP during the night period of 6/7 December 2022. Locations N17 and N19 were not accessible due to a road closure related to flooding. There were no suitable alternate locations to represent N17 and N19 that were accessible, so no monitoring occurred for these locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the December 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Appendix A Regulator documents



SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

 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	
ote: 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

 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)

	Day	Evening	Nig	iht
Location	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LAI(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		2
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

- 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

- 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

- 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

 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

- Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
- 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.
- 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.

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

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

A.2 Environment 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.

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.

Location	Site	Туре	Easting ¹	Northing ¹	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	1	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Table 7 Noise Monitoring Locations

Location	Site	Туре	Easting ¹	Northing ¹	Justification
Wollar Village ⁴	10	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 ⁴	-*	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 ³	0	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	As per Table 7, Figure 3 and Figure 4			
Period	 Night-time period (10 pm to 7 am) being the most sensitive time period for noise. 			
Frequency	 12 times per year¹ (i.e. one night per month); plus 12 times per year¹ (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5). 			

Notes: ¹ 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.

Appendix B Calibration certificates





The sound level meter submitted for testing has successfully completed the class 4 periodic tests of IEC 61872-3-2013, for the environmental conditions under which the tests were performed

As public evidence was available, fram 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 usual level mean 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.

	Lea	st Uncertainties of Measurement -		
Acoustic Tests		Environmental Conditions		
125Hz IAHz MiHz Electrical Tests	=0.12dB =0.47dD =0.13dB =0.13dB =0.05dB	Temperaturi Belative Homositi Barinmetric Pressure	=00.2°C +2.4°0 ≈0.015kPa	

All anternameters are derived at the UPS confidence level with a coverage factor of 2

This califyration cartificate is to be read in conjunction with the califyration test report. Accustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172

NATA

Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the fests, orlibrations and/or measurements included in this document are traceable to \$1 mills.

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PAGE LOF 1



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 C21341

	Clie	nt Details	Global Acor	ustics Pty Ltd			
			12/16 Hunti Thornton N	ngdale Drive SW 2322			
Equipme 1	nt Tested/ Model ! nstrument Serial !	Number : Number :	Pulsar Mode 79631	el 106			
		Atmosph	heric Conditi	ons			
	Ambient Temp	erature :	22.7°C	10			
	Relative H	umidity +	47 50%				
	Barometric P	ressure :	100.64kPa				
Calibration Technic	ian : Jeff Yu		Sec	ondary Chec	k: Hai	Tison Kim	
Calibration D	ate: 26 May 202	1	Repo	ort Issue Date	e: 26	May 2021	
	Approved Si	gnatory :	Kam	0			Ken Williams
Characteristic Tested	1	Re	sult				
Generated Sound Pressur	e Level	Pi	axs				
Frequency Generated		P_i	a.s.s				
Total Distortion		P	I.S.V				
N	ominal Level	Nominal	Frequency	Measured	Level	Measur	ed Frequency
	94	10	000	94.02		1	000.40
The sound calibrator has bee the sound pressure le	n shown to conform to t wel(s) and frequency(ies	he class 2 req) stated, for t	uirements for per	iodic testing, des conditions under	cribed in A	amex B of IE	C 60942:2017 for r formed
		east Uncertai	intics of Measure	ment -			
Spocific Tests	11130		Environmental	Conditions			
Generated SPL	$\pm 0.14 dB$		Tempenar	BV'BP	±0.2%		
Distortion	10.0095		Relative I	fumiality in Research	22.4%	si	
Forestor allow	641419-70		Difficult I	a retsure	-20,01.	11/12	
	All uncortainlies ure der	treed in the 95	Ph com/fidence lev	el nútil à conveg	r factor of	12	
* The	teas <1000 kHz are not	covered by /	Acountie Research	Libs Pro Ltd N	ATA acces	ditation	
	and the second second		and the second s		A LA BOARD	ALCONT.	

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, Accredised for compliance with ISO/IEC 17025 - calibration.



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

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Wilpinjong Coal

Annual Environmental Monitoring Report 2022

Prepared for Wilpinjong Coal Pty Ltd

March 2023

Wilpinjong Coal

Annual Environmental Monitoring Report 2022

Wilpinjong Coal Pty Ltd

E220456 RP#01

March 2023

Version	Date	Prepared by	Reviewed by	Comments
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Approved by

Alle

Robert Kirwan Associate Acoustic Consultant 14 March 2023

Level 3 175 Scott Street Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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Executive Summary

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal (WCP) Pty Ltd to provide an Annual Environmental Monitoring Report for 2022, 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 2022. 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 2022 Compliance

During 2022 attended noise monitoring, noise levels from WCP complied with relevant noise limits at all monitoring locations, with a single exception. There was one exceedance of WCP impact assessment LAeq noise criteria at N15 in June 2022. A follow up measurement was conducted directly afterwards and WCP levels were compliant with relevant criteria.

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. At N14, N19, and N20, site only L_{Aeq} noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements. At N6, N15, and N17, site only L_{Aeq} noise levels were occasionally above 30 dB and long-term noise trend lines indicate site only L_{Aeq} noise levels have increased slightly during attended noise monitoring.

EIS Comparison

When comparable, measured noise levels were lower than predicted noise levels under corresponding meteorological conditions at all locations during all measurements, with three exceptions.

During the April 2022 measurement at N15, the measured site only L_{Aeq} was 5 dB higher than predicted under calm conditions. The measured site only L_{Aeq} was 12 dB lower than the relevant criterion during this measurement.

During the May 2022 measurement at N20, the measured site only L_{Aeq} was 13 dB higher than predicted under calm conditions. The measured site only L_{Aeq} was 13 dB lower than the relevant criterion during this measurement.

During the June 2022 measurement at N15, the measured site only L_{Aeq} was 3 dB higher than predicted under strong inversion conditions. The measured site only L_{Aeq} was 1 dB higher than the relevant criterion during this measurement.

TABLE OF CONTENTS

Exe	ecutive	ES.1			
1	Intro	1			
	1.1	Background	1		
	1.2	Monitoring locations	1		
	1.3	Terminology and abbreviations	1		
2	Statu	tory requirements and criteria	2		
	2.1	Project approval	2		
	2.2	Development consents	2		
	2.3	Environment protection licence	2		
	2.4	Noise Monitoring Program	2		
	2.5	Project Specific Criteria	2		
	2.6	Modifying Factors	3		
3	Meth	nodology	4		
	3.1	Overview	4		
	3.2	Attended noise monitoring	4		
	3.3	Modifying factors	5		
	3.4	Attended real time noise monitoring comparison	5		
	3.5	Comparison with WEP EIS model predictions	5		
4	Resu	lts	7		
	4.1	January 2022	7		
	4.2	February 2022	10		
	4.3	March 2022	13		
	4.4	April 2022	16		
	4.5	May 2022	19		
	4.6	June 2022	22		
	4.7	July 2022	25		
	4.8	August 2022	28		
	4.9	September 2022	31		
	4.10	October 2022	34		
	4.11	November 2022	37		
	4.12	December 2022	40		
5	Long term trends				

	5.1	Noise trend graphs	43			
	5.2	Discussion	47			
6	Comparison with EIS modelled predictions					
	6.1	Results	49			
	6.2	Discussion	55			
7	Sumn	nary	56			
	7.1	January to December 2022 compliance	56			
	7.2	Long term noise trends	56			
	7.3	EIS Comparison	56			

Tables

Table 1.1	Attended monitoring locations	1
Table 1.2	Terminology and abbreviations	1
Table 2.1	WCP project specific criteria, dB	2
Table 3.1	attended and real time monitoring locations for comparison	5
Table 3.2	Meteorological condition definitions	6
Table 4.1	Measured noise levels ¹ – January 2022	7
Table 4.2	LAeq,15minute generated by WCP against project specific criteria – January 2022	8
Table 4.3	LA1,1minute generated by WCP against project specific criteria – January 2022	8
Table 4.4	Real time and attended noise levels ¹ – January 2022	9
Table 4.5	Measured noise levels ¹ – February 2022	10
Table 4.6	LAeq,15minute generated by WCP against project specific criteria – February 2022	11
Table 4.7	LA1,1minute generated by WCP against project specific criteria – February 2022	11
Table 4.8	Real time and attended noise levels ¹ – February 2022	12
Table 4.9	Measured noise levels ¹ – March 2022	13
Table 4.10	LAeq,15minute generated by WCP against project specific criteria – March 2022	14
Table 4.11	LA1,1minute generated by WCP against project specific criteria – March 2022	14
Table 4.12	Real time and attended noise levels ¹ – March 2022	15
Table 4.13	Measured noise levels ¹ – April 2022	16
Table 4.14	LAeq,15minute generated by WCP against project specific criteria – April 2022	17
Table 4.15	LA1,1minute generated by WCP against project specific criteria – April 2022	17
Table 4.16	Real time and attended noise levels ¹ – April 2022	18
Table 4.17	Measured noise levels ¹ – May 2022	19
Table 4.18	LAeq,15minute generated by WCP against project specific criteria – May 2022	20
Table 4.19	LA1,1minute generated by WCP against project specific criteria – May 2022	20
Table 4.20	Real time and attended noise levels ¹ – May 2022	21
Table 4.21	Measured noise levels ¹ – June 2022	22

Table 4.22	LAeq,15minute generated by WCP against project specific criteria – June 2022	23
Table 4.23	LA1,1minute generated by WCP against project specific criteria – June 2022	23
Table 4.24	Real time and attended noise levels ¹ – June 2022	24
Table 4.25	Measured noise levels 1 – July 2022	25
Table 4.26	LAeq,15minute generated by WCP against project specific criteria – July 2022	26
Table 4.27	LA1,1minute generated by WCP against project specific criteria – July 2022	26
Table 4.28	Real time and attended noise levels ¹ – July 2022	27
Table 4.29	Measured noise levels ¹ – August 2022	28
Table 4.30	LAeq,15minute generated by WCP against project specific criteria – August 2022	29
Table 4.31	LA1,1minute generated by WCP against project specific criteria – August 2022	29
Table 4.32	Real time and attended noise levels ¹ – August 2022	30
Table 4.33	Measured noise levels ¹ – September 2022	31
Table 4.34	LAeq,15minute generated by WCP against project specific criteria – September 2022	32
Table 4.35	LA1,1minute generated by WCP against project specific criteria – September 2022	32
Table 4.36	Real time and attended noise levels ¹ – September 2022	33
Table 4.37	Measured noise levels ¹ – October 2022	34
Table 4.38	LAeq,15minute generated by WCP against project specific criteria – October 2022	35
Table 4.39	LA1,1minute generated by WCP against project specific criteria – October 2022	35
Table 4.40	Real time and attended noise levels ¹ – October 2022	36
Table 4.41	Measured noise levels ¹ – November 2022	37
Table 4.42	LAeq,15minute generated by WCP against project specific criteria – November 2022	38
Table 4.43	LA1,1minute generated by WCP against project specific criteria – November 2022	38
Table 4.44	Real time and attended noise levels ¹ – November 2022	39
Table 4.45	Measured noise levels ¹ – December 2022	40
Table 4.46	LAeq,15minute generated by WCP against project specific criteria – December 2022	41
Table 4.47	LA1,1minute generated by WCP against project specific criteria – December 2022	41
Table 4.48	Real time and attended noise levels ¹ – December 2022	42
Table 6.1	WCP operational predictions, Year 2020 - dB	48
Table 6.2	Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N6, dB(A)	49
Table 6.3	Measured WCP $L_{Aeq,15minute}$ compared to year 2022 predicted $L_{Aeq,15minute}$ at N14, dB(A)	50
Table 6.4	Measured WCP $L_{Aeq,15minute}$ compared to year 2022 predicted $L_{Aeq,15minute}$ at N15, dB(A)	51
Table 6.5	Measured WCP $L_{Aeq,15minute}$ compared to year 2022 predicted $L_{Aeq,15minute}$ at N17, dB(A)	52
Table 6.6	Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N19, dB(A)	53

Table 6.7Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N20,
dB(A)54

Figures

Figure 1.1	Wilpinjong noise monitoring locations	1
Figure 5.1	Attended noise monitoring data, N6	44
Figure 5.2	Attended noise monitoring data, N14	44
Figure 5.3	Attended noise monitoring data, N15	45
Figure 5.4	Attended noise monitoring data, N17	45
Figure 5.5	Attended noise monitoring data, N19	46
Figure 5.6	Attended noise monitoring data, N20	46

1 Introduction

1.1 Background

EMM was engaged by WCP to provide an Annual Environmental Monitoring Report (AEMR) for 2022, 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 2022. 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 1.1. It should be noted that Figure 1.1 shows the actual monitoring positions, not the location of residences.

Table 1.1 Attended monitoring locations

NMP Descriptor	Monitoring Location
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 and abbreviations

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

Table 1.2Terminology and abbreviations

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
LAmax	The maximum A-weighted noise level over a time period.
L _{A1}	The noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L _{A10}	The noise level which is exceeded for 10 percent of the time.
LAeq	The average noise A-weighted energy during a measurement period.
L _{A50}	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L _{A90}	The level exceeded for 90 percent of the time. The L _{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
LAmin	The minimum A-weighted noise level over a time period.
LCeq	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 micro pascals.
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

2.2 Development consents

The most current development consent 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.

2.3 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.

2.4 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.

2.5 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 2.1WCP project specific criteria, dB

NMP Descriptor	Monitoring Locations	Day ^L Aeq,15minute	Evening ^L Aeq,15minute	Night ^L Aeq,15minute	Night ^L A1,1minute
N6 ¹	St Laurence O'Toole Catholic Church	36	37	37	45
N14	'Tichular'	35	35	35	45
N15	Wollar Village	36	37	37	45
N17 ²	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.

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.

2.6 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.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of lowfrequency noise which is consistent with methodology in Fact Sheet C of the NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and 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 done 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 Will Moore.

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 LAeq,15minute and LA1,1minute (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 (eg, 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 (eg, 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.

For this assessment the measured L_{Amax} has been used as a conservative estimate of L_{A1,1minute}. The EPA accepts sleep disturbance analysis based on either the L_{A1,1minute} or L_{Amax} metrics, with the L_{Amax} resulting in a more conservative assessment of site noise emissions.

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 noise.

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 "<30 dB").

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 Attended real time noise monitoring 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.

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

Table 3.1 attended and real time monitoring locations for comparison

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 2022 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.

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)	19ºC	55%	E 3 m/s	0°C/100 m
Evening	Calm	19ºC	56%	0 m/s	0°C/100 m
	Autumn Wind 30% (occurrence)	18ºC	63%	ESE 3 m/s	0°C/100 m
	Winter Wind 30% (occurrence)	10ºC	71%	WNW, NW 3 m/s	0°C/100 m
Night-time	Calm	14ºC	76%	0 m/s	0°C/100 m
	Summer Wind > 30% (occurrence)	19ºC	68%	ESE, SE, E 3 m/s	0°C/100 m
	Strong Inversion (10% exceedance) ¹	6°C	86%	0 m/s	5.2°C/100 m

Table 11 INP Assessable Meteorological Noise Modelling Parameters

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:

- 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;
- 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° 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 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
- 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° to 5.2° C/100m were included. This vertical temperature gradient range corresponds with Stability Category F according to Table D2 of the NPfI.

Meteorological parameter bounds used to identify corresponding meteorological conditions during attended monitoring are outlined in Table 3.2.

Table 3.2 Meteorological condition definitions

	Night					
Parameter	Clam	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 2022

4.1.1 Total measured noise levels

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

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	27/01/2022 22:48	45	40	37	36	36	35	31
N14	27/01/2022 23:15	56	54	52	49	48	42	33
N15	27/01/2022 22:30	47	39	38	37	37	35	33
N17	28/01/2022 01:12	53	36	35	34	34	33	31
N19	28/01/2022 00:47	51	47	42	40	40	37	34
N20	28/01/2022 00:00	52	49	43	41	39	36	33

Table 4.1Measured noise levels 1 – January 2022

Notes: 1. Levels in this table are not necessarily the result of activity 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.

4.1.3 Attended noise monitoring results

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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	27/01/2022 22:48	1.1	E	37	Yes	IA	Nil
N14	27/01/2022 23:15	1.6	E	35	Yes	IA	Nil
N15	27/01/2022 22:30	1.2	E	37	Yes	IA	Nil
N17	28/01/2022 01:12	1.2	E	38	Yes	IA	Nil
N19	28/01/2022 00:47	1.5	E	35	Yes	IA	Nil
N20	28/01/2022 00:00	1.8	E	35	Yes	IA	Nil

Table 4.2 LAeq,15minute generated by WCP against project specific criteria – January 2022

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 LAeg,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.3 LA1,1minute generated by WCP against project specific criteria – January 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	27/01/2022 22:48	1.1	E	45	Yes	IA	Nil
N14	27/01/2022 23:15	1.6	E	45	Yes	IA	Nil
N15	27/01/2022 22:30	1.2	E	45	Yes	IA	Nil
N17	28/01/2022 01:12	1.2	E	45	Yes	IA	Nil
N19	28/01/2022 00:47	1.5	E	45	Yes	IA	Nil
N20	28/01/2022 00:00	1.8	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.4Real time and attended noise levels 1 – January 2022

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time		Sentine	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	27/01/2022 23:15	27/01/2022 23:15	49	47	26	24	42	ΙΑ
N15/SX33	27/01/2022 22:30	27/01/2022 22:30	42	38	21	18	35	ΙΑ
N19/SX32	28/01/2022 00:47	28/01/2022 00:45	40	37	20	17	37	IA
N20/SX30	28/01/2022 00:00	28/01/2022 00:00	47	45	34	21	36	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.2 February 2022

4.2.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.5.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	10/02/2022 23:19	49	44	42	41	41	38	35
N14	11/02/2022 00:30	52	50	48	45	45	39	32
N15	10/02/2022 23:00	48	43	37	36	36	35	33
N17	10/02/2022 22:26	49	36	34	32	32	30	27
N19	10/02/2022 22:00	52	41	38	36	35	34	31
N20	10/02/2022 23:45	52	51	50	47	47	42	36

Table 4.5Measured noise levels 1 – February 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.2.2 Modifying factors

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

4.2.3 Attended noise monitoring results

Table 4.6 to Table 4.7 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	10/02/2022 23:19	2.1	E	37	Yes	IA	Nil
N14	11/02/2022 00:30	1.7	D	35	Yes	IA	Nil
N15	10/02/2022 23:00	2.3	E	37	Yes	IA	Nil
N17	10/02/2022 22:26	2.3	E	38	Yes	IA	Nil
N19	10/02/2022 22:00	3.9	E	35	No	IA	NA
N20	10/02/2022 23:45	2.2	E	35	Yes	IA	Nil

Table 4.6 LAeq,15minute generated by WCP against project specific criteria – February 2022

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 LAeg,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.7 LA1,1minute generated by WCP against project specific criteria – February 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	10/02/2022 23:19	2.1	E	45	Yes	IA	Nil
N14	11/02/2022 00:30	1.7	D	45	Yes	IA	Nil
N15	10/02/2022 23:00	2.3	E	45	Yes	IA	Nil
N17	10/02/2022 22:26	2.3	E	45	Yes	IA	Nil
N19	10/02/2022 22:00	3.9	E	45	No	IA	NA
N20	10/02/2022 23:45	2.2	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.8Real time and attended noise levels 1 – February 2022

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time		Sentine	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	11/02/2022 00:30	11/02/2022 00:30	50	46	25	21	39	ΙΑ
N15/SX33	10/02/2022 23:00	10/02/2022 23:00	53	52	29	17	35	ΙΑ
N19/SX32	10/02/2022 22:00	10/02/2022 22:00	40	37	14	12	34	IA
N20/SX30	10/02/2022 23:45	10/02/2022 23:45	53	47	22	20	42	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.3 March 2022

4.3.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.9.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	02/03/2022 23:19	45	42	42	41	41	31	38
N14	03/03/2022 00:30	45	37	37	36	36	33	33
N15	02/03/2022 23:00	45	38	36	35	34	26	31
N17	02/03/2022 22:30	46	41	31	30	28	33	23
N19	02/03/2022 22:06	52	36	35	34	34	35	31
N20	02/03/2022 23:46	41	35	33	32	32	40	30

Table 4.9Measured noise levels 1 – March 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.3.2 Modifying factors

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

4.3.3 Attended noise monitoring results

Table 4.10 to Table 4.11 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	02/03/2022 23:19	2.4	D	37	Yes	IA	Nil
N14	03/03/2022 00:30	1.3	D	35	Yes	IA	Nil
N15	02/03/2022 23:00	1.0	D	37	Yes	IA	Nil
N17	02/03/2022 22:30	1.7	E	38	Yes	IA	Nil
N19	02/03/2022 22:06	1.7	D	35	Yes	IA	Nil
N20	02/03/2022 23:46	1.8	D	35	Yes	IA	Nil

Table 4.10 LAeq,15minute generated by WCP against project specific criteria – March 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.11 LA1.1minute generated by WCP against project specific criteria – March 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	02/03/2022 23:19	2.4	D	45	Yes	IA	Nil
N14	03/03/2022 00:30	1.3	D	45	Yes	IA	Nil
N15	02/03/2022 23:00	1.0	D	45	Yes	IA	Nil
N17	02/03/2022 22:30	1.7	E	45	Yes	IA	Nil
N19	02/03/2022 22:06	1.7	D	45	Yes	IA	Nil
N20	02/03/2022 23:46	1.8	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.12Real time and attended noise levels 1 – March 2022

Location/Sentinex	Attended Start	Sentinex Start Date		Sentin		Attended Measurement		
	Date and Time	and Time	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	03/03/2022 00:30	03/03/2022 00:30	53	51	20	18	33	ΙΑ
N15/SX33	02/03/2022 23:00	02/03/2022 23:00	50	41	26	18	26	ΙΑ
N19/SX32	02/03/2022 22:06	02/03/2022 22:00	36	34	23	14	35	IA
N20/SX30	02/03/2022 23:46	02/03/2022 23:45	53	51	17	16	40	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.4 April 2022

4.4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.13.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	29/04/2022 01:15	45	42	35	34	33	32	30
N14	28/04/2022 23:46	53	45	42	41	41	40	39
N15	28/04/2022 23:00	56	51	43	41	36	34	31
N17	28/04/2022 22:25	52	36	32	30	29	28	27
N19	28/04/2022 22:00	44	41	38	34	31	28	27
N20	29/04/2022 00:30	49	43	35	33	30	28	26

Table 4.13Measured noise levels 1 – April 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.4.2 Modifying factors

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

4.4.3 Attended noise monitoring results

Table 4.14 to Table 4.15 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	29/04/2022 01:15	0.8	E	37	Yes	<20	Nil
N14	28/04/2022 23:46	0.0	D	35	Yes	<25	Nil
N15	28/04/2022 23:00	0.0	E	37	Yes	23	Nil
N17	28/04/2022 22:25	0.0	E	38	Yes	<20	Nil
N19	28/04/2022 22:00	0.0	E	35	Yes	IA	Nil
N20	29/04/2022 00:30	1.2	E	35	Yes	<25	Nil

Table 4.14 LAeq,15minute generated by WCP against project specific criteria – April 2022

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 LAeg,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.15 LA1,1minute generated by WCP against project specific criteria – April 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	29/04/2022 01:15	0.8	E	45	Yes	23	Nil
N14	28/04/2022 23:46	0.0	D	45	Yes	<25	Nil
N15	28/04/2022 23:00	0.0	E	45	Yes	32	Nil
N17	28/04/2022 22:25	0.0	E	45	Yes	23	Nil
N19	28/04/2022 22:00	0.0	E	45	Yes	IA	Nil
N20	29/04/2022 00:30	1.2	E	45	Yes	<25	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.16Real time and attended noise levels 1 – April 2022

Location/Sentinex	Attended Start	Sentinex Start Date		Sentine		Attended Measurement		
	Date and Time	and time	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	28/04/2022 23:46	28/04/2022 23:45	49	47	31	28	40	<25
N15/SX33	28/04/2022 23:00	28/04/2022 23:00	49	38	43	27	34	23
N19/SX32	28/04/2022 22:00	28/04/2022 22:00	26	23	18	NR	28	IA
N20/SX30	29/04/2022 00:30	29/04/2022 00:30	45	31	33	23	28	<25

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.5 May 2022

4.5.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.17.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	17/05/2022 00:30	48	47	45	39	29	27	25
N14	16/05/2022 23:30	52	34	32	30	28	26	23
N15	16/05/2022 23:00	44	40	37	34	33	30	26
N17	16/05/2022 22:25	45	37	34	33	32	30	28
N19	16/05/2022 22:00	47	42	32	30	25	22	20
N20	17/05/2022 00:00	38	31	29	27	27	25	23

Table 4.17Measured noise levels 1 – May 2022

Notes: 1. Levels in this table are not necessarily the result of activity 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.

4.5.3 Attended noise monitoring results

Table 4.18 to Table 4.19 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	17/05/2022 00:30	0.0	F	37	Yes	<25	Nil
N14	16/05/2022 23:30	0.0	F	35	Yes	IA	Nil
N15	16/05/2022 23:00	0.0	F	37	Yes	34	Nil
N17	16/05/2022 22:25	0.0	F	38	Yes	32	Nil
N19	16/05/2022 22:00	1.1	F	35	Yes	<20	Nil
N20	17/05/2022 00:00	0.0	D	35	Yes	22	Nil

Table 4.18 LAeq,15minute generated by WCP against project specific criteria – May 2022

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 LAeg,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.19 LA1,1minute generated by WCP against project specific criteria – May 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	17/05/2022 00:30	0.0	F	45	Yes	<25	Nil
N14	16/05/2022 23:30	0.0	F	45	Yes	IA	Nil
N15	16/05/2022 23:00	0.0	F	45	Yes	38	Nil
N17	16/05/2022 22:25	0.0	F	45	Yes	37	Nil
N19	16/05/2022 22:00	1.1	F	45	Yes	<20	Nil
N20	17/05/2022 00:00	0.0	D	45	Yes	28	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.20Real time and attended noise levels 1 – May 2022

Location/Sentinex	Attended Start	Sentinex Start Date		Sentine		Attended Measurement		
	Date and Time	and Time	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	16/05/2022 23:30	16/05/2022 23:30	31	29	23	22	26	ΙΑ
N15/SX33	16/05/2022 23:00	16/05/2022 23:00	NR	NR	NR	NR	30	34
N19/SX32	16/05/2022 22:00	16/05/2022 22:00	26	24	18	16	22	<20
N20/SX30	17/05/2022 00:00	17/05/2022 00:00	31	30	26	24	25	22

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.6 June 2022

4.6.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.21.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	16/06/2022 1:15	41	37	32	30	29	27	24
N14	16/06/2022 00:00	40	32	29	27	26	24	21
N15	15/06/2022 23:00	59	55	43	43	37	34	29
N15 remeasure	15/06/2022 23:30	45	39	36	35	34	32	30
N17	15/06/2022 22:25	45	35	32	28	26	23	20
N19	15/06/2022 22:00	39	23	22	21	21	20	18
N20	16/06/20220 0:45	40	27	24	23	23	21	20

Table 4.21Measured noise levels 1 – June 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.6.2 Modifying factors

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

4.6.3 Attended noise monitoring results

Table 4.22 to Table 4.23 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	16/06/2022 1:15	0.0	G	37	No	30	Nil
N14	16/06/2022 00:00	0.0	F	35	Yes	IA	Nil
N15	15/06/2022 23:00	0.0	F	37	Yes	38	1
N15							
remeasure	15/06/2022 23:30	0.0	F	37	Yes	34	Nil
N17	15/06/2022 22:25	0.0	F	38	Yes	23	Nil
N19	15/06/2022 22:00	0.0	F	35	Yes	IA	Nil
N20	16/06/2022 00:45	0.0	F	35	Yes	IA	Nil

Table 4.22 LAeq,15minute generated by WCP against project specific criteria – June 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.23 LA1,1minute generated by WCP against project specific criteria – June 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	16/06/2022 1:15	0.0	G	45	No	37	Nil
N14	16/06/2022 00:00	0.0	F	45	Yes	IA	Nil
N15	15/06/2022 23:00	0.0	F	45	Yes	42	Nil
N15 remeasure	15/06/2022 23:30	0.0	F	45	Yes	35	Nil
N17	15/06/2022 22:25	0.0	F	45	Yes	28	Nil
N19	15/06/2022 22:00	0.0	F	45	Yes	IA	Nil
N20	16/06/2022 00:45	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_{A1,1}minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.24Real time and attended noise levels 1 – June 2022

Location/Sentinex	Attended Start	Sentinex Start Date		Sentin		Attended Measurement		
	Date and Time	and Time	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	16/06/2022 00:00	16/06/2022 00:00	25	23	25	23	24	ΙΑ
N15/SX33	15/06/2022 23:00	15/06/2022 23:00	49	35	47	34	34	38
N15 ³ /SX33	15/06/2022 23:30	15/06/2022 23:30	38	34	36	33	32	34
N19/SX32	15/06/2022 22:00	15/06/2022 22:00	24	23	20	19	20	IA
N20/SX30	16/06/2022 00:45	16/06/2022 00:45	27	26	22	21	21	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

2. NR – no Sentinex data recorded for this period.

3. Remeasure.

4.7 July 2022

4.7.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.25.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	28/07/2022 23:19	58	44	37	35	32	28	27
N14	29/07/2022 00:34	61	54	36	40	29	26	24
N15	28/07/2022 23:00	42	36	33	30	30	28	26
N17	28/07/2022 22:25	42	34	31	29	29	27	25
N19	28/07/2022 22:00	59	45	38	35	31	27	25
N20	29/07/2022 00:00	45	35	32	29	29	27	25

Table 4.25Measured noise levels 1 – July 2022

Notes: 1. Levels in this table are not necessarily the result of activity 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.

4.7.3 Attended noise monitoring results

Table 4.26 to Table 4.27 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	28/07/2022 23:19	0.0	G	37	No	IA	NA
N14	29/07/2022 00:34	0.0	G	35	No	IA	NA
N15	28/07/2022 23:00	0.0	G	37	No	29	NA
N17	28/07/2022 22:25	0.2	G	38	No	27	NA
N19	28/07/2022 22:00	1.2	G	35	No	IA	NA
N20	29/07/2022 00:00	0.0	G	35	No	IA	NA

Table 4.26 LAeq,15minute generated by WCP against project specific criteria – July 2022

Notes:
 Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
 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 LAeg,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.27 LA1.1minute generated by WCP against project specific criteria – July 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	28/07/2022 23:19	0.0	G	45	No	IA	NA
N14	29/07/2022 00:34	0.0	G	45	No	IA	NA
N15	28/07/2022 23:00	0.0	G	45	No	40	NA
N17	28/07/2022 22:25	0.2	G	45	No	30	NA
N19	28/07/2022 22:00	1.2	G	45	No	IA	NA
N20	29/07/2022 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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.28Real time and attended noise levels 1 – July 2022

Location/Sentinex	Attended Start	Sentinex Start Date		Sentin		Attended Measurement		
	Date and Time	and Time	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	29/07/2022 00:34	29/07/2022 00:30	46	23	30	18	26	ΙΑ
N15/SX34	28/07/2022 23:00	28/07/2022 23:00	NR	NR	NR	NR	28	29
N19/SX32	28/07/2022 22:00	28/07/2022 22:00	34	27	33	24	27	IA
N20/SX30	29/07/2022 00:00	29/07/2022 00:00	30	29	24	24	27	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.8 August 2022

4.8.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.29.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	26/08/2022 00:45	44	35	30	27	25	24	23
N14	25/08/2022 23:30	56	49	44	39	27	24	23
N15	25/08/2022 23:00	53	47	41	37	29	24	22
N17	25/08/2022 22:23	40	38	35	31	28	25	23
N19	25/08/2022 22:00	55	49	37	37	31	27	22
N20	26/08/2022 00:15	42	37	32	29	27	24	22

Table 4.29Measured noise levels 1 – August 2022

Notes: 1. Levels in this table are not necessarily the result of activity 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.

4.8.3 Attended noise monitoring results

Table 4.30 to Table 4.31 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	26/08/2022 00:45	0.0	F	37	Yes	IA	Nil
N14	25/08/2022 23:30	0.0	G	35	No	IA	NA
N15	25/08/2022 23:00	0.8	F	37	Yes	IA	Nil
N17	25/08/2022 22:23	1.0	F	38	Yes	IA	Nil
N19	25/08/2022 22:00	0.0	F	35	Yes	IA	Nil
N20	26/08/2022 00:15	0.0	F	35	Yes	IA	Nil

Table 4.30 LAeq,15minute generated by WCP against project specific criteria – August 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.31 LA1,1minute generated by WCP against project specific criteria – August 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	26/08/2022 00:45	0.0	F	45	Yes	IA	Nil
N14	25/08/2022 23:30	0.0	G	45	No	IA	NA
N15	25/08/2022 23:00	0.8	F	45	Yes	IA	Nil
N17	25/08/2022 22:23	1.0	F	45	Yes	IA	Nil
N19	25/08/2022 22:00	0.0	F	45	Yes	IA	Nil
N20	26/08/2022 00:15	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.32Real time and attended noise levels 1 – August 2022

Location/Sentinex	Attended Start	Sentinex Start Date		Sentin		Attended Measurement		
	Date and Time	and Time	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	25/08/2022 23:30	25/08/2022 23:30	39	25	33	21	24	ΙΑ
N15/SX33	25/08/2022 23:00	25/08/2022 23:00	41	29	39	23	24	IA
N19/SX32	25/08/2022 22:00	25/08/2022 22:00	27	24	23	18	27	IA
N20/SX30	26/08/2022 00:15	26/08/2022 00:15	31	30	26	23	24	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.9 September 2022

4.9.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.33.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	20/09/2022 00:42	50	48	43	37	28	27	26
N14	20/09/2022 00:15	59	53	43	41	30	28	25
N15	19/09/2022 23:00	47	34	30	29	28	26	25
N17	19/09/2022 22:28	52	44	42	41	41	40	38
N19	19/09/2022 22:00	51	36	34	33	33	31	29
N20	19/09/2022 23:31	50	48	44	41	39	36	32

Table 4.33Measured noise levels 1 – September 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.9.2 Modifying factors

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

4.9.3 Attended noise monitoring results

Table 4.34 to Table 4.35 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	20/09/2022 00:42	0.8	G	37	No	IA	NA
N14	20/09/2022 00:15	0.0	G	35	No	<25	NA
N15	19/09/2022 23:00	0.0	G	37	No	<25	NA
N17	19/09/2022 22:28	1.3	F	38	Yes	27	Nil
N19	19/09/2022 22:00	0.0	F	35	Yes	<25	Nil
N20	19/09/2022 23:31	0.0	G	35	No	IA	NA

Table 4.34 LAeq, 15minute generated by WCP against project specific criteria – September 2022

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 LAeg,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

Table 4.35 LA1,1minute generated by WCP against project specific criteria – September 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	20/09/2022 00:42	0.8	G	45	No	IA	NA
N14	20/09/2022 00:15	0.0	G	45	No	<25	NA
N15	19/09/2022 23:00	0.0	G	45	No	<25	NA
N17	19/09/2022 22:28	1.3	F	45	Yes	34	Nil
N19	19/09/2022 22:00	0.0	F	45	Yes	26	Nil
N20	19/09/2022 23:31	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.36Real time and attended noise levels 1 – September 2022

Location/Sentinex	Attended Start	Sentinex Start Date		Sentin	Attended Measurement			
	Date and Time	and nine	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	20/09/2022 00:15	20/09/2022 00:15	36	32	26	22	28	<25
N15/SX33	19/09/2022 23:00	19/09/2022 23:00	37	31	31	19	26	<25
N19/SX32	19/09/2022 22:00	19/09/2022 22:00	35	31	23	21	31	<25
N20/SX30	19/09/2022 23:31	19/09/2022 23:30	47	36	44	30	36	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

4.10 October 2022

4.10.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.37.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	11/10/2022 22:21	62	44	41	39	37	35	33
N14	11/10/2022 23:00	51	47	46	45	45	45	44
N15	11/10/2022 22:00	81	53	46	47	42	39	35
N17 ²	-	-	-	-	-	-	-	-
N19 ²	-	-	-	-	-	-	-	-
N20	11/10/2022 23:45	46	40	39	37	37	35	33

Table 4.37Measured noise levels 1 – October 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

2. Access to Mogo Road closed, measurements could not be taken.

4.10.2 Modifying factors

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

4.10.3 Attended noise monitoring results

Table 4.38 to Table 4.39 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	11/10/2022 22:21	2.1	E	37	Yes	IA	Nil
N14	11/10/2022 23:00	2.7	E	35	Yes	<25	Nil
N15	11/10/2022 22:00	2.0	E	37	Yes	IA	Nil
N17 ⁵	-	-	-	38	-	-	-
N19 ⁵	-	-	-	35	-	-	-
N20	11/10/2022 23:45	2.4	E	35	Yes	IA	Nil

Table 4.38 LAeq,15minute generated by WCP against project specific criteria – October 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

5. Access to Mogo Road closed, measurements could not be taken.

Table 4.39 LA1.1minute generated by WCP against project specific criteria – October 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	11/10/2022 22:21	2.1	E	45	Yes	IA	Nil
N14	11/10/2022 23:00	2.7	E	45	Yes	<25	Nil
N15	11/10/2022 22:00	2.0	E	45	Yes	IA	Nil
N17 ⁵	-	-	-	45	-	-	-
N19⁵	-	-	-	45	-	-	-
N20	11/10/2022 23:45	2.4	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

5. Access to Mogo Road closed, measurements could not be taken.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.40Real time and attended noise levels 1 – October 2022

Location/Sentinex	Attended Start	rt Sentinex Start Date e and Time		Sentin	Attended Measurement			
	Date and Time		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	11/10/2022 23:00	11/10/2022 23:00	44	42	22	22	45	<25
N15/SX34	11/10/2022 22:00	11/10/2022 22:00	55	45	46	28	39	ΙΑ
N19 ³ /SX32	-	-	-	-	-	-	-	-
N20/SX30	11/10/2022 23:45	11/10/2022 23:45	37	36	30	29	35	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

2. NR – no Sentinex data recorded for this period.

3. Access to Mogo Road closed, measurements could not be taken.

4.11 November 2022

4.11.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.41.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	15/11/2022 23:37	43	36	33	32	31	30	28
N14	15/11/2022 22:45	50	40	37	35	35	33	30
N15	15/11/2022 23:15	44	40	37	35	34	31	28
N17 ²	-	-	-	-	-	-	-	-
N19 ²	-	-	-	-	-	-	-	-
N20	15/11/2022 22:00	46	43	42	41	40	39	36

Table 4.41Measured noise levels 1 – November 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

2. Access to Mogo Road closed, measurements could not be taken.

4.11.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfl and methodology described in Section 3.3.
4.11.3 Attended noise monitoring results

Table 4.42 to Table 4.43 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	15/11/2022 23:37	2.4	С	37	Yes	<25	Nil
N14	15/11/2022 22:45	3.0	D	35	Yes	<25	Nil
N15	15/11/2022 23:15	3.3	E	37	No	<25	NA
N17 ⁵	-	-	-	38	-	-	-
N19⁵	-	-	-	35	-	-	-
N20	15/11/2022 22:00	2.6	D	35	Yes	IA	Nil

Table 4.42 LAeq,15minute generated by WCP against project specific criteria – November 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

5. Access to Mogo Road closed, measurements could not be taken.

Table 4.43 LA1.1minute generated by WCP against project specific criteria – November 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	15/11/2022 23:37	2.4	С	45	Yes	27	Nil
N14	15/11/2022 22:45	3.0	D	45	Yes	30	Nil
N15	15/11/2022 23:15	3.3	E	45	No	<25	NA
N17 ⁵	-	-	-	45	-	-	-
N19⁵	-	-	-	45	-	-	-
N20	15/11/2022 22:00	2.6	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.44Real time and attended noise levels 1 – November 2022

Location/Sentinex	Attended Start	Sentinex Start Date and Time		Sentin	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	15/11/2022 22:45	15/11/2022 22:45	40	37	24	24	33	<25
N15/SX33	15/11/2022 23:15	15/11/2022 23:15	52	37	23	22	31	<25
N19 ³ /SX32	-	-	-	-	-	-	-	-
N20/SX30	15/11/2022 22:00	15/11/2022 22:00	39	36	35	29	39	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

2. NR – no Sentinex data recorded for this period.

4.12 December 2022

4.12.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.45.

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
N6	06/12/2022 23:35	56	50	44	39	28	24	22
N14	06/12/2022 22:45	48	46	42	37	33	29	25
N15	06/12/2022 23:15	50	43	38	34	31	27	24
N17 ²	-	-	-	-	-	-	-	-
N19 ²	-	-	-	-	-	-	-	-
N20	06/12/2022 22:00	46	43	37	35	33	31	27

Table 4.45Measured noise levels 1 – December 2022

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

2. Access to Mogo Road closed, measurements could not be taken.

4.12.2 Modifying factors

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

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

4.12.3 Attended noise monitoring results

Table 4.46 to Table 4.47 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

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{Aeq} dB ^{3,4}	Exceedance dB ⁴
N6	06/12/2022 23:35	0.4	F	37	Yes	<20	Nil
N14	06/12/2022 22:45	1.1	F	35	Yes	IA	Nil
N15	06/12/2022 23:15	0.0	G	37	No	<20	NA
N17 ⁵	-	-	-	38	-	-	-
N19 ⁵	-	-	-	35	-	-	-
N20	06/12/2022 22:00	0.7	F	35	Yes	IA	Nil

Table 4.46 LAeq,15minute generated by WCP against project specific criteria – December 2022

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 LAeq,15minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

5. Access to Mogo Road closed, measurements could not be taken.

Table 4.47 LA1,1minute generated by WCP against project specific criteria – December 2022

Location	Start Date and Time	Wind Speed m/s ¹	Stability Class ¹	Criterion dB	Criterion Applies? ²	WCP L _{A1,1min} dB ^{3,4}	Exceedance dB ⁴
N6	06/12/2022 23:35	0.4	F	45	Yes	<20	Nil
N14	06/12/2022 22:45	1.1	F	45	Yes	IA	Nil
N15	06/12/2022 23:15	0.0	G	45	No	<20	NA
N17 ⁵	-	-	-	45	-	-	-
N19⁵	-	-	-	45	-	-	-
N20	06/12/2022 22:00	0.7	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 LA1,1minute attributed to WCP, including modifying factors if applicable.

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) LAeq and LA90 are typically good indicators of mining noise levels.

Table 4.48Real time and attended noise levels 1 – December 2022

Location/Sentinex	Attended Start	Sentinex Start Date and Time		Sentine	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	06/12/2022 22:45	06/12/2022 22:45	30	24	19	18	29	IA
N15/SX33	06/12/2022 23:15	06/12/2022 23:15	53	43	27	23	27	<20
N19 ³ /SX32	-	-	-	-	-	-	-	-
N20/SX30	06/12/2022 22:00	06/12/2022 22:00	47	32	46	28	31	IA

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.

2. NR – no Sentinex data recorded for this period.

5 Long term trends

Site only L_{Aeq} noise levels measured during monthly attended environmental noise monitoring over a 5-year period from January 2018 to December 2022 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 LAeq noise levels for each monitoring event have been grouped into one of three categories:

WCP only L_{Aeq} was either inaudible (IA), not measurable (NM), or less than 30 dB, which together are represented by green bars;

WCP only LAeq was between 30 dB and the relevant impact assessment criterion (inclusive), represented by blue bars; or

WCP only LAeq 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 5.1 to Figure 5.6 provide percentage occurrence information for WCP noise levels at six monitoring locations.



LAeq Data Percentages (WCP noise only)





LAeq Data Percentages (WCP noise only)

Figure 5.2 Attended noise monitoring data, N14



LAeq Data Percentages (WCP noise only)





LAeq Data Percentages (WCP noise only)

Figure 5.4 Attended noise monitoring data, N17







LAeq Data Percentages (WCP noise only)

Figure 5.6 Attended noise monitoring data, N20

5.2 Discussion

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. At N14, N19, and N20, site only L_{Aeq} noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements. At N6, N15, and N17, site only L_{Aeq} noise levels were occasionally above 30 dB and long-term noise trend lines indicate site only L_{Aeq} noise levels have increased slightly during attended noise monitoring.

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 2022 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.

NMP Descriptor	Monitoring Locations	Nearest property ID	Night _{LAeq,} 15minute Calm	Night _{LAeq,15} minute Wind or Inversion	Night _{LA1,1minute} Wind or Inversion
N6	St Laurence O'Toole Catholic Church	(903) ¹	19	33	40
N14	Tichular	(153)1	13	31	38
N15	Wollar Village	(933) ¹	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

Table 6.1WCP operational predictions, Year 2020 - dB

Notes: 1. Monitoring location is not at residence in brackets. Noise predictions for the nearest residence have been used 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 2022. 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 Laurance O'Toole Catholic Curch

Table 6.2 Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N6, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference ^{2,3}	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference ^{2,3}
January	Summer Wind	ΙΑ	33	NC	ΙΑ	40	NC
February	Summer Wind	IA	33	NC	ΙΑ	40	NC
March	NA	IA	-	NA	ΙΑ	-	NA
April	NA	<20	-	NA	23	-	NA
Мау	Strong Inversion	<25	33	NC	<25	40	NC
June	Strong Inversion	30	33	-3	37	40	-3
July	Strong Inversion	IA	33	NC	ΙΑ	40	NC
August	Strong Inversion	ΙΑ	33	NC	ΙΑ	40	NC
September	NA	IA	-	NA	ΙΑ	-	NA
October	Summer Wind	ΙΑ	33	NC	ΙΑ	40	NC
November	NA	<25	-	NA	27	-	NA
December	Strong Inversion	<20	33	NC	<20	40	NC

Notes: 1. Refer to Table 3.2 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

6.1.2 N14, Tichular

Table 6.3Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N14, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference ^{2,3}	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference ^{2,3}
January	Summer Wind	IA	31	NC	IA	38	NC
February	Summer Wind	IA	31	NC	IA	38	NC
March	NA	ΙΑ	-	NA	ΙΑ	-	NA
April	Calm	<25	13	NC	<25	-	NC
Мау	Strong Inversion	ΙΑ	31	NC	ΙΑ	38	NC
June	Strong Inversion	ΙΑ	31	NC	ΙΑ	38	NC
July	Strong Inversion	ΙΑ	31	NC	ΙΑ	38	NC
August	Strong Inversion	ΙΑ	31	NC	ΙΑ	38	NC
September	Strong Inversion	<25	31	NC	<25	38	NC
October	Summer Wind	<25	31	NC	<25	38	NC
November	NA	<25	-	NC	30	-	NA
December	NA	IA	-	NA	IA	-	NA

Notes: 1. Refer to Table 3.2 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

6.1.3 N15, Wollar Village

Table 6.4Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N15, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference ^{2,3}	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference ^{2,3}
January	Summer Wind	IA	35	NC	IA	42	NC
February	Summer Wind	IA	35	NC	IA	42	NC
March	NA	IA	-	NA	ΙΑ	-	NA
April	Calm	23	18	+5	32	-	NA
Мау	Strong Inversion	34	35	-1	38	42	-4
June	Strong Inversion	38	35	+3	42	42	0
June remeasure	Strong Inversion	34	35	-1	35	42	-7
July	Strong Inversion	29	35	-6	40	42	-2
August	NA	ΙΑ	-	NC	ΙΑ	-	NA
September	Strong Inversion	<25	35	NC	<25	42	NC
October	Summer Wind	IA	35	NC	IA	42	NC
November	NA	<25	-	NC	<25	-	NC
December	Strong Inversion	<20	35	NC	<20	42	NC

Notes: 1. Refer to Table 3.2 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

6.1.4 N17, Mogo Road

Table 6.5Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N17, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference ^{2,3}	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference ^{2,3}
January	Summer Wind	ΙΑ	35	NC	ΙΑ	42	NC
February	Summer Wind	ΙΑ	35	NC	ΙΑ	42	NC
March	NA	IA	-	NA	IA	-	NA
April	Calm	<20	21	NC	23	-	NA
May	Strong Inversion	32	35	-3	37	42	-5
June	Strong Inversion	23	35	-12	28	42	-14
July	Strong Inversion	27	35	-8	30	42	-12
August	NA	ΙΑ	-	NA	ΙΑ	-	NA
September	NA	27	-	NA	34	-	NA
October ⁴	-	-	-	-	-	-	-
November ⁴	-	-	-	-	-	-	-
December ⁴	-	-	-	-	-	-	-

Notes: 1. Refer to Table 3.2 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 indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (eg. 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 LAeq,15minute	compared to year 2022	2 predicted LAeq,15minute	at N19, dB(A)
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Month	Applicable Meteorological Condition ^{1,2}	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference ^{2,3}	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference ^{2,3}
January	Summer Wind	IA	31	NC	IA	37	NC
February	NA	IA	-	NA	IA	-	NA
March	NA	IA	-	NA	IA	-	NA
April	Calm	IA	19	NC	IA	-	NA
May	Strong Inversion	<20	31	NC	<20	37	NC
June	Strong Inversion	ΙΑ	31	NC	ΙΑ	37	NC
July	NA	IA	-	NA	IA	-	NA
August	Strong Inversion	IA	31	NC	IA	37	NC
September	Strong Inversion	<25	31	NC	26	37	-11
October ⁴	-	-	-	-	-	-	-
November ⁴	-	-	-	-	-	-	-
December ⁴	-	-	-	-	-	-	-

Notes: 1. Refer to Table 3.2 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 indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (eg. Less than 30 dB), therefore measured and predicted noise levels were not comparable.

6.1.6 N20, Ringwood Road

Table 6.7	Measured WCP LAeg.15minute	compared to year 2	2022 predicted LAea	.15minute at N20, dB(A)
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Month	Applicable Meteorological Condition ^{1,2}	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference ^{2,3}	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference ^{2,3}
January	Summer Wind	IA	27	NC	IA	34	NC
February	Summer Wind	IA	27	NC	IA	34	NC
March	NA	IA	-	NA	ΙΑ	-	NA
April	Summer Wind	<25	27	NC	<25	34	NC
Мау	Calm	22	9	+13	28	-	NA
June	NA	ΙΑ	-	NA	ΙΑ	-	NA
July	Strong Inversion	ΙΑ	27	NC	ΙΑ	34	NC
August	Strong Inversion	ΙΑ	27	NC	ΙΑ	34	NC
September	Strong Inversion	ΙΑ	27	NC	ΙΑ	34	NC
October	Summer Wind	ΙΑ	27	NC	ΙΑ	34	NC
November	NA	ΙΑ	-	NA	ΙΑ	-	NA
December	NA	IA	-	NA	IA	-	NA

Notes: 1. Refer to Table 3.2 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

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 three exceptions.

During the April 2022 measurement at N15, the measured site only L_{Aeq} was 5 dB higher than predicted under calm conditions. The measured site only L_{Aeq} was 12 dB lower than the relevant criterion during this measurement.

During the May 2022 measurement at N20, the measured site only L_{Aeq} was 13 dB higher than predicted under calm conditions. The measured site only L_{Aeq} was 13 dB lower than the relevant criterion during this measurement.

During the June 2022 measurement at N15, the measured site only L_{Aeq} was 3 dB higher than predicted under strong inversion conditions. The measured site only L_{Aeq} was 1 dB higher than the relevant criterion during this measurement.

7 Summary

EMM was engaged by WCP to provide an Annual Environmental Monitoring Report for 2022, 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 2022. 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 2022 compliance

During 2022 attended noise monitoring, noise levels from WCP complied with relevant noise limits at all monitoring locations, with a single exception. There was one exceedance of WCP impact assessment L_{Aeq} noise criteria at N15 in June 2022. A follow up measurement was conducted directly afterwards and WCP levels were compliant with relevant criteria.

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. At N14, N19, and N20, site only L_{Aeq} noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements. At N6, N15, and N17, site only L_{Aeq} noise levels were occasionally above 30 dB and long-term noise trend lines indicate site only L_{Aeq} noise levels have increased slightly during attended noise monitoring.

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 three exceptions.

During the April 2022 measurement at N15, the measured site only L_{Aeq} was 5 dB higher than predicted under calm conditions. The measured site only L_{Aeq} was 12 dB lower than the relevant criterion during this measurement.

During the May 2022 measurement at N20, the measured site only L_{Aeq} was 13 dB higher than predicted under calm conditions. The measured site only L_{Aeq} was 13 dB lower than the relevant criterion during this measurement.

During the June 2022 measurement at N15, the measured site only L_{Aeq} was 3 dB higher than predicted under strong inversion conditions. The measured site only L_{Aeq} was 1 dB higher than the relevant criterion during this measurement.

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